Chapter NR 440

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Subchapter I — Standards of Performance

Note: Corrections made under s. 13.93 (2m) (b) 7., Stats., Register, April, 1997, No. 496.

NR 440.01 Applicability; purpose. (1) APPLICABILITY. On and after February 1, 1984 the provisions of this chapter apply to the owner or operator of any stationary source which contains an affected facility.

(2) PURPOSE. This chapter is adopted to enable the department to implement and enforce standards of performance for new stationary sources promulgated by the United States environmental protection agency under section 111 of the federal clean air act, (42 USC 7411) as required by s. 285.27 (1), Stats.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.02 Definitions. The definitions contained in s. NR 400.02 apply to the terms used in this chapter. In addition, the following definitions apply to the terms used in this chapter:

(3) "Affected facility" means, with reference to a stationary source, any apparatus to which a standard set out in this chapter is applicable.

(5) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the administrator's satisfaction to produce, in specific cases, results adequate for his or her determination of compliance.

(6) "Capital expenditure" means an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair allowance percentage" specified in the latest edition of internal revenue service (IRS) publication 534 and the existing facility's basis, as defined by 26 USC 1012. However, the total expenditure for a physical or operational change to an existing facility may not be reduced by any"excluded additions" as defined in IRS publication 534, as would be done for tax purposes.

(6m) "Clean coal technology demonstration project" means a project using funds appropriated under the heading 'Department of Energy Clean Coal Technology', up to a total amount of $2,500,000,000 for commercial demonstrations of clean coal technology, or similar projects funded through appropriations for the U.S. environmental protection agency.

(7) "Commenced" means, with respect to the definition of "new source" in sub. (18), that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(8) "Construction" means fabrication, erection or installation of an affected facility.

(9) "Continuous monitoring system" means the total equipment, required under the emission monitoring subsections in applicable sections of this chapter, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

(10) "Electric utility steam generating unit" means any steam electric generating unit that is constructed for the purpose of supplying more than one third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

(11) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

(12) "Excess emissions and monitoring system performance report" means a report that must be submitted periodically by a source in order to provide data on its compliance with stated emission limits and operating parameters, and on the performance of its monitoring systems.

(13) "Existing facility" means, with reference to a stationary source, any apparatus of the type for which a standard is promulgated in this chapter, and the construction or modification of which was commenced before the applicability date of that standard; or any apparatus which could be altered in such a way as to be of that type.

(13m) "Existing unit", for purposes of s. NR 440.14 (10), has the meaning given in s. NR 409.02 (39).

(14) "Isokinetic sampling" means sampling in which the linear velocity of the gas entering the sampling nozzle is equal to that of the undisturbed gas stream at the sample point.

(15m) "Method X," where "X" is a number or a number followed by a letter, means the specified method contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(16) "Modification" means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

(17) "Monitoring device" means the total equipment, required under the monitoring of operations subsections in applicable sections of this chapter, used to measure and, if applicable, record process parameters.

(18) "New source" means any stationary source, the construction or modification of which is commenced after the applicability date of a standard of performance in this chapter which will be applicable to the source.

(18m) "New unit", for purposes s. NR 440.14 (10), has the meaning given in s. NR 409.02 (49).

(19) "Nitrogen oxides" means all oxides of nitrogen except nitrous oxide, as measured by test methods set forth in this chapter or incorporated by reference in this chapter by s. NR 440.17.

(20) "One–hour period" means any 60–minute period commencing on the hour.

(22) "Owner or operator" means any person who owns, leases, operates, controls or supervises an affected facility or a stationary source of which an affected facility is a part.

(23) "Particulate matter" means any finely divided solid or liquid material, other than uncombined water, as measured by the reference methods specified under each applicable section of this chapter, or an equivalent or alternative method.

(25) "Proportional sampling" means sampling at a rate that produces a constant ratio of sampling rate to stack gas flow rate.

(25m) "Reactivation of a very clean coal fired electric utility steam generating unit" means any physical change or change in the method of operation associated with the commencement of commercial operations by a coal fired utility unit after a period of discontinued operation where the unit:

(a) Has not been in operation for the 2 year period prior to the enactment of the clean air act amendments of 1990, and the emissions from the unit continue to be carried in the department's emissions inventory at the time of enactment;

(b) Was equipped prior to shutdown with a continuous system of emissions control that achieves a removal efficiency for sulfur dioxide of no less than 85% and a removal efficiency for particulates of no less than 98%.

(c) Is equipped with low NO_X burners prior to the time of commencement of operations following reactivation; and

(d) Is otherwise in compliance with the requirements of the act.

(26) "Reference method" means any method of sampling and analyzing for an air pollutant as specified in the applicable section.

(26m) "Repowering" means replacement of an existing coal fired boiler with one of the following clean coal technologies: atmospheric or pressurized fluidized bed combustion, integrated gasification combined cycle, magnetohydrodynamics, direct and indirect coal fired turbines, integrated gasification fuel cells, or as determined by the administrator of the U.S. environmental protection agency, in consultation with the secretary of energy, a derivative of one or more of these technologies, and any other technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of November 15, 1990. Repowering shall also include any oil,

oil and gas or gas fired unit which has been awarded clean coal technology demonstration funding as of January 1, 1991 by the United States department of energy.

(27) "Run" means the net period of time during which an emission sample is collected. Unless otherwise specified, a run may be either intermittent or continuous within the limits of good engineering practice.

(28) "Shutdown" means the cessation of operation of an affected facility for any purpose.

(29) "Six–minute period" means any one of the 10 equal parts of a one–hour period.

(30) "Standard" means a standard of performance set out in ss. NR 440.19 to 440.74.

(33) "Startup" means the setting in operation of an affected facility for any purpose.

(34) "Stationary source" means any building, structure, facility or installation which emits or may emit any air pollutant.

(35) "Volatile organic compound" or "VOC" means any organic compound which participates in atmospheric photochemical reactions, or which is measured by a reference method, an equivalent method, an alternative method, or which is determined by procedures specified under any section of this chapter.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (intro.), (1), (5), (11) and (35), r. (24), Register, September, 1990, No. 417; renum. (12) to be (13), cr. (12) and (15m), am. (26), Register, July, 1993, No. 451, eff. 8–1–93; am. (intro.), r. (1), (2), (15), (31), cr. (6m), (13m), (18m), (25m), (26m), r. and recr. (10), renum. (21) to be NR 400.02 (60m) and am., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.03 Units and abbreviations. The definitions contained in s. NR 400.03 apply to the abbreviations and symbols of units of measure used in this chapter. In addition, the following definitions apply to the units and abbreviations used in this chapter:

(1) System international (SI) units of measure:

MJ – megajoule—10^6 joule

(2) Other units of measure:

(a) cal – calorie

(b) cu ft – cubic feet

(c) k – 1,000

(d) mol. wt. – molecular weight

(e) ppb – parts per billion (by volume)

(f) scf – cubic feet at standard conditions

(g) scfh – cubic feet per hour at standard conditions

(h) scfm – cubic feet per minute at standard conditions

(i) scm – cubic meter at standard conditions

(j) sec – second

(k) sq ft – square feet

(L) std – at standard conditions

(3) Chemical nomenclature:

P_2O_5 – phosphorus pentoxide

(4) Miscellaneous:

DNR – Wisconsin department of natural resources

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) and (2), Register, September, 1990, No. 417; am. Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.04 Addresses. All requests, reports, applications, submittals and other communications to the department under this chapter shall be submitted in duplicate and addressed to the appropriate regional office of the department of natural resources, to the attention of the regional director. The regional offices are:

(1) DNR South Central Region, 2801 Coho St, Madison WI 53713.

(2) DNR Northeast Region, 1125 N Military Ave, PO Box 10448, Green Bay WI 54307–0448.

(3) DNR West Central Region, 1300 Clairemont Ave, Call Box 4001, Eau Claire WI 54702.

(4) DNR Southeast Region, Air Management Section, 2300 N Dr Martin Luther King Jr Dr, PO Box 12436, Milwaukee WI 53212.

(5) DNR Northern Region, Hwy 70 West, Box 309, Spooner WI 54801.

Note: The counties in each administrative region are:

(1) South Central Region—Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, LaFayette, Richland, Rock and Sauk Counties.

(2) Northeast Region—Brown, Calumet, Door, Fond du Lac, Green Lake, Kewaunee, Manitowoc, Marinette, Marquette, Menominee, Oconto, Outagamie, Shawano, Waupaca, Waushara and Winnebago Counties.

(3) West Central Region—Adams, Buffalo, Chippewa, Clark, Dunn, Eau Claire, Jackson, Juneau, LaCrosse, Marathon, Monroe, Pepin, Pierce, Portage, St. Croix, Trempealeau, Vernon and Wood Counties.

(4) Southeast Region—Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha Counties.

(5) Northern Region—Ashland, Barron, Bayfield, Burnett, Douglas, Florence, Forest, Iron, Langlade, Lincoln, Oneida, Polk, Price, Rusk, Sawyer, Taylor, Vilas and Washburn Counties.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) to (5), Register, September, 1990, No. 417; correction in (1) made under s. 13.93 (2m) (b) 6., Stats., Register, July, 1993, No. 451, eff. 8–1–93; am. (5), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.05 Determination of construction or modification. (1) When requested to do so by an owner or operator, the department shall make a determination of whether action taken or intended to be taken by the owner or operator constitutes construction, including reconstruction, or modification or the commencement thereof within the meaning of this chapter.

(2) The department shall respond to any request for a determination under sub. (1) within 30 days of receipt of the request.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.06 Review of plans. (1) When requested to do so by an owner or operator, the department shall review plans for construction or modification for the purpose of providing technical advice to the owner or operator.

(a) A separate request shall be submitted for each construction or modification project.

(b) Each request shall identify the location of the project and be accompanied by technical information describing the proposed nature, size, design and method of operation of each affected facility involved in the project, including information on any equipment to be used for measurement or control of emissions.

(2) Neither a request for plans review nor advice furnished by the department in response to a request shall relieve an owner or operator of legal responsibility for compliance with any provision of this chapter or of any other applicable requirement, or prevent the department from implementing or enforcing any provision of this chapter or taking any other action authorized by the law.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.07 Notification and recordkeeping. (1) Any owner or operator subject to this chapter shall furnish the department written notification as follows:

(a) A notification of the date construction, or reconstruction as defined under s. NR 440.15, of an affected facility is commenced, postmarked no later than 30 days after such date. This requirement does not apply in case of mass–produced facilities which are purchased in completed form.

(b) A notification of the anticipated date of initial startup of an affected facility, postmarked not more than 60 days nor less than 30 days prior to such date.

(c) A notification of the actual date of initial startup of an affected facility, postmarked within 15 days after such date.

(d) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable section of this chapter or in s. NR 440.14 (5). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The department may request additional relevant information subsequent to this notice.

(e) A notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with s. NR 440.13 (3). Notification shall be postmarked not less than 30 days prior to such date.

(f) A notification of the anticipated date for conducting the opacity observations required by s. NR 440.11 (5) (a). The notification shall also include, if appropriate, a request for the department to provide a visible emissions reader during a performance test. The notification shall be postmarked not less than 30 days prior to the anticipated opacity observation date.

(g) A notification that continuous opacity monitoring system data results will be used to determine compliance with the applicable opacity standard during a performance test required by s. NR 440.08, in lieu of Method 9 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, observation data, as allowed by s. NR 440.11 (5) (f). This notification shall be postmarked not less than 30 days prior to the date of the performance test.

(2) Any owner or operator subject to this chapter shall maintain records of the occurrence and duration of any startup, shutdown or malfunction in the operation of an affected facility, any malfunction of the air pollution control equipment and any periods during which a continuous monitoring system or monitoring device is inoperative.

(3) Each owner or operator required to install a continuous monitoring system (CMS) or monitoring device shall submit an excess emissions and monitoring systems performance report, excess emissions are defined in applicable sections, or a summary report form as described in sub. (4), or both, to the department semiannually, except when: more frequent reporting is specifically required by an applicable section; or the CMS data are to be used directly for compliance determination, in which case quarterly reports shall be submitted; or the department, on a case–by–case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the new source. All reports shall be postmarked by the 30th day following the end of each calendar half, or quarter, as appropriate. Written reports of excess emissions shall include the following information:

(a) The magnitude of excess emissions computed in accordance with s. NR 440.13 (8), any conversion factor or factors used, and the date and time of commencement and completion of each time period of excess emissions.

(am) The process operating time during the reporting period.

(b) Specific identification of each period of excess emissions that occurs during startups, shutdowns and malfunctions of the affected facility. The nature and cause of any malfunction, if known, and the corrective action taken or preventative measures adopted.

(c) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(d) When no excess emissions have occurred or the continuous monitoring system or systems have not been inoperative, repaired or adjusted, such information shall be stated in the report.

(4) The summary report form shall contain the information and be in the format shown in figure 1 unless otherwise specified by the department. One summary report form shall be submitted for each pollutant monitored at each affected facility.

(a) If the total duration of excess emission for the reporting period is less than 1% of the total operating time for the reporting period and CMS downtime for the reporting period is less than 5% of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emissions and monitoring system performance report described in sub. (3) need not be submitted unless requested by the department.

(b) If the total duration of excess emission for the reporting period is 1% or greater of the total operating time for the reporting period or the total CMS downtime for the reporting period is 5% or greater of the total operating time for the reporting period, the summary report form and the excess emissions and monitoring system performance report described in sub. (3) shall both be submitted.

Figure 1 — Summary Report — Gaseous and Opacity Excess Emission and Monitoring System Performance

Pollutant (circle One –– SO_2/NO_x/TRS/H_2S/CO/Opacity)

Reporting period dates: From______ to______________

Company:

Emission Limitation______________________________

Address:

Monitor Manufacturer and Model No. ________________

Date of Latest CMS Certification or Audit_____________

Process Unit(s) Description:

Total source operating time in reporting period[1]. _________

Emission data summary[1]

1. Duration of excess emissions in reporting period due to:
a. Startup/shutdown
b. Control equipment problems
c. Process problems
d. Other known causes
e. Unknown causes
2. Total duration of excess emission
3. [Total duration of excess emissions] × (100)/[Total source operating time] (%[2]):

CMS performance summary[1]

1. CMS downtime in reporting period due to:
a. Monitor equipment malfunctions
b. Non–monitor equipment malfunctions
c. Quality assurance calibration
d. Other known causes
e. Unknown causes
2. Total CMS downtime
3. [Total CMS downtime] × (100)/[Total source operating time] (%[2]):

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[1] For opacity, record all times in minutes. For gases, record all times in hours.

[2] For the reporting period: If the total duration of excess emissions is 1% or greater of the total operating time or the total CMS downtime is 5% or greater of the total operating time, both the summary report form and the excess emission report described in sub. (3) shall be submitted.

On a separate page, describe any changes since last quarter in CMS, process or controls. I certify that the information contained in this report is true, accurate, and complete.

Name____

Signature____________________________________

Title____

Date____

(5) Any owner or operator subject to this chapter shall maintain a file of all measurements, including continuous monitoring system, monitoring device and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this chapter recorded in a permanent form suitable for inspection. The file shall be retained for at least 2 years following the date of such measurements, maintenance, reports and records.

(6) Individual sections of this chapter may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (5), Register, September, 1986, No. 369, eff. 10–1–86; cr. (1) (f) and (g), Register, September, 1990, No. 417; r. and recr. (3) (intro.), cr. (3) (am) and (4), renum. (4) and (5) to be (5) and (6), Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (b) Figure 1, Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.08 Performance tests. (1) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility and at such other times as may be required by the department, the owner or operator of the facility shall conduct performance tests and furnish the department a written report of the results of the performance tests.

(2) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable section of this chapter unless the department specifies or approves, in specific cases, the use of a reference method with minor changes in methodology or waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the department's satisfaction that the affected facility is in compliance with the standard, or the department approves shorter sampling times and smaller sampling volumes when necessitated by process variables, or unless the administrator:

(a) Approves the use of an equivalent method, or

(b) Approves the use of an alternative method the results of which the administrator has determined to be adequate for indicating whether a specific source is in compliance.

(3) Performance tests shall be conducted under such conditions as the department shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the department such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown and malfunction do not constitute representative conditions for the purpose of a performance test nor will emissions in excess of the level of the applicable emission limit during periods of startup, shutdown and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard.

(4) The owner or operator of the affected facility shall provide the department at least 30 days prior notice of any performance tests, except as specified under other sections of this chapter, to afford the department the opportunity to have an observer present.

(5) The owner or operator of the affected facility shall provide, or cause to be provided, performance testing facilities as follows:

(a) Sampling ports adequate for test methods applicable to the facility. This includes:

1. Constructing the air pollution control system such that the volumetric flow rates and pollution emission rates can be accurately determined by applicable test methods and procedures, and

2. Providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test method procedures.

(b) Safe sampling platform or platforms.

(c) Safe access to sampling platform or platforms.

(d) Utilities for sampling and testing equipment.

(6) Unless otherwise specified in an applicable section of this chapter, each performance test shall consist of 3 separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the 3 runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the 3 runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other circumstances beyond the owner or operator's control, compliance may, upon the department's approval, be determined using the arithmetic mean of the results of the 2 other runs.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2), renum, (5) (e) to be (6), Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (intro.) and (5) (a), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.09 Enforcement; penalties. (1) If the department has reason to believe that a violation of this chapter has occurred, it may proceed under s. 285.83, Stats.

(2) Any person who violates any provision of this chapter is subject to the penalties provided under s. 285.87, Stats.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.10 Other requirements apply. (1) Exemption or the granting of an exemption from any requirement of this chapter does not relieve any person from compliance with chs. NR 400 to 499 or with ch. 285 or s. 299.15, Stats.

(2) In cases where an emission limitation or other requirement set in chs. NR 400 to 499, a permit, plan approval or special order also applies to a source or facility affected by this chapter, the more restrictive limitation shall be met.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. Register, September, 1986, No. 369, eff. 10–1–86; am. (1), Register, September, 1990, No. 417, eff. 10–1–90; am. (1), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.11 Compliance with standards and maintenance requirements. (1) Compliance with standards in this chapter, other than opacity standards, shall be determined only by performance tests established by s. NR 440.08, unless otherwise specified in the applicable standard.

(2) Compliance with opacity standards in this chapter shall be determined by conducting observations in accordance with Reference Method 9 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, with any alternative method that is approved by the administrator, or as provided in sub. (5) (e). For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6–minute averages) for the performance test or other set of observations (meaning those fugitive–type emission sources subject only to an opacity standard).

(3) The opacity standards set forth in this chapter shall apply at all times except during periods of startup, shutdown, malfunction and as otherwise provided in the applicable standard.

(4) At all times, including periods of startup, shutdown and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the department which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures and inspection of the source.

(5) (a) For the purpose of demonstrating initial compliance, opacity observations shall be conducted concurrently with the initial performance test required in s. NR 440.08, unless one of the following conditions apply:

1. If no performance test under s. NR 440.08 is required, then opacity observations shall be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup of the facility.

2. If visibility or other conditions prevent the opacity observations from being conducted concurrently with the initial performance test required under s. NR 440.08, the owner or operator of an affected facility shall reschedule the opacity observations as soon after the initial performance test as possible, but not later than 30 days thereafter, and shall advise the department of the rescheduled date.

(b) When the conditions specified in par. (a) 1. or 2. are met, the 30–day prior notification to the department required in s. NR 440.07 (1) (f) shall be waived. A rescheduled opacity observation shall be conducted, to the extent possible, under the same operating conditions that existed during the initial performance test conducted under s. NR 440.08. The visible emissions observer shall determine whether visibility or other conditions prevent the opacity observations from being made concurrently with the initial performance test in accordance with procedures contained in Reference Method 9 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17. Opacity readings of portions of plumes which contain condensed, uncombined water vapor may not be used for purposes of determining compliance with opacity standards. The owner or operator of an affected facility shall make available, upon request by the department, such records as may be necessary to determine the conditions under which the visual observations were made and shall provide evidence indicating proof of current visible emissions observer certification. Except as provided in par. (f), the results of continuous monitoring by transmissometer which indicate that the opacity at the time visual observations were made was not in excess of the standard are probative but not conclusive evidence of the actual opacity of an emission, provided that the owner or operator shall meet the burden of proving that the instrument used meets, at the time of the alleged violation indicated by visual observation, Performance Specification 1 in Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17, has been properly maintained and that the resulting data collected at the time of the alleged violation have not been altered in any way.

(c) Except as provided in par. (d), the owner or operator of an affected facility to which an opacity standard in this chapter applies shall conduct opacity observations in accordance with sub. (2), shall record the opacity of emissions, and shall report to the department the opacity results along with the results of the initial performance test required under s. NR 440.08. The inability of an owner or operator to secure a visible emissions observer may not be considered a reason for not conducting the opacity observations concurrently with the initial performance test.

(d) The owner or operator of an affected facility to which an opacity standard in this chapter applies may request the department to determine and to record the opacity of emissions from the affected facility during the initial performance test and at such times as may be required. The owner or operator of the affected facility shall report the opacity results to the department. Any request to the department to determine and to record the opacity of emissions from an affected facility shall be included in the notification required in s. NR 440.07 (1) (f). If the department cannot determine and record the opacity of emissions from the affected facility during the performance test, then the provisions of pars. (a) and (b) shall apply.

(e) An owner or operator of an affected facility using a continuous opacity monitor (transmissometer) shall record the monitoring data produced during the initial performance test required by s. NR 440.08 and shall furnish the department a written report of the monitoring results along with the results obtained using Method 9 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, and s. NR 440.08 performance test results.

(f) An owner or operator of an affected facility subject to an opacity standard may submit, for compliance purposes, continuous opacity monitoring system (COMS) data results produced during any performance test required under s. NR 440.08 in lieu of Method 9 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, observation data. If an owner or operator elects to submit COMS data for compliance with the opacity standard, he or she shall notify the department of that decision, in writing, at least 30 days before any performance test required under s. NR 440.08 is conducted. Once the owner or operator of an affected facility has notified the department to that effect, the department shall use the COMS data results to determine opacity compliance during subsequent tests required under s. NR 440.08, until the owner or operator notifies the department, in writing, to the contrary. For the purpose of determining compliance with the opacity standard during a performance test required under s. NR 440.08 using COMS data, the minimum total time of COMS data collection shall be sufficient to include the averages of all 6–minute continuous periods within the duration of the mass emission performance test. Results of the COMS opacity determinations shall be submitted along with the results of the performance test required under s. NR 440.08. The owner or operator of an affected facility using a COMS for compliance purposes is responsible for demonstrating that the COMS meets the requirements specified in s. NR 440.13 (3), that the COMS has been properly maintained and operated, and that the resulting data have not been altered in any way. If COMS data results are submitted for compliance with the opacity standard for a period of time during which Method 9 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, data indicate noncompliance, the Method 9 data shall be used to determine opacity compliance.

(g) Upon receipt from an owner or operator of the written reports of the results of the performance tests required by s. NR 440.08, the opacity observation results and observer certification required by sub. (5) (b), and the COMS results, if applicable, the department shall make a finding concerning compliance with opacity and other applicable standards. If COMS data results are used to comply with an opacity standard, only those results are required to be submitted along with the performance test results required by s. NR 440.08. If the department finds that an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with s. NR 440.08, but during the time such performance tests are being conducted fails to meet any applicable opacity standard, the department shall notify the owner or operator and advise him or her that he or she may petition the administrator within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

Note: Under 40 CFR 60.11 (e) (7) and (8), the administrator will grant a petition for adjustment of the opacity standard for an affected facility upon a demonstration by the owner or operator that the facility and associated air pollution control equipment were operated and maintained in a manner to minimize the opacity of emissions during the performance tests; that the performance tests were performed under the conditions established by the department; and that the affected facility and associated air pollution control equipment were incapable of being adjusted or operated to meet the applicable opacity standard. The administrator will establish an opacity standard for the affected facility at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity standard at all times during which the source is meeting the applicable mass or concentration emission standard. The administrator will promulgate the new opacity standard in the federal register.

(6) Special provisions set forth under an applicable section of this chapter shall supersede any conflicting provisions of this section.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (6), Register, September, 1986, No. 369, eff. 10–1–86; am. (2), r. and recr. (5), Register, September, 1990, No. 417, eff. 10–1–90.

NR 440.12 Circumvention. No owner or operator subject to the provisions of this chapter may build, erect, install or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.13 Monitoring requirements. (1) For the purposes of this section, all continuous monitoring systems required under applicable sections of this chapter shall be subject to the provisions of this section upon promulgation of performance specifications for continuous monitoring systems under 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, unless otherwise specified in an applicable section or by the department. If the continuous monitoring system is used to determine compliance with emission limits on a continuous basis, the quality assurance requirements of 40 CFR part 60, Appendix F, incorporated by reference in s. NR 440.17, apply unless an applicable section or the department specify otherwise.

(2) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests under s. NR 440.08. Verification of operational status shall, at a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation and calibration of the device.

(3) If the owner or operator of an affected facility elects to submit continuous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under s. NR 440.11 (5) (f), the owner or operator shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17, before the performance test required under s. NR 440.08 is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of the COMS or continuous emission monitoring system (CEMS) during any performance test required under s. NR. 440.08 or within 30 days thereafter in accordance with the applicable performance specification in Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17. The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the department.

(a) The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under s. NR 440.08 and as described in s. NR 440.11 (5) (f) shall furnish the department 2 or, upon request, more copies of a written report of the results of the COMS performance evaluation described in this subsection at least 10 days before the performance test required under s. NR 440.08 is conducted.

(b) Except as provided in par. (a), the owner or operator of an affected facility shall furnish the department within 60 days of completion 2 or, upon request, more copies of a written report of the results of the performance evaluation.

(4) (a) Owners and operators of all continuous emission monitoring systems installed in accordance with the provisions of this chapter shall check the zero (or low–level value between 0 and 20% of span value) and span (50 to 100% of span value) calibration drifts at least once daily in accordance with a written procedure. The zero span shall, at a minimum, be adjusted whenever the 24–hour zero drift or 24–hour span drift exceeds 2 times the limits of the applicable performance specifications in 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17. The system must allow the amount of excess zero and span drift measured at the 24–hour interval checks to be recorded and quantified, whenever specified. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the emissions shall be cleaned prior to performing the zero and span drift adjustments, except that for systems using automatic zero adjustments the optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4% opacity.

(b) Unless otherwise approved by the department, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero opacity condition and an upscale (span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly.

(5) Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under sub. (4), all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

(a) All continuous monitoring systems referenced by sub. (3) for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10–second period and one cycle of data recording for each successive 6–minute period.

(b) All continuous monitoring systems referenced by sub. (3) for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing and data recording) for each successive 15–minute period.

(6) All continuous monitoring systems or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of continuous monitoring systems contained in the applicable performance specifications of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, shall be used.

(7) When the emissions from a single affected facility or 2 or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems on each emission or on the combined emissions. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each emission. When the emission from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable continuous monitoring system on each separate emission unless the installation of fewer systems is approved by the department. When more than one continuous monitoring system is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each continuous monitoring system.

(8) Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6–minute averages and for continuous monitoring systems other than opacity to one–hour averages for time periods as defined under s. NR 440.02 (20) and (29), respectively. Six–minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6–minute period. For continuous monitoring systems other than opacity, one–hour averages shall be computed from 4 or more data points equally spaced over each one–hour period. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments may not be included in the data averages computed under this subsection. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g. ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in the standards. After conversion into units of the standard, the data may be rounded to the same number of significant digits used in the standard to specify the emission limit (e.g., rounded to the nearest one percent opacity).

(9) After receipt and consideration of written application, the department may approve alternatives to any monitoring procedures or requirements of this chapter including, but not limited to the following:

(a) Alternative monitoring requirements when installation of a continuous monitoring system or monitoring device specified by this chapter would not provide accurate measurements due to liquid water or other interferences caused by substances with the effluent gases.

(b) Alternative monitoring requirements when the affected facility is infrequently operated.

(c) Alternative monitoring requirements to accommodate continuous monitoring systems that require additional measurements to correct for stack moisture conditions.

(d) Alternative locations for installing continuous monitoring systems or monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.

(e) Alternative methods of converting pollutant concentration measurements to units of the standards.

(f) Alternative procedures for performing daily checks of zero and span drift that do not involve use of span gases or tests cells.

(g) Alternatives to the ASTM test methods or sampling procedures specified by any section of this chapter.

(h) Alternative continuous monitoring systems that do not meet the design or performance requirements in Performance Specification 1 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, but adequately demonstrate a definite and consistent relationship between their measurements and the measurements of opacity by a system complying with the requirements in Performance Specification 1. The department may require that a demonstration be performed for each affected facility.

(i) Alternative monitoring requirements when the emission from a single affected facility or the combined emissions from 2 or more affected facilities are released to the atmosphere through more than one point.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) (intro.), r. (1) (a) and (b), Register, September, 1986, No. 369, eff. 10–1–86; am. (1), (4) (b), (5) (a) and (b) and (8), r. and recr. (3), r. (5) (c), Register, September, 1990, No. 417, eff. 10–1–90.

NR 440.14 Modification. **(1)** Except as provided under subs. (5), (6) and (8) to (12), any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of this chapter. Upon modification, an existing facility becomes an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere.

(2) (a) Emission factors as specified in "Compilation of Air Pollutant Emission Factors," AP–42, Volume 1: Stationary Point and Area Sources, USEPA–OAQPS, as amended, incorporated by reference in s. NR 440.17, or other emission factors determined by the department to be superior to AP–42 emission factors, in cases where utilization of emission factors demonstrate that the emission level resulting from the physical or operational change will either clearly increase or clearly not increase.

(b) Material balances, continuous monitor data, or manual emission tests in cases where utilization of emission factors as referenced in par. (a) does not demonstrate to the department's satisfaction whether the emission level resulting from the physical or operational change will either clearly increase or clearly not increase, or where an owner or operator demonstrates to the department's satisfaction that there are reasonable grounds to dispute the result obtained by the department utilizing emission factors as referenced in par. (a). When the emission rate is based on results from manual emission tests or continuous monitoring systems, the procedures specified in 40 CFR part 60, Appendix C, incorporated by reference in s. NR 440.17, shall be used to determine whether an increase in emission rate has occurred. Tests shall be conducted under such conditions as the department may specify to the owner or operator based on representative performance of the facility. At least 3 valid test runs shall be conducted before and at least 3 after the physical or operational change. All operating parameters which may affect emissions shall be held constant to the maximum feasible degree for all test runs.

(3) The addition of an affected facility to a stationary source as an expansion to that source or as a replacement for an existing facility will not by itself bring within the applicability of this chapter any other facility within that source.

(5) The following may not, by themselves, be considered modifications under this chapter:

(a) Maintenance, repair and replacement which the department determines to be routine for a source category, subject to the provisions of sub. (3) and s. NR 440.15.

(b) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.

(c) An increase in the hours of operation.

(d) Use of an alternative fuel or raw material if, prior the date any standard under this chapter became applicable to that source type, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change. Conversion to coal required for energy considerations, as specified in section 111 (a) (8) of the act (42 USC 7411 (a) (8)), will not be considered a modification under this chapter.

(e) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the department determines to be less environmentally beneficial.

(f) The relocation or change in ownership of an existing facility.

(6) Special provisions set forth under any other applicable section of this chapter shall supersede any conflicting provisions of this section.

(7) Within 180 days of the completion of any physical or operational change subject to the control measures specified in sub. (1), compliance with all applicable standards shall be achieved.

(8) No physical change or change in the method of operation at an existing electric utility steam generating unit may be treated as a modification for the purposes of this section provided that the change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the 5 years prior to the change.

(9) Repowering projects that are awarded funding from the department of energy as permanent clean coal technology demonstration projects, or similar projects funded by the U.S. environmental protection agency, are exempt from the requirements of this section provided that the change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the 5 years prior to the change.

(10) (a) Repowering projects that qualify for an extension under section 409 (b) of the act (42 USC 7651h (b)) are exempt from the requirements of this section provided that the change does not increase the actual hourly emissions of any pollutant regulated under this section above the actual hourly emissions achievable at that unit during the 5 years prior to the change.

(b) This exemption does not apply to any new unit that:

1. Is designated as a replacement for an existing unit;

2. Qualifies under section 409 (b) of the act (42 USC 7651h (b)) for an extension of an emission limitation compliance date under section 405 of the act (42 USC 7651d) and;

3. Is located at a different site than the existing unit.

(11) The installation, operation, cessation or removal of a temporary clean coal technology demonstration project is exempt from the requirements of this section. A temporary clean coal control technology demonstration project for the purposes of this section is a clean coal technology demonstration project that is operated for a period of 5 years or less and which complies with the state implementation plan for the state in which the project is located and other requirements necessary to attain and maintain the national ambient air quality standards during the project and after it is terminated.

(12) The reactivation of a very clean coal fired electric utility steam generating unit is exempt from the requirements of this section.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1), (2) (a), (5) (d), cr. (8) to (12), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.15 Reconstruction. (1) An existing facility, upon reconstruction, becomes an affected facility, irrespective of any change in emission rate.

(2) "Reconstruction" means the replacement of components of an existing facility to such an extent that:

(a) The fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility, and

(b) It is technologically and economically feasible to meet the applicable standards set forth in this chapter.

(3) "Fixed capital cost" means the capital needed to provide all the depreciable components.

(4) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility, the owner or operator shall notify the department of the proposed replacements. The notice shall be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and shall include the following information:

(a) Name and address of the owner or operator.

(b) The location of the existing facility.

(c) A brief description of the existing facility and the components which are to be replaced.

(d) A description of the existing air pollution control equipment and the proposed air pollution control equipment.

(e) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility.

(f) The estimated life of the existing facility after the replacements.

(g) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements.

(5) The department shall determine, within 30 days of the receipt of the notice required by sub. (4) and any additional information it may reasonably require, whether the proposed replacement constitutes reconstruction.

(6) The department's determination under sub. (5) shall be based on:

(a) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new facility;

(b) The estimated life of the facility after the replacements compared to the life of a comparable entirely new facility;

(c) The extent to which the components being replaced cause or contribute to the emissions from the facility; and

(d) Any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements.

(7) Individual sections of this chapter may include specific provisions which refine and delimit the concept of reconstruction set forth in this section.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84.

NR 440.17 Incorporation by reference of code of federal regulations provisions and other materials. (1) APPENDICES. Appendices A, B, C and F of 40 CFR part 60 and Appendix B of 40 CFR part 61 as in effect on July 1, 1994 are incorporated by reference and made a part of this chapter. Copies of these Appendices are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin, or may be purchased for personal use from the superintendent of documents, U.S. government printing office, Washington, DC 20402.

(2) OTHER MATERIALS. The materials listed in this subsection are incorporated by reference in the corresponding sections noted. Some of the materials are also incorporated in Appendices A, B, C and F of 40 CFR part 60 as in effect on July 1, 1988 by the administrator. Since these Appendices are incorporated by reference in this chapter by sub. (1), materials incorporated by reference in the Appendices are hereby also incorporated by reference and made a part of this chapter. The materials are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin or may be purchased for personal use at the corresponding address noted.

(a) The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103; or the University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106:

1. ASTM D388–77, Standard Specification for Classification of Coals by Rank, for ss. NR 440.19 (2) (a) and (6) (f) 4. a., b. and f., 440.20 (2) (b), (n) and (y), 440.205 (2) (d) and (t), 440.207 (2) (b) and 440.42 (2) (a) and (b).

2. ASTM D3178–73, Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke, for s. NR 440.19 (6) (f) 5. a. and for 40 CFR part 60, Appendix A, Method 19.

3. ASTM D3176–74, Standard Method for Ultimate Analysis of Coal and Coke, for s. NR 440.19 (6) (f) 5. a. and for 40 CFR part 60, Appendix A, Method 19.

4. ASTM D1137–53 (reapproved 1975), Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer, for s. NR 440.19 (6) (f) 5. a.

5. ASTM D1945–64 (reapproved 1976), Standard Method for Analysis of Natural Gas by Gas Chromatography, for s. NR 440.19 (6) (f) 5. a.

6. ASTM D1946–77, Standard Method for Analysis of Reformed Gas by Gas Chromatography, for ss. NR 440.18 (6) (c), 440.19 (6) (f) 5. a., 440.647 (6) (f), 440.675 (5) (d) 3. b. and 5., 440.686 (5) (d) 2. b. and 4. and 440.705 (5) (d) 2. b. and 4.

7. ASTM D2015–77, Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter, for s. NR 440.19 (6) (f) 5. b. and (7) (c) 2. and for 40 CFR part 60, Appendix A, Method 19.

8. ASTM D1826–77, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, for ss. NR 440.19 (6) (f) 5. b. and (7) (c) 2. and 440.46 (7) (b) 3., and for 40 CFR part 60, Appendix A, Method 19.

9. ASTM D240–76, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, for ss. NR 440.19 (7) (c) 2. and 440.46 (7) (b) 3., and for 40 CFR part 60, Appendix A, Method 19.

10. ASTM D396–78, Standard Specifications for Fuel Oils, for ss. NR 440.205 (2) (h) and (zf), 440.207 (2) (g) and (v), 440.27 (2) (g) and 440.28 (2) (f).

11. ASTM D2880–78, Standard Specification for Gas Turbine Fuel Oils, for ss. NR 440.27 (2) (g), 440.28 (2) (f), and 440.50 (6) (d).

12. ASTM D975–78, Standard Specification for Diesel Fuel Oils, for ss. NR 440.27 (2) (g) and 440.28 (2) (f).

13. ASTM D323–82, Test Method for Vapor Pressure of Petroleum Products (Reid Method), for ss. NR 440.27 (2) (i), 440.28 (2) (h) and 440.285 (2) (i) and (7) (f) 2. b.

14. ASTM A99–76, Standard Specification for Ferromanganese, for s. NR 440.43 (2) (v).

15. ASTM A483–64 (reapproved 1974), Standard Specification for Silicomanganese, for s. NR 440.43 (2) (q).

16. ASTM A101–73, Standard Specification for Ferrochromium, for s. NR 440.43 (2) (o).

17. ASTM A100–69, (reapproved 1974), Standard Specification for Ferrosilicon, for s. NR 440.43 (2) (k) and (t).

18. ASTM A482–76, Standard Specification for Ferrochromesilicon, for s. NR 440.43 (2) (i).

19. ASTM A495–76, Standard Specification for Calcium – Silicon and Calcium Manganese–Silicon, for s. NR 440.43 (2) (c).

20. ASTM D1072–80, Standard Method for Total Sulfur in Fuel Gases, for s. NR 440.50 (6) (d).

21. ASTM D2986–71 (reapproved 1978), Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test, for 40 CFR part 60, Appendix A, Method 5, par. 3.1.1, Method 12, par. 4.1.1, and Method 17, par. 3.1.1.

22. ASTM D1193–77, Standard Specification for Reagent Water, for 40 CFR part 60, Appendix A, Method 6, par. 3.1.1; Method 7, par. 3.2.2; Method 7A, par. 3.2; Method 7C, par. 3.1.1; Method 7D, par. 3.1.1; Method 8, par. 3.1.3; Method 11, par. 6.1.3; Method 12, par. 4.1.3 and Method 13A, par. 6.1.2.

24. ASTM D2234–76, Standard Methods for Collection of a Gross Sample of Coal, for 40 CFR part 60, Appendix A, Method 19.

25. ASTM D3173–73, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, for 40 CFR part 60, Appendix A, Method 19.

26. ASTM D3177–75, Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke, for 40 CFR part 60, Appendix A, Method 19.

27. ASTM D2013–72, Standard Method for Preparing Coal Samples for Analysis, for 40 CFR part 60, Appendix A, Method 19.

28. ASTM D270–65 (reapproved 1975), Standard Method of Sampling Petroleum and Petroleum Products, for 40 CFR part 60, Appendix A, Method 19.

30. ASTM D1475–60 (reapproved 1980), Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products, for s. NR 440.56 (6) (d) 1., and for 40 CFR part 60, Appendix A, Method 24, par. 2.1, and Method 24A, par. 2.2.

31. ASTM D2369–81, Standard Test Method for Volatile Content of Coatings, for 40 CFR part 60, Appendix A, Method 24, par. 2.2.

32. ASTM D3792–79, Standard Method for Water Content of Water–Reducible Paints by Direct Injection into a Gas Chromatograph, for 40 CFR part 60, Appendix A, Method 24, par. 2.3.

33. ASTM D4017–81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, for 40 CFR part 60, Appendix A, Method 24, par. 2.4.

34. ASTM E169–63 (reapproved 1977), General Techniques of Ultraviolet Quantitative Analysis, for ss. NR 440.62 (6) (d) 1., 440.66 (4) (b) and 440.682 (3) (f).

35. ASTM E168–67 (reapproved 1977), General Techniques of Infrared Quantitative Analysis, for ss. NR 440.62 (6) (d) 1., 440.66 (4) (b) and 440.682 (3) (f).

36. ASTM E260–73, General Gas Chromatography Procedures, for ss. NR 440.62 (6) (d) 1., 440.66 (4) (b), 440.682 (3) (f) and 440.684 (5) (b) 3.

37. ASTM D2879–83, Test Method for Vapor Pressure – Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, for ss. NR 440.285 (2) (f) 3., (7) (e) 3. b. and (f) 2. a. and 440.62 (6) (e) 1.

38. ASTM D2382–76 (reapproved 1980), Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High–Precision Method), for ss. NR 440.18 (6), 440.62 (6) (g) 6., 440.647 (6) (f), 440.675 (5) (d) 5., 440.686 (5) (d) 4. and 440.705 (5) (d) 4.

39. ASTM D2504–67 (reapproved 1977), Noncondensable Gases in C_3 and Lighter Hydrocarbon Products by Gas Chromatography, for s. NR 440.62 (6) (g) 5.

40. ASTM D86–78, Distillation of Petroleum Products, for ss. NR 440.647 (4) (d), 440.66 (4) (d) and 440.682 (4) (h).

42. ASTM D3031–81, Standard Test Method for Total Sulfur in Natural Gas by Hydrogenation, for s. NR 440.50 (6) (d).

43. ASTM D4084–82, Standard Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), for s. NR 440.50 (6) (d).

44. ASTM D3246–81, Standard Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, for s. NR 440.50 (6) (d).

45. ASTM D2584–68 (reapproved 1985), Standard Test Method for Ignition Loss of Cured Reinforced Resins, for s. NR 440.69 (6) (c) 3. a.

46. ASTM D3431–80 (reapproved 1987), Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons (Microcoulometric Method), for s. NR 440.205 (10) (e).

47. ASTM D129–64 (reapproved 1978), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), for 40 CFR part 60, Appendix A, Method 19.

48. ASTM D1552–83, Standard Test Method for Sulfur in Petroleum Products (High Temperature Method), for 40 CFR part 60, Appendix A, Method 19.

49. ASTM D1835–86, Standard Specification for Liquified Petroleum (LP) Gases, for ss. NR 440.205 (2) (y) and 440.207 (2) (q).

50. ASTM D3286–85, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isothermal – Jacket Bomb Calorimeter, for 40 CFR part 60, Appendix A, Method 19.

51. ASTM D4057–81, Standard Practice for Manual Sampling of Petroleum and Petroleum Products, for 40 CFR part 60, Appendix A, Method 19.

52. ASTM D4239–85, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, for 40 CFR part 60, Appendix A, Method 19.

53. ASTM D2016–74 (reapproved 1983), Standard Test Methods for Moisture Content of Wood, for 40 CFR part 60, Appendix A, Method 28.

54. ASTM D4442–84, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood–base Materials, for 40 CFR part 60, Appendix A, Method 28.

56. ASTM D129–64 (reapproved 1978), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), for s. NR 440.26 (7) (j) 2.

57. ASTM D1552–83, Standard Test Method for Sulfur in Petroleum Products (High–Temperature Method), for s. NR 440.26 (7) (j) 2.

58. ASTM D2622–87, Standard Test Method for Sulfur in Petroleum Products by X–Ray Spectrometry, for s. NR 440.26(7) (j) 2.

59. ASTM D1266–87, Standard Test Method for Sulfur in Petroleum Products (Lamp Method), for s. NR 440.26 (7) (j) 2.

60. ASTM D2908–74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous–Injection Gas Chromatography, for s. NR 440.647 (6) (j).

61. ASTM D3370–76, Standard Practices for Sampling Water, for s. NR 440.647 (6) (j).

(b) The following material is available for purchase from the Association of Official Analytical Chemists, 1111 North 19th Street, Suite 210, Arlington VA 22209:

1. AOAC Method 9, Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11–12, for ss. NR 440.37 (5) (b) 3. b., 440.38 (5) (b) 3. b., 440.39 (5) (b) 3. b., 440.40 (5) (b) 3. b., and 440.41 (5) (c) 3. b.

(c) The following material is available for purchase from the American Petroleum Institute, 1220 L Street NW, Washington DC 20005:

1. API Publication 2517, Evaporation Loss from External Floating–Roof Tanks, Second Edition, February 1980, for ss. NR 440.27 (2) (k) and (4) (b), 440.28 (2) (j) and (6) (b), and 440.285 (2) (f) 1. and (7) (e) 2. a.

(d) The following material is available for purchase from the Technical Association of the Pulp and Paper Industry (TAPPI), Dunwoody Park, Atlanta GA 30341:

1. TAPPI Method T624 os–68, for s. NR 440.45 (6) (d) 3.

(e) The following material is available for purchase from the American Public Health Association, 1015 15th Street NW, Suite 300, Washington DC 20005:

1. Method 2540 B., Total Solids Dried at 103–105°C, in Standard Methods for the Examination of Water and Wastewater, 17th edition, 1989, for s. NR 440.69 (4) (b).

2. Method 2540 G., Total, Fixed, and Volatile Solids in Solid and Semisolid Samples, in Standard Methods for the Examination of Water and Wastewater, 17th edition, 1989, for s. NR 440.32 (5) (b) 5.

(f) The following material is available for purchase from the following address: Underwriter's Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook IL 60062:

1. UL 103, Sixth Edition revised as of September 3, 1986, Standard for Chimneys, Factory–built, Residential Type and Building Heating Appliance, for 40 CFR part 60, Appendix A, Method 28.

(g) The following material is available for purchase from the following address: West Coast Lumber Inspection Bureau, 6980 SW Barnes Road, Portland OR 97223:

1. West Coast Lumber Standard Grading Rules No. 16, pages 5–21 and 90 and 91, September 3, 1970, revised 1984, for 40 CFR, part 60, Appendix A, Method 28.

(h) The following material is available for purchase from the following address: The American Society of Mechanical Engineers (ASME), 22 Law Drive, Fairfield NJ 07004:

1. ASME QRO–1–1989. Standard for the Qualification and Certification of Resource Recovery Facility Operators, for s. NR 440. 215 (7).

2. ASME PTC 4.1, Power Test Codes: Test Code for Steam Generating Units, 1964, for ss. NR 440.205 (7) (g) and 440.215 (9) (h).

3. ASME Interim Supplement 19.5 on Instruments and Apparatus; Application, Part II of Fluid Meters, 6th Edition, 1971, for s. NR 440.215 (9) (h).

(i) The following material is available from the National Technical Information Service, 5285 Port Royal Road, Springfield VA 22161:

1. The Standard Industrial Classification Manual, 1987, NTIS order no. PB 87–100012, for ss. NR 440.205 (2) (c) and (zb), 440.46 (2) (c), (d), (i) and (L) and 440.72 (2) (a) 1.

2. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, as amended by Supplement B in September, 1989, Supplement C in September, 1990, Supplement D in September, 1990, Supplement E in October, 1992, and Supplement F in July, 1993, for s. NR 440.14 (2) (a).

(j) The following material is available for purchase from the Industrial Press Inc., 200 Madison Ave, New York NY 10016: Gas Engineers Handbook, 1st edition, 2nd printing, 1966, page 6/25, Fuel Gas Engineering Practice, for s. NR 440.684 (9).

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1), (2) (intro.), (a) 1., 3., 7. to 10., 13., 20., 22. and 24. to 28., (2) (b) 1. and (c) (intro.), cr. (2) (a) 34. to 55., (2) (e) and (h) renum. (2) (e) to be (2) (g), Register, September, 1990, No. 417, eff. 10–1–90; am. (1) (a) (intro.) to 5. and (b), (2) (a) 1., 6. to 11., 20. and 34. to 45., (b) 1., (c) 1., (d) 1., (e) (intro.) and 1., r. (2) (a) 46. and (g), renum. (2) (a) 47. to 55., (f) and (h) to be (2) (a) 46., to 54., (i) and (j) and am. (2) (a) 46. and 49., (i) and (j), cr. (2) (a) 56. to 61., (e) 2., (f), (g) and (h), Register, June, 1993, No. 450, eff. 8–1–93; r. (1) (a), renum. (1) (b) to be (1) and am., (2) (h) 1. to be (2) (h) 2. and am., am. (2) (a) 6., 20., 38., (b) (intro.), (d), (e) 1., (h) (intro.), cr. (2) (h) 1., 3., Register, December, 1995, No. 480, eff. 1–1–96; am. (2) (f) 1. and (g) 1., Register, April, 1997, No. 496, eff. 5–1–97.

NR 440.18 General control device requirements.

(1) INTRODUCTION. This section contains requirements for control devices used to comply with applicable sections of this chapter and chs. NR 445 to 484. The requirements are placed in this section for administrative convenience and only apply to facilities covered by sections or chapters referring to this section.

(2) FLARES. Subsections (3) through (6) apply to flares.

(3) (a) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in sub. (6), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

(b) Flares shall be operated with a flame present at all times, as determined by the methods specified in sub. (6).

(c) Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam–assisted or air–assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in sub. (6).

(d) 1. Steam–assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), less than 18.3 m/sec (60 ft/sec), except as provided in subds. 2. and 3.

2. Steam–assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

3. Steam–assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), less than the velocity, V_{max}, as determined by the method specified in sub. (6) (e), and less than 122 m/sec (400 ft/sec) are allowed.

(e) Air–assisted flares shall be designed and operated with an exit velocity less than the velocity, V_{max}, as determined by the method specified in sub. (6) (f).

(f) Flares used to comply with this section shall be steam–assisted, air–assisted, or nonassisted.

(4) Owners or operators of flares used to comply with the provisions of this section shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable sections below provide provisions stating how owners or operators of flares shall monitor these control devices.

(5) Flares used to comply with provisions of this section shall be operated at all times when emissions may be vented to them.

(6) (a) Reference Method 22 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, shall be used to determine the compliance of flares with the visible emission provisions of this section. The observation period is 2 hours and shall be used according to Method 22.

(b) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(c) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

where:

H_T is the net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 700 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

K is the conversion constant, 1.740×10^{-7}

$$\left[\frac{1}{\text{ppm}}\right]\left[\frac{\text{g–mole}}{\text{scm}}\right]\left[\frac{\text{MJ}}{\text{kcal}}\right]$$

where the standard temperature for (g–mole)/scm is 20°C;

C_i is the concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, and measured for hydrogen and carbon monoxide by ASTM D1946–77, incorporated by reference in s. NR 440.17; and

H_i is the net heat of combustion of sample component i, kcal/(g–mole) at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382–76, incorporated by reference in s. NR 440.17, if published values are not available or cannot be calculated.

(d) The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined as appropriate by Reference Method 2, 2A, 2C, or 2D of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, by the unobstructed (free) cross sectional area of the flare tip.

(e) The maximum permitted velocity, V_{max}, for flares complying with sub. (3) (d) 3. shall be determined by the following equation:

$$\mathrm{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

where:

V_{max} is the maximum permitted velocity, m/sec

28.8 = constant

31.7 = constant

H_T is the net heating value as determined in par. (c)

(f) The maximum permitted velocity, V_{max}, for air–assisted flares shall be determined by the following equation:

$$V_{max} = 8.706 + 0.7084 (H_T)$$

where:

V_{max} is the maximum permitted velocity, m/sec

8.706 = constant

0.7084 = constant

H_T is the net heating value as determined in par. (c)

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (6) (a), (c), (e) and (f), Register, July, 1993, No. 451, eff. 8–1–93; am. (6) (c), Register, December, 1995, No. 480, eff. 1–1–96.

Subchapter I — Standards of Performance

NR 440.19 Fossil–fuel–fired steam generators for which construction is commenced after August 17, 1971.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facilities to which the provisions of this section apply are:

1. Each fossil–fuel–fired steam generating unit of more than 73 megawatts heat input rate (250 million Btu per hour).

2. Each fossil–fuel and wood–residue–fired steam generating unit capable of firing fossil fuel at a heat input rate of more than 73 megawatts (250 million Btu per hour).

(b) Any change to an existing fossil–fuel–fired steam generating unit to accommodate the use of combustible materials other than fossil fuels as defined in this section does not bring that unit under the applicability of this section.

(c) Except as provided in par. (d), any facility under par. (a) that commenced construction or modification after August 17, 1971, is subject to the requirements of this section.

(d) The requirements of subs. (5) (a) 4. and 5., (b) and (d), and (6) (f) 4. f. are applicable to lignite–fired steam generating units that commenced construction or modification after December 22, 1976.

(e) Any facility covered under s. NR 440.20 is not covered under this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Coal" means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by ASTM D388–77, incorporated by reference in s. NR 440.17.

(b) "Coal refuse" means waste–products of coal mining, cleaning and coal preparation operations (e.g. culm, gob, etc.) containing coal, matrix material, clay and other organic and inorganic material.

(c) "Fossil fuel" means natural gas, petroleum, coal and any form of solid, liquid or gaseous fuel derived from such materials for the purpose of creating useful heat.

(d) "Fossil–fuel and wood–residue–fired steam generating unit" means a furnace or boiler used in the process of burning fossil fuel and wood residue for the purpose of producing steam by heat transfer.

(e) "Fossil–fuel–fired steam generating unit" means a furnace or boiler used in the process of burning fossil fuel for the purpose of producing steam by heat transfer.

(f) "Wood residue" means bark, sawdust, slabs, chips, shavings, mill trim and other wood products derived from wood processing and forest management operations.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 43 nanograms per joule heat input (0.10 lb per million Btu) derived from fossil fuel or fossil fuel and wood residue.

2. Exhibit greater than 20% opacity except for one 6–minute period per hour of not more than 27% opacity.

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of:

1. 340 nanograms per joule heat input (0.80 lb per million Btu) derived from liquid fossil fuel or liquid fossil fuel and wood residue.

2. 520 nanograms per joule heat input (1.2 lb per million Btu) derived from solid fossil fuel or solid fossil fuel and wood residue.

(b) When different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) shall be determined by proration using the following formula:

$$PS_{SO_2} = [y(340) + z(520)]/[y + z]$$

in which:

PS_{SO_2} is the prorated standard for sulfur dioxide when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired

y is the percentage of total heat input derived from liquid fossil fuel

z is the percentage of total heat input derived from solid fossil fuel

(c) Compliance shall be based on the total heat input from all fossil fuels burned, including gaseous fuels.

(5) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain nitrogen oxides, expressed as NO_2 in excess of:

1. 86 nanograms per joule heat input (0.20 lb per million Btu) derived from gaseous fossil fuel.

2. 129 nanograms per joule heat input (0.30 lb per million Btu) derived from liquid fossil fuel, liquid fossil fuel and wood residue, or gaseous fossil fuel and wood residue.

3. 300 nanograms per joule heat input (0.70 lb per million Btu) derived from solid fossil fuel or solid fossil fuel and wood residue (except lignite or a solid fuel containing 25%, by weight, or more of coal refuse).

4. 260 nanograms per joule heat input (0.60 lb per million Btu) derived from lignite or lignite and wood residue, except as provided under subd. 5.

5. 340 nanograms per joule heat input (0.80 lb per million Btu) derived from lignite which is mined in North Dakota, South Dakota or Montana and which is burned in a cyclone–fired unit.

(b) Except as provided under pars. (c) and (d), when different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) is determined by proration using the following formula:

$$PS_{NO_x} = \frac{w(260) + x(86) + y(130) + z(300)}{w + x + y + z}$$

in which:

PS_{NO_x} is the prorated standard for nitrogen oxides when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired

w is the percentage of total heat input derived from lignite

x is the percentage of total heat input derived from gaseous fossil fuel

y is the percentage of total heat input derived from liquid fossil fuel

z is the percentage of total heat input derived from solid fossil fuel (except lignite)

(c) When a fossil fuel containing at least 25%, by weight, of coal refuse is burned in combination with gaseous, liquid or other solid fossil fuel or wood residue, the standard for nitrogen oxides does not apply.

(d) Cyclone–fired units which burn fuels containing at least 25% of lignite that is mined in North Dakota, South Dakota or Montana remain subject to par. (a) 5. regardless of the types of fuel combusted in combination with that lignite.

(6) EMISSION AND FUEL MONITORING. (a) Each owner or operator shall install, calibrate, maintain and operate continuous monitoring systems for measuring the opacity of emissions, sulfur dioxide emissions, nitrogen oxides emissions, and either oxygen or carbon dioxide except as provided in par. (b).

(b) Certain of the continuous monitoring system requirements under par. (a) do not apply to owners or operators under the following conditions:

1. For a fossil–fuel–fired steam generator that burns only gaseous fossil fuel, continuous monitoring systems for measuring the opacity of emissions and sulfur dioxide emissions are not required.

2. For a fossil–fuel–fired steam generator that does not use a flue gas desulfurization device, a continuous monitoring system for measuring sulfur dioxide emissions is not required if the owner or operator monitors sulfur dioxide emissions by fuel sampling and analysis under par. (d).

3. Notwithstanding s. NR 440.13 (2), installation of a continuous monitoring system for nitrogen oxides may be delayed until after the initial performance tests under s. NR 440.08 have been conducted. If the owner or operator demonstrates during the performance test that emissions of nitrogen oxides are less than 70% of the applicable standards in sub. (5), a continuous monitoring system for measuring nitrogen oxides emissions is not required. If the initial performance test results show that nitrogen oxide emissions are greater than 70% of the applicable standard, the owner or operator shall install a continuous monitoring system for nitrogen oxides within one year after the date of the initial performance tests under s. NR 440.08 and comply with all other applicable monitoring requirements under this chapter.

4. If an owner or operator does not install any continuous monitoring systems for sulfur oxides and nitrogen oxides, as provided under subds. 1. and 3. or subds. 2. and 3., a continuous monitoring system for measuring either oxygen or carbon dioxide is not required.

(c) For performance evaluations under s. NR 440.13 (3) and calibration checks under s. NR 440.13 (4), the following procedures shall be used:

1. Methods 6, 7 and 3B of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, shall be used for the performance evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems. Acceptable alternative methods for Methods 6, 7 and 3B are given in sub. (7) (d).

2. Sulfur dioxide or nitric oxide, as applicable, shall be used for preparing calibration gas mixtures under Performance Specification 2 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17.

3. For affected facilities burning fossil fuel, the span value for a continuous monitoring system measuring the opacity of emissions shall be 80, 90 or 100% and for a continuous monitoring system measuring sulfur oxides or nitrogen oxides the span value shall be determined as follows:

[In parts per million]

Fossil fuel	Span value for sulfur dioxide	Span value for nitrogen oxides
Gas	not applicable	500
Liquid	1,000	500
Solid	1,500	1000
Combinations	1,000y + 1,500z	500(x+ y) + 1,000z

in which:

x is the fraction of total heat input derived from gaseous fossil fuel

y is the fraction of total heat input derived from liquid fossil fuel

z is the fraction of total heat input derived from solid fossil fuel

4. All span values computed under subd. 3. for burning combinations of fossil fuels shall be rounded to the nearest 500 ppm.

5. For a fossil–fuel–fired steam generator that simultaneously burns fossil fuel and nonfossil fuel, the span value of all continuous monitoring systems shall be subject to the department's approval.

(e) For any continuous monitoring system installed under par. (a), the conversion procedures of this paragraph shall be used to convert the continuous monitoring data into units of the applicable standards (ng/J, lb/million Btu).

1. When a continuous monitoring system for measuring oxygen is selected, the measurement of the pollutant concentration and oxygen concentration shall each be on a consistent basis (wet or dry). Alternative procedures approved by the department shall be used when measurements are on a wet basis. When measurements are on a dry basis, the following conversion procedures shall be used:

$$E = CF\ [20.9/(20.9 - \text{percent } O_2)]$$

where E, C, F, and percent O_2 are determined under par. (f).

2. When a continuous monitoring system for measuring carbon dioxide is selected, the measurement of the pollutant concentration and carbon dioxide concentration shall each be on a consistent basis (wet or dry) and the following conversion procedure shall be used:

$$E = CF_c\ [100/\text{percent } CO_2]$$

where E, C, F_c and percent CO_2 are determined under par. (f).

(f) The values used in the equations under par. (e) 1. and 2. are derived as specified in this paragraph.

1. E is the pollutant emissions, ng/J (lb/million Btu).

2. C is the pollutant concentration, ng/dscm (lb/dscf), determined by multiplying the average concentration (ppm) for each one–hour period by 4.15×10^4 M ng/dscm per ppm (2.59×10^{-9} M lb/dscf per ppm) where M is the pollutant molecular weight, g/g–mole (lb/lb–mole). M = 64.07 for sulfur dioxide and 46.01 for nitrogen oxides.

3. $\%O_2$ or $\%CO_2$ is the oxygen or carbon dioxide volume expressed as percent, determined with equipment specified under par. (a).

4. F, F_c are a factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted (F), and a factor representing a ratio of the volume of carbon dioxide generated to the calorific value of the fuel combusted (F_c), respectively. Values of F_c and F are:

a. For anthracite coal as classified according to ASTM D388–77, incorporated by reference in s. NR 440.17, F = 2.723×10^{-7} dscm/J (10,140 dscf/million Btu) and $F_c = 0.532 \times 10^{-7}$ scm CO_2/J (1,980 scf CO_2/million Btu).

b. For subbituminous and bituminous coal as classified according to ASTM D388–77, incorporated by reference in s. NR 440.17, F = 2.637×10^{-7} dscm/J (9,820 dscf/million Btu) and $F_c = 0.486 \times 10^{-7}$ scm CO_2/J (1,810 scf CO_2/million Btu).

c. For liquid fossil fuels including crude, residual and distillate oils, F = 2.476×10^{-7} dscm/J (9,220 dscf/million Btu) and $F_c = 0.384 \times 10^{-7}$ scm CO_2/J (1,430 scf CO_2/million Btu).

d. For gaseous fossil fuels, F = 2.347×10^{-7} dscm/J (8,740 dscf/million Btu). For natural gas, propane and butane fuels, $F_c = 0.279 \times 10^{-7}$ scm CO_2/J (1,040 scf CO_2/million Btu) for natural gas, 0.322×10^{-7} scm CO_2/J (1,200 scf CO_2/million Btu) for propane, and 0.338×10^{-7} scm CO_2/J (1,260 scf CO_2/million Btu) for butane.

e. For bark, F = 2.589×10^{-7} dscm/J (9,640 dscf/million Btu) and $F_c = 0.500 \times 10^{-7}$ scm CO_2/J (1,840 scf CO_2/million

Btu). For wood residue other than bark, F = 2.492 × 10^{-7} dscm/J (9,280 dscf/million Btu) and F_c = 0.494 × 10^{-7} scm CO_2/J (1,860 scf CO_2/million Btu).

f. For lignite coal as classified according to ASTM D388–77, incorporated by reference in s. NR 440.17, F = 2.659 × 10^{-7} dscm/J (9900 dscf/million Btu) and F_c = 0.516 × 10^{-7} scm CO_2/J (1,920 scf CO_2/million Btu).

5. The owner or operator may use the following equation to determine an F factor (dscm/J or dscf/million Btu) on a dry basis (if it is desired to calculate F on a wet basis, consult the department) or F_c factor (scm CO_2/J, or scf CO_2/million Btu) on either basis in lieu of the F or F_c factors specified in subd. 4.:

$$F = \frac{10^{-6}[227.2(\%H) + 95.5(\%C) + 35.6(\%S) + 8.7(\%N) - 28.7(\%O)]}{GCV}$$

(*SI units*)

$$F_c = \frac{2.0 \times 10^{-5}(\%C)}{GCV}$$

(*SI units*)

$$F = \frac{10^{6}[3.64(\%H) + 1.53(\%C) + 0.57(\%S) + 0.14(\%N) - 0.46(\%O)]}{GCV}$$

(*English units*)

$$F_c = \frac{321 \times 10^{3}(\%C)}{GCV}$$

(*English units*)

a. H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen and oxygen (expressed as percent), respectively, as determined on the same basis as GCV by ultimate analysis of the fuel fired, using ASTM method D3178–73 or D3176–74 (solid fuels), or computed from results using ASTM method D1137–53 (1975), D1945–64 (1976) or D1946–77 (gaseous fuels) as applicable. These 5 ASTM methods are incorporated by reference in s. NR 440.17.

b. GCV is the gross calorific value (kJ/kg, Btu/lb) of the fuel combusted, determined by the ASTM test methods D2015–77 for solid fuels and D1826–77 for gaseous fuels as applicable. These 2 ASTM methods are incorporated by reference in s. NR 440.17.

c. For affected facilities which fire both fossil fuels and nonfossil fuels, the F or F_c value shall be subject to the department's approval.

6. For affected facilities firing combinations of fossil fuels or fossil fuels and wood residue, the F or F_c factors determined by subd. 4. or 5. shall be prorated in accordance with the applicable formulas as follows:

$$F = \sum_{i=1}^{n} X_i F_i \text{ or } F_c = \sum_{i=1}^{n} X_i (F_c)_i$$

X_i is the fraction of total heat input derived from each type of fuel (e.g. natural gas, bituminous coal, wood residue, etc.)

F_i or $(F_c)_i$ is the applicable F or F_c factor for each fuel type determined in accordance with subd. 4. or 5.

n is the number of fuels being burned in combination

(g) Excess emission and monitoring system performance reports shall be submitted to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter. Each excess emission and MSP report shall include the information required in s. NR 440.07 (3). Periods of excess emissions and monitoring systems downtime that shall be reported are defined as follows:

1. Opacity. Excess emissions are defined as any 6–minute period during which the average opacity of emissions exceeds 20% opacity, except that one 6–minute average per hour of up to 27% opacity need not be reported.

2. Sulfur dioxide. Excess emissions for affected facilities are defined as:

a. Any 3–hour period during which the average emissions (arithmetic average of 3 contiguous one–hour periods) of sulfur dioxide as measured by a continuous monitoring system exceed the applicable standard under sub. (4).

3. Nitrogen oxides. Excess emissions for affected facilities using a continuous monitoring system for measuring nitrogen oxides are defined as any 3–hour period during which the average emissions (arithmetic average of 3 contiguous one–hour periods) exceed the applicable standards under sub. (5).

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Acceptable alternative methods and procedures are given in par. (d).

(b) The owner or operator shall determine compliance with the particulate matter, SO_2 and NO_x standards in subs. (3), (4) and (5) as follows:

1. The emission rate (E) of particulate matter, SO_2 or NO_x shall be computed for each run using the following equation:

$$E = CF_d\,(20.9)/(20.9 - \%O_2)$$

where:

E is the emission rate of pollutant, ng/J (lb/million Btu)

C is the concentration of pollutant, ng/dscm (lb/dscf)

$\%O_2$ is the oxygen concentration, percent dry basis

F_d is the factor as determined from Method 19

2. Method 5 shall be used to determine the particulate matter concentration (C) at affected facilities without wet flue–gas–desulfurization (FGD) systems and Method 5B shall be used to determine the particulate matter concentration (C) after FGD systems.

a. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). The probe and filter holder heating systems in the sampling train may be set to provide a gas temperature no greater than 160 ± 14°C (320 ± 25°F).

b. The emission rate correction factor, integrated or grab sampling and analysis procedure of Method 3B shall be used to determine the O_2 concentration ($\%O_2$). The O_2 sample shall be obtained simultaneously with, and at the same traverse points as, the particulate sample. If the grab sampling procedure is used, the O_2 concentration for the run shall be the arithmetic mean of all the individual O_2 sample concentrations at each traverse point.

c. If the particulate run has more than 12 traverse points, the O_2 traverse points may be reduced to 12 provided that Method 1 is used to locate the 12 O_2 traverse points.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

4. Method 6 shall be used to determine the SO_2 concentration.

a. The sampling site shall be the same as that selected for the particulate sample. The sampling location in the duct shall be at the centroid of the cross section or at a point no closer to the walls than 1 m (3.28 ft). The sampling time and sample volume for each sample run shall be at least 20 minutes and 0.020 dscm (0.71 dscf). Two samples shall be taken during a 1–hour period, with each sample taken within a 30–minute interval.

b. The emission rate correction factor, integrated sampling and analysis procedure of Method 3B shall be used to determine the O_2 concentration (%O_2). The O_2 sample shall be taken simultaneously with, and at the same point as, the SO_2 sample. The SO_2 emission rate shall be computed for each pair of SO_2 and O_2 samples. The SO_2 emission rate (E) for each run shall be the arithmetic mean of the results of the 2 pairs of samples.

5. Method 7 shall be used to determine NO_x concentration.

a. The sampling site and location shall be the same as for the SO_2 sample. Each run shall consist of 4 grab samples, with each sample taken at about 15–minute intervals.

b. For each NO_x sample, the emission rate correction factor, grab sampling and analysis procedure of Method 3B shall be used to determine the O_2 concentration (%O_2). The sample shall be taken simultaneously with, and at the same point as, the NO_x sample.

c. The NO_x emission rate shall be computed for each pair of NO_x and O_2 samples. The NO_x emission rate (E) for each run shall be the arithmetic mean of the results of the 4 pairs of samples.

(c) When combinations of fossil fuels or fossil fuel and wood residue are fired, the owner or operator, in order to compute the prorated standard as shown in subs. (4) (b) and (5) (b), shall determine the percentage (w, x, y, or z) of the total heat input derived from each type of fuel as follows:

1. The heat input rate of each fuel shall be determined by multiplying the gross calorific value of each fuel fired by the rate of each fuel burned.

2. ASTM Methods D2015–77 (solid fuels), D240–76 (liquid fuels) or D1826– 77 (gaseous fuels), incorporated by reference in s. NR 440.17, shall be used to determine the gross calorific values of the fuels. The method used to determine the calorific value of wood residue shall be approved by the department.

3. Suitable methods shall be used to determine the rate of each fuel burned during each test period, and a material balance over the steam generating system shall be used to confirm the rate.

(d) The owner or operator may use the following as alternatives to the reference methods and procedures in this subsection or in other subsections as specified:

1. The emission rate (E) of particulate matter, SO_2 and NO_x may be determined by using the F_c factor, provided that the following procedure is used:

a. The emission rate (E) shall be computed using the following equation:

$$E = CF_c\ (100/\%CO_2)$$

where:

E is the emission rate of pollutant, ng/J (lb/million Btu)

C is the concentration of pollutant, ng/dscm (lb/dscf)

%CO_2 is the carbon dioxide concentration, percent dry basis

F_c is the factor as determined in appropriate sections of Method 19

b. If and only if the average F_c factor in Method 19 is used to calculate E and either E is from 0.97 to 1.00 of the emission standard or the relative accuracy of a continuous emission monitoring system is from 17 to 20%, then 3 runs of Method 3 shall be used to determine the O_2 and CO_2 concentration according to the procedures in sub. (7) (b) 2. b., 4. b. or 5. b. Then if F_o (average of 3 runs), as calculated from the equation in Method 3B, is more than ± 3% than the average F_o value, as determined from the average values of F_d and F_c in Method 19, that is, $F_{oa} = 0.209\ (F_{da}/F_{ca})$, then the following procedure shall be followed:

1) When F_o is less than 0.97 F_{oa}, then E shall be increased by that proportion under 0.97 F_{oa}. For example, if F_o is 0.95 F_{oa}, E shall be increased by 2%. This recalculated value shall be used to determine compliance with the emission standard.

2) When F_o is less than 0.97 F_{oa} and when the average difference (d) between the continuous monitor minus the reference methods is negative, then E shall be increased by that proportion under 0.97 F_{oa}. For example, if F_o is 0.95 F_{oa}, E shall be increased by 2%. This recalculated value shall be used to determine compliance with the relative accuracy specification.

3) When F_o is greater than 1.03 F_{oa} and when the average difference d is positive, then E shall be decreased by that proportion over 1.03 F_{oa}. For example, if F_o is 1.05 F_{oa}, E shall be decreased by 2%. This recalculated value shall be used to determine compliance with the relative accuracy specification.

2. For Method 5 or 5B, Method 17 may be used at facilities with or without wet FGD systems if the stack gas temperature at the sampling location does not exceed an average temperature of 160°C (320°F). The procedures of sections 2.1 and 2.3 of Method 5B may be used with Method 17 only if it is used after wet FGD systems. Method 17 may not be used after wet FGD systems if the effluent gas is saturated or laden with water droplets.

3. Particulate matter and SO_2 may be determined simultaneously with the Method 5 train provided that the following changes are made:

a. The filter and impinger apparatus in sections 2.1.5 and 2.1.6 of Method 8 is used in place of the condenser (section 2.1.7) of Method 5.

b. All applicable procedures in Method 8 for the determination of SO_2, including moisture, are used.

4. For Method 6, Method 6C may be used. Method 6A may also be used whenever Methods 6 and 3B data are specified to determine the SO_2 emission rate, under the conditions in par. (d) 1.

5. For Method 7, Method 7A, 7C, 7D or 7E may be used. If Method 7C, 7D or 7E is used, the sampling time for each run shall be at least 1 hour and the integrated sampling approach shall be used to determine the O_2 concentration (%O_2) for the emission rate correction factor.

6. For Method 3, Method 3A or 3B may be used.

7. For Method 3B, Method 3A may be used.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (6) (c) 1., (7) (a) 2., 4. and 5., (7) (c), (e), (f) 2., 3. (intro.) and a., Register, September, 1986, No. 369, eff. 10–1–86; am. (1) (b), (2) (intro.), (5) (a) 1. and 2., (6) (c) 1. and (f) 5. a., (7) (a) 1. to 5., (b); (c) and (f) 3., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (6) (c) 1., (g) (intro.) and (7), am. (6) (c) 3., (f) 1. to 3., 4. a. and 5. (intro.), Register, July, 1993, No. 451, eff. 8–1–93; am. (6) (f) 5. (intro.), a., (7) (b) 2. (intro.), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.20 Electric steam generating units for which construction is commenced after September 18, 1978. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which this section applies is each electric utility steam generating unit:

1. That is capable of combusting more than 73 megawatts (250 million Btu/hour) heat input of fossil fuel, either alone or in combination with any other fuel; and

2. For which construction or modification is commenced after September 18, 1978.

(b) This section applies to electric utility combined cycle gas turbines that are capable of combusting more than 73 megawatts (250 million Btu/hour) heat input of fossil fuel in the steam generator. Only emissions resulting from combustion of fuels in the steam generating unit are subject to this section.

Note: The gas turbine emissions are subject to s. NR 440.50.

(c) Any change to an existing fossil–fuel–fired steam generating unit to accommodate the use of combustible materials, other than fossil fuels, will not bring that unit under the applicability of this section.

(d) Any change to an existing steam generating unit originally designed to fire gaseous or liquid fossil fuels, to accommodate the use of any other fuel (fossil or nonfossil) will not bring that unit under the applicability of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "24–hour period" means the period of time between 12:01 a.m. and 12:00 midnight.

(b) "Anthracite" means coal that is classified as anthracite according to the American Society for Testing and Materials (ASTM) Standard Specification for Classification of Coals by Rank, D388–77, incorporated by reference in s. NR 440.17.

(c) "Available purchase power" means the lesser of the following:

1. The sum of available system capacity in all neighboring companies.

2. The sum of the rated capacities of the power interconnection devices between the principal company and all neighboring companies, minus the sum of the electric power load on these interconnections.

3. The rated capacity of the power transmission lines between the power interconnection devices and the electric generating units (the unit in the principal company that has the malfunctioning flue gas desulfurization system and the unit or units in the neighboring company supplying replacement electrical power) less the electric power load on these transmission lines.

(d) "Available system capacity" means the capacity determined by subtracting the system load and the system emergency reserves from the net system capacity.

(e) "Boiler operating day" means a 24–hour period during which fossil fuel is combusted in a steam generating unit for the entire 24 hours.

(f) "Coal refuse" means waste products of coal mining, physical coal cleaning, and coal preparation operations (e.g. culm, gob, etc.) containing coal, matrix material, clay, and other organic and inorganic material.

(g) "Combined cycle gas turbine" means a stationary turbine combustion system where heat from the turbine exhaust gases is recovered by a steam generating unit.

(h) "Electric utility combined cycle gas turbine" means any combined cycle gas turbine used for electric generation that is constructed for the purpose of supplying more than one–third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam distribution system that is constructed for the purpose of providing steam to a steam–electric generator that would produce electrical power for sale is also considered in determining the electrical energy output capacity of the affected facility.

(i) "Electric utility company" means the largest interconnected organization, business or governmental entity that generates electric power for sale (e.g., a holding company with operating subsidiary companies).

(j) "Electric utility steam generating unit" means any steam electric generating unit that is constructed for the purpose of supplying more than one–third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam–electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

(k) "Emergency condition" means that period of time when:

1. The electric generation output of an affected facility with a malfunctioning flue gas desulfurization system cannot be reduced or electrical output must be increased because:

a. All available system capacity in the principal company interconnected with the affected facility is being operated, and

b. All available purchase power interconnected with the affected facility is being obtained, or

2. The electric generation demand is being shifted as quickly as possible from an affected facility with a malfunctioning flue gas desulfurization system to one or more electrical generating units held in reserve by the principal company or by a neighboring company, or

3. An affected facility with a malfunctioning flue gas desulfurization system becomes the only available unit to maintain a part or all of the principal company's system emergency reserves and the unit is operated in spinning reserve at the lowest practical electric generation load consistent with not causing significant physical damage to the unit. If the unit is operated at a higher load to meet load demand, an emergency condition would not exist unless the conditions under subd. 1. apply.

(L) "Fossil fuel" means natural gas, petroleum, coal, and any form of solid, liquid or gaseous fuel derived from such material for the purpose of creating useful heat.

(m) "Interconnected" means that 2 or more electric generating units are electrically tied together by a network of power transmission lines, and other power transmission equipment.

(n) "Lignite" means coal that is classified as lignite A or B according to the STM Standard Specification for Classification of Coals by Rank, D388–77, incorporated by reference in s. NR 440.17.

(o) "Neighboring company" means any one of those electric utility companies with one or more electric power interconnections to the principal company and which have geographically adjoining service areas.

(p) "Net system capacity" means the sum of the net electric generating capability (not necessarily equal to rated capacity) of all electric generating equipment owned by an electric utility company (including steam generating units, internal combustion engines, gas turbines, nuclear units, hydroelectric units, and all other electric generating equipment) plus firm contractual purchases that are interconnected to the affected facility that has the malfunctioning flue gas desulfurization system. The electric generating capability of equipment under multiple ownership is prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(q) "Potential combustion concentration" means the theoretical emissions (ng/J, lb/million Btu heat input) that would result from combustion of a fuel in an uncleaned state without emission control systems) and:

1. For particulate matter is:

a. 3,000 ng/J (7.0 lb/million Btu) heat input for solid fuel; and

b. 75 ng/J (0.17 lb/million Btu) heat input for liquid fuels.

2. For sulfur dioxide is determined under sub. (9) (b).

3. For nitrogen oxides is:

a. 290 ng/J (0.67 lb/million Btu) heat input for gaseous fuels;

b. 310 ng/J (0.72 lb/million Btu) heat input for liquid fuels; and

c. 990 ng/J (2.30 lb/million Btu) heat input for solid fuels.

(r) "Potential electrical output capacity" means 33% of the maximum design heat input capacity of the system generating unit (e.g., a steam generating unit with a 100–MW (340 million Btu/hr) fossil–fuel heat input capacity would have a 33–MW potential electrical output capacity). For electric utility combined cycle gas turbines the potential electrical output capacity is determined on the basis of the fossil–fuel firing capacity of the steam generator exclusive of the heat input and electrical power contribution by the gas turbine.

(s) "Principal company" means the electric utility company which owns the affected facility.

(t) "Resource recovery unit" means a facility that combusts more than 75% nonfossil fuel on a quarterly (calendar) heat input basis.

(u) "Solid–derived fuel" means any solid, liquid or gaseous fuel derived from solid fuel for the purpose of creating useful heat and includes, but is not limited to, solvent refined coal, liquified coal and gasified coal.

(v) "Spare flue gas desulfurization system module" means a separate system of sulfur dioxide emission control equipment capable of treating an amount of flue gas equal to the total amount of flue gas generated by an affected facility when operated at maximum capacity divided by the total number of nonspare flue gas desulfurization modules in the system.

(w) "Spinning reserve" means the sum of the unutilized net generating capability of all units of the electric utility company that are synchronized to the power distribution system and that are capable of immediately accepting additional load. The electric generating capability of equipment under multiple ownership shall be prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(x) "Steam generating unit" means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam including fossil–fuel–fired steam generators associated with combined cycle gas turbines but nuclear steam generators are not included.

(y) "Subbituminous coal" means coal that is classified as subbituminous A, B or C according to the ASTM Standard Specification for Classification of Coals by Rank, D388–77, incorporated by reference in s. NR 440.17.

(z) "System emergency reserves" means an amount of electric generating capacity equivalent to the rated capacity of the single largest electric generating unit in the electric utility company (including steam generating units, internal combustion engines, gas turbines, nuclear units, hydroelectric units and all other electric generating equipment) which is interconnected with the affected facility that has the malfunctioning flue gas desulfurization system. The electric generating capability of equipment under multiple ownership shall be prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(zm) "System load" means the entire electric demand of an electric utility company's service area interconnected with the affected facility that has the malfunctioning flue gas desulfurization system plus firm contractual sales to other electric utility companies. Sales to other electric utility companies (e.g., emergency power) not on a firm contractual basis may also be included in the system load when no available system capacity exists in the electric utility company to which the power is supplied for sale.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of:

1. 13 ng/J (0.03 lb/million Btu) heat input derived from the combustion of solid, liquid or gaseous fuel;

2. One percent of the potential combustion concentration (99% reduction) when combusting solid fuel; and

3. 30% of potential combustion concentration (70% reduction) when combusting liquid fuel.

(b) On and after the date the particulate matter performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which exhibit greater than 20% opacity (6–minute average), except for one 6–minute period per hour of not more than 27% opacity.

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts solid fuel or solid–derived fuel, except as provided under par. (c), (d), (f) or (h), any gases which contain sulfur dioxide in excess of:

1. 520 ng/J (1.20 lb/million Btu) heat input and 10% of the potential combustion concentration (90% reduction), or

2. 30% of the potential combustion concentration (70% reduction), when emissions are less than 260 ng/J (0.60 lb/million Btu) heat input.

(b) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts liquid or gaseous fuels (except for liquid or gaseous fuels derived from solid fuels and as provided under par. (h)), any gases which contain sulfur dioxide in excess of:

1. 340 ng/J (0.80 lb/million Btu) heat input and 10% of the potential combustion concentration (90% reduction), or

2. 100% of the potential combustion concentration (zero percent reduction) when emissions are less than 86 ng/J (0.20 lb/million Btu) heat input.

(c) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is complete, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts solid solvent refined coal (SRC–I) any gases which contain sulfur dioxide in excess of 520 ng/J (1.20 lb/million Btu) heat input and 15% of the potential combustion concentration (85% reduction) except as provided under par. (f); compliance with the emission limitation is determined on a 30–day rolling average basis and compliance with the percent reduction requirement is determined on a 24–hour basis.

(d) Sulfur dioxide emissions shall be limited to no more than 520 ng/J (1.20 lb/million Btu) heat input from any affected facility which:

1. Combusts 100% anthracite, or

2. Is classified as a resource recovery facility.

(f) The emission reduction requirements under this subsection do not apply to any affected facility that is operated under an SO_2 commercial demonstration permit issued by the administrator in accordance with the provisions of 40 CFR 60.45a.

(g) Compliance with the emission limitation and percent reduction requirements under this subsection are both determined on a 30–day rolling average basis except as provided under par. (c).

(h) When different fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

1. If emissions of sulfur dioxide to the atmosphere are greater than 260 ng/J (0.60 lb/million Btu) heat input:

$$E_s = [340\ x + 520\ y]/100$$

and

$$\%P_s = 10$$

2. If emissions of sulfur dioxide to the atmosphere are equal to or less than 260 ng/J (0.60 lb/million Btu) heat input:

$$E_s = [340\ x + 520\ y]/100$$

and

$$\%P_s = [10\ x + 30\ y]/100$$

where:

E_s is the prorated sulfur dioxide emission limit (ng/J heat input)

$\%P_s$ is the percentage of potential sulfur dioxide emission allowed

x is the percentage of total heat input derived from the combustion of liquid or gaseous fuels, excluding solid–derived fuels

y is the percentage of total heat input derived from the combustion of solid fuel, including solid–derived fuels

(5) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility, except as provided under par. (b), any gases which contain nitrogen oxides in excess of the following emission limits, based on a 30–day rolling average.

1. NO$_x$ emission limits.

	Emission limit for heat input	
Fuel type	**ng/J**	**(lb/million Btu)**
Gaseous fuels:		
Coal–derived fuels . . .	210	0.50
All other fuels	86	0.20
Liquid fuels:		
Coal–derived fuels . . .	210	0.50
Shale oil	210	0.50
All other fuels	130	0.30
Coal–derived fuels . . .	210	0.50
Any fuel containing more than 25%, by weight, coal refuse	(1)	(1)
Solid fuels:		
Any fuel containing more than 25%, by weight, lignite if the lignite is mined in North Dakota, South Dakota, or Montana, and is combusted in a slag tap furnace[2]	340	0.80
Any fuel containing more than 25%, by weight, lignite not subject to the 340 ng/J heat input emission limit[2]	260	0.60
Subbituminous coal	210	0.50
Bituminous coal	260	0.60
Anthracite coal	260	0.60
All other fuels	260	0.60

[1] Exempt from NO$_x$ standards and NO$_x$ monitoring requirements.

[2] Any fuel containing less than 25%, by weight, lignite is not prorated but its percentage is added to the percentage of the predominant fuel.

2. NO$_x$ reduction requirements.

Fuel type	**Percent reduction of potential combustion concentration**
Gaseous fuels	25
Liquid fuels	30
Solid fuels	65

(b) The emission limitations under par. (a) do not apply to any affected facility which is combusting coal–derived liquid fuel and is operating under a commercial demonstration permit issued by the administrator in accordance with the provisions of 40 CFR 60.45a.

(c) When 2 or more fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

$$E_n = [86\ w + 130\ x + 210\ y + 260\ z + 340\ v]\ /100$$

where:

E_n is the applicable standard for nitrogen oxides when multiple fuels are combusted simultaneously (ng/J heat input)

w is the percentage of total heat input derived from the combustion of fuels subject to the 86 ng/J heat input standard

x is the percentage of total heat input derived from the combustion of fuels subject to the 130 ng/J heat input standard

y is the percentage of total heat input derived from the combustion of fuels subject to the 210 ng/J heat input standard

z is the percentage of total heat input derived from the combustion of fuels subject to the 260 ng/J heat input standard

v is the percentage of total heat input delivered from the combustion of fuels subject to the 340 ng/J heat input standard

(6) COMPLIANCE PROVISIONS. (a) Compliance with the particulate matter emission limitation under sub. (3) (a) 1. constitutes compliance with the percent reduction requirements for particulate matter under sub. (3) (a) 2. and 3.

(b) Compliance with the nitrogen oxides emission limitation under sub. (5) (a) 1. constitutes compliance with the percent reduction requirements under sub. (5) (a) 2.

(c) The particulate matter emissions standards under sub. (3) and the nitrogen oxides emission standards under sub. (5) apply at all times except during periods of startup, shutdown or malfunction. The sulfur dioxide emission standards under sub. (4) apply at all times except during periods of startup, shutdown or when both emergency conditions exist and the procedures under par. (d) are implemented.

(d) During emergency conditions in the principal company, an affected facility with a malfunctioning flue gas desulfurization system may be operated if sulfur dioxide emissions are minimized by:

1. Operating all operable flue gas desulfurization system modules, and bringing back into operation any malfunctioned module as soon as repairs are completed.

2. Bypassing flue gases around only those flue gas desulfurization system modules that have been taken out of operation because they were incapable of any sulfur dioxide emission reduction or which would have suffered significant physical damage if they had remained in operation, and

3. Designing, constructing and operating a spare flue gas desulfurization system module for an affected facility larger than 365 MW (1,250 million Btu/hr) heat input (approximately 125 MW electrical output capacity). The department may at its discretion require the owner or operator within 60 days of notification to demonstrate spare module capability. To demonstrate this capability, the owner or operator shall demonstrate compliance with the appropriate requirements under sub. (4) (a), (b), (d) and (h) for any period of operation lasting from 24 hours to 30 days when:

a. Any one flue gas desulfurization module is not operated.

b. The affected facility is operating at the maximum heat input rate,

c. The fuel fired during the 24–hour to 30–day period is representative of the type and average sulfur content of fuel used over a typical 30–day period, and

d. The owner or operator has given the department at least 30 days notice of the date and period of time over which the demonstration will be performed.

(e) After the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limitations and percentage reduction requirements under sub. (4) and the nitrogen oxides emission limitations under sub. (5) shall be based on the average emission rate for 30 successive boiler operating days. A separate performance test is completed at the end of each boiler operating day after the initial performance test, and a new 30–day average emission rate for both sulfur dioxide and nitrogen oxides and a new percent reduction of sulfur dioxide are calculated to show compliance with the standards.

(f) For the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limitations and percent reduction requirements under sub. (4) and the nitrogen oxides emission limitation under sub. (5) shall be based on the average emission rates for sulfur dioxide, nitrogen oxides, and percent reduction for sulfur dioxide for the first 30 successive boiler operating days. The initial performance test is the only test in which at least 30 days prior notice is required unless otherwise specified by the department. The initial performance test shall be scheduled so that the first boiler operating day of the 30 successive boiler operating days is completed within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility.

(g) Compliance shall be determined by calculating the arithmetic average of all hourly emission rates for SO_2 and NO_x for the 30 successive boiler operating days, except for data obtained during startup, shutdown, malfunction (NO_x only) or emergency conditions (SO_2 only). Compliance with the percentage reduction requirement for SO_2 shall be determined based on the average inlet and average outlet SO_2 emission rates for the 30 successive boiler operating days.

(h) If an owner or operator has not obtained the minimum quantity of emission data as required under sub. (7), compliance of the affected facility with the emission requirements under subs. (4) and (5) for the day on which the 30–day period ends may be determined by the department by following the applicable procedures in section 7.0 of Method 19, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(7) EMISSION MONITORING. (a) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring the opacity of emissions discharged to the atmosphere, except where gaseous fuel is the only fuel combusted. If opacity interference due to water droplets exists in the stack (for example, from the use of a flue gas desulfurization (FGD) system), the opacity shall be monitored upstream of the interference (at the inlet to the FGD system). If opacity interference is experienced at all locations (both at the inlet and outlet of the sulfur dioxide control system), alternate parameters indicative of the particulate matter control system's performance shall be monitored (subject to the approval of the department).

(b) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring sulfur dioxide emissions, except where natural gas is the only fuel combusted, as follows:

1. Sulfur dioxide emissions shall be monitored at both the inlet and outlet of the sulfur dioxide control device.

2. For a facility which qualifies under the provisions of sub. (4) (d), sulfur dioxide emissions shall only be monitored as discharged to the atmosphere.

3. An "as fired" fuel monitoring system (upstream of coal pulverizers) meeting the requirements of Method 19, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, may be used to determine potential sulfur dioxide emissions in place of a continuous sulfur dioxide emission monitor at the inlet to the sulfur dioxide control device as required under subd. 1.

(c) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system for measuring nitrogen oxides emissions discharged to the atmosphere.

(d) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring the oxygen or carbon dioxide content of the flue gases at each location where sulfur dioxide or nitrogen oxides emissions are monitored.

(e) The continuous monitoring systems under pars. (b), (c) and (d) shall be operated and data recorded during all periods of operation of the affected facility including period of startup, shutdown, malfunction or emergency conditions, except for continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments.

(f) The owner or operator shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days. If this minimum data requirement cannot be met with a continuous monitoring system, the owner or operator shall supplement emission data with other monitoring systems approved by the department or the reference methods and procedures as described in par. (h).

(g) The one–hour averages required under s. NR 440.13 (8) shall be expressed in ng/J (lbs/million Btu) heat input and used to calculate the average emission rates under sub. (6). The one–hour averages shall be calculated using the data points required under s. NR 440.13 (2). At least 2 data points shall be used to calculate the one–hour averages.

(h) When it becomes necessary to supplement continuous monitoring system data to meet the minimum data requirements in par. (f), the owner or operator shall use the reference methods and procedures as specified in this paragraph. Acceptable alternative methods and procedures are given in par. (j).

1. Method 6 shall be used to determine the SO_2 concentration at the same location as the SO_2 monitor. Samples shall be

taken at 60 minute intervals. The sampling time and sample volume for each sample shall be at least 20 minutes and 0.020 dscm (0.71 dscf). Each sample represents a 1–hour average.

2. Method 7 shall be used to determine the NO_x concentration at the same location as the NO_x monitor. Samples shall be taken at 30–minute intervals. The arithmetic average of 2 consecutive samples represent a 1–hour average.

3. The emission rate correction factor, integrated bag sampling and analysis procedure of Method 3B shall be used to determine the O_2 or CO_2 concentration at the same location as the O_2 or CO_2 monitor. Samples shall be taken for at least 30 minutes in each hour. Each sample represents a 1–hour average.

4. The procedures in Method 19 shall be used to compute each 1–hour average concentration in ng/J (lb/million Btu) heat input.

(i) The owner or operator shall use methods and procedures in this paragraph to conduct monitoring system performance evaluations under s. NR 440.13 (3) and calibration checks under s. NR 440.13 (4). Acceptable alternative methods and procedures are given in par. (j).

1. Methods 6, 7 and 3B, as applicable, shall be used to determine O_2, SO_2 and NO_x concentrations.

2. SO_2 or NO_x (NO), as applicable, shall be used for preparing the calibration gas mixtures (in N_2, as applicable) under Performance Specification 2 of Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17.

3. For affected facilities burning only fossil fuel, the span value for a continuous monitoring system for measuring opacity shall be between 60 and 80% and for a continuous monitoring system measuring nitrogen oxides shall be determined as follows:

Fossil fuel	Span value for nitrogen oxides (ppm)
Gas	500
Liquid	500
Solid	1,000
Combination	500(x+ y)+ 1,000z

where:

x is the fraction of total heat input derived from gaseous fossil fuel

y is the fraction of total heat input derived from liquid fossil fuel

z is the fraction of total heat input derived from solid fossil fuel

4. All span values computed under par. (b) 3. for burning combinations of fossil fuels shall be rounded to the nearest 500 ppm.

5. For affected facilities burning fossil fuel, alone or in combination with nonfossil fuel, the span value of the sulfur dioxide continuous monitoring system at the inlet to the sulfur dioxide control device shall be 125% of the maximum estimated hourly potential emissions of the fuel fired, and the outlet of the sulfur dioxide control device shall be 50% of maximum estimated hourly potential emissions of the fuel fired.

(j) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection. All test methods are in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. For Method 6, Method 6A or 6B (whenever Methods 6 and 3 or 3B data are used) or 6C may be used. Each Method 6B sample obtained over 24 hours represents 24 1–hour averages. If Method 6A or 6B is used under par. (i), the conditions under s. NR 440.19 (7) (d) 1. apply; these conditions do not apply under par. (h).

2. For Method 7, Method 7A, 7C, 7D or 7E may be used. If Method 7C, 7D or 7E is used, the sampling time for each run shall be 1 hour.

3. For Method 3, Method 3A may be used if the sampling time is 1 hour.

4. For Method 3B, Method 3A may be used.

(8) COMPLIANCE DETERMINATION TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or the methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Section NR 440.08 (6) does not apply to this subsection for SO_2 and NO_x. Acceptable alternative methods are given in par. (e).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The dry basis F factor (O_2) procedures in Method 19 shall be used to compute the emission rate of particulate matter.

2. For the particulate matter concentration, Method 5 shall be used at affected facilities without wet FGD systems and Method 5B shall be used after wet FGD systems.

a. The sampling time and sample volume for each run shall be at least 120 minutes and 1.70 dscm (60 dscf). The probe and filter holder heating system in the sampling train may be set to provide an average gas temperature of no greater than 160 ± 14°C (320 ± 25°F).

b. For each particulate run, the emission rate correction factor, integrated or grab sampling and analysis procedures of Method 3B shall be used to determine the O_2 concentration. The O_2 sample shall be obtained simultaneously with, and at the same traverse points as, the particulate run. If the particulate run has more than 12 traverse points, the O_2 simultaneous traverse points may be reduced to 12 provided that Method 1 is used to locate the 12 O_2 traverse points. If the grab sampling procedure is used, the O_2 concentration for the run shall be the arithmetic mean of all the individual O_2 concentrations at each traverse point.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) The owner or operator shall determine compliance with the SO_2 standards in sub. (4) as follows:

1. The percent of potential SO_2 emissions (% P_s) to the atmosphere shall be computed using the following equation:

$$\% P_s = [(100 - \%R_f)(100 - \%R_g)]/100$$

where:

$\%P_s$ is the percent of potential SO_2 emissions, percent

$\%R_f$ is the percent reduction from fuel pretreatment, percent

$\%R_g$ is the percent reduction by SO_2 control system, percent

2. The procedures in Method 19 may be used to determine percent reduction ($\%R_f$) of sulfur by such processes as fuel pretreatment (physical coal cleaning, hydrodesulfurization of fuel oil, etc.), coal pulverizers, and bottom and flyash interactions. This determination is optional.

3. The procedures in Method 19 shall be used to determine the percent SO_2 reduction ($\%R_g$) of any SO_2 control system. Alternatively, a combination of an 'as fired' fuel monitor and emission rates measured after the control system, following the procedures in Method 19, may be used if the percent reduction is calculated using the average emission rate from the SO_2 con-

trol device and the average SO_2 input rate from the 'as fired' fuel analysis for 30 successive boiler operating days.

4. The appropriate procedures in Method 19 shall be used to determine the emission rate.

5. The continuous monitoring system in sub. (7) (b) and (d) shall be used to determine the concentrations of SO_2 and CO_2 or O_2.

(d) The owner or operator shall determine compliance with the NO_x standard in sub. (5) as follows:

1. The appropriate procedures in Method 19 shall be used to determine the emission rate of NO_x.

2. The continuous monitoring system in sub. (7) (c) and (d) shall be used to determine the concentrations of NO_x and CO_2 or O_2.

(e) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. For Method 5 or 5B, Method 17 may be used at facilities with or without wet FGD systems if the stack temperature at the sampling location does not exceed an average temperature of 160°C (320 °F). The procedures of sections 2.1 and 2.3 of Method 5B may be used in Method 17 only if it is used after wet FGD systems. Method 17 may not be used after wet FGD systems if the effluent is saturated or laden with water droplets.

2. The F_c factor (CO_2) procedures in Method 19 may be used to compute the emission rate of particulate matter under the stipulations of s. NR 440.19 (7) (d) 1. The CO_2 shall be determined in the same manner as the O_2 concentration.

(9) REPORTING REQUIREMENTS. (a) For sulfur dioxide, nitrogen oxides and particulate matter emissions, the performance test data from the initial performance test and from the performance evaluation of the continuous monitors (including the transmissometer) shall be submitted to the department.

(b) For sulfur dioxide and nitrogen oxides the following information shall be reported to the department for each 24–hour period.

1. Calendar date.

2. The average sulfur dioxide and nitrogen oxide emission rates (ng/J or lb/million Btu) for each 30 successive boiler operating days, ending with the last 30–day period in the quarter; reasons for noncompliance with the emission standards; and description of corrective actions taken.

3. Percent reduction of the potential combustion concentration of sulfur dioxide for each 30 successive boiler operating days, ending with the last 30–day period in the quarter; reasons for noncompliance with the standard; and description of corrective actions taken.

4. Identification of the boiler operating days for which pollutant or diluent data have not been obtained by an approved method for at least 18 hours of operation of the facility; justification for not obtaining sufficient data; and description of corrective actions taken.

5. Identification of the times when emissions data have been excluded from the calculation of average emission rates because of startup, shutdown, malfunction (NO_x only), emergency conditions (SO_2 only) or other reasons, and justification for excluding data for reasons other than startup, shutdown, malfunction or emergency conditions.

6. Identification of "F" factor used for calculations, method of determination and type of fuel combusted.

7. Identification of times when hourly averages have been obtained based on manual sampling methods.

8. Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.

9. Description of any modifications to the continuous monitoring system which could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17.

(c) If the minimum quantity of emission data as required by sub. (7) is not obtained for any 30 successive boiler operating days, the following information obtained under the requirements of sub. (6) (h) shall be reported to the department for that 30–day period:

1. The number of hourly averages available for outlet emissions rates (n_o) and inlet emission rates (n_i), as applicable.

2. The standard deviation of hourly averages for outlet emission rates (S_o) and inlet emission rates (S_i), as applicable.

3. The lower confidence limit for the mean outlet emission rate (E_o*) and the upper confidence limit for the mean inlet emission rate (E_i*), as applicable.

4. The applicable potential combustion concentration.

5. The ratio of the upper confidence limit for the mean outlet emission rate (E_o*) and the allowable emission rate (E_{std}), as applicable.

(d) If any standards under sub. (4) are exceeded during emergency conditions because of control system malfunction, the owner or operator of the affected facility shall submit a signed statement:

1. Indicating if emergency conditions existed and requirements under sub. (6) (d) were met during each period, and

2. Listing the following information:

a. Time periods the emergency condition existed;

b. Electrical output and demand on the owner or operator's electric utility system and the affected facility;

c. Amount of power purchased from interconnected neighboring utility companies during the emergency period;

d. Percent reduction in emissions achieved;

e. Atmospheric emission rate (ng/J) of the pollutant discharged; and

f. Actions taken to correct control system malfunction.

(e) If fuel pretreatment credit toward the sulfur dioxide emission standard under sub. (4) is claimed, the owner or operator of the affected facility shall submit a signed statement:

1. Indicating what percentage cleaning credit was taken for the calendar quarter, and whether the credit was determined in accordance with the provisions of sub. (8) and Method 19 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17; and

2. Listing the quantity, heat content, and date each pretreated fuel shipment was received during the previous quarter; the name and location of the fuel pretreatment facility; and the total quantity and total heat content of all fuels received at the affected facility during the previous quarter.

(f) For any periods for which opacity, sulfur dioxide or nitrogen oxides emissions data are not available, the owner or operator of the affected facility shall submit a signed statement indicating if any changes were made in operation of the emission control system during the period of data unavailability. Operations of the control system and affected facility during periods of data unavailability are to be compared with operation of the control system and affected facility before and following the period of data unavailability.

(g) The owner or operator of the affected facility shall submit a signed statement indicating whether:

1. The required continuous monitoring system calibration, span, and drift checks or other periodic audits have or have not been performed as specified.

2. The data used to show compliance was or was not obtained in accordance with approved methods and procedures of this chapter and is representative of plant performance.

3. The minimum data requirements have or have not been met; or, the minimum data requirements have not been met for errors that were unavoidable.

4. Compliance with the standards has or has not been achieved during the reporting period.

(h) For the purposes of the reports required under s. NR 440.07, periods of excess emissions are defined as all 6–minute periods during which the average opacity exceeds the applicable opacity standards under sub. (3) (b). Opacity levels in excess of the applicable opacity standard and the date of such excesses shall be submitted to the department each calendar quarter.

(i) The owner or operator of an affected facility shall submit the written reports required under this subsection and ss. NR 440.01 to 440.15 to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (7) (h) 1., 3., 4., (L) 1. and (8) (a) 1., Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (7) (h) 1. to 3., (i) 1., (8) (a) 1. to 6., r. (8) (a) 7., Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (h) 1. and 2., (5) (a) 1., (c), (6) (d) 3. (intro.) and (h), r. and recr. (7) (f), (h), (i) (intro.) to 2. and (8), cr. (7) (j), Register, July, 1993, No. 451, eff. 8–1–93; am. (2) (n), (y), (5) (a) 1., (7) (h) 2., (8) (b) 2., Register, December, 1995, No. 480, eff. 1–1–96**; correction in (4) (b) (intro.) made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.205 Industrial – commercial – institutional steam generating units. (1) APPLICABILITY. (a) The affected facility to which this section applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of more than 29 MW (100 million Btu/hour).

(b) Any affected facility meeting the applicability requirements under par. (a) and commencing construction, modification, or reconstruction after June 19, 1984, but on or before June 19, 1986, is subject to the following standards:

1. Coal–fired affected facilities having a heat input capacity between 29 and 73 MW (100 and 250 million Btu/hour), inclusive, are subject to the particulate matter and nitrogen oxides standards under this section.

2. Coal–fired affected facilities having a heat input capacity greater than 73 MW (250 million Btu/hour) and meeting the applicability requirements under s. NR 440.19 (standards of performance for fossil fuel–fired steam generators) are subject to the particulate matter and nitrogen oxides standards under this section and to the sulfur dioxide standards in s. NR 440.19 (4).

3. Oil–fired affected facilities having a heat input capacity between 29 and 73 MW (100 and 250 million Btu/hour), inclusive, are subject to the nitrogen oxides standards in this section.

4. Oil–fired affected facilities having a heat input capacity greater than 73 MW (250 million Btu/hour) and meeting the applicability requirements in s. NR 440.19 (standards of performance for fossil fuel–fired steam generators) are also subject to the nitrogen oxides standards in this section and the particulate matter and sulfur dioxide standards in s. NR 440.19 (3) and (4).

(c) Affected facilities which also meet the applicability requirements under s. NR 440.26 (standards of performance for petroleum refineries) are subject to the particulate matter and nitrogen oxides standards under this section and the sulfur dioxide standards under s. NR 440.26 (5).

(d) Affected facilities which also meet the applicability requirements in s. NR 440.21 (standards of performance for incinerators) are subject to the nitrogen oxides and particulate matter standards in this section.

(e) Steam generating units meeting the applicability requirements in s. NR 440.20 (standards of performance for electric utility steam generating units) are not subject to this section.

(f) Any change to an existing steam generating unit for the sole purpose of combusting gases containing TRS as defined in s. NR 440.45 (2) is not considered a modification under s. NR 440.14 and the steam generating unit is not subject to this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Annual capacity factor" means the ratio between the actual heat input to a steam generating unit from the fuels listed in sub. (3) (a), (4) (a) or (5) (a), as applicable, during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours at the maximum steady state design heat input capacity. In the case of steam generating units that are rented or leased, the actual heat input shall be determined based on the combined heat input from all operations of the affected facility in a calendar year.

(b) "Byproducts/waste" means any liquid or gaseous substance produced at chemical manufacturing plants or petroleum refineries (except natural gas, distillate oil, or residual oil) and combusted in a steam generating unit for heat recovery or for disposal. Gaseous substances with carbon dioxide levels greater than 50% or carbon monoxide levels greater than 10% are not byproduct/waste for the purposes of this section.

(c) "Chemical manufacturing plants" means industrial plants which are classified by the department of commerce under SIC code 28 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17.

(d) "Coal" means all solid fuels classified as an anthracite, bituminous, subbituminous, or lignite by the American Society for Testing and Materials in ASTM D388–77, Standard Specification for Classification of Coals by Rank, incorporated by reference in s. NR 440.17, coal refuse, and petroleum coke. Coal–derived synthetic fuels, including but not limited to solvent refined coal, gasified coal, coal–oil mixtures, and coal–water mixtures, are also included in this definition for the purposes of this section.

(e) "Coal refuse" means any byproduct of coal mining or coal cleaning operations with an ash content greater than 50%, by weight, and a heating value less than 13,900 kJ/kg (6,000 Btu/lb) on a dry basis.

(f) "Combined cycle system" means a system where a separate source, such as a gas turbine, internal combustion engine, kiln, etc., provides exhaust gas to a heat recovery steam generating unit.

(g) "Conventional technology" means wet flue gas desulfurization (FGD) technology, dry FGD technology, atmospheric fluidized bed combustion technology, and oil hydrodesulfurization technology.

(h) "Distillate oil" means fuel oils which contain 0.05 weight % nitrogen or less and comply with the specifications for fuel oils number 1 and 2, as defined by the American Society for Testing and Materials in ASTM D396–78, Standard Specification for Fuel Oils, incorporated by reference in s. NR 440.17.

(i) "Dry flue gas desulfurization technology" means a sulfur dioxide control system that is located downstream of the steam generating unit and removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution and forming a dry powder material. This definition includes devices where the dry powder material is subsequently converted to another form. Alkaline slurries or solutions used in dry flue gas desulfurization technology include but are not limited to lime and sodium.

(j) "Duct burner" means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary gas turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a heat recovery steam generating unit.

(k) "Emerging technology" means any sulfur dioxide control system that is not defined as a conventional technology under this subsection, and for which the owner or operator of the facility has applied to the administrator and received approval to operate as an emerging technology under sub. (10) (a) 4.

(m) "Fluidized bed combustion technology" means combustion of fuel in a bed or series of beds (including but not limited to bubbling bed units and circulating bed units) of limestone aggregate (or other sorbent materials) in which these materials are forced upward by the flow of combustion air and the gaseous products of combustion.

(n) "Fuel pretreatment" means a process that removes a portion of the sulfur in a fuel before combustion of the fuel in a steam generating unit.

(o) "Full capacity" means operation of the steam generating unit at 90% or more of the maximum steady–state design heat input capacity.

(p) "Heat input" means heat derived from combustion of fuel in a steam generating unit and does not include the heat input from preheated combustion air, recirculated flue gases, or exhaust gases from other sources, such as gas turbines, internal combustion engines, kilns, etc.

(q) "Heat release rate" means the steam generating unit design heat input capacity (in MW or Btu/hour) divided by the furnace volume (in cubic meters or cubic feet); the furnace volume is that volume bounded by the front furnace wall where the burner is located, the furnace side waterwall, and extending to the level just below or in front of the first row of convection pass tubes.

(r) "Heat transfer medium" means any material that is used to transfer heat from one point to another point.

(s) "High heat release rate" means a heat release rate greater than 730,000 J/sec–m^3 (70,000 Btu/hour–ft^3).

(t) "Lignite" means a type of coal classified as lignite A or lignite B by the American Society for Testing and Materials in ASTM D388–77, Standard Specification for Classification of Coals by Rank, incorporated by reference in s. NR 440.17.

(u) "Low heat release rate" means a heat release rate of 730,000 J/sec–m^3 (70,000 Btu/hour–ft^3) or less.

(v) "Mass–feed stoker steam generating unit" means a steam generating unit where solid fuel is introduced directly into a retort or is fed directly onto a grate where it is combusted.

(w) "Maximum heat input capacity" means the ability of a steam generating unit to combust a stated maximum amount of fuel on a steady state basis, as determined by the physical design and characteristics of the steam generating unit.

(x) "Municipal–type solid waste" means refuse, more than 50% of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and noncombustible materials such as glass and rock.

(y) "Natural gas" means:

1. A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal hydrocarbon constituent is methane; or

2. Liquid petroleum gas, as defined by the American Society for Testing and Materials in ASTM D1835–86, Standard Specification for Liquid Petroleum Gases, incorporated by reference in s. NR 440.17.

(z) "Noncontinental area" means the state of Hawaii, the Virgin Islands, Guam, American Samoa, the commonwealth of Puerto Rico, or the Northern Mariana Islands.

(za) "Oil" means crude oil or petroleum or a liquid fuel derived from crude oil or petroleum, including distillate and residual oil.

(zb) "Petroleum refinery" means industrial plants as classified by the department of commerce under SIC code 29 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17.

(zc) "Potential sulfur dioxide emission rate" means the theoretical sulfur dioxide emissions (ng/J, lb/million Btu heat input) that would result from combusting fuel in an uncleaned state and without using emission control systems.

(zd) "Process heater" means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.

(ze) "Pulverized coal–fired steam generating unit" means a steam generating unit in which pulverized coal is introduced into an air stream that carries the coal to the combustion chamber of the steam generating unit where it is fired in suspension. This includes both conventional pulverized coal–fired and micropulverized coal–fired steam generating units.

(zf) "Residual oil" means crude oil, fuel oil numbers 1 and 2 that have a nitrogen content greater than 0.05 weight %, and all fuel oil numbers 4, 5 and 6, as defined by the American Society for Testing and Materials in ASTM D396–78, Standard Specifications for Fuel Oils, incorporated by reference in s. NR 440.17.

(zg) "Spreader stoker steam generating unit" means a steam generating unit in which solid fuel is introduced to the combustion zone by a mechanism that throws the fuel onto a grate from above and in which combustion takes place both in suspension and on the grate.

(zh) "Steam generating unit" means a device that combusts any fuel or byproduct/waste to produce steam or to heat water or any other heat transfer medium. This term includes any municipal–type solid waste incinerator with a heat recovery steam generating unit or any steam generating unit that combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters as they are defined in this section.

(zi) "Steam generating unit operating day" means a 24–hour period between 12:00 midnight and the following midnight during which any fuel is combusted at anytime in the steam generating unit. It is not necessary for fuel to be combusted continuously for the entire 24–hour period.

(zj) "Very low sulfur oil" means an oil that contains no more than 0.50 weight percent sulfur or that, when combusted without sulfur dioxide emission control, has a sulfur dioxide emission rate equal to or less than 215 ng/J (0.50 lb/million Btu) heat input.

(zk) "Wet flue gas desulfurization technology" means a sulfur dioxide control system that is located downstream of the steam generating unit and removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gas with an alkaline slurry or solution and forming a liquid material. This definition applies to devices where the aqueous liquid material product of this contact is subsequently converted to other forms. Alkaline reagents used in wet flue gas desulfurization technology include, but are not limited to, lime, limestone, and sodium.

(zL) "Wet scrubber system" means any emission control device that mixes an aqueous stream or slurry with the exhaust gases from a steam generating unit to control emissions of particulate matter or sulfur dioxide.

(zm) "Wood" means wood, wood residue, bark, or any derivative fuel or residue thereof, in any form, including, but not limited to, sawdust, sanderdust, wood chips, scraps, slabs, millings, shavings, and processed pellets made from wood or other forest residues.

(3) STANDARD FOR SULFUR DIOXIDE. (a) Except as provided in par. (b), (c), (d), or (j) on and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal or oil may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 10% (0.10) of the potential sulfur dioxide emission rate (90% reduction) and that contain sulfur dioxide in excess of the emission limit determined according to the following formula:

$$E_s = (K_aH_a + K_bH_b)/(H_a + H_b)$$

where:

E_s is the sulfur dioxide emission limit, in ng/J or lb/million Btu heat input

K_a is 520 ng/J (or 1.2 lb/million Btu)

K_b is 340 ng/J (or 0.80 lb/million Btu)

H_a is the heat input from the combustion of coal, in J (million Btu)

H_b is the heat input from the combustion of oil, in J (million Btu)

Only the heat input supplied to the affected facility from the combustion of coal and oil is counted under this subsection. No credit is provided for the heat input to the affected facility from the combustion of natural gas, wood, municipal–type solid waste, or other fuels or heat input to the affected facility from exhaust gases from another source, such as gas turbines, internal combustion engines, kilns, etc.

(b) On and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that combusts coal refuse alone in a fluidized bed combustion steam generating unit may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 20% of the potential sulfur dioxide emission rate (80% reduction) and that contain sulfur dioxide in excess of 520 ng/J (1.2 lb/million Btu) heat input. If coal or oil is fired with coal refuse, the affected facility is subject to par. (a) or (d), as applicable.

(c) On and after the date on which the performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that combusts coal or oil, either alone or in combination with any other fuel, and that uses an emerging technology for the control of sulfur dioxide emissions, may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 50% of the potential sulfur dioxide emission rate (50% reduction) and that contain sulfur dioxide in excess of the emission limit determined according to the following formula:

$$E_s = (K_cH_c + K_dH_d)/(H_c + H_d)$$

where:

E_s is the sulfur dioxide emission limit, expressed in ng/J or lb/million Btu heat input

K_c is 260 ng/J (or 0.60 lb/million Btu)

K_d is 170 ng/J (or 0.40 lb/million Btu)

H_c is the heat input from the combustion of coal, in J (million Btu)

H_d is the heat input from the combustion of oil, in J (million Btu)

Only the heat input supplied to the affected facility from the combustion of coal and oil is counted under this subsection. No credit is provided for the heat input to the affected facility from the combustion of natural gas, wood, municipal–type solid waste, or other fuels, or from the heat input to the affected facility from exhaust gases from another source, such as gas turbines, internal combustion engines, kilns, etc.

(d) On and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility listed in subd. 1., 2. or 3. may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 520 ng/J (1.2 lb/million Btu) heat input if the affected facility combusts coal, or 215 ng/J (0.50 lb/million Btu) heat input if the affected facility combusts oil other than very low sulfur oil. Percent reduction requirements are not applicable to affected facilities under this paragraph.

1. Affected facilities that have an annual capacity factor for coal and oil of 30% (0.30) or less and are subject to a federally enforceable permit limiting the operation of the affected facility to an annual capacity factor for coal and oil to 30% (0.30) or less;

2. Affected facilities located in a noncontinental area; or

3. Affected facilities combusting coal or oil, alone or in combination with any other fuel, in a duct burner as part of a combined cycle system where 30% (0.30) or less of the heat input to the steam generating unit is from combustion of coal and oil in the duct burner and 70% (0.70) or more of the heat input to the steam generating unit is from the exhaust gases entering the duct burner.

(e) Except as provided in par. (f), compliance with the emission limits, fuel oil sulfur limits, and/or percent reduction requirements under this subsection are determined on a 30–day rolling average basis.

(f) Except as provided for in par. (j) 2., compliance with the emission limits or fuel oil sulfur limits under this subsection is determined on a 24–hour average basis for affected facilities that:

1. Have a federally enforceable permit limiting the annual capacity factor for oil to 10% or less;

2. Combust only very low sulfur oil; and

3. Do not combust any other fuel.

(g) Except as provided in par. (i), the sulfur dioxide emission limits and percent reduction requirements under this subsection apply at all times, including periods of startup, shutdown, and malfunction.

(h) Reductions in the potential sulfur dioxide emission rate through fuel pretreatment are not credited toward the percent reduction requirement under par. (c) unless:

1. Fuel pretreatment results in a 50% or greater reduction in potential sulfur dioxide emissions and

2. Emissions from the pretreated fuel (without combustion or post combustion sulfur dioxide control) are equal to or less than the emission limits specified in par. (c).

(i) An affected facility subject to par. (a), (b), or (c) may combust very low sulfur oil or natural gas when the sulfur dioxide control system is not being operated because of malfunction or maintenance of the sulfur dioxide control system.

(j) Percent reduction requirements are not applicable to affected facilities combusting only very low sulfur oil. The owner or operator of an affected facility combusting very low sulfur oil shall demonstrate that the oil meets the definition of very low sulfur oil by:

1. Following the performance testing procedures as described in sub. (6) (c) or (d), and following the monitoring procedures as described in sub. (8) (a) or (b) to determine sulfur dioxide emission rate or fuel oil sulfur content; or

2. Maintaining fuel receipts as described in sub. (10) (r).

(4) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility which combusts coal or combusts mixtures of coal with other fuels, may cause to be discharged into the atmosphere from that affected facility any gases which contain particulate matter in excess of the following emission limits:

1. 22 ng/J (0.050 lb/million Btu) heat input;

a. If the affected facility combusts only coal, or

b. If the affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels of 10% (0.10) or less.

2. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels greater than 10% (0.10) and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor greater than 10% (0.10) for fuels other than coal.

3. 86 ng/J (0.20 lb/million Btu) heat input if the affected facility combusts coal or coal and other fuels and:

a. Has an annual capacity factor for coal or coal and other fuels of 30% (0.30) or less,

b. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less,

c. Has a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor 30% (0.30) or less for coal or coal and other solid fuels, and

d. Construction of the affected facility commenced after June 19, 1984 and before November 25, 1986.

(b) On or after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts oil, or mixtures of oil with other fuels, and uses a conventional or emerging technology to reduce sulfur dioxide emissions may discharge into the atmosphere from that affected facility any gases that contain particulate matter in excess of 43 ng/J (0.10 lb/million Btu) heat input.

(c) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts wood, or wood with other fuels, except coal, may cause to be discharged from that affected facility any gases that contain particulate matter in excess of the following emission limits:

1. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility has an annual capacity factor greater than 30% (0.30) for wood.

2. 86 ng/J (0.20 lb/million Btu) heat input if:

a. The affected facility has an annual capacity factor of 30% (0.30) or less for wood,

b. Is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor 30% (0.30) or less for wood, and:

c. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less.

(d) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts municipal–type solid waste or mixtures of municipal–type solid waste with other fuels, may cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter in excess of the following emission limits:

1. 43 ng/J (0.10 lb/million Btu) heat input if;

a. The affected facility combusts only municipal–type solid waste, or

b. The affected facility combusts municipal–type solid waste and other fuels and has an annual capacity factor for the other fuels of 10% (0.10) or less.

2. 86 ng/J (0.20 lb/million Btu) heat input if the affected facility combusts municipal–type solid waste or municipal–type solid waste and other fuels; and

a. Has an annual capacity factor for municipal–type solid waste and other fuels of 30% (0.30) or less,

b. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less,

c. Has a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor of 30% (0.30) for municipal–type solid waste, or municipal–type solid waste and other fuels, and

d. Construction of the affected facility commenced after June 19, 1984, but before November 25, 1986.

(e) For the purposes of this subsection, the annual capacity factor is determined by dividing the actual heat input to the steam generating unit during the calendar year from the combustion of coal, wood, or municipal– type solid waste, and other fuels, as applicable, by the potential heat input to the steam generating unit if the steam generating unit had been operated for 8,760 hours at the maximum design heat input capacity.

(f) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal, oil, wood or mixtures of these fuels with any other fuels may cause to be discharged into the atmosphere any gases that exhibit greater than 20% opacity (6–minute average), except for one 6–minute period per hour of not more than 27% opacity.

(g) The particulate matter and opacity standards apply at all times, except during period of startup, shutdown or malfunction.

(5) STANDARD FOR NITROGEN OXIDES. (a) Except as provided under par. (k), on and after the date on which the performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that is subject to the provisions of this subsection and that combusts only coal, oil, or natural gas may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides (expressed as NO_2) in excess of the following emission limits:

Fuel/Steam Generating Unit Type	Nitrogen Oxide Emission Limits ng/J (lb/million Btu) (expressed as NO_2) Heat Input
1. Natural gas and distillate oil, except 4.:	
a. Low heat release rate	43 (0.10)
b. High heat release rate	86 (0.20)

2.	Residual oil:	
	a. Low heat release rate	130 (0.30)
	b. High heat release rate	170 (0.40)
3.	Coal:	
	a. Mass–feed stoker	210 (0.50)
	b. Spreader stoker and fluidized bed combustion	260 (0.60)
	c. Pulverized coal	300 (0.70)
	d. Lignite, except e.	260 (0.60)
	e. Lignite mined in North Dakota, South Dakota, or Montana and combusted in a slag tap furnace	340 (0.80)
	f. Coal–derived synthetic fuels	210 (0.50)
4.	Duct burner used in a combined cycle system:	
	a. Natural gas and distillate oil	86 (0.20)
	b. Residual oil	170 (0.40)

(b) Except as provided under par. (k), on and after the date on which the initial performance test is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts mixtures of coal, oil, or natural gas may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of a limit determined by use of the following formula:

$$E_n = [(EL_{go} H_{go}) + (EL_{ro} H_{ro}) + (EL_c H_c)]/(H_{go} + H_{ro} + H_c)$$

where:

E_n is the nitrogen oxides emission limit (expressed as NO_2), ng/J (lb/million Btu)

EL_{go} is the appropriate emission limit from the table in par. (a) for combustion of natural gas or distillate oil, ng/J (lb/million Btu)

H_{go} is the heat input from combustion of natural gas or distillate oil, J (million Btu)

EL_{ro} is the appropriate emission limit from the table in par. (a) for combustion of residual oil

H_{ro} is the heat input from combustion of residual oil, J (million Btu)

EL_c is the appropriate emission limit from the table in par. (a) for combustion of coal

H_c is the heat input from combustion of coal, J (million Btu)

(c) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that simultaneously combusts coal or oil, or a mixture of these fuels with natural gas, and wood, municipal–type solid waste, or any other fuel may cause to be discharged into the atmosphere any gases that contain nitrogen oxides in excess of the emission limit for the coal or oil, or mixture of these fuels with natural gas combusted in the affected facility, as determined pursuant to par. (a) or (b), unless the affected facility has annual capacity factor for coal or oil, or mixture of these fuels with natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement that limits operation of the facility to an annual capacity factor of 10% (0.10) or less for coal, oil, or a mixture of these fuels with natural gas.

(d) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts natural gas with wood, municipal–type solid waste, or other solid fuel, except coal, may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of 130 ng/J (0.30 lb/million Btu) heat input unless the affected facility has an annual capacity factor for natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement that limits operation of the affected facility to an annual capacity factor of 10% (0.10) or less for natural gas.

(e) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts coal, oil, or natural gas with byproduct/waste may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of an emission limit determined by the following formula unless the affected facility has an annual capacity factor for coal, oil, and natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement which limits operation of the affected facility to an annual capacity factor of 10% (0.10) or less:

$$E_n = [(EL_{go} H_{go}) + (EL_{ro} H_{ro}) + (EL_c H_c)]/(H_{go} + H_{ro} + H_c)$$

where:

E_n is the nitrogen oxides emission limit (expressed as NO_2), ng/J (lb/million Btu)

EL_{go} is the appropriate emission limit from the table in par. (a) for combustion of natural gas or distillate oil, ng/J (lb/million Btu)

H_{go} is the heat input from combustion of natural gas, distillate oil and gaseous byproduct/waste, J (million Btu)

EL_{ro} is the appropriate emission limit from the table in par. (a) for combustion of residual oil, ng/J (lb/million Btu)

H_{ro} is the heat input from combustion of residual oil and/or liquid byproduct/waste, J (million Btu)

EL_c is the appropriate emission limit from the table in par. (a) for combustion of coal

H_c is the heat input from combustion of coal, J (million Btu)

(f) Any owner or operator of an affected facility that combusts byproduct/waste with either natural gas or oil may petition the administrator within 180 days of the initial startup of the affected facility to establish a nitrogen oxide emission limit which shall apply specifically to that affected facility when the byproduct/waste is combusted. The petition shall include sufficient and appropriate data, as determined by the administrator, such as nitrogen oxides emissions from the affected facility, waste composition (including nitrogen content), and combustion conditions to allow the administrator to confirm that the affected facility is unable to comply with the emission limits in par. (e) and to determine the appropriate emission limit for the affected facility.

1. Any owner or operator of an affected facility petitioning for a facility–specific nitrogen oxides emission limit under this subsection shall:

a. Demonstrate compliance with the emission limits in the par. (a) table for natural gas and distillate oil or for residual oil as appropriate, by conducting a 30–day performance test as provided in sub. (7) (e). During the performance test only natural gas, distillate oil, or residual oil shall be combusted in the affected facility; and

b. Demonstrate that the affected facility is unable to comply with the emission limits in the par. (a) table for natural gas and distillate oil or for residual oil as appropriate, when gaseous or liquid byproduct/waste is combusted in the affected facility under the same conditions and using the same technological system of emission reduction applied when demonstrating compliance under subd. 1. a.

2. The nitrogen oxides emission limits in the par. (a) table for natural gas or distillate oil or for residual oil, as appropriate, shall be applicable to the affected facility until and unless the petition is approved by the administrator. If the petition is

approved by the administrator, a facility–specific nitrogen oxides emission limit will be established at the nitrogen oxides emission level achievable when the affected facility is combusting oil or natural gas and byproduct/waste in a manner which the administrator determines to be consistent with minimizing nitrogen oxides emissions.

(g) Any owner or operator of an affected facility that combusts hazardous waste, as defined by 40 CFR part 261 or 40 CFR part 761, as in effect on July 1, 1994, with natural gas or oil may petition the administrator within 180 days of the initial startup of the affected facility for a waiver from compliance with the nitrogen oxides emission limit which applies specifically to that affected facility. The petition shall include sufficient and appropriate data, as determined by the administrator, on nitrogen oxides emissions from the affected facility, waste destruction efficiencies, waste composition (including nitrogen content), the quantity of specific wastes to be combusted and combustion conditions, to allow the administrator to determine if the affected facility is able to comply with the nitrogen oxides emission limits required by this subsection. The owner or operator of the affected facility shall demonstrate that when hazardous waste is combusted in the affected facility, thermal destruction efficiency requirements for hazardous waste specified in an applicable federally enforceable requirement preclude compliance with the nitrogen oxides emission limits of this subsection. The nitrogen oxides emission limits in the par. (a) table for natural gas or distillate oil or for residual oil, as appropriate, are applicable to the affected facility until and unless the petition is approved by the administrator.

Note: See 40 CFR 761.70 for regulations applicable to the incineration of materials containing polychlorinated biphenyls (PCBs).

(h) For purposes of par. (i), the nitrogen oxide standards under this subsection apply at all times including periods of startup, shutdown or malfunction.

(i) Except as provided under par. (j), compliance with the emission limits under this subsection is determined on a 30–day rolling average basis.

(j) Compliance with the emission limits under this subsection is determined on a 24–hour average basis for the initial performance test and on a 3–hour average basis for subsequent performance tests for any affected facilities that:

1. Combust, alone or in combination, only natural gas, distillate oil or residual oil with a nitrogen content of 0.30 weight percent or less;

2. Have a combined annual capacity factor of 10% or less for natural gas, distillate oil and residual oil with a nitrogen content of 0.30 weight percent or less, and

3. Are subject to a federally enforceable requirement limiting operation of the affected facility to the firing of natural gas, distillate oil and/or residual oil with a nitrogen content of 0.30 weight percent or less and limiting operation of the affected facility to a combined annual capacity factor of 10% or less for natural gas, distillate oil and residual oil and a nitrogen content of 0.30 weight percent or less.

(k) Affected facilities that meet the criteria described in par. (j) 1., 2., and 3., and that have a heat input capacity of 73 MW (250 million Btu/hour) or less, are not subject to the nitrogen oxides emission limits under this subsection.

(6) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR SULFUR DIOXIDE. (a) The sulfur dioxide emission standards under sub. (3) apply at all times.

(b) In conducting the performance tests required under s. NR 440.08, the owner or operator shall use the cited methods and procedures in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or the methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Section NR 440.08 (6) does not apply to this subsection. The 30–day notice required in s. NR 440.08 (4) applies only to the initial performance test unless otherwise specified by the department.

(c) The owner or operator of an affected facility shall conduct performance tests to determine compliance with the percent of potential sulfur dioxide emission rate ($\%P_s$) and the sulfur dioxide emission rate (E_s) pursuant to sub. (3) following the procedures listed below, except as provided under par. (d).

1. The initial performance test shall be conducted over the first 30 consecutive operating days of the steam generating unit. Compliance with the sulfur dioxide standards shall be determined using a 30–day average. The first operating day included in the initial performance test shall be scheduled within 30 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility.

2. If only coal or only oil is combusted, the following procedures are used:

a. The procedures in Method 19, Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, shall be used to determine the hourly sulfur dioxide emission rate (E_{ho}) and the 30–day average emission rate (E_{ao}). The hourly averages used to compute the 30–day averages are obtained from the continuous emission monitoring system of sub. (8) (a) or (b).

b. The percent of potential sulfur dioxide emission rate ($\%P_s$) emitted to the atmosphere is computed using the following formula:

$$\%P_s = 100\,(1–\%R_g/100)\,(1–\%R_f/100)$$

where:

$\%R_g$ is the sulfur dioxide removal efficiency of the control device as determined by Method 19

$\%R_f$ is the sulfur dioxide removal efficiency of fuel pretreatment as determined by Method 19

3. If coal or oil is combusted with other fuels, the same procedures required in subd. 2. are used, except as provided in the following:

a. An adjusted hourly sulfur dioxide emission rate ($E_{ho}{}^{o}$) is used in equation 19–19 of Method 19 to compute an adjusted 30–day average emission rate ($E_{ao}{}^{o}$). The $E_{ho}{}^{o}$ is computed using the following formula:

$$E_{ho^o} = [E_{ho} - E_w(1 - X_k)]/X_k$$

where:

$E_{ho}{}^{o}$ is the adjusted hourly sulfur dioxide emission rate, ng/J (lb/million Btu)

E_{ho} is the hourly sulfur dioxide emission rate, ng/J (lb/million Btu)

E_w is the sulfur dioxide concentration in fuels other than coal and oil combusted in the affected facility, as determined by the fuel sampling and analysis procedures in Method 19, ng/J (lb/million Btu). The value E_w for each fuel lot is used for each hourly average during the time that the lot is being combusted.

X_k is the fraction of total heat input from fuel combustion derived from coal, oil, or coal and oil, as determined by applicable procedures in Method 19

b. To compute the percent of potential sulfur dioxide emission rate ($\%P_s$), an adjusted $\%R_g$ ($\%R_g{}^{o}$) is computed from the adjusted $E_{ao}{}^{o}$ from subd. 3. a. and an adjusted average sulfur dioxide inlet rate ($E_{ai}{}^{o}$) using the following formula:

$$\%R_g{}^{o} = 100\,(1.0–E_{ao}{}^{o}/E_{ai}{}^{o})$$

To compute $E_{ai}{}^{\circ}$, an adjusted hourly sulfur dioxide inlet rate ($E_{hi}{}^{\circ}$) is used. The $E_{hi}{}^{\circ}$ is computed using the following formula:

where:

$$E_{hi}{}^{o} = [E_{hi} - E_w(1 - X_k)]/X_k$$

$E_{hi}°$ is the adjusted hourly sulfur dioxide inlet rate, ng/J (lb/million Btu)

E_{hi} is the hourly sulfur dioxide inlet rate, ng/J (lb/million Btu)

4. The owner or operator of an affected facility subject to subd. 3. does not have to measure parameters E_w or X_k if the owner or operator elects to assume that $X_k = 1.0$. Owners or operators of affected facilities who assume $X_k = 1.0$ shall determine $\%P_s$, following the procedures in subd. 2., and sulfur dioxide emissions (E_s) shall be considered to be in compliance with sulfur dioxide emission limits under sub. (3).

5. The owner or operator of an affected facility that qualifies under the provisions of sub. (3) (d) does not have to measure parameters E_w or X_k under subd. 3. if the owner or operator of the affected facility elects to measure sulfur dioxide emission rates of the coal or oil following the fuel sampling and analysis procedures under Method 19.

(d) Except as provided in par. (j), the owner or operator of an affected facility that combusts only very low sulfur oil, has an annual capacity factor for oil of 10% (0.10) or less, and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor for oil of 10% (0.10) or less shall:

1. Conduct the initial performance test over 24 consecutive steam generating unit operating hours at full load;

2. Determine compliance with the standards after the initial performance test based on the arithmetic average of the hourly emissions data during each steam generating unit operating day if a continuous emission monitoring system (CEMS) is used, or based on a daily average if Method 6B, Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or fuel sampling and analysis procedures under Method 19, Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, are used.

(e) The owner or operator of an affected facility subject to sub. (3) (d) 1., shall demonstrate the maximum design capacity of the steam generating unit by operating the facility at maximum capacity for 24 hours. This demonstration will be made during the initial performance test and a subsequent demonstration may be requested at any other time. If the 24–hour average firing rate for the affected facility is less than the maximum design capacity provided by the manufacturer of the affected facility, the 24–hour average firing rate shall be used to determine the capacity utilization rate for the affected facility, otherwise the maximum design capacity provided by the manufacturer shall be used.

(f) For the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limits and percent reduction requirements under sub. (3) is based on the average emission rates and the average percent reduction for sulfur dioxide for the first 30 consecutive steam generating unit operating days, except as provided under par. (d). The initial performance test is the only test for which at least 30 days prior notice is required unless otherwise specified by the department. The initial performance test is to be scheduled so that the first steam generating unit operating day of the 30 successive steam generating unit operating days is completed within 30 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility. The boiler load during the 30–day period does not have to be the maximum design load, but shall be representative of future operating conditions and include at least one 24–hour period at full load.

(g) After the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limits and percent reduction requirements under sub. (3) is based on the average emission rates and the average percent reduction for sulfur dioxide for 30 successive steam generating unit operating days, except as provided under par. (d). A separate performance test shall be completed at the end of each steam generating unit operating day after the initial performance test, and a new 30–day average emission rate and percent reduction for sulfur dioxide shall be calculated to show compliance with the standard.

(h) Except as provided under par. (i), the owner or operator of an affected facility shall use all valid sulfur dioxide emissions data in calculating $\%P_s$ and E_{ho} under par. (c), whether or not the minimum emissions data requirements under sub. (7) are achieved. All valid emissions data, including valid sulfur dioxides emission data collected during periods of startup, shutdown and malfunctions, shall be used in calculating $\%P_s$ and E_{ho} pursuant to par. (c).

(i) During periods of malfunction or maintenance of the sulfur dioxide control systems when oil is combusted as provided under sub. (3) (i), emission data are not used to calculate $\%P_s$ or E_s under sub. (3) (a), (b) or (c). However, the emissions data are used to determine compliance with the emission limit under sub. (3) (i).

(j) The owner or operator of an affected facility that combusts very low sulfur oil is not subject to the compliance and performance testing requirements of this subsection if the owner or operator obtains fuel receipts as described in sub. (10) (r).

(7) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR PARTICULATE MATTER AND NITROGEN OXIDES. (a) The particulate matter emission standards and opacity limits under sub. (4) apply at all times except during periods of startup, shutdown, or malfunction. The nitrogen oxides emission standards under sub. (5) apply at all times.

(b) Compliance with the particulate matter emission standards under sub. (4) shall be determined through performance testing as described in par. (d).

(c) Compliance with the nitrogen oxides emission standards under sub. (5) shall be determined through performance testing under par. (e) or (f), or under pars. (g) and (h), as applicable.

(d) To determine compliance with the standards for particulate matter emission limits and opacity limits under sub. (4), the owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 using the following procedures and reference methods. These reference methods and procedures are in 40 CFR part 60, Appendix A, which is incorporated by reference in s. NR 440.17.

1. Method 3B is used for gas analysis when applying Method 5 or Method 17.

2. Method 5, Method 5B, or Method 17 shall be used to measure the concentration of particulate matter as follows:

a. Method 5 shall be used at affected facilities without wet flue gas desulfurization (FGD) systems; and

b. Method 17 may be used at facilities with or without wet scrubber systems provided the stack gas temperature does not exceed a temperature of 160°C (320°F). The procedures of ss. 2.1 and 2.3 of Method 5B may be used in Method 17 only if it is used after a wet FGD system. Do not use Method 17 after wet FGD systems if the effluent is saturated or laden with water droplets.

c. Method 5B is to be used only after wet FGD systems.

3. Method 1 is used to select the sampling site and the number of traverse sampling points. The sampling time for each run shall be at least 120 minutes and the minimum sampling volume is 1.7 dscm (60 dscf) except that smaller sampling times or volumes may be approved by the department when necessitated by process variables or other factors.

4. For Method 5, the temperature of the sample gas in the probe and filter holder is monitored and is maintained at 160°C (320°F).

5. For determination of particulate emissions, the oxygen or carbon dioxide sample is obtained simultaneously with each run of Method 5, Method 5B or Method 17 by traversing the duct at the sampling location.

6. For each run using Method 5, Method 5B or Method 17, the emission rate expressed in nanograms per joule heat input is determined using:

a. The oxygen or carbon dioxide measurements and particulate matter measurements obtained under this subsection,

b. The dry basis F factor, and

c. The dry basis emission rate calculation procedure contained in Method 19.

7. Method 9 is used for determining the opacity of stack emissions.

(e) To determine compliance with the emission limits for nitrogen oxides required under sub. (5), the owner or operator of an affected facility shall conduct the performance test as required under s. NR 440.08 using the continuous system for monitoring nitrogen oxides under sub. (9).

1. For the initial compliance test, nitrogen oxides from the steam generating unit shall be monitored for 30 successive steam generating unit operating days and the 30–day average emission rate is used to determine compliance with the nitrogen oxides emission standards under sub. (5). The 30–day average emission rate is calculated as the average of all hourly emissions data recorded by the monitoring system during the 30–day test period.

2. Following the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which combusts coal or which combusts residual oil having a nitrogen content greater than 0.30 weight % shall determine compliance with the nitrogen oxides emission standards under sub. (5) on a continuous basis through the use of a 30–day rolling average emission rate. A new 30–day rolling average emission rate is calculated each steam generating unit operating day as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

3. Following the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which has a heat input capacity greater than 73 MW (250 million Btu/hour) and which combusts natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight % or less shall determine compliance with the nitrogen oxides standards under sub. (5) on a continuous basis through the use of a 30–day rolling average emission rate. A new 30–day rolling average emission rate is calculated each steam generating unit operating day as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

4. Following the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which has a heat input capacity of 73 MW (250 million Btu/hour) or less and which combusts natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight % or less shall, upon request, determine compliance with the nitrogen oxides standards under sub. (5) through the use of a 30–day performance test. During periods when performance tests are not requested, nitrogen oxides emissions data collected pursuant to sub. (9) (g) 1. or 2. are used to calculate a 30–day rolling average emission rate on a daily basis and used to prepare excess emission reports, but will not be used to determine compliance with the nitrogen oxides emission standards. A new 30–day rolling average emission rate is calculated each steam generating unit operating day as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

5. If the owner or operator of an affected facility which combusts residual oil does not sample and analyze the residual oil for nitrogen content, as specified in sub. (10) (e), the requirements of subd. 2. apply and the provisions of subd. 4. are inapplicable.

(f) To determine compliance with the emission limit for nitrogen oxides required by the table in sub. (5) (a) for duct burners used in combined cycle systems, the owner or operator of an affected facility shall conduct the performance test required under s. NR 440.08 using the nitrogen oxides and oxygen measurement procedures in Method 20 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17. During the performance test, one sampling site shall be located as close as practicable to the exhaust of the turbine, as provided by s. 6.1.1 of Method 20. A second sampling site shall be located at the outlet to the steam generating unit. Measurements of nitrogen oxides and oxygen shall be taken at both sampling sites simultaneously during the performance test. The nitrogen oxides emission rate from the combined cycle system shall be calculated by subtracting the nitrogen oxides emission rate measured at the sampling site at the outlet from the turbine from the nitrogen oxides emission rate measured at the sampling site at the outlet from the steam generating unit.

(g) The owner or operator of an affected facility described in sub. (5) (j) or (k) shall demonstrate the maximum heat input capacity of the steam generating unit by operating the facility at maximum capacity for 24 hours. The owner or operator of an affected facility shall determine the maximum heat input capacity using the heat loss method described in Sections 5 and 7.3 of the ASME Power Test Codes 4.1, incorporated by reference in s. NR 440.17. This demonstration of maximum heat input capacity shall be made during the initial performance test for affected facilities that meet the criteria of sub. (5) (j). It shall be made within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of each facility, for affected facilities meeting the criteria of sub. (5) (k). Subsequent demonstrations may be required by the department at any other time. If this demonstration indicates that the maximum heat input capacity of the affected facility is less than that stated by the manufacturer of the affected facility, the maximum heat input capacity determined during this demonstration shall be used to determine the capacity utilization rate for the affected facility. Otherwise, the maximum heat input capacity provided by the manufacturer is used.

(h) The owner or operator of an affected facility described in sub. (5) (j) that has a heat input capacity greater than 73 MW (250 million Btu/hour) shall:

1. Conduct an initial performance test as required under s. NR 440.08 over a minimum of 24 consecutive steam generating unit operating hours at maximum heat input capacity to demonstrate compliance with the nitrogen oxides emission standards under sub. (5) using Method 7, 7A or 7E of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or other approved reference methods; and

2. Conduct subsequent performance tests once per calendar year or every 400 hours or operation (whichever comes first) to demonstrate compliance with the nitrogen oxides emission standards under sub. (5) over a minimum of 3 consecutive steam generating unit operating hours at maximum heat input capacity using Method 7, 7A, 7E or other approved reference methods.

(8) EMISSION MONITORING FOR SULFUR DIOXIDE. (a) Except as provided in pars. (b) and (f), the owner or operator of an affected facility subject to the sulfur dioxide standards under sub. (3) shall install, calibrate, maintain, and operate continuous emission monitoring systems (CEMS) for measuring sulfur dioxide concentrations and either oxygen (O_2) or carbon dioxide (CO_2) concentrations and shall record the output of the systems. The sulfur dioxide and either oxygen or carbon dioxide concentrations shall both be monitored at the inlet and outlet of the sulfur dioxide control device.

(b) As an alternative to operating CEMS as required under par. (a), an owner or operator may elect to determine the average sulfur dioxide emissions and percent reduction by:

1. Collecting coal or oil samples in an as–fired condition at the inlet to the steam generating unit and analyzing them for sulfur and heat content according to Method 19 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17. Method 19 provides procedures for converting these measurements into the format to be used in calculating the average sulfur dioxide input rate, or

2. Measuring sulfur dioxide according to Method 6B of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, at the inlet or outlet to the sulfur dioxide control system. An initial stratification test is required to verify the adequacy of the Method 6B sampling location. The stratification test shall consist of 3 paired runs of a suitable sulfur dioxide and carbon dioxide measurement train operated at the candidate location and a second similar train operated according to the procedures in Section 3.2 and the applicable procedures in Section 7 of Performance Specification 2 of Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17. Method 6B, Method 6A, or a combination of Methods 6 and 3 or 3B or Methods 6C and 3A, all in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, are suitable measurement techniques. If Method 6B is used for the second train, sampling time and timer operation may be adjusted for the stratification test as long as an adequate sample volume is collected; however, both sampling trains are to be operated similarly. For the location to be adequate for Method 6B 24–hour tests, the mean of the absolute difference between the 3 paired runs shall be less than 10%.

3. A daily sulfur dioxide emission rate, E_D, shall be determined using the procedure described in Method 6A, Section 7.6.2 (equation 6A–8) and stated in ng/J (lb/million Btu) heat input.

4. The mean 30–day emission rate is calculated using the daily measured values in ng/J (lb/million Btu) for 30 successive steam generating unit operating days using equation 19–20 of Method 19.

(c) The owner or operator of an affected facility shall obtain emission data for at least 75% of the operating hours in at least 22 out of 30 successive boiler operating days. If this minimum data requirement is not met with a single monitoring system, the owner or operator of the affected facility shall supplement the emission data with data collected with other monitoring systems as approved by the department or the reference methods and procedures as described in par. (b).

(d) The 1–hour average sulfur dioxide emission rates measured by the CEMS required by par. (a) and required under s. NR 440.13 (8) shall be expressed in ng/J or lb/million Btu heat input and shall be used to calculate the average emission rates under sub. (3). Each 1–hour average sulfur dioxide emission rate shall be based on more than 30 minutes of steam generating unit operation and include at least 2 data points with each representing a 15–minute period. Hourly sulfur dioxide emission rates are not calculated if the affected facility is operated less than 30 minutes in a 1–hour period and are not counted toward determination of a steam generating unit operating day.

(e) The procedures in s. NR 440.13 shall be followed for installation, evaluation, and operation of the CEMS.

1. All CEMS shall be operated in accordance with the applicable procedures under Performance Specifications 1, 2, and 3, Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17.

2. Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 of Appendix F, 40 CFR part 60, incorporated by reference in s. NR 440.17.

3. For affected facilities combusting coal or oil, alone or in combination with other fuels, the span value of the sulfur dioxide CEMS at the inlet to the sulfur dioxide control device shall be 125% of the maximum estimated hourly potential sulfur dioxide emissions of the fuel combusted, and the span value of the CEMS at the outlet to the sulfur dioxide control device shall be 50% of the maximum estimated hourly potential sulfur dioxide emissions of the fuel combusted.

(f) The owner or operator of an affected facility that combusts very low sulfur oil is not subject to the emission monitoring requirements of this subsection if the owner or operator obtains fuel receipts as described in sub. (10) (r).

(9) EMISSION MONITORING FOR PARTICULATE MATTER AND NITROGEN OXIDES. (a) The owner or operator of an affected facility subject to the opacity standard under sub. (4) shall install, calibrate, maintain, and operate a continuous monitoring system for measuring the opacity of emissions discharged to the atmosphere and record the output of the system.

(b) Except as provided under pars. (g), (h) and (i), the owner or operator of an affected facility subject to the nitrogen oxides standard of sub. (5) shall install, calibrate, maintain, and operate a continuous monitoring system for measuring nitrogen oxides emissions discharged to the atmosphere and record the output of the system.

(c) The continuous monitoring systems required under par. (b) shall be operated and data recorded during all periods of operation of the affected facility except for continuous monitoring system breakdowns and repairs. Data shall be recorded during calibration checks, and zero and span adjustments.

(d) The 1–hour average nitrogen oxides emission rates measured by the continuous nitrogen oxides monitor required by par. (b) and required under s. NR 440.13 shall be expressed in ng/J or lb/million Btu heat input and shall be used to calculate the average emission rates under sub. (5). The 1–hour averages shall be calculated using the data points required under s. NR 440.13 (2). At least 2 data points shall be used to calculate each 1–hour average.

(e) The procedures under s. NR 440.13 shall be followed for installation, evaluation, and operation of the continuous monitoring systems.

1. For affected facilities combusting coal, wood or municipal–type solid waste, the span value for a continuous monitoring system for measuring opacity shall be between 60 and 80%.

2. For affected facilities combusting coal, oil, or natural gas, the span value for nitrogen oxides is determined as follows:

Fuel	Span values for nitrogen oxides (ppm)
Natural gas	500
Oil	500
Coal	1,000
Combination	500 (x + y) + 1,000z

where:

x is the fraction of total heat input derived from natural gas

y is the fraction of total heat input derived from oil z is the fraction of total heat input derived from coal

3. All span values computed under subd. 2. for combusting mixtures of regulated fuels shall be rounded to the nearest 500 PPM.

(f) When nitrogen oxides emission data are not obtained because of continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments, emission data will be obtained by using standby monitoring systems, Method 7 or 7A of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, or other approved reference methods to provide emission data for a minimum of 75% of the operating hours in each steam generating unit operating day, in at least 22 out of 30 successive steam generating unit operating days.

(g) The owner or operator of an affected facility that has a heat input capacity of 73 MW (250 million Btu/hour) or less, and which has an annual capacity factor for residual oil having a nitrogen content of 0.30 weight % or less, natural gas, distillate oil, or any mixture of these fuels, greater than 10% (0.10) shall:

1. Comply with the provisions of pars. (b), (c), (d), (e) 2., (e) 3., and (f), or

2. Monitor steam generating unit operating conditions and predict nitrogen oxides emission rates as specified in a plan submitted pursuant to sub. (10) (c).

(h) The owner or operator of an affected facility which is subject to the nitrogen oxides standards for duct burners in the table in sub. (5) (a) is not required to install or operate a continuous monitoring system to measure nitrogen oxides emissions.

(i) The owner or operator of an affected facility described under sub. (5) (j) or (k) is not required to install or operate a continuous monitoring system for measuring nitrogen oxide emissions.

(10) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of each affected facility shall submit notification of the date of initial startup, as provided by s. NR 440.07. This notification shall include:

1. The design heat input capacity of the affected facility and identification of the fuels to be combusted in the affected facility,

2. If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under subs. (3) (d) 1., (4) (a) 2., 3. c., (c) 2. b., (d) 2. c., (5) (c), (d), (e), (i), (j) or (k), (6) (d), (7) (g) or (h), or (9) (i),

3. The annual capacity factor at which the owner or operator anticipates operating the facility based on all fuels fired and based on each individual fuel fired, and

4. Notification that an emerging technology will be used for controlling emissions of sulfur dioxide. The administrator will examine the description of the emerging technology and will determine whether the technology qualifies as an emerging technology. In making this determination, the administrator may require the owner or operator of the affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of sub. (3) (a) unless and until this determination is made by the administrator.

(b) The owner or operator of each affected facility subject to the sulfur dioxide, particulate matter, or nitrogen oxides emission limits under subs. (3), (4), and (5) shall submit to the department the performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17. The owner or operator of each affected facility described in sub. (5) (j) or (k) shall submit to the department the maximum heat input capacity data from the demonstration of the maximum heat input capacity of the affected facility.

(c) The owner or operator of each affected facility subject to the nitrogen oxides standard of sub. (5) who seeks to demonstrate compliance with those standards through the monitoring of steam generating unit operating conditions under the provisions of sub. (9) (g) 2. shall submit to the department for approval a plan that identifies the operating conditions to be monitored under sub. (9) (g) 2. and the records to be maintained under par. (j). This plan shall be submitted to the department for approval within 360 days of the initial startup of the affected facility. The plan shall:

1. Identify the specific operating conditions to be monitored and the relationship between these operating conditions and nitrogen oxides emission rates (i.e., ng/J or lbs/million Btu heat input). Steam generating unit operating conditions include, but are not limited to, the degree of staged combustion (i.e., the ratio of primary air to secondary and/or tertiary air) and the level of excess air (i.e., flue gas oxygen level);

2. Include the data and information that the owner or operator used to identify the relationship between nitrogen oxides emission rates and these operating conditions;

3. Identify how these operating conditions, including steam generating unit load, will be monitored under sub. (9) (g) on an hourly basis by the owner or operator during the period of operation of the affected facility; the quality assurance procedures or practices that will be employed to ensure that the data generated by monitoring these operating conditions will be representative and accurate; and the type and format of the records of these operating conditions, including steam generating unit load, that will be maintained by the owner or operator under par. (j). If the plan is approved, the owner or operator shall maintain records of predicted nitrogen oxide emission rates and the monitored operating conditions, including steam generating unit load, identified in the plan.

(d) The owner or operator of an affected facility shall record and maintain records of the amounts of all fuels combusted during each day and calculate the annual capacity factor individually for coal, distillate oil, residual oil, natural gas, wood, and municipal–type solid waste for each calendar quarter. The annual capacity factor is determined on a 12–month rolling average basis with a new annual capacity factor calculated at the end of each calendar month.

(e) For an affected facility that combusts residual oil and meets the criteria under sub. (5) (j) or (k) or (7) (e) 4., the owner or operator shall maintain records of the nitrogen content of the residual oil combusted in the affected facility and calculate the average fuel nitrogen content on a per calendar quarter basis. The nitrogen content shall be determined using ASTM Method D3431–80 (reapproved 1987), Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons, incorporated by reference in s. NR 440.17, or fuel specification data obtained from fuel suppliers. If residual oil blends are being combusted, fuel nitrogen specifications may be prorated based on the ratio of residual oils of different nitrogen content in the fuel blend.

(f) For facilities subject to the opacity standard under sub. (4), the owner or operator shall maintain records of opacity.

(g) Except as provided under par. (p), the owner or operator of an affected facility subject to nitrogen oxides standards under sub. (5) shall maintain records of the following information for each steam generating unit operating day:

1. Calendar date.

2. The average hourly nitrogen oxides emission rates (expressed as NO_2) (ng/J or lb/million Btu heat input) measured or predicted.

3. The 30–day average nitrogen oxides emission rates (ng/J or lb/million Btu heat input) calculated at the end of each steam generating unit operating day from the measured or predicted

hourly nitrogen oxide emission rates for the preceding 30 steam generating unit operating days.

4. Identification of the steam generating unit operating days when the calculated 30–day average nitrogen oxides emission rates are in excess of the nitrogen oxides emissions standards under sub. (5), with the reasons for such excess emissions as well as a description of corrective actions taken.

5. Identification of the steam generating unit operating days for which pollutant data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken.

6. Identification of the times when emission data have been excluded from the calculation of average emission rates and the reasons for excluding data.

7. Identification of "F" factor used for calculations, method of determination, and type of fuel combusted.

8. Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.

9. Description of any modifications to the continuous monitoring system that could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3 of Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17.

10. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 CFR part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

(h) The owner or operator of any affected facility in any category listed in subd. 1. or 2. is required to submit excess emission reports for any calendar quarter during which there are excess emissions from the affected facility. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report semiannually stating that no excess emissions occurred during the semiannual reporting period.

1. Any affected facility subject to the opacity standards under sub. (4) (f) or to the operating parameter monitoring requirements under s. NR 440.13 (9) (a).

2. Any affected facility which is subject to the nitrogen oxides standard of sub. (5), and that:

a. Combusts natural gas, distillate oil, or residual oil with a nitrogen content of 0.3 weight % or less, or

b. Has a heat input capacity of 73 MW (250 million Btu/hour) or less and is required to monitor nitrogen oxides emissions on a continuous basis under sub. (9) (g) 1. or steam generating unit operating conditions under sub. (9) (g) 2.

3. For the purpose of sub. (4), excess emissions are defined as all 6–minute periods during which the average opacity exceeds the opacity standards under sub. (4) (f).

4. For purposes of sub. (9) (g) 1., excess emissions are defined as any calculated 30–day rolling average nitrogen oxides emission rate, as determined under sub. (7) (e), which exceeds the applicable emission limits in sub. (5).

(i) The owner or operator of any affected facility subject to the continuous monitoring requirements for nitrogen oxides under sub. (9) shall submit a quarterly report containing the information recorded under par. (g). All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(j) The owner or operator of any affected facility subject to the sulfur dioxide standards under sub. (3) shall submit written reports to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(k) For each affected facility subject to the compliance and performance testing requirements of sub. (6) and the reporting requirement in par. (j) the following information shall be reported to the department:

1. Calendar dates covered in the reporting period.

2. Each 30–day average sulfur dioxide emission rate (ng/J or lb/million Btu heat input) measured during the reporting period, ending with the last 30–day period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken.

3. Each 30–day average percent reduction in sulfur dioxide emissions calculated during the reporting period, ending with the last 30–day period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken.

4. Identification of the steam generating unit operating days that coal or oil was combusted and for which sulfur dioxide or diluent (oxygen or carbon dioxide) data have not been obtained by an approved method for at least 75% of the operating hours in the steam generating unit operating day; justification for not obtaining sufficient data; and description of corrective action taken.

5. Identification of the times when emissions data have been excluded from the calculation of average emission rates; justification for excluding data; and description of corrective action taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

6. Identification of "F" factor used for calculations, method of determination, and type of fuel combusted.

7. Identification of times when hourly averages have been obtained based on manual sampling methods.

8. Identification of the times when the pollutant concentration exceeded full span of the CEMS.

9. Description of any modifications to the CEMS that could affect the ability of the CEMS to comply with Performance Specification 2 or 3 of Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17.

10. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 CFR part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

11. The annual capacity factor of each fuel fired as provided under par. (d).

(L) For each affected facility subject to the compliance and performance testing requirements of sub. (6) (d) and the reporting requirements of par. (j), the following information shall be reported to the department:

1. Calendar dates when the facility was in operation during the reporting period;

2. The 24–hour average sulfur dioxide emission rate measured for each steam generating unit operating day during the reporting period that coal or oil was combusted, ending in the last 24–hour period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken;

3. Identification of the steam generating unit operating days that coal or oil was combusted for which sulfur dioxide or diluent (oxygen or carbon dioxide) data have not been obtained by an approved method for at lest 75% of the operating hours; justification for not obtaining sufficient data; and description of corrective action taken.

4. Identification of the times when emissions data have been excluded from the calculation of average emission rates; justification of excluding data, and description of corrective action

taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

5. Identification of "F" factor used for calculations, method of determination and type of fuel combusted.

6. Identification of times when hourly averages have been obtained based on manual sampling methods.

7. Identification of the times when the pollutant concentration exceeded full span of the CEMS.

8. Description of any modifications to the CEMS which could affect the ability of the CEMS to comply with Performance Specification 2 or 3 of Appendix B, 40 CFR part 60, incorporated by reference in s. NR 440.17.

9. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 CFR part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

(m) For each affected facility subject to the sulfur dioxide standards under sub. (3) for which the minimum amount of data required under sub. (8) (f) were not obtained during a calendar quarter, the following information is reported to the department in addition to that required under par. (k).

1. The number of hourly averages available for outlet emission rates and inlet emission rates.

2. The standard deviation of hourly averages for outlet emission rates and inlet emission rates, as determined in Method 19, Section 7 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17.

3. The lower confidence limit for the mean outlet emission rate and the upper confidence limit for the mean inlet emission rate, as calculated in Method 19, Section 7.

4. The ratio of the lower confidence limit for the mean outlet emission rate and the allowable emission rate, as determined in Method 19, Section 7.

(n) If a percent removal efficiency by fuel pretreatment (i.e., $\%R_f$) is used to determine the overall percent reduction (i.e., $\%R_o$) under sub. (6), the owner or operator of the affected facility shall submit a signed statement with the quarterly report:

1. Indicating what removal efficiency by fuel pretreatment (i.e., $\%R_f$) was credited for the calendar quarter;

2. Listing the quantity, heat content, and date each pretreated fuel shipment was received during the previous calendar quarter; the name and location of the fuel pretreatment facility; and the total quantity and total heat content of all fuels received at the affected facility during the previous calendar quarter;

3. Documenting the transport of the fuel from the fuel pretreatment facility to the steam generating unit;

4. Including a signed statement from the owner or operator of the fuel pretreatment facility certifying that the percent removal efficiency achieved by fuel pretreatment was determined in accordance with the provisions of Method 19 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, and listing the heat content and sulfur content of each fuel before and after fuel pretreatment.

(o) All records required under this subsection shall be maintained by the owner or operator of the affected facility for a period of 2 years following the date of the record.

(p) The owner or operator of an affected facility described in sub. (5) (j) or (k) shall maintain records of the following information for each steam generating unit operating day:

1. Calendar date,

2. The number of hours of operation, and

3. A record of the hourly steam load.

(q) The owner or operator of an affected facility described in sub. (5) (j) or (k) shall submit to the department on a quarterly basis:

1. The annual capacity factor over the previous 12 months,

2. The average fuel nitrogen content during the quarter, if residual oil was fired; and

3. If the affected facility meets the criteria described in sub. (5) (j), the results of any nitrogen oxides emission tests required during the quarter, the hours of operation during the quarter and the hours of operation since the last nitrogen oxides emission test.

(r) The owner or operator of an affected facility who elects to demonstrate that the affected facility combusts only very low sulfur oil under sub. (3) (j) 2. shall obtain and maintain at the affected facility fuel receipts from the fuel supplier which certify that the oil meets the definition of distillate oil as defined in sub. (2). For the purposes of this subsection, the oil need not meet the fuel nitrogen content specification in the definition of distillate oil. Quarterly reports shall be submitted to the department certifying that only very low sulfur oil meeting this definition was combusted in the affected facility during the preceding quarter.

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (1) (c), (2) (c), (k), (L) and (zb), (3) (a), (c) to (e), (f) (intro.), 2. and (g), (4) (a) 1. (intro.), (b), (e) and (f), (5) (a), (b), (f) 1. (intro.), (g) and (h), (6) (b), (c) 2.a. and b., 3. a., 5. and (d) (intro.), (7) (c), (d) (intro.), 1.,6. a. and c. and (f), (8) (a) and (b) 2., (9) (b) and (f), (10) (a) 2. (b), (e), (g) (intro.), (m) 2. to 4. and (o), r. and recr. (2) (zj), cr. (3) (j), (5) (i) to (k), (6) (j), (7) (g), (h), (8) (f), (9) (i) and (10) (p) to (r), Register, July, 1993, No. 451, eff. 8–1–93**;** am. (2) (zj), (3) (d) (intro.), (4) (b), (f), (5) (g), (6) (d) 2., (7) (g), (h) 1., (10) (b), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.207 Small industrial–commercial–institutional steam generating units. (1) APPLICABILITY. The affected facility to which this section applies is each steam generating unit for which construction, modification or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million Btu per hour (Btu/hr)) or less, but greater than or equal to 2.9 MW (10 million Btu/hr).

(2) DEFINITIONS. As used in this section, all terms not defined herein shall have the meaning given them in s. NR 440.02.

(a) "Annual capacity factor" means the ratio between the actual heat input to a steam generating unit from an individual fuel or combination of fuels during a period of 12 consecutive calendar months and the potential heat input to the steam generating unit from all fuels had the steam generating unit been operated for 8,760 hours during that 12–month period at the maximum design heat input capacity. In the case of steam generating units that are rented or leased, the actual heat input shall be determined based on the combined heat input from all operations of the affected facility during a period of 12 consecutive calendar months.

(b) "Coal" means all solid fuels classified as anthracite, bituminous, subbituminous or lignite by the American Society for Testing and Materials in ASTM D388–77, "Standard Specification for Classification of Coals by Rank", incorporated by reference in s. NR 440.17; coal refuse; and petroleum coke. Synthetic fuels derived from coal for the purpose of creating useful heat, including but not limited to solvent–refined coal, gasified coal and coal–oil mixtures, are included in this definition for the purposes of this section.

(c) "Coal refuse" means any by–product of coal mining or coal cleaning operations with an ash content greater than 50% (by weight) and a heating value less than 13,900 kilojoules per kilogram (k/kg) (6,000 Btu per pound (Btu/lb)) on a dry basis.

(d) "Cogeneration steam generating unit" means a steam generating unit that simultaneously produces both electrical (or mechanical) and thermal energy from the same primary energy source.

(e) "Combined cycle system" means a system in which a separate source, such as a stationary gas turbine, internal combustion engine or kiln, provides exhaust gas to a steam generating unit.

(f) "Conventional technology" means wet flue gas desulfurization technology, dry flue gas desulfurization technology, atmospheric fluidized bed combustion technology and oil hydrodesulfurization technology.

(g) "Distillate oil" means fuel oil that complies with the specifications for fuel oil numbers 1 or 2, as defined by the American Society for Testing and Materials in ASTM D396–78, "Standard Specification for Fuel Oils", incorporated by reference in s. NR 440.17.

(h) "Dry flue gas desulfurization technology" means a sulfur dioxide (SO_2) control system that is located between the steam generating unit and the exhaust vent or stack, and that removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution and forming a dry powder material. This definition includes devices where the dry powder material is subsequently converted to another form. Alkaline reagents used in dry flue gas, desulfurization systems include, but are not limited to, lime and sodium compounds.

(i) "Duct burner" means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary gas turbine, internal combustion engine, kiln, and other similar devices, to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a steam generating unit.

(j) "Emerging technology" means any SO_2 control system that is not defined as a conventional technology under this subsection, and for which the owner or operator of the affected facility has received approval from the administrator to operate as an emerging technology under sub. (9) (a) 4.

(L) "Fluidized bed combustion technology" means a device wherein fuel is distributed onto a bed, or series of beds, of limestone aggregate, or other sorbent materials, for combustion; and these materials are forced upward in the device by the flow of combustion air and the gaseous products of combustion. Fluidized bed combustion technology includes, but is not limited to, bubbling bed units and circulating bed units.

(m) "Fuel pretreatment" means a process that removes a portion of the sulfur in a fuel before combustion of the fuel in a steam generating unit.

(n) "Heat input" means heat derived from combustion of fuel in a steam generating unit and does not include the heat derived from preheated combustion air, recirculated flue gases, or exhaust gases from other sources, such as stationary gas turbines, internal combustion engines and kilns.

(o) "Heat transfer medium" means any material that is used to transfer heat from one point to another point.

(p) "Maximum design heat input capacity" means the ability of a steam generating unit to combust a stated maximum amount of fuel, or combination of fuels, on a steady state basis as determined by the physical design and characteristics of the steam generating unit.

(q) "Natural gas" means:

1. A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal constituent is methane, or

2. Liquified petroleum (LP) gas, as defined by the American Society for Testing and Materials in ASTM D1835–86, "Standard Specification for Liquified Petroleum Gases", incorporated by reference in s. NR 440.17.

(r) "Noncontinental area" means the state of Hawaii, the Virgin Islands, Guam, American Samoa, the commonwealth of Puerto Rico or the Northern Mariana Islands.

(s) "Oil" means crude oil or petroleum, or a liquid fuel derived from crude oil or petroleum, including distillate oil and residual oil.

(t) "Potential sulfur dioxide emission rate" means the theoretical SO_2 emissions, nanograms per joule (ng/J) or pounds per million Btu (lb/million Btu) heat input, that would result from combusting fuel in an uncleansed state and without using emission control systems.

(u) "Process heater" means a device that is primarily used to heat a material to initiate or promote a chemical reaction to which the material participates as a reactant or catalyst.

(v) "Residual oil" means crude oil, fuel oil that does not comply with the specifications under the definition of distillate oil, and all fuel oil numbers 4, 5 and 6, as defined by the American Society for Testing and Materials in ASTM D396–78, "Standard Specification for Fuel Oils", incorporated by reference in s. NR 440.17.

(w) "Steam generating unit" means a device that combusts any fuel and produces steam or heats water or any other heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this section.

(x) "Steam generating unit operating day" means a 24–hour period between 12:00 midnight and the following midnight during which any fuel is combusted at any time in the steam generating unit. It is not necessary for fuel to be combusted continuously for the entire 24–hour period.

(y) "Wet flue gas desulfurization technology" means an SO_2 control system that is located between the steam generating unit and the exhaust vent or stack, and that removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution and forming a liquid material. This definition includes devices where the liquid material is subsequently converted to another form. Alkaline reagents used in wet flue gas desulfurization systems include, but are not limited to, lime, limestone and sodium compounds.

(z) "Wet scrubber system" means any emission control device that mixes an aqueous stream or slurry with the exhaust gases from a steam generating unit to control emissions of particulate matter (PM) or SO_2.

(zm) "Wood" means wood, wood residue, bark or any derivative fuel or residue thereof, in any form, including but not limited to sawdust, sanderdust, wood chips, scraps, slabs, millings, shavings and processed pellets made from wood or other forest residues.

(3) STANDARDS FOR SULFUR DIOXIDE. (a) Except as provided in pars. (b), (c) and (e), on and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility that combusts only coal may neither:

1. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 10% (0.10) of the potential SO_2 emission rate, 90% reduction; nor

2. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 520 ng/J (1.2 lb/million Btu) heat input. If coal is combusted with other fuels, the affected facility is subject to the 90% SO_2 reduction requirement specified in this paragraph and the emission limit is determined pursuant to par. (e) 2.

(b) Except as provided in pars. (c) and (e), on and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility that:

1. Combusts coal refuse alone in a fluidized bed combustion steam generating unit may neither:

a. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 20% (0.20) of the potential SO_2 emission rate (80% reduction); nor

b. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 520 ng/J (1.2 lb/million Btu) heat input. If coal is fired with coal refuse, the affected facility is subject to par. (a). If oil or any other fuel, except coal, is fired with coal refuse, the affected facility is subject to the 90% SO_2 reduction requirement specified in par. (a) and the emission limit determined pursuant to par. (e) 2.

2. Combusts only coal and that uses an emerging technology for the control of SO_2 emissions may neither:

a. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 50% (0.50) of the potential SO_2 emission rate, 50% reduction; nor

b. Cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 260 ng/J (0.60 lb/million Btu) heat input. If coal is combusted with other fuels, the affected facility is subject to the 50% SO_2 reduction requirement specified in this paragraph and the emission limit determined pursuant to par. (e) 2.

(c) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal, alone or in combination with any other fuel, and is listed in subd. 1., 2., 3. or 4. may cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of the emission limit determined pursuant to par. (e) 2. Percent reduction requirements are not applicable to affected facilities under this paragraph.

1. Affected facilities that have a heat input of 22 MW (75 million Btu/hr) or less.

2. Affected facilities that have an annual capacity for coal of 55% (0.55) or less and are subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor for coal of 55% (0.55) or less.

3. Affected facilities located in a noncontinental area.

4. Affected facilities that combust coal in a duct burner as part of a combined cycle system where 30% (0.30) or less of the heat entering the steam generating unit is from combustion of coal in the duct burner and 70% (0.70) or more of the heat entering the steam generating unit is from exhaust gases entering the duct burner.

(d) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts oil may cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 215 ng/J (0.50 lb/million Btu) heat input; or, as an alternative, no owner or operator of an affected facility that combusts oil shall combust oil in the affected facility that contains greater than 0.5 weight percent sulfur. The percent reduction requirements are not applicable to affected facilities under this paragraph.

(e) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal, oil, or coal and oil with any other fuel may cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of the following:

1. The percent of potential SO_2 emission rate required under paragraph (a) or (b) 2., as applicable, for any affected facility that:

a. Combusts coal in combination with any other fuel,

b. Has a heat input capacity greater than 22 MW (75 million Btu/hr), and

c. Has an annual capacity factor for coal greater than 55% (0.55); and

2. The emission limit determined according to the following formula for any affected facility that combusts coal, oil, or coal and oil with any other fuel:

$$E_s = (K_aH_a + K_bH_b + K_cH_c)/(H_a + H_b + H_c)$$

where:

E_s is the SO_2 emission limit, expressed in ng/J or lb/million Btu heat input

K_a is 520 ng/J (1.2 lb/million Btu)

K_b is 260 ng/J (0.60 lb/million Btu)

K_c is 215 ng/J (0.50 lb/million Btu)

H_a is the heat input from the combustion of coal, except coal combusted in an affected facility subject to par. (b) 2., in joules (J) (million Btu)

H_b is the heat input from the combustion of coal, in an affected facility subject to par. (b) 2., in J (million Btu)

H_c is the heat input from the combustion of oil, in J (million Btu)

(f) Reduction in the potential SO_2 emission rate through fuel pretreatment is not credited toward the percent reduction requirement under par. (b) 2. unless:

1. Fuel pretreatment results in a 50% (0.50) or greater reduction in the potential SO_2 emission rate; and

2. Emissions from the pretreated fuel, without either combustion or post–combustion SO_2 control, are equal to or less than the emission limits specified under par. (b) 2.

(g) Except as provided in par. (h), compliance with the percent reduction requirements, fuel oil sulfur limits, and emission limits of this subsection shall be determined on a 30–day rolling average basis.

(h) For affected facilities listed under subd. 1., 2. or 3., compliance with the emission limits or fuel oil sulfur limits under this subsection may be determined based on a certification from the fuel supplier, as described under sub. (9) (f) 1., 2. or 3., as applicable.

1. Distillate oil–fired affected facilities with heat input capacities between 2.9 and 29 MW (10 and 100 million Btu/hr).

2. Residual oil–fired affected facilities with heat input capacities between 2.9 and 8.7 MW (10 and 30 million Btu/hr).

3. Coal–fired facilities with heat input capacities between 2.9 and 8.7 MW (10 and 30 million Btu/hr).

(i) The SO_2 emission limits, fuel oil sulfur limits and percent reduction requirements under this subsection apply at all times, including periods of startup, shutdown and malfunction.

(j) Only the heat input supplied to the affected facility from the combustion of coal and oil is counted under this subsection. No credit is provided for the heat input to the affected facility from wood or other fuels or for heat derived from exhaust gases from other sources, such as stationary gas turbines, internal combustion engines and kilns.

(4) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal or combusts mixtures of coal with other fuels and has a heat input capacity of 8.7 MW (30 million Btu/hr) or greater, may cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of the following emission limits:

1. 22 ng/J (0.050 lb/million Btu) heat input if the affected facility combusts only coal, or combusts coal with other fuels and has an annual capacity factor for the other fuels of 10% (0.10) or less.

2. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility combusts coal with other fuels, has an annual capacity factor for the other fuels greater than 10% (0.10), and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor greater than 10% (0.10) for fuels other than coal.

(b) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts mixtures of wood with other fuels, except coal, and has a heat input capacity of 8.7 MW (30 million Btu/hr) or greater, may cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of the following emission limits:

1. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility has an annual capacity factor for wood greater than 30% (0.30); or

2. 130 ng/J (0.30 lb/million Btu) heat input if the affected facility has an annual capacity factor for wood of 30% (0.30) or less and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor for wood of 30% (0.30) or less.

(c) On and after the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal, wood or oil and has a heat input capacity of 8.7 MW (30 million Btu/hr) or greater may cause to be discharged into the atmosphere from that affected facility any gases that exhibit greater than 20% opacity (6–minute average), except for one 6–minute period per hour of not more than 27% opacity.

(d) The PM and opacity standards under this subsection apply at all times, except during periods of startup, shutdown or malfunction.

(5) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR SULFUR DIOXIDE. (a) Except as provided in pars. (g) and (h) and in s. NR 440.08(2), performance tests required under s. NR 440.08 shall be conducted following the procedures specified in pars. (b) to (f), as applicable. The cited methods and procedures are in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17. Section NR 440.08 (6) does not apply to this subsection. The 30–day notice required in s. NR 440.08 (4) applies only to the initial performance test unless otherwise specified by the department.

(b) The initial performance test required under s. NR 440.08 shall be conducted over 30 consecutive operating days of the steam generating unit. Compliance with the percent reduction requirements and SO_2 emission limits under sub. (3) shall be determined using a 30–day average. The first operating day included in the initial performance test shall be scheduled within 30 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after the initial startup of the facility. The steam generating unit load during the 30–day period does not have to be the maximum design heat input capacity, but shall be representative of future operating conditions.

(c) After the initial performance test required under par. (b) and s. NR 440.08, compliance with the percent reduction requirements and SO_2 emission limits under sub. (3) is based on the average percent reduction and the average SO_2 emission rates for 30 consecutive steam generating unit operating days. A separate performance test is completed at the end of each steam generating unit operating day, and a new 30–day average percent reduction and SO_2 emission rate are calculated to show compliance with the standard.

(d) If only coal, only oil, or a mixture of coal and oil is combusted in an affected facility, the procedures in Method 19 are used to determine the hourly SO_2 emission rate (E_{ho}) and the 30–day average SO_2 emission rate (E_{ao}). The hourly averages are obtained from the continuous emission monitoring system (CEMS). Method 19 shall be used to calculate E_{ao} when using daily fuel sampling or Method 6B.

(e) If coal, oil, or coal and oil are combusted with other fuels:

1. An adjusted E_{ho} (E_{ho}^o) is used in equation 19–19 of Method 19 to compute the adjusted E_{ao} (E_{ao}^o). The E_{ho}^o is computed using the following formula:

$$E_{ho}^o = (E_{ho} - E_w(1 - X_k))/X_k$$

where:

E_{ho}^o is the adjusted E_{ho}, ng/J (lb/million Btu)

E_{ho} is the hourly SO_2 emission rate, ng/J (lb/million Btu)

E_w is the SO_2 concentration in fuels other than coal and oil combusted in the affected facility, as determined by fuel sampling and analysis procedures in Method 9, ng/J (lb/million Btu). The value E_w for each fuel lot is used for each hourly average during the time that the lot is being combusted. The owner or operator does not have to measure E_w if the owner or operator elects to assume $E_w = 0$

X_k is the fraction of the total heat input from fuel combustion derived from coal and oil, as determined by applicable procedures in Method 19

2. The owner or operator of an affected facility that qualifies under the provisions of sub. (3) (c) or (d), where percent reduction is not required, does not have to measure the parameters E_w or X_k if the owner or operator of the affected facility elects to measure emission rates of the coal or oil using the fuel sampling and analysis procedures under Method 19.

(f) Affected facilities subject to the percent reduction requirements under sub. (3) (a) or (b) shall determine compliance with the SO_2 emission limits under sub. (3) pursuant to par. (d) or (e), and shall determine compliance with the percent reduction requirements using the following procedures:

1. If only coal is combusted, the percent of potential SO_2 emission rate is computed using the following formula:

$$\%P_s = 100\,(1 - \%R_g/100)\ (1 - \%R_f/100)$$

where:

$\%P_s$ is the percent of potential SO_2 emission rate, in percent

$\%R_g$ is the SO_2 removal efficiency of the control device as determined by Method 19, in percent

$\%R_f$ is the SO_2 removal efficiency of fuel pretreatment as determined by Method 19, in percent

2. If coal, oil, or coal and oil are combusted with other fuels, the same procedures required in subd. 1. are used, except as provided for in the following:

a. To compute the $\%P_s$, an adjusted $\%R_g$ ($\%R_g^o$) is computed from E_{ao}^o from par. (e) 1. and an adjusted SO_2 inlet rate (E_{ai}^o) using the following formula:

$$\%R_g^o = 100\,[1.0 - (E_{ao}^o/E_{ai})]$$

where:

$\%R_g^o$ is the adjusted $\%R_g$, in percent

E_{ao}^o is the adjusted E_{ao}, ng/J (lb/million Btu)

E_{ai}^o is the adjusted average SO_2 inlet rate, ng/J (lb/million Btu)

b. To compute E_{ai}^o, an adjusted hourly SO_2 inlet rate (E_{hi}^o) is used. The E_{hi}^o is computed using the following formula:

$$E_{hi}^o = [E_{hi} - E_w (1 - X_k)]/X_k$$

where:

E_{hi}^o is the adjusted E_{hi}, ng/J (lb/million Btu)

E_{hi} is the SO_2 concentration in fuels other than coal and oil combusted in the affected facility, as determined by fuel sampling and analysis procedures in Method 19, ng/J (lb/million Btu). The value E_w for each fuel lot is used for each hourly average during the time that the lot is being combusted. The owner or operator does not have to measure E_w if the owner or operator elects to assume $E_w = 0$

X_k is the fraction of the total heat input from fuel combustion derived from coal and oil, as determined by applicable procedures in Method 19

(g) For oil–fired affected facilities where the owner or operator seeks to demonstrate compliance with the fuel oil sulfur limits under sub. (3) based on shipment fuel sampling, the initial performance test shall consist of sampling and analyzing the oil in the initial tank of oil to be fired in the steam generating unit to demonstrate that the oil contains 0.5 weight percent sulfur or less. Thereafter, the owner or operator of the affected facility shall sample the oil in the fuel tank after each new shipment of oil is received, as described under sub. (7) (d) 2.

(h) For affected facilities subject to sub. (3) (h) 1., 2. or 3. where the owner or operator seeks to demonstrate compliance with the SO_2 standards based on fuel supplier certification, the performance test shall consist of the certification, the certification from the fuel supplier, as described under sub. (9) (f) 1., 2. or 3., as applicable.

(i) The owner or operator of an affected facility seeking to demonstrate compliance with the SO_2 standards under sub. (3) (c) 2. shall demonstrate the maximum design heat input capacity of the steam generating unit by operating the steam generating unit at this capacity for 24 hours. This demonstration shall be made during the initial performance test, and a subsequent demonstration may be requested at any other time. If the demonstrated 24–hour averaged firing rate for the affected facility is less than the maximum design heat input capacity stated by the manufacturer of the affected facility, the demonstrated 24–hour average firing rate shall be used to determine the annual capacity factor for the affected facility; otherwise, the maximum design heat input capacity provided by the manufacturer shall be used.

(j) The owner or operator of an affected facility shall use all valid SO_2 emissions data in calculating $\%P_s$ and E_{ho} under par. (d), (e) or (f), as applicable, whether or not the minimum emissions data requirements under sub. (7) (f) are achieved. All valid emissions data, including valid data collected during periods of startup, shutdown and malfunction shall be used in calculating $\%P_s$ or E_{ho} pursuant to par. (d), (e) or (f), as applicable.

(6) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR PARTICULATE MATTER. (a) The owner or operator of an affected facility subject to the PM standards, opacity standards, or both, under sub. (4) shall conduct an initial performance test as required under s. NR 440.08, and shall conduct subsequent performance tests as requested by the department, to determine compliance with the standards using the following procedures and reference methods. Unless otherwise indicated, these procedures and reference methods are in 40 CFR part 60, Appendix A, which is incorporated by reference in s. NR 440.17.

1. Method 1 shall be used to select the sampling site and the number of traverse sampling points. The sampling time for each run shall be at least 120 minutes and the minimum sampling volume shall be 1.7 dry square cubic meters (dscm) [60 dry square cubic feet (dscf)] except that smaller sampling times or volumes may be approved by the department when necessitated by process variables or other factors.

2. Method 3 shall be used for gas analysis when applying Method 5, Method 5B or Method 17.

3. Method 5, Method 5B or Method 17 shall be used to measure the concentration of PM as follows:

a. Method 5 may be used only at the affected facilities without wet scrubber systems.

b. Method 17 may be used at affected facilities with or without wet scrubber systems provided the stack gas temperature does not exceed a temperature of 160°C (320°F). The procedures of Sections 2.1 and 2.3 of Method 5B may be used in Method 17 only if Method 17 is used in conjunction with a wet scrubber system. Method 17 may not be used in conjunction with a wet scrubber system if the effluent is saturated or laden with water droplets.

c. Method 5B may be used in conjunction with a wet scrubber system.

4. For Method 5 or Method 5B, the temperature of the sample gas in the probe and filter holder shall be monitored and maintained at 160°C (320°F).

5. For determination of PM emissions, an oxygen or carbon dioxide measurement shall be obtained simultaneously with each run of Method 5, Method 5B or Method 17 by traversing the duct at the same sampling location.

6. For each run using Method 5, Method 5B or Method 17, the emission rates expressed in ng/J (lb/million Btu) heat input shall be determined using:

a. The oxygen or carbon dioxide measurements and PM measurements obtained under this subsection,

b. The dry basis F–factor, and

c. The dry basis emission rate calculation procedure contained in Method 19.

7. Method 9 (6–minute average of 24 observations) shall be used for determining the opacity of stack emissions.

(b) The owner or operator of an affected facility seeking to demonstrate compliance with the PM standards under sub. (4) (b) 2. shall demonstrate the maximum design heat input capacity of the steam generating unit by operating the steam generating unit at this capacity for 24 hours. This demonstration shall be made during the initial performance test, and a subsequent demonstration may be requested at any other time. If the demonstrated 24–hour average firing rate for the affected facility is less than the maximum design heat input capacity stated by the manufacturer of the affected facility, the demonstrated 24–hour average firing rate shall be used to the determine annual capacity factor for the affected facility; otherwise, the maximum design heat input capacity provided by the manufacturer shall be used.

(7) EMISSION MONITORING FOR SULFUR DIOXIDE. (a) Except as provided in pars. (d) and (e), the owner or operator of an affected facility subject to the SO_2 emission limits under sub. (3) shall install, calibrate, maintain and operate a CEMS for measuring SO_2 concentrations and either oxygen or carbon dioxide concentrations at the outlet of the SO_2 control device (or the outlet of the steam generating unit if no SO_2 control device is used), and shall record the output of the system. The owner or operator of an affected facility subject to the percent reduction requirements under sub. (3) shall measure SO_2 concentrations and either oxygen or carbon dioxide concentrations at both the inlet and outlet of the SO_2 control device.

(b) The 1–hour average SO_2 emission rates measured by a CEM shall be expressed in ng/J or lb/million Btu heat input and shall be used to calculate the average emission rates under sub. (3). Each 1–hour average SO_2 emission rate shall be based on at least 30 minutes of operation and include at least 2 data points representing 2 15–minute periods. Hourly SO_2 emission rates are not calculated if the affected facility is operated less than 30 minutes in a 1–hour period and are not counted toward determination of a steam generating unit operating day.

(c) The procedure under s. NR 440.13 shall be followed for installation, evaluation and operation of the CEMS.

1. All CEMS shall be operated in accordance with the applicable procedures under Performance Specifications 1, 2 and 3 of 40 CFR part 60 Appendix B, incorporated by reference in s. NR 440.17.

2. Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 of 40 CFR part 60 Appendix F, incorporated by reference in s. NR 440.17.

3. For affected facilities subject to the percent reduction requirements under sub. (3), the span value of the SO_2 CEMS at the inlet to the SO_2 control device shall be 125% of the maximum estimated hourly potential SO_2 emission rate of the fuel combusted, and the span value of the SO_2 CEMS at the outlet from the SO_2 control device shall be 50% of the maximum estimated hourly potential SO_2 rate of the fuel combusted.

4. For affected facilities that are not subject to the percent reduction requirements of sub. (3), the span value of the SO_2 CEMS at the outlet from the SO_2 control device, or outlet of the steam generating unit if no SO_2 control device is used, shall be 125% of the maximum estimated hourly potential SO_2 emission rate of the fuel combusted.

(d) As an alternative to operating a CEMS at the inlet to the SO_2 control device, or outlet of the steam generating unit if no SO_2 control device is used, as required under par. (a), an owner or operator may elect to determine the average SO_2 emission rate by sampling the fuel prior to combustion. As an alternative to operating a CEM at the outlet from the SO_2 control device, or outlet of the steam generating unit if no SO_2 control device is used, as required under par. (a), an owner or operator may elect to determine the average SO_2 emission rate by using Method 6B. Fuel sampling shall be conducted pursuant to either subd. 1. or 2. Method 6B shall be conducted pursuant to subd. 3.

1. For affected facilities combusting coal or oil, coal or oil samples shall be collected daily in an as–fired condition at the inlet to the steam generating unit and analyzed for sulfur content and heat content according to Method 19. Method 19 provides procedures for converting these measurements into the format to be used in calculating the average SO_2 input rate.

2. As an alternative fuel sampling procedure for affected facilities combusting oil, oil samples may be collected from the fuel tank for each steam generating unit immediately after the fuel tank is filled and before any oil is combusted. The owner or operator of an affected facility shall analyze the oil sample to determine the sulfur content of the oil. If a partially empty fuel tank is refilled, a new sample and analysis of the fuel in the tank is required upon filling. Results of the fuel analysis taken after each new shipment of oil is received shall be used as the daily value when calculating the 30–day rolling average until the next shipment is received. If the fuel analysis shows that the sulfur content in the fuel tank is greater than 0.5 weight percent sulfur, the owner or operator shall ensure that the sulfur content of subsequent oil shipments is low enough to cause the 30–day rolling average sulfur content to be 0.5 weight percent sulfur or less.

3. Method 6B may be used in lieu of CEMS to measure SO_2 at the inlet or outlet of the SO_2 control system. An initial stratification test is required to verify the adequacy of the Method 6B sampling location. The stratification test shall consist of 3 paired runs of a suitable SO_2 and carbon dioxide measurement train operated at the candidate location and a second similar train operated according to the procedures in s. 3.2 and the applicable procedures in section 7 of Performance Specification 2 of 40 CFR part 60 Appendix B, incorporated by reference in s. NR 440.17. Method 6B, Method 6A or a combination of Methods 6 and 3 or Methods 6C and 3A are suitable measurement techniques. If Method 6B is used for the second train, sampling time and timer operation may be adjusted for the stratification test as long as an adequate sample volume is collected; however, both sampling trains are to be operated similarly. For the location to be adequate for Method 6B 24–hour tests, then the mean of the absolute difference between the 3 paired runs shall be less than 10% (0.10).

(e) The monitoring requirements of pars. (a) and (d) do not apply to affected facilities subject to sub. (3) (h) 1., 2. or 3. where the owner or operator of the affected facility seeks to demonstrate compliance with the SO_2 standards based on fuel supplier certification, or as described under sub. (9) (f) 1., 2. or 3., as applicable.

(f) The owner or operator of an affected facility operating a CEMS pursuant to par. (a), or conducting as–fired fuel sampling pursuant to par. (d) 1., shall obtain emission data for at least 75% of the operating hours in at least 22 out of 30 successive steam generating unit operating days. If this minimum data requirement is not met with a single monitoring system, the owner or operator of the affected facility shall supplement the emission data with data collected with other monitoring systems as approved by the department.

(8) EMISSION MONITORING FOR PARTICULATE MATTER. (a) The owner or operator of an affected facility combusting coal, residual oil or wood that is subject to the opacity standards under sub. (4) shall install, calibrate, maintain and operate a CEMS for measuring the opacity of the emissions discharged to the atmosphere and record the output of the system.

(b) All CEMS for measuring opacity shall be operated in accordance with the applicable procedures under Performance Specification 1 of 40 CFR part 60 Appendix B, incorporated by reference in s. NR 440.17. The span value of the opacity CEMS shall be between 60 and 80%.

(9) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction, anticipated startup and actual startup, as provided by s. NR 440.07. This notification shall include:

1. The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

2. If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under sub. (3) or (4).

3. The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.

4. Notification if an emerging technology will be used for controlling SO_2 emissions. The administrator shall examine the description of the control device and determine whether the technology qualifies as an emerging technology. In making this determination, the administrator may require the owner or operator of an affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of sub. (3) (a) or (b) 1., unless and until this determination is made by the administrator.

(b) The owner or operator of each affected facility subject to the SO_2 emission limits of sub. (3), or the PM or opacity limits of sub. (4), shall submit to the department the performance test data from the initial and any subsequent performance tests and, if applicable, the performance evaluation of the CEMS using the applicable performance specifications in Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(c) The owner or operator of each coal–fired, residual oil–fired, or wood–fired affected facility subject to the opacity limits under sub. (4) (c) shall submit excess emission reports for any calendar quarter for which there are excess emissions from the affected facility. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report semiannually stating that no excess emissions occur during the semiannual reporting period. The initial quarterly report shall be postmarked by the 30th day of the third month following the completion of the initial performance test, unless no excess emissions occur during that quarter. The initial semiannual report shall be postmarked by the 30th day of the sixth month following the completion of the initial performance test, or following the date of the previous quarterly report, as applicable. Each subsequent quarterly or semiannual report shall be postmarked by the 30th day following the end of the reporting period.

(d) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits or percent reduction requirements under sub. (3) shall submit quarterly reports to the department. The initial quarterly report shall be postmarked by the 30th day of the third month following the completion of the initial performance test. Each subsequent quarterly report shall be postmarked by the 30th day following the end of the reporting period.

(e) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits or percent reduction requirements under sub. (3) shall keep records and submit quarterly reports as required under par. (d), including the following information, as applicable:

1. Calendar dates covered in the reporting period.

2. Each 30–day average SO_2 emission rate (ng/J or lb/million Btu), or 30–day average sulfur content (weight percent), calculated during the reporting period, ending with the last 30–day period in the quarter; reasons for any noncompliance with the emission standards; and a description of corrective actions taken.

3. Each 30–day average percent of potential SO_2 emission rate calculated during the reporting period, ending with the last 30–day period in the quarter; reasons for any noncompliance with the emission standards; and a description of corrective actions taken.

4. Identification of any steam generating unit operating days for which SO_2 or diluent, oxygen or carbon dioxide, data have not been obtained by an approved method for at least 75% of the operating hours; justification for not obtaining sufficient data; and a description of corrective actions taken.

5. Identification of any times when emissions data have been excluded from the calculation of average emission rates; justification for excluding data; and a description of corrective actions taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

6. Identification of the F factor used in calculations, method of determination and type of fuel combusted.

7. Identification of whether averages have been obtained based on CEMS rather than manual sampling methods.

8. If a CEMS is used, identification of any times when the pollutant concentration exceeded the full span of the CEMS.

9. If a CEMS is used, description of any modifications to the CEMS that could affect the ability of the CEMS to comply with Performance Specifications 2 or 3 in Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17.

10. If a CEMS is used, results of daily CEMS drift tests and quarterly accuracy assessments as required under Appendix F, Procedure 1 of 40 CFR Part 60, incorporated by reference in s. NR 440.17.

11. If fuel supplier certification is used to demonstrate compliance, records of fuel supplier certification as described under par. (f) 1., 2. or 3., as applicable. In addition to records of fuel supplier certifications, the quarterly report shall include a certified statement signed by the owner or operator of the affected facility that the records of fuel supplier certifications submitted represent all of the fuel combusted during the quarter.

(f) Fuel supplier certification shall include the following information:

1. For distillate oil:

a. The name of the oil supplier; and

b. A statement from the oil supplier that the oil complies with the specifications under the definition of distillate oil in sub. (2).

2. For residual oil:

a. The name of the oil supplier;

b. The location of the oil when the sample was drawn for analysis to determine the sulfur content of the oil, specifically including whether the oil was sampled as delivered to the affected facility, or whether the sample was drawn from oil in storage at the oil supplier's or oil refiner's facility, or other location;

c. The sulfur content of the oil from which the shipment came, or of the shipment itself; and

d. The method used to determine the sulfur content of the oil.

3. For coal:

a. The name of the coal supplier;

b. The location of the coal when the sample was collected for analysis to determine the properties of the coal, specifically including whether the coal was sampled as delivered to the affected facility or whether the sample was collected from coal in storage at the mine, at a coal preparation plant, at a coal supplier's facility or at another location. The certification shall include the name of the coal mine, and coal seam, coal storage facility or coal preparation plant, where the sample was collected;

c. The results of the analysis of the coal from which the shipment came, or of the shipment itself, including the sulfur content, moisture content, ash content and heat content; and

d. The methods used to determine the properties of the coal.

(g) The owner or operator of each affected facility shall record and maintain records of the amounts of each fuel combusted during each day.

(h) The owner or operator of each affected facility subject to a federally enforceable requirement limiting the annual capacity factor for any fuel or mixture of fuels under sub. (3) or (4) shall calculate the annual capacity factor individually for each fuel combusted. The annual capacity factor is determined on a 12–month rolling average basis with a new annual capacity factor calculated at the end of the calendar month.

(i) All records required under this subsection shall be maintained by the owner or operator of the affected facility for a period of 2 years following the date of such record.

History: Cr. Register, June, 1993, No.450, eff. 8–1–93**;** r. (2) (k), am. (3) (a) (intro.), (b) 1. (intro.), 2. (intro.), (c) (intro.), (d), (e) (intro.), 2., (4) (a) (intro.), 1., (b) (intro.), (c), (5) (j), Register, December, 1995, No. 480, eff. 1–1–96; correction in (g) (e) (intro.) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 1995, No., 480.

NR 440.21 Incinerators. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each incinerator of more than 45 metric tons per day charging rate (50 tons/day), which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Day" means 24 hours.

(b) "Incinerator" means any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter.

(c) "Solid waste" means refuse, more than 50% of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber and other combustibles, and noncombustible materials such as glass and rock.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of 0.18 g/dscm (0.08 gr/dscf) corrected to 12% CO_2.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any incinerator subject to the provisions of this section shall record the daily charging rates and hours of operation.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standard in sub. (3) as follows:

1. The emission rate (C_{12}) of particulate matter, corrected to 12% CO_2, shall be computed for each run using the following equation:

$$C_{12} = C_s\,(12/\%CO_2)$$

where:

C_{12} is the concentration of particulate matter corrected to 12% CO_2 g/dscm (gr/dscf)

C_s is the concentration of particulate matter, g/dscm (gr/dscf)

$\%CO_2$ is the CO_2 concentration, percent dry basis

2. Method 5 shall be used to determine the particulate matter concentration (C_s). The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The emission rate correction factor, integrated or grab sampling and analysis procedure of Method 3B shall be used to determine CO_2 concentration ($\%CO_2$).

a. The CO_2 sample shall be obtained simultaneously with, and at the same traverse points as, the particulate run. If the particulate run has more than 12 traverse points, the CO_2 traverse points may be reduced to 12 if Method 1 is used to locate the 12 CO_2 traverse points. If individual CO_2 samples are taken at each traverse point, the CO_2 concentration ($\%CO_2$) used in the correction equation shall be the arithmetic mean of all the individual CO_2 sample concentrations at each traverse point.

b. If sampling is conducted after a wet scrubber, an "adjusted" CO_2 concentration, $(\%CO_2)_{adj}$, which accounts for the effects of CO_2 absorption and dilution air, may be used instead of the CO_2 concentration determined in this paragraph. The adjusted CO_2 concentration shall be determined by either of the procedures in par. (c).

(c) The owner or operator may use either of the following procedures to determine the adjusted CO_2 concentration.

1. The volumetric flow rates at the inlet and outlet of the wet scrubber and the inlet CO_2 concentration may be used to determine the adjusted concentration, $(\%CO_2)_{adj}$, using the following equation:

$$(\%CO_2)_{adj}, = (\%CO_2)_{di}\,(Q_{di}/Q_{do})$$

where:

$(\%CO_2)_{adj}$ is the adjusted outlet CO_2 concentration, percent dry basis

$(\%CO_2)_{di}$ is the CO_2 concentration measured before the scrubber, percent dry basis

Q_{di} is the volumetric flow rate of effluent gas before the wet scrubber, dscm/min (dscf/min)

Q_{do} is the volumetric flow rate of effluent gas after the wet scrubber, dscm/min (dscf/min)

a. At the outlet, Method 5 is used to determine the volumetric flow rate (Q_{do}) of the effluent gas.

b. At the inlet, Method 2 is used to determine the volumetric flow rate (Q_{di}) of the effluent gas as follows: Two full velocity traverses are conducted, one immediately before and one immediately after each particulate run conducted at the outlet, and the results are averaged.

c. At the inlet, the emission rate correction factor, integrated sampling and analysis procedure of Method 3B is used to determine the CO_2 concentration, $(\%CO_2)_{di}$, as follows: At least 9 sampling points are selected randomly from the velocity traverse points and are divided randomly into 3 sets, equal in number of points; the first set of 3 or more points is used for the first run, the second set for the second run, and the third set for the third run. The CO_2 sample is taken simultaneously with each particulate run being conducted at the outlet, by traversing the 3 sampling points, or more, and sampling at each point for equal increments of time.

2. Excess air measurements may be used to determine the adjusted CO_2 concentration, $(\%CO_2)_{adj}$, using the following equation:

$$(\%CO_2)_{adj} = (\%CO_2)_{di}\,[(100 + \%EA_i)/(100 + \%EA_o)]$$

where:

$(\%CO_2)_{adj}$ is the adjusted outlet CO_2 concentration, percent dry basis

$(\%CO_2)_{di}$ is the CO_2 concentration at the inlet of the wet scrubber, percent dry basis

$\%EA_i$ is the excess air at the inlet of the scrubber, percent

$\%EA_o$ is the excess air at the outlet of the scrubber, percent

a. A gas sample is collected as in subd. 1. c. and the gas samples at both the inlet and outlet locations are analyzed for CO_2, O_2 and N_2.

b. Equation 3B–3 of Method 3B is used to compute the percentages of excess air at the inlet and outlet of the wet scrubber.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.215 Municipal waste combustors. (1) APPLICABILITY. (a) The affected facility to which this section applies is each MWC unit with an MWC unit capacity greater than 225 megagrams per day (250 tons per day) of MSW or RDF for which construction, modification or reconstruction is commenced after December 20, 1989.

(c) Affected facilities that combust tires or fuel derived solely from tires and that combust no other MSW or RDF are exempt from this section except the initial report required under sub. (10).

(d) Cofired combustors, as defined under sub. (2), are exempt from this section except the initial report required under sub. (10) and records and reports of the daily weight of MSW or RDF and other fuels fired as required under subs. (10c) (h) and (10u).

(e) Cofired combustors that are subject to a federally enforceable permit limiting the operation of the combustor to no more than 225 megagrams per day (250 tons per day) of MSW or RDF are exempt from this section.

(f) Physical or operational changes made to an existing MWC unit solely to comply with emission guidelines under 40 CFR part 60 subpart Ca, as in effect on July 1, 1994, are not considered a modification or reconstruction and do not bring an existing MWC unit under this section.

(g) Municipal waste combustors combusting medical waste combined with other MSW are subject to this section. Units combusting solely medical waste are not covered by this section.

(2) DEFINITIONS. All terms not defined in this section have the meanings given in s. NR 440.02. In this section:

(a) "Batch MWC"means an MWC unit designed such that it cannot combust MSW continuously 24 hours per day because the design does not allow waste to be fed to the unit or ash to be removed while combustion is occurring.

(b) "Bubbling fluidized bed combustor" means a fluidized bed combustor in which the majority of the bed material remains in a fluidized state in the primary combustion zone.

(bm) "Chief facility operator" means the person in direct charge and control of the operation of an MWC and who is responsible for daily on site supervision, technical direction, management and overall performance of the facility.

(c) "Circulating fluidized bed combustor" means a fluidized bed combustor in which the majority of the fluidized bed material is carried out of the primary combustion zone and is transported back to the primary zone through a recirculation loop.

(cm) "Coal/RDF mixed fuel fired combustor" means a combustor that fires coal and RDF simultaneously.

(d) "Cofired combustor" means a unit combusting MSW or RDF with a non–MSW fuel and subject to a federally enforceable permit limiting the unit to combusting a fuel feed stream, 30% or less of the weight of which is comprised, in aggregate, of MSW or RDF as measured on a 24 hour daily basis. A unit combusting a fuel feed stream, more than 30% of the weight of which is comprised, in aggregate, of MSW or RDF shall be considered an MWC unit and not a cofired combustor. Cofired combustors which fire less than 30% segregated medical waste and no other municipal solid waste are not covered by this section.

(dm) "Continuous emission monitoring system" or "CEMS" means a monitoring system for continuously measuring the emissions of a pollutant from an affected facility.

(e) "Dioxin/furan" means total tetra through octa–chlorinated dibenzo–p– dioxins and dibenzofurans.

(em) "Four–hour block average" or "4–hour block average" means the average of all hourly emission rates when the affected facility is operating and combusting MSW measured over 4–hour periods of time from 12:00 midnight to 4 a.m., 4 a.m. to 8 a.m., 8 a.m. to 12:00 noon, 12:00 noon to 4 p.m., 4 p.m. to 8 p.m., and 8 p.m. to 12:00 midnight.

(f) "Large MWC plant" means an MWC plant with an MWC plant capacity greater than 225 megagrams per day (250 tons per day) of MSW.

(fm) "Mass burn refractory MWC" means a combustor that combusts MSW in a refractory wall furnace. This does not include rotary combustors without waterwalls.

(g) "Mass burn rotary waterwall MWC" means a combustor that combusts MSW in a cylindrical rotary waterwall furnace. This does not include rotary combustors without waterwalls.

(gm) "Mass burn waterwall MWC" means a combustor that combusts MSW in a conventional waterwall furnace.

(h) "Maximum demonstrated MWC unit load" means the maximum 4–hour block average MWC unit load achieved during the most recent dioxin/furan test demonstrating compliance with the applicable standard for MWC organics specified under sub. (4).

(hm) "Maximum demonstrated particulate matter control device temperature" means the maximum 4–hour block average temperature measured at the final particulate matter control device inlet during the most recent dioxin/furan test demonstrating compliance with the applicable standard for MWC organics specified under sub. (4). If more than one particulate matter control device is used in series at the affected facility, the maximum 4–hour block average temperature is measured at the final particulate matter control device.

(i) "Medical waste" means any solid waste which is generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto or in production or testing of biologicals. Medical waste does not include any hazardous waste identified under subtitle C of the resource conservation and recovery act (42 USC 6921 to 6939e) or any household waste as defined in regulations under subtitle C of the resource conservation and recovery act (42 USC 6921 to 6939e).

Note: The references to 42 USC 6921 to 6939e refers to those laws in effect on May 1, 1997.

(im) "Modular excess air MWC" means a combustor that combusts MSW and that is not field erected and has multiple combustion chambers, all of which are designed to operate at conditions with combustion air amounts in excess of theoretical air requirements.

(j) "Modular starved air MWC" means a combustor that combusts MSW and that is not field erected and has multiple combustion chambers in which the primary combustion chamber is designed to operate at substoichiometric conditions.

(jm) "Municipal type solid waste" or "MSW" means household, commercial, retail or institutional waste. Household waste includes material discarded by single and multiple residential dwellings, hotels, motels and other similar permanent or temporary housing establishments or facilities. Commercial or retail waste includes material discarded by stores, offices, restaurants, warehouses, nonmanufacturing activities at industrial facilities and other similar establishments or facilities. Institutional waste includes material discarded by schools, hospitals, nonmanufacturing activities at prisons and government facilities and other similar establishments or facilities. Household, commercial or retail and institutional waste do not include sewage, wood pallets, construction and demolition wastes, industrial process or manufacturing wastes or motor vehicles including motor vehicle parts or vehicle fluff. Municipal type solid waste does include motor vehicle maintenance materials, limited to vehicle batteries, used motor oil and tires. Municipal type solid waste does not include wastes that are solely segregated medical wastes. Any mixture of segregated medical wastes and other wastes which contains more than 30% waste medical waste discards is considered to be municipal type solid waste.

(k) "Municipal waste combustor" or "MWC" or "MWC unit" means any device that combusts solid, liquid or gasified MSW including, but not limited to, field erected incinerators with or without heat recovery; modular incinerators; starved air or excess air boilers or steam generating units; furnaces whether suspension fired, grate fired, mass fired or fluidized bed fired; and gasification combustion units. This does not include combustion units, engines or other devices that combust landfill gases collected by landfill gas collection systems.

(L) "MWC acid gases" means all acid gases emitted in the exhaust gases from MWC units including but not limited to sulfur dioxide and hydrogen chloride gases.

(m) "MWC metals" means metals and metal compounds emitted in the exhaust gases from MWC units.

(n) "MWC organics" means organic compounds emitted in the exhaust gases from MWC units and includes total tetra through octa–chlorinated dibenzo–p– dioxins and dibenzofurans.

(o) "MWC plant" means one or more MWC units at the same location for which construction, modification or reconstruction is commenced after December 20, 1989.

(p) "MWC plant capacity" means the aggregate MWC unit capacity of all MWC units at an MWC plant for which construction, modification or reconstruction commenced after December 20, 1989. Any MWC units for which construction, modification or reconstruction is commenced on or before December 20, 1989 are not included for determining applicability under this section.

(q) "MWC unit capacity" means the maximum design charging rate of an MWC unit expressed in megagrams per day or tons per day of MSW combusted, calculated according to the procedures under sub. (9) (j). Municipal waste combustor unit capacity is calculated using a design heating value of 10,500 kilojoules per kilogram (4,500 British thermal units per pound) for MSW and 19,800 kilojoules per kilogram (8,500 British thermal units per pound) for medical waste. The calculational procedures under sub. (9) (j) include procedures for determining MWC unit capacity for batch MWCs and cofired combustors and combustors firing mixtures of medical waste and other MSW.

(r) "Particulate matter" means total particulate matter emitted from MWC units as measured by Method 5 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(s) "Potential hydrogen chloride emission rate" means the hydrogen chloride emission rate that would occur from combustion of MSW in the absence of any hydrogen chloride emissions control.

(t) "Potential sulfur dioxide emission rate" means the sulfur dioxide emission rate that would occur from combustion of MSW in the absence of any sulfur dioxide emissions control.

(u) "RDF stoker" means a steam generating unit that combusts RDF in a semi–suspension firing mode using air fed distributors.

(v) "Refuse derived fuel" or "RDF" means a type of MSW produced by processing MSW through shredding and size classification. This includes all classes of RDF including low density fluff RDF through densified RDF and RDF fuel pellets.

(w) "Same location" means the same or contiguous property that is under common ownership or control, including properties that are separated only by a street, road, highway or other public right of way. Common ownership or control includes properties that are owned, leased or operated by the same entity, parent entity, subsidiary, subdivision or any combination thereof, including any municipality or other governmental unit or any quasi–governmental authority such as a public utility district or regional waste disposal authority.

(x) "Shift supervisor" means the person in direct charge and control of the operation of an MWC and who is responsible for on site supervision, technical direction, management and overall performance of the facility during an assigned shift.

(y) "Standard conditions" means a temperature of 293 K (68°F) and a pressure of 101.3 kPa (29.92 in Hg).

(z) "Twenty–four–hour daily average" or "24–hour daily average" means the arithmetic or geometric mean as specified in sub. (9) (e), (g) or (h), as applicable, of all hourly emission rates when the affected facility is operating and firing MSW measured over a 24–hour period between 12:00 midnight and the following midnight.

(3) STANDARD FOR MUNICIPAL WASTE COMBUSTOR METALS. (a) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant may cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter in excess of 34 milligrams per dry standard cubic meter (0.015 grains per dry standard cubic foot), corrected to 7% oxygen dry basis.

(b) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility subject to the particulate matter emission limit under par. (a) may cause to be discharged into the atmosphere from that affected facility any gases that exhibit greater than 10% opacity (6–minute average).

(4) STANDARD FOR MUNICIPAL WASTE COMBUSTOR ORGANICS. (b) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant may cause to be discharged into the atmosphere from that affected facility any gases that contain dioxin/furan emissions that exceed 30 nanograms per dry standard cubic meter (12 grains per billion dry standard cubic feet), corrected to 7% oxygen dry basis.

(5) STANDARD FOR MUNICIPAL WASTE COMBUSTOR ACID GASES. (c) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain sulfur dioxide in excess of 20% of the potential sulfur dioxide emission rate (80% reduction by weight or volume) or 30 parts per million by volume, corrected to 7% oxygen dry basis, whichever is less stringent. The averaging time is specified in sub. (9) (e).

(d) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant may cause to be discharged into the atmosphere from that affected facility any gases that contain hydrogen chloride in excess of 5% of the potential hydrogen chloride emission rate (95% reduction by weight or volume) or 25 parts per million by volume, corrected to 7% oxygen dry basis, whichever is less stringent.

(6) STANDARD FOR NITROGEN OXIDES. On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of 180 parts per million by volume, corrected to 7% oxygen dry basis. The averaging time is specified under sub. (9) (g).

(7) STANDARDS FOR MUNICIPAL WASTE COMBUSTOR OPERATING PRACTICES. (a) On and after the date on which the initial compliance test is completed or is required to be completed under s. NR 440.08, no owner or operator of an affected facility located within a large MWC plant may cause the facility to exceed the carbon monoxide standards shown in Table 1.

Table 1. MWC Operating Standards

MWC Technology	Carbon Monoxide Emission Limit (parts per million by volume)[1]
Mass burn waterwall	100
Mass burn refractory	100
Mass burn rotary waterwall	100
Modular starved air	50
Modular excess air	50
RDF Stoker	150
Bubbling fluidized bed combustor	100
Circulating fluidized bed combustor	100
Coal/RDF mixed fuel fired combustors	150

[1] Measured at the combustor outlet in conjunction with a measurement of oxygen concentration, corrected to 7% oxygen dry basis. The averaging times are specified in sub. (9) (h).

(b) No owner or operator of an affected facility located within a large MWC plant may cause the facility to operate at a load level greater than 110% of the maximum demonstrated MWC unit load as defined in sub. (2). The averaging time is specified under sub. (9) (h).

(c) No owner or operator of an affected facility located within a large MWC plant may cause the facility to operate at a temperature, measured at the final particulate matter control device inlet, exceeding 17°C (30°F) above the maximum demonstrated particulate matter control device temperature as defined in sub. (2). The averaging time is specified under sub. (9) (h).

(d) Within 24 months from the date of startup of an affected facility or before February 11, 1993, whichever is later, each chief facility operator and shift supervisor of an affected facility located within a large MWC plant shall obtain and keep current either a provisional or operator certification in accordance with ASME QRO–1–1989, incorporated by reference in s. NR 440.17, or an equivalent state approved certification program.

(e) No owner or operator of an affected facility may allow the affected facility located at a large MWC plant to operate at any time without a certified shift supervisor, as provided under par. (d), on duty at the affected facility. This requirement shall take effect 24 months after the date of startup of the affected facility or on and after February 11, 1993, whichever is later.

(f) The owner or operator of an affected facility located within a large MWC plant shall develop and update on a yearly basis a site specific operating manual that shall, at a minimum, address the following elements of MWC unit operation:

1. Summary of the applicable standards under this section;

2. Description of basic combustion theory applicable to an MWC unit;

3. Procedures for receiving, handling and feeding MSW;

4. MWC unit startup, shutdown and malfunction procedures;

5. Procedures for maintaining proper combustion air supply levels;

6. Procedures for operating the MWC unit within the standards established under this section;

7. Procedures for responding to periodic upset or off specification conditions;

8. Procedures for minimizing particulate matter carryover;

9. Procedures for monitoring the degree of MSW burnout;

10. Procedures for handling ash;

11. Procedures for monitoring MWC unit emissions; and

12. Reporting and recordkeeping procedures.

(g) The owner or operator of an affected facility located within a large MWC plant shall establish a program for reviewing the operating manual annually with each person who has responsibilities affecting the operation of an affected facility including, but not limited to, chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel and crane or load handlers.

(h) The initial review of the operating manual, as specified under par. (g), shall be conducted prior to assumption of responsibilities affecting MWC unit operation by any person required to undergo training under par. (g). Subsequent reviews of the manual shall be carried out annually by each such person.

(i) The operating manual shall be kept in a readily accessible location for all persons required to undergo training under par. (g). The operating manual and records of training shall be available for inspection by U.S. EPA or the department upon request.

(9) COMPLIANCE AND PERFORMANCE TESTING. (a) The standards under this section apply at all times except during periods of startup, shutdown or malfunction, provided that the duration of the period of startup, shutdown or malfunction does not exceed 3 hours per occurrence.

1. The startup period commences when the affected facility begins the continuous burning of MSW and does not include any warm up period when the affected facility is combusting only a fossil fuel or other non–MSW fuel and no MSW is being combusted.

2. Continuous burning is the continuous, semicontinuous or batch feeding of MSW for purposes of waste disposal, energy production or providing heat to the combustion system in preparation for waste disposal or energy production. The use of MSW solely to provide thermal protection of grate or hearth during the startup period is not considered to be continuous burning.

(b) The procedures and test methods in this paragraph shall be used to determine compliance with the emission limits for particulate matter under sub. (3). The cited procedures and test methods are contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. Method 1 shall be used to select sampling site and number of traverse points.

2. Method 3 shall be used for gas analysis.

3. Method 5 shall be used for determining compliance with the particulate matter emission standard. The minimum sample volume shall be 1.7 cubic meters (60 cubic feet). The probe and filter holder heating systems in the sample train shall be set to provide a gas temperature no greater than 160° ± 14°C (320° ± 25°F). An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 5 run.

4. For each Method 5 run, the emission rate shall be determined using:

a. Oxygen or carbon dioxide measurements;

b. Dry basis F factor; and

c. Dry basis emission rate calculation procedures in Method 19.

5. An owner or operator may request that compliance be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

6. The owner or operator of an affected facility shall conduct an initial compliance test for particulate matter and opacity as required under s. NR 440.08.

7. Method 9 shall be used for determining compliance with the opacity limit.

8. The owner or operator of an affected facility shall install, calibrate, maintain and operate a CEMS for measuring opacity and record the output of the system on a 6–minute average basis.

9. Following the date the initial compliance test for particulate matter is completed or is required to be completed under s. NR 440.08 for an affected facility located within a large MWC plant, the owner or operator shall conduct a performance test for particulate matter on an annual basis (no more than 12 calendar months following the previous compliance test).

(d) The procedures and test methods in this paragraph shall be used to determine compliance with the limits for dioxin/furan emissions under sub. (4). The cited procedures and test methods are contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. Method 23 shall be used for determining compliance with the dioxin/furan emission limits. The minimum sample time shall be 4 hours per test run.

2. The owner or operator of an affected facility shall conduct an initial compliance test for dioxin/furan emissions as required under s. NR 440.08.

3. Following the date of the initial compliance test or the date on which the initial compliance test is required to be completed under s. NR 440.08, the owner or operator of an affected facility located within a large MWC plant shall conduct a performance test for dioxin/furan emissions on an annual basis (no more than 12 calendar months following the previous compliance test).

5. An owner or operator may request that compliance with the dioxin/furan emissions limit be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(e) The procedures and test methods in this paragraph shall be used for determining compliance with the sulfur dioxide limit under sub. (5). The cited procedures and test methods are contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. Method 19, section 5.4, shall be used to determine the daily geometric average percent reduction in the potential sulfur dioxide emission rate.

2. Method 19, section 4.3, shall be used to determine the daily geometric average sulfur dioxide emission rate.

3. An owner or operator may request that compliance with the sulfur dioxide emissions limit be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

4. The owner or operator of an affected facility shall conduct an initial compliance test for sulfur dioxide as required under s. NR 440.08. Compliance with the sulfur dioxide emission limit and percent reduction is determined by using a CEMS to measure sulfur dioxide and calculating a 24–hour daily geometric mean emission rate and daily geometric mean percent reduction using Method 19 sections 4.3 and 5.4, as applicable, except as provided under subd. 5.

5. For batch MWCs or MWC units that do not operate continuously, compliance shall be determined using a daily geometric mean of all hourly average values for the hours during the day that the affected facility is combusting MSW.

6. The owner or operator of an affected facility shall install, calibrate, maintain and operate a CEMS for measuring sulfur dioxide emissions discharged to the atmosphere and record the output of the system.

7. Following the date of the initial compliance test or the date on which the initial compliance test is required to be completed under s. NR 440.08, compliance with the sulfur dioxide emission limit or percent reduction shall be determined based on the geometric mean of the hourly arithmetic average emission rates during each 24–hour daily period measured between 12:00 midnight and the following midnight using: CEMS inlet and outlet data, if compliance is based on a percent reduction; or CEMS outlet data only if compliance is based on an emission limit.

8. At a minimum, valid CEMS data shall be obtained for 75% of the hours per day for 75% of the days per month the affected facility is operated and combusting MSW.

9. The 1–hour arithmetic averages required under subd. 7. shall be expressed in parts per million dry basis and used to calculate the 24–hour daily geometric mean emission rates. The 1–hour arithmetic averages shall be calculated using the data points required under s. NR 440.13 (5) (b). At least 2 data points shall be used to calculate each 1–hour arithmetic average.

10. All valid CEMS data shall be used in calculating emission rates and percent reductions even if the minimum CEMS data requirements of subd. 8. are not met.

11. The procedures under s. NR 440.13 shall be followed for installation, evaluation and operation of the CEMS.

12. The CEMS shall be operated according to performance specifications 1, 2 and 3 of Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17.

13. Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with procedure 1 of Appendix F of 40 CFR part 60, incorporated by reference in s. NR 440.17.

14. The span value of the CEMS at the inlet to the sulfur dioxide control device is 125% of the maximum estimated hourly potential sulfur dioxide emissions of the MWC unit and the span value of the CEMS at the outlet to the sulfur dioxide control device is 50% of the maximum estimated hourly potential sulfur dioxide emissions of the MWC unit.

15. When sulfur dioxide emissions data are not obtained because of CEMS breakdowns, repairs, calibration checks and zero and span adjustments, emissions data shall be obtained by using other monitoring systems as approved by the department or Method 19 to provide, as necessary, valid emission data for a minimum of 75% of the hours per day for 75% of the days per month the unit is operated and combusting MSW.

16. Not operating a sorbent injection system for the sole purpose of testing in order to demonstrate compliance with the percent reduction standards for MWC acid gases is not considered a physical change in the method of operation under ch. NR 405, 406 or 408.

(f) The procedures and test methods in this paragraph shall be used for determining compliance with the hydrogen chloride limits under sub. (5). The cited procedures and test methods are contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. The percentage reduction in the potential hydrogen chloride emissions ($\%P_{HCl}$) is computed using the following formula:

$$\%P_{HCl} = \frac{(E_i - E_o)}{E_i} \times 100$$

where:

E_i is the potential hydrogen chloride emission rate

E_o is the hydrogen chloride emission rate measured at the outlet of the acid gas control device

2. Method 26 shall be used for determining the hydrogen chloride emission rate. The minimum sampling time for Method 26 shall be one hour.

3. An owner or operator may request that compliance with the hydrogen chloride emissions limit be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

4. The owner or operator of an affected facility shall conduct an initial compliance test for hydrogen chloride as required under s. NR 440.08.

5. Following the date of the initial compliance test or the date on which the initial compliance test is required under s. NR 440.08, the owner or operator of an affected facility located within a large MWC plant shall conduct a performance test for hydrogen chloride on an annual basis and no more than 12 calendar months following the previous compliance test.

7. Not operating a sorbent injection system for the sole purpose of testing in order to demonstrate compliance with the percent reduction standards for MWC acid gases is not considered a physical change in the method of operation under ch. NR 405, 406 or 408.

(g) The procedures and test methods in this paragraph shall be used to determine compliance with the nitrogen oxides limit under sub. (6). The cited procedures and test methods are contained in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

1. Method 19, section 4.1, shall be used for determining the daily arithmetic average nitrogen oxides emission rate.

2. An owner or operator may request that compliance with the nitrogen oxides emissions limit be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

3. The owner or operator of an affected facility subject to the nitrogen oxides limit under sub. (6) shall conduct an initial compliance test for nitrogen oxides as required under s. NR 440.08. Compliance with the nitrogen oxides emission standard shall be determined by using a CEMS for measuring nitrogen oxides and calculating a 24–hour daily arithmetic average emission rate using Method 19, section 4.1, except as specified under subd. 4.

4. For batch MWCs or MWCs that do not operate continuously, compliance shall be determined using a daily arithmetic average of all hourly average values for the hours during the day that the affected facility is combusting MSW.

5. The owner or operator of an affected facility subject to the nitrogen oxides emissions limit under sub. (6) shall install, calibrate, maintain and operate a CEMS for measuring nitrogen oxides discharged to the atmosphere and record the output of the system.

6. Following the initial compliance test or the date on which the initial compliance test is required to be completed under s. NR 440.08, compliance with the emission limit for nitrogen oxides required under sub. (6) shall be determined based on the arithmetic average of the arithmetic average hourly emission rates during each 24–hour daily period measured between 12:00 midnight and the following midnight using CEMS data.

7. At a minimum, valid CEMS data shall be obtained for 75% of the hours per day for 75% of the days per month the affected facility is operated and combusting MSW.

8. The 1–hour arithmetic averages required by subd. 6. shall be expressed in parts per million volume dry basis and used to calculate the 24–hour daily arithmetic average emission rates. The 1–hour arithmetic averages shall be calculated using the data points required under s. NR 440.13 (2). At least 2 data points shall be used to calculate each 1–hour arithmetic average.

9. All valid CEMS data shall be used in calculating emission rates even if the minimum CEMS data requirements of subd. 7. are not met.

10. The procedures under s. NR 440.13 shall be followed for installation, evaluation and operation of the CEMS.

11. Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with procedure 1 of Appendix F of 40 CFR part 60, incorporated by reference in s. NR 440.17.

12. When nitrogen oxides emissions data are not obtained because of CEMS breakdowns, repairs, calibration checks and zero and span adjustments, emission data calculations to determine compliance shall be made using other monitoring systems as approved by the department or Method 19 to provide, as necessary, valid emission data for a minimum of 75% of the hours per day for 75% of the days per month the unit is operated and combusting MSW.

(h) The following procedures shall be used for determining compliance with the operating standards under sub. (7):

1. Compliance with the carbon monoxide emission limits in sub. (7) (a) shall be determined using a 4–hour block arithmetic average for all types of affected facilities except mass burn rotary waterwall MWCs and RDF stokers.

2. For affected mass burn rotary waterwall MWCs and RDF stokers, compliance with the carbon monoxide emission limits in sub. (7) (a) shall be determined using a 24–hour daily arithmetic average.

3. The owner or operator of an affected facility shall install, calibrate, maintain and operate a CEMS for measuring carbon monoxide at the combustor outlet and record the output of the system.

4. The 4–hour and 24–hour daily arithmetic averages in subds. 1. and 2. shall be calculated from 1–hour arithmetic averages expressed in parts per million by volume dry basis. The 1–hour arithmetic averages shall be calculated using the data points generated by the CEMS. At least 2 data points shall be used to calculate each 1–hour arithmetic average.

5. An owner or operator may request that compliance with the carbon monoxide emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7% oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

6. The following procedures shall be used to determine compliance with load level requirements under sub. (7) (b):

a. The owner or operator of an affected facility with steam generation capability recovery shall install, calibrate, maintain and operate a steam flow meter and measure steam flow in kilograms per hour or pounds per hour steam on a continuous basis and record the output of the monitor. Steam flow shall be calculated in 4–hour block arithmetic averages.

b. The method contained in ASME Power Test Codes: Test Code for Steam Generating Units, PTC 4.1 (1964) section 4, incorporated by reference in s. NR 440.17, shall be used for calculating the steam flow required under subd. 6. a. The recommendations of Instruments and Apparatus: Measurement of Quantity of Materials, ASME Interim Supplement 19.5 (1971) chapter 4, incorporated by reference in s. NR 440.17, shall be followed for design, construction, installation, calibration and use of nozzles and orifices.

7. To determine compliance with the maximum particulate matter control device temperature requirements under sub. (7) (c), the owner or operator of an affected facility shall install, calibrate, maintain and operate a device for measuring temperature of the flue gas stream at the inlet to the final particulate matter control device on a continuous basis and record the output of the device. Temperature shall be calculated in 4–hour block arithmetic averages.

8. Maximum demonstrated MWC unit load shall be determined during the initial compliance test for dioxins/furans and each subsequent performance test during which compliance with the dioxin/furan emission limit under sub. (4) is achieved. Maximum demonstrated MWC unit load shall be the maximum 4– hour arithmetic average load achieved during the most recent test during which compliance with the dioxin/furan limit was achieved.

9. The maximum demonstrated particulate matter control device temperature shall be determined during the initial compliance test for dioxins/furans and each subsequent performance test during which compliance with the dioxin/furan emission limit under sub. (4) is achieved. Maximum demonstrated particulate matter control device temperature shall be the maximum 4–hour arithmetic average temperature achieved at the final particulate matter control device inlet during the most recent test during which compliance with the dioxin/furan limit was achieved.

10. At a minimum, valid CEMS data for carbon monoxide, steam flow and particulate matter control device inlet temperature shall be obtained 75% of the hours per day for 75% of the days per month the affected facility is operated and combusting MSW.

11. All valid data shall be used in calculating the parameters specified under this paragraph even if the minimum data requirements of subd. 10. are not met.

12. Quarterly accuracy determinations and daily calibration drift tests for carbon monoxide CEMS shall be performed in accordance with procedure 1 of Appendix F of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(j) The following procedures shall be used for calculating MWC unit capacity as defined under sub. (2):

1. For MWC units capable of combusting MSW continuously for a 24–hour period, MWC unit capacity in megagrams per day or tons per day of MSW combusted shall be calculated based on 24 hours of operation at the maximum design charging rate. The design heating values under subd. 4. shall be used in calculating the design charging rate.

2. For batch MWC units, MWC unit capacity in megagrams per day or tons per day of MSW combusted shall be calculated as the maximum design amount of MSW that can be charged per batch multiplied by the maximum number of batches that could be processed in a 24–hour period. The maximum number of batches that could be processed in a 24–hour period is calculated as 24 hours divided by the design number of hours required to process one batch of MSW, and may include fractional batches. The design heating values under subd. 4. shall be used in calculating the MWC unit capacity in megagrams per day or tons per day of MSW.

Note: For example, if one batch requires 16 hours then 24/16 or 1.5 batches could be combusted in a 24–hour period.

3. For cofired combustors as defined under sub. (2), MWC unit capacity is the maximum daily amount of MSW or RDF specified in a federally enforceable permit that can be combusted in the cofired combustor expressed in megagrams per day or tons per day of MSW.

4. MWC unit capacity shall be calculated using a design heating value of 10,500 kilojoules per kilogram (4,500 Btu per pound) for all MSW except medical waste and 19,800 kilojoules per kilogram (8,500 Btu per pound) for medical waste. If an affected MWC unit fires both medical waste and other MSW, either the procedure described in subd. 4. a. or b. shall be used to determine the design heating value.

a. The design heating value may be prorated using the following equation:

$$HV_D = 10,500\frac{MSW}{MSW + Med} + 19,800\frac{Med}{MSW + Med}$$

where:

HV_D is the design heating value in kilojoules per kilogram

MSW is the amount of nonmedical MSW fired on a daily basis

Med is the amount of medical waste fired on a daily basis. If this equation is used, records shall be kept of the daily amounts of medical waste and other MSW combusted.

b. The owner or operator of an affected MWC firing both medical waste and other MSW may elect to assume a design heating value of 10,500 kilojoules per kilogram (4,500 British thermal units per pound) for all MSW and medical waste fired. If this assumption is used, records of the daily amount of MSW and medical waste combusted are not required to be kept.

(10) REPORTING AND RECORDKEEPING REQUIREMENTS. The owner or operator of an affected facility located at an MWC plant with a capacity greater than 225 megagrams per day (250 tons per day) shall provide notification of intent to construct and of planned initial startup date and the type or types of fuels that they plan to combust in the affected facility. The MWC unit capacity and MWC plant capacity and supporting capacity calculations shall be provided at the time of the notification of construction. At the time of notification of construction, owners or operators of cofired combustors shall provide estimates of the types and amounts of each fuel they plan to combust and the date on which they plan to start combusting MSW or RDF and shall submit a copy of a federally enforceable permit limiting the maximum amount of MSW that may be combusted in the cofired combustor in any single day (midnight to midnight), expressed in percent of the aggregate fuel feed stream by weight.

(10c) DAILY RECORDS. The owner or operator of an affected facility located within a small or large MWC plant and subject to the standards under sub. (3), (4), (5), (6) or (7) shall maintain records of the following information for each affected facility for a period of at least 2 years:

(a) Calendar date.

(b) The emission rates and parameters measured using CEMS as follows:

1. The following measurements shall be recorded in computer readable format and on paper:

a. All 6–minute average opacity levels required under sub. (9) (b).

b. All 1–hour average sulfur dioxide emission rates at the inlet and outlet of the acid gas control device if compliance is based on a percent reduction or at the outlet only if compliance is based on the outlet emission limit as specified under sub. (9) (e).

c. All 1–hour average nitrogen oxides emission rates as specified under sub. (9) (g).

d. All 1–hour average carbon monoxide emission rates, MWC unit load measurements and particulate matter control device inlet temperatures as specified under sub. (9) (h).

2. The following average rates shall be computed and recorded:

a. All 24–hour daily geometric average percent reductions in sulfur dioxide emissions and all 24–hour daily geometric average sulfur dioxide emission rates as specified under sub. (9) (e).

b. All 24–hour daily arithmetic average nitrogen oxides emission rates as specified under sub. (9) (g).

c. All 4–hour block or 24–hour daily arithmetic average carbon monoxide emission rates, as applicable, as specified under sub. (9) (h).

d. All 4–hour block arithmetic average MWC unit load levels and particulate matter control device inlet temperatures as specified under sub. (9) (h).

(c) Identification of the operating days when any of the average emission rates, percent reductions or operating parameters specified under par. (b) 2. or the opacity level exceeded the applicable limits with reasons for such exceedances as well as a description of corrective actions taken.

(d) Identification of operating days for which the minimum number of hours of sulfur dioxide or nitrogen oxides emissions or operational data, including carbon monoxide emissions, unit load or particulate matter control device temperature, have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken.

(e) Identification of the times when sulfur dioxide or nitrogen oxides emission or operational data, including carbon monoxide emissions, unit load or particulate matter control device temperature, have been excluded from the calculation of average emission rates or parameters and the reasons for excluding data.

(f) The results of daily sulfur dioxide, nitrogen oxides and carbon monoxide CEMS drift tests and accuracy assessments as required under procedure 1 of Appendix F of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(g) The results of all annual performance tests conducted to determine compliance with the particulate matter, dioxin/furan and hydrogen chloride limits. For all annual dioxin/furan tests, the maximum demonstrated MWC unit load and maximum demonstrated particulate matter control device temperature shall be recorded along with supporting calculations.

(h) For cofired combustors having an MWC unit capacity greater than 225 megagrams per day (250 tons per day) of MSW, the weight of MSW and each other fuel combusted on a daily basis.

(i) For combustors firing both medical waste and other MSW, the amount of nonmedical MSW and the amount of medical waste combusted on a daily basis unless it is assumed that the total heat input to the combustor is from MSW with a design heating value of 10,500 kilojoules per kilogram (4,500 British thermal units per pound).

(10f) INITIAL COMPLIANCE TEST REPORT. Following the initial compliance test as required under s. NR 440.08 and sub. (9), the owner or operator of an affected facility located within a large MWC plant shall submit the initial compliance test data, the performance evaluation of the CEMS using the applicable performance specifications in Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17, and the maximum demonstrated MWC unit load and maximum demonstrated particulate matter control device temperature established during the dioxin/furan compliance test.

(10i) QUARTERLY COMPLIANCE REPORTS. The owner or operator of an affected facility located within a large MWC plant shall submit quarterly compliance reports for sulfur dioxide, nitrogen oxide if applicable, carbon monoxide, load level and particulate matter control device temperature to the department containing the information recorded under sub. (10c) (a), (b) 2. and (c) to (f) for each pollutant or parameter. The hourly average values recorded under sub. (10c) (b) 1. are not required to be included in the quarterly reports. Combustors firing a mixture of medical waste and other MSW shall also provide the information under sub. (10c) (i) in each quarterly report if applicable. Reports shall be postmarked no later than the 30th day following the end of each calendar quarter.

(10k) QUARTERLY OPACITY EXCEEDANCE REPORTS. The owner or operator of an affected facility located within a large MWC plant shall submit quarterly excess emission reports, as applicable, for opacity. The quarterly excess emission reports shall include all information recorded under sub. (10c) (c) which pertains to opacity and a listing of the 6– minute average opacity levels recorded under sub. (10c) (b) 1. a. for all periods when the 6–minute average levels exceeded the opacity limit under sub. (3). The quarterly report shall also list the percent of the affected facility operating time for the calendar quarter that the opacity CEMS was operating and collecting valid data. Excess emission reports shall be postmarked no later than the 30th day following the end of each calendar quarter.

(10n) ANNUAL PERFORMANCE TEST REPORTS. The owner or operator of an affected facility located within a large MWC plant shall submit reports to the department of all annual performance tests for particulate matter, dioxin/furan and hydrogen chloride as recorded under sub. (10c) (g), as applicable, from the affected facility. For each annual dioxin/furan compliance test, the maximum demonstrated MWC unit load and maximum demonstrated particulate matter control device temperature shall be reported. Reports shall be submitted when available and in no case later than the date of required submittal of the quarterly report specified under sub. (10i) covering the calendar quarter following the quarter during which the test was conducted.

(10p) CEMS DATA RECORDS. Records of CEMS data for opacity, sulfur dioxide, nitrogen oxides, carbon monoxide, load level data and particulate matter control device temperature data shall be maintained for at least 2 years after date of recordation and be made available for inspection upon request.

(10s) OPERATING MANUAL REVIEW RECORDS. Records showing the names of persons who have completed review of the operating manual, including the date of the initial review and all subsequent annual reviews, shall be maintained for at least 2 years after date of review and be made available for inspection upon request.

(10u) QUARTERLY COFIRED COMBUSTOR REPORTS. The owner or operator of a cofired combustor located within a plant having an MWC plant capacity, as determined under subs. (2) and (9) (j) 3., greater than 225 megagrams per day (250 tons per day) shall submit quarterly reports of the daily weights of MSW and each other fuel fired as recorded under sub. (10c) (h). Reports shall be postmarked no later than the 30th day following the end of each calendar quarter.

History: Cr., Register, December, 1995, No. 480, eff. 1–1–96; correction made under s. 13.93 (2m) (b) 1., Stats., Register, April, 1997, No. 496; **correction in (10c) (intro.) made under s. 13.93 (2m) (b) 7., Register, November, 1999, No. 527.**

NR 440.22 Portland cement plants.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in portland cement plants: Kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Portland cement plant" means any facility manufacturing portland cement by either the wet or dry process.

(b) "Bypass" means any system that prevents all or a portion of the kiln or clinker cooler exhaust gases from entering the main control device and ducts the gases through a separate control device. This does not include emergency systems designed to duct exhaust gases directly to the atmosphere in the event of a malfunction of any control device controlling kiln or clinker cooler emissions.

(c) "Bypass stack" means the stack that vents exhaust gases to the atmosphere from the bypass control device.

(d) "Monovent" means an exhaust configuration of a building or emission control device, for example a positive–pressure fabric filter, that extends the length of the structure and has a width very small in relation to its length, that is, length to width ratio is typically greater than 5:1. The exhaust may be an open vent with or without a roof, louvered vents or a combination of such features.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any kiln any gases which:

1. Contain particulate matter in excess of 0.15 kg per metric ton of feed (dry basis) to the kiln (0.30 lb per ton).

2. Exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any clinker cooler any gases which:

1. Contain particulate matter in excess of 0.050 kg per metric ton of feed (dry basis) to the kiln (0.10 lb. per ton).

2. Exhibit 10% opacity, or greater.

(c) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility other than the kiln and clinker cooler any gases which exhibit 10% opacity, or greater.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any portland cement plant subject to the provisions of this section shall record the daily production rates and kiln feed rates.

(b) Except as provided for in par. (c), each owner or operator of a kiln or clinker cooler that is subject to the provisions of this section shall install, calibrate, maintain and operate in accordance with s. NR 440.13 a continuous opacity monitoring system to measure the opacity of the emissions discharged into the atmosphere from any kiln or clinker cooler. Except as provided for in par. (c), a continuous opacity monitoring system shall be installed on each stack of any multiple stack device controlling emissions from any kiln or clinker cooler. If there is a separate bypass installed, each owner or operator of a kiln or clinker cooler shall also install, calibrate, maintain and operate a continuous opacity monitoring system on each bypass stack in addition to the main control device stack. Each owner or operator of an affected kiln or clinker cooler for which the performance test required under s. NR 440.08 has been completed prior to December 14, 1988, shall install the continuous opacity monitoring system within 180 days after December 14, 1988.

(c) Each owner or operator of a kiln or clinker cooler subject to the provisions of this section using a positive–pressure fabric filter with multiple stacks, or an electrostatic precipitator with multiple stacks may, in lieu of installing the continuous opacity monitoring system required by par. (b), monitor visible emissions at least once per day by using a certified visible emissions observer. If the control device exhausts gases through a monovent, visible emissions observations in lieu of a continuous opacity monitoring system are required. These observations shall be taken in accordance with Method 9 of 40 CFR part 60 Appendix A, incorporated by reference in s. NR 440.17. Visible emissions shall be observed during conditions representative of normal operation. Observations shall be recorded for at least 3 6–minute periods each day. In the event that visible emissions are observed for a number of emission sites from the control device with multiple stacks, Method 9 observations shall be recorded for the emission site with the highest opacity. All records of visible emissions shall be maintained for a period of 2 years.

(d) For the purpose of reports under sub. (6), periods of excess emissions that shall be reported are defined as all 6–minute periods during which the average opacity exceeds that allowed by sub. (3) (a) 2. or (b) 2.

(e) The provisions of pars. (a), (b) and (c) apply to kilns and clinker coolers for which construction, modification or reconstruction commenced after August 17, 1971.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standard in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s Q_{sd})/(PK)$$

where:

E is the emission rate of particulate matter, kg/metric ton (lb/ton) of kiln feed

c_s is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the total kiln feed (dry basis) rate, metric ton/hr (ton/hr)

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30.0 dscf) for the kiln and at least 60 minutes and 1.15 dscm (40.6 dscf) for the clinker cooler.

3. Suitable methods shall be used to determine the kiln feed rate (P), except fuels, for each run. Material balance over the production system shall be used to confirm the feed rate.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(6) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Each owner or operator required to install a continuous opacity monitoring system under sub. (4) (b) shall submit reports of excess emissions as defined in sub. (4) (d). The content of these reports shall comply with the requirements in s. NR 440.07(3). Notwithstanding the provisions of s. NR 440.07(3), reports shall be submitted semiannually.

(b) Each owner or operator monitoring visible emissions under sub. (4) (c) shall submit semiannual reports of observed excess emissions as defined in sub. (4) (d).

(c) Each owner or operator subject to the provisions of sub. (4) (c) shall submit semiannual reports of the malfunction information required to be recorded by s. NR 440.07 (2). These reports shall include the frequency, duration and cause of any incident resulting in deenergization of any device controlling kiln emissions or in the venting of emissions directly to the atmosphere.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; cr. (2) (b) to (d), (4) (b) to (e) and (6), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.23 Nitric acid plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each nitric acid production unit, which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Nitric acid production unit" means any facility producing weak nitric acid by either the pressure or atmospheric pressure process.

(b) "Weak nitric acid" means acid which is 30 to 70% in strength.

(3) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain nitrogen oxides, expressed as NO_2, in excess of 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100% nitric acid.

2. Exhibit 10% opacity, or greater.

(4) EMISSION MONITORING. (a) The source owner or operator shall install, calibrate, maintain and operate a continuous monitoring system for measuring nitrogen oxides (NO_x). The pollutant gas mixtures under Performance Specification 2 of Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17, and for calibration checks under s. NR 440.13 (4) shall be nitrogen dioxide (NO_2). The span value shall be 500 ppm of NO_2. Method 7 shall be used for the performance evaluation under s. NR 440.13 (3). Acceptable alternative methods to Method 7 are given in sub. (5) (c).

(b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton). The conversion factor shall be established by measuring emissions with the continuous monitoring system concurrent with measuring emissions with the applicable reference method tests. Using only that portion of the continuous monitoring emission data that represents emission measurements concurrent with the reference method test periods, the conversion factor shall be determined by dividing the reference method test data averages by the monitoring data averages to obtain a ratio expressed in units of the applicable standard to units of the monitoring data, i.e., kg/metric ton per ppm (lb/ton per ppm). The conversion factor shall be reestablished during any performance test under s. NR 440.08 or any continuous monitoring system performance evaluation under s. NR 440.13 (3).

(c) The owner or operator shall record the daily production rate and hours of operation.

(e) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as any 3–hour period during which the average nitrogen oxides emissions (arithmetic average of 3 contiguous one–hour periods) as measured by a continuous monitoring system exceed the standard under sub. (3) (a).

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Acceptable alternative methods and procedures are given in par. (c).

(b) The owner or operator shall determine compliance with the NO_x standard in sub. (3) as follows:

1. The emission rate (E) of NO_x shall be computed for each run using the following equation:

$$E = (C_s\,Q_{sd})/(PK)$$

where:

E is the emission rate of NO_x as NO_2, kg/metric ton (lb/ton) of 100% nitric acid

C_s is the concentration of NO_x as NO_2, g/dscm (lb/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the acid production rate, metric ton/hr (ton/hr) or 100% nitric acid

K is the conversion factor, 1000 g/kg (1.0 lb/lb)

2. Method 7 shall be used to determine the NO_x concentration of each grab sample. Method 1 shall be used to select the sampling site and the sampling point shall be the centroid of the stack or duct or at a point no closer to the walls than 1 m (3.28 ft). Four grab samples shall be taken at approximately 15–minute intervals. The arithmetic mean of the 4 sample concentrations shall constitute the run value (C_s).

3. Method 2 shall be used to determine the volumetric flow rate (Q_{sd}) of the effluent gas. The measurement site shall be the same as for the NO_x sample. A velocity traverse shall be made once per run within the hour that the NO_x samples are taken.

4. The methods of sub. (4) (c) shall be used to determine the production rate (P) of 100% nitric acid for each run. Material balance over the production system shall be used to confirm the production rate.

(c) The owner or operator may use the following as alternatives to the methods and procedures specified in this subsection:

1. For Method 7, Method 7A, 7B, 7C or 7D may be used. If Method 7C or 7D is used, the sampling time shall be at least 1 hour.

(d) The owner or operator shall use the procedure in sub. (4) (b) to determine the conversion factor for converting the monitoring data to the units of the standard.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (4) (a), (5) (a) 1., and (b), Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (4) (e) and (5) (b), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4) (a) and (5), am. (4) (b), Register, June, 1993, No. 450, eff. 8–1–93.

NR 440.24 Sulfuric acid plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each sulfuric acid production unit, which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Acid mist" means sulfuric acid mist, as measured by Method 8 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or an equivalent or alternative method.

(b) "Sulfuric acid production unit" means any facility producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides and mercaptans or acid sludge, but does not include facilities where conversion to sulfuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulfur dioxide or other sulfur compounds.

(3) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of 2.0 kg per metric ton of acid produced (4.0 lb per ton), the production being expressed as 100% H_2SO_4.

(4) STANDARD FOR ACID MIST. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain acid mist, expressed as H_2SO_4, in excess of 0.075 kg per metric ton of acid produced (0.15 lb per ton), the production being expressed as 100% H_2SO_4.

2. Exhibit 10% opacity, or greater.

(5) EMISSION MONITORING. (a) A continuous monitoring system for the measurement of sulfur dioxide shall be installed, calibrated, maintained and operated by the owner or operator. The pollutant gas used to prepare calibration gas mixtures under Performance Specification 2 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, and for calibration checks under s. NR 440.13 (4) shall be sulfur dioxide (SO_2). Method 8 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used for conducting monitoring system performance evaluations under s. NR 440.13 (3), except that only the sulfur dioxide portion of the Method 8 results shall be used. The span value shall be set at 1000 ppm of sulfur dioxide.

(b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton). The conversion factor shall be determined, at a minimum, 3 times daily by measuring the concentration of sulfur dioxide entering the converter using suitable methods (e.g., the Reich test, National Air Pollution Control Administration Publication No. 999–AP–13) and calculating the appropriate conversion factor for each 8–hour period as follows:

$$CF = k[(1.000 - 0.015r)/(r - s)]$$

where:

CF is the conversion factor (kg/metric ton per ppm, lb/ton per ppm)

k is the constant derived from material balance. For determining CF in metric units, k = 0.0653. For determining CF in English units, k = 0.1306.

r is the percentage of sulfur dioxide by volume entering the gas converter. Appropriate corrections must be made for air injection plants subject to the department's approval.

s is the percentage of sulfur dioxide by volume in the emissions to the atmosphere determined by the continuous monitoring system required under par. (a).

(c) The owner or operator shall record all conversion factors and values under par. (b) from which they were computed (i.e., CF, r, and s).

(d) Alternatively, a source that processes elemental sulfur or an area that contains elemental sulfur and uses air to supply oxygen may use the following continuous emission monitoring approach and calculation procedures in determining SO_2 emission rates in terms of the standard. This procedure is not required but is an alternative that would alleviate problems encountered in the measurement of gas velocities or production rate. Continuous emission monitoring of SO_2, O_2 and CO_2, if required, shall be installed, calibrated, maintained and operated by the owner or operator and subjected to the certification procedures in Performance Specifications 2 and 3. The calibration procedure and span value for this SO_2 monitor shall be as specified in par. (b). The span value for CO_2, if required, shall be 10% and for O_2 shall be 20.9% (air). A conversion factor based on process rate data is not necessary. Calculate the SO_2 emission rate as follows:

$$E_s = (C_sS)/[0.265 - (0.0126\%0_2) - (A\%CO_2)]$$

where:

E_s is the SO_2 emission rate in kg/metric ton (lb/ton) of 100% of H_2SO_4 produced

C_s is the concentration of SO_2, kg/dscm (lb/dscf) (see table below)

S is the acid production rate factor, 368 dscm/metric ton (11,800 dscf/ton) of 100% H_2SO_4 produced

$\%O_2$ is the oxygen concentration, percent dry basis

A is the auxiliary fuel factor,

= 0.00 for no fuel

= 0.0226 for methane

= 0.0217 for natural gas

= 0.0196 for propane

= 0.0172 for #2 oil

= 0.0161 for #6 oil

= 0.0148 for coal

= 0.0126 for coke

$\%CO_2$ is the carbon dioxide concentration, percent dry basis

Note: It is necessary in some cases to convert measured concentration units to other units for these calculations. Use the following table for such conversions:

From	To	Multiply by
g/scm	kg/scm	10^{-3}
mg/scm	kg/scm	10^{-6}
ppm (SO_2)	kg/scm	2.660×10^{-6}
ppm (SO_2)	lb/scm	1.660×10^{-7}

(e) For the purpose of reports under s. NR 440.07 (3), periods of excess emissions shall be all 3–hour periods (or the arithmetic average of 3 consecutive 1–hour periods) during which the integrated average sulfur dioxide emissions exceed the applicable standards under sub. (3).

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Acceptable alternative methods and procedures are given in par. (c).

(b) The owner or operator shall determine compliance with the SO_2 acid mist, and visible emission standards in subs. (4) and (5) as follows:

1. The emission rate (E) of acid mist or SO_2 shall be computed for each run using the following equation:

$$E = (CQ_{sd})/(PK)$$

where:

E is the emission rate of acid mist or SO_2 kg/metric ton (lb/ton) of 100% H_2SO_4 produced

C is the concentration of acid mist or SO_2, g/dscm (lb/dscf)

Q_{sd} is the volumetric flow rate of the effluent gas, dscm/hr (dscf/hr)

P is the production rate of 100% H_2SO_4, metric ton/hr (ton/hr)

K is the conversion factor, 1000 g/kg (1.0 lb/lb)

2. Method 8 shall be used to determine the acid mist and SO_2 concentrations (C's) and the volumetric flow rate (Q_{sd}) of the effluent gas. The moisture content may be considered to be zero. The sampling time and sample volume for each run shall be at least 60 minutes and 1.15 dscm (40.6 dscf).

3. Suitable methods shall be used to determine the production rate (P) of 100% H_2SO_4 for each run. Material balance over the production system shall be used to confirm the production rate.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. If a source processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen, the following procedure may be used instead of determining the volumetric flow rate and production rate:

a. The integrated technique of Method 3 is used to determine the O_2 concentration and, if required, CO_2 concentration.

b. The SO_2 or acid mist emission rate is calculated as described in sub. (5) (d), substituting the acid mist concentration for C_s as appropriate.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (5) (d) and (6) (e), Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.) and (3) (a), Register, September, 1990, No. 417, eff. 10–1–90; am. (5) (a) and (b), r. and recr. (5) (d) and (6), Register, July, 1993, No. 451, eff. 8–1–93; cr. (5) (e), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.25 Asphalt concrete plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each hot mix asphalt facility. For the purpose of this section, a hot mix asphalt facility is comprised only of any combination of the following: dryers; systems for screening, handling, storing and weighing hot aggregate; systems for loading, transferring and storing mineral filler; systems for mixing hot mix asphalt; and the loading, transfer and storage systems associated with emission control systems.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Hot mix asphalt facility" means any facility, as described in sub. (1), used to manufacture hot mix asphalt by heating and drying aggregate and mixing with asphalt cement.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 90 mg/dscm (0.039 gr/dscf).

2. Exhibit 20% opacity, or greater.

(4) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf).

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) (a), (2) (intro.) and (a), (3) (a) 1., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.26 Petroleum refineries. (1) APPLICABILITY, DESIGNATION OF AFFECTED FACILITY, AND RECONSTRUCTION. (a) The provisions of this section are applicable to the following affected facilities in petroleum refineries: fluid catalytic cracking unit catalyst regenerators, fuel gas combustion devices, and all Claus sulfur recovery plants except Claus plants of 20 long tons per day (LTD) or less. The Claus sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

(b) Any fluid catalytic cracking unit catalyst regenerator or fuel gas combustion device under par. (a) which commences construction or modification after June 11, 1973 or any Claus sulfur recovery plant under par. (a) which commences construction or modification after October 4, 1976, is subject to the requirements of this section except as provided under pars. (c) and (d).

(c) Any fluid catalytic cracking unit catalyst regenerator under par. (b) which commences construction or modification on or before January 17, 1984, is exempted from sub. (5) (b).

(d) Any fluid catalytic cracking unit in which a contact material reacts with petroleum derivatives to improve feedstock quality and in which the contact material is regenerated by burning off coke, other deposits, or both and that commences construction or modification on or before January 17, 1984, is exempt from this section.

(e) For purposes of this section, under s. NR 440.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2–year period following January 17, 1984. For purposes of this paragraph, "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Claus sulfur recovery plant" means a process unit which recovers sulfur from hydrogen sulfide by a vapor–phase catalytic reaction of sulfur dioxide and hydrogen sulfide.

(b) "Coke burn–off" means the coke removed from the surface of the fluid catalytic cracking unit catalyst by combustion in the catalyst regenerator. The rate of coke burn–off is calculated by the formula specified in sub. (7).

(c) "Contact material" means any substance formulated to remove metals, sulfur, nitrogen or any other contaminant from petroleum derivatives.

(d) "Fluid catalytic cracking unit" means a refinery process unit in which petroleum derivatives are continuously charged; hydrocarbon molecules in the presence of a catalyst suspended in a fluidized bed are fractured into smaller molecules or react with a contact material suspended in a fluidized bed to improve feedstock quality for additional processing; and the catalyst or contact material is continuously regenerated by burning off coke and other deposits. The unit includes the riser, reactor, regenerator, air blowers, spent catalyst or contact material recovery equipment, and regenerator equipment for controlling air pollutant emissions and for heat recovery.

(e) "Fluid catalytic cracking unit catalyst regenerator" means one or more regenerators (multiple regenerators) which comprise that portion of the fluid catalytic cracking unit in which coke burn–off and catalyst or contact material regeneration occurs, and includes the regenerator combustion air blower or blowers.

(f) "Fresh feed" means any petroleum derivative feedstock stream charged directly into the riser or reactor of a fluid catalytic cracking unit except for petroleum derivatives recycled within the fluid catalytic cracking unit, fractionator or gas recovery unit.

(g) "Fuel gas" means any gas which is generated at a petroleum refinery and which is combusted. Fuel gas also includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. Fuel gas does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners.

(h) "Fuel gas combustion device" means any equipment, such as process heaters, boilers and flares used to combust fuel gas, except facilities in which gases are combusted to produce sulfur or sulfuric acid.

(i) "Oxidation control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to sulfur dioxide.

(j) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(k) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

(L) "Process gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas as defined in this subsection.

(m) "Process upset gas" means any gas generated by a petroleum refinery process unit as a result of startup, shutdown, upset or malfunction.

(n) "Reduced sulfur compounds" means hydrogen sulfide (H_2S), carbonyl sulfide (COS) and carbon disulfide (CS_2).

(o) "Reduction control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to hydrogen sulfide.

(p) "Refinery process unit" means any segment of the petroleum refinery in which a specific processing operation is conducted.

(q) "Valid day" means a 24–period in which at least 18 valid hours of data are obtained. A "valid hour" is one in which at least 2 valid data points are obtained.

(3) STANDARD FOR PARTICULATE MATTER. Each owner or operator of any fluid catalytic cracking unit catalyst regenerator that is subject to the requirements of this section shall comply with the emission limitations set forth in this subsection on and after the date on which the initial performance test, required by s. NR 440.08, is completed, but not later than 60 days after achieving the maximum production rate at which the fluid catalytic cracking unit catalyst regenerator will be operated, or 180 days after initial startup, whichever comes first.

(a) No owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any fluid catalytic cracking unit catalyst regenerator:

1. Particulate matter in excess of 1.0 kg/1000 kg (1.0 lb/1000 lb) of coke burn–off in the catalyst regenerator.

2. Gases exhibiting greater than 30% opacity, except for one 6–minute average opacity reading in any one hour period.

(b) Where the gases discharged by the fluid catalytic cracking unit catalyst regenerator pass through an incinerator or waste heat boiler in which auxiliary or supplemental liquid or solid fossil fuel is burned, particulate matter in excess of that permitted by par. (a) 1. may be emitted to the atmosphere, except that the incremental rate of particulate matter emissions may not exceed 43.0 g/MJ (0.10 lb/million Btu) of heat input attributable to such liquid or solid fossil fuel.

(4) STANDARD FOR CARBON MONOXIDE. Each owner or operator of any fluid catalytic cracking unit catalyst regenerator that is subject to the requirements of this section shall comply with the emission limitations set forth in this subsection on and after the date on which the initial performance test, required by s. NR 440.08, is completed, but not later than 60 days after achieving the maximum production rate at which the fluid catalytic cracking unit catalyst regenerator will be operated, or 180 days after initial startup, whichever comes first.

(a) No owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any fluid catalytic cracking unit catalyst regenerator any gases that contain carbon monoxide (CO) in excess of 500 ppm by volume (dry basis).

(5) STANDARD FOR SULFUR DIOXIDE. Each owner or operator that is subject to the requirements of this section shall comply with the emission limitations set forth in this subsection on and after the date on which the initial performance test, required by s. NR 440.08, is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first.

(a) No owner or operator subject to the provisions of this section may:

1. Burn in any fuel gas combustion device any fuel gas that contains hydrogen sulfide (H_2S) in excess of 230 mg/dscm (0.10 gr/dscf). The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this paragraph.

2. Discharge or cause the discharge of any gases into the atmosphere from any Claus sulfur recovery plant containing in excess of:

a. For an oxidation control system or a reduction control system followed by incineration, 250 ppm by volume (dry basis) of sulfur dioxide (SO_2) at zero percent excess air.

b. For a reduction control system not followed by incineration, 300 ppm by volume of reduced sulfur compounds and 10 ppm by volume of hydrogen sulfide (H_2S), each calculated as ppm SO_2 by volume (dry basis) at zero percent excess air.

(b) Each owner or operator that is subject to the provisions of this section shall comply with one of the following conditions for each affected fluid catalytic cracking unit catalyst regenerator:

1. With an add–on control device, reduce sulfur dioxide emissions to the atmosphere by 90% or maintain sulfur dioxide emissions to the atmosphere less than or equal to 50 ppm by volume (ppmv), whichever is less stringent; or

2. Without the use of an add–on control device, maintain sulfur oxides emissions calculated as sulfur dioxide to the atmosphere less than or equal to 9.8 kg/1,000 kg coke burn–off; or

3. Process in the fluid catalytic cracking unit fresh feed that has a total sulfur content no greater than 0.30% by weight.

(c) Compliance with par. (b) 1., 2. or 3. is determined daily on a 7–day rolling average basis using the appropriate procedures outlined in sub. (7).

(d) A minimum of 22 valid days of data shall be obtained every 30 rolling successive calendar days when complying with par. (b) 1.

(6) MONITORING OF EMISSIONS AND OPERATIONS. (a) Continuous monitoring systems shall be installed, calibrated, maintained and operated by the owner or operator subject to the provisions of this section as follows:

1. For fluid catalytic cracking unit catalyst regenerators subject to sub. (3) (a) 2., an instrument for continuously monitoring and recording the opacity of emission into the atmosphere. The instrument shall be spanned at 60, 70 or 80% opacity.

2. For fluid catalytic cracking unit catalyst regenerators subject to sub. (4) (a), an instrument for continuously monitoring and recording the concentration by volume (dry basis) of CO emission into the atmosphere, except as provided in subd. 2. b.

a. The span value for this instrument is 1,000 ppm CO.

b. A CO continuous monitoring system need not be installed if the owner or operator demonstrates that the average CO emission are less than 50 ppm on a dry basis and also files a written request for exemption to the department and receives an exemption. The demonstration shall consist of continuously monitoring CO emissions for 30 days using an instrument that shall meet the requirements of Performance Specification 4 of Appendix B of 40 CFR part 60, incorporated by reference in s. NR 440.17. The span value shall be 100 ppm CO instead of 1,000 ppm, and the relative accuracy limit shall be 10% of the average CO emission or 5 ppm CO, whichever is greater. For instruments that are identical to Method 10 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, and employ the sample conditioning system of Method 10A of Appendix A, the alternative relative accuracy test procedure in s. 10.1 of Performance Specification 2 of Appendix B may be used in place of the relative accuracy test.

3. For fuel gas combustion devices subject to sub. (5) (a) 1., an instrument for continuously monitoring and recording the concentration by volume (dry basis, zero percent excess air) of SO_2 emissions into the atmosphere, except where an H_2S monitor is installed under par. (a) 4. The monitor shall include an oxygen monitor for correcting the data for excess air.

a. The span values for this monitor are 50 ppm SO_2 and 10% oxygen (O_2).

b. The SO_2 monitoring level equivalent to the H_2S standard under sub. (5) (a) 1. shall be 20 ppm (dry basis, zero percent excess air).

c. The performance evaluations for this SO_2 monitor under s. NR 440.13 (3) shall use Performance Specification 2. Methods 6 and 3 of Appendix A shall be used for conducting the relative accuracy evaluations. Method 6 samples shall be taken at a flow rate of approximately 2 liters/min for at least 30 minutes. The relative accuracy limit shall be 20% or 4 ppm, whichever is greater, and the calibration drift limit shall be 5% of the established span value.

d. Fuel gas combustion devices having a common source of fuel gas may be monitored at only one location, that is, after one of the combustion devices, if monitoring at this location accurately represents the SO_2 emission into the atmosphere from each of the combustion devices.

4. In place of the SO_2 monitor in par. (a) 3., an instrument for continuously monitoring and recording the concentration (dry basis) of H_2S in fuel gases before being burned in any fuel gas combustion device.

a. The span value for this instrument is 425 mg/dscm H_2S.

b. Fuel gas combustion devices having a common source of fuel gas may be monitored at only one location, if monitoring at this location accurately represents the concentration of H_2S in the fuel gas begin burned.

c. The performance evaluations for this H_2S monitor under s. NR 440.13 (3) shall use Performance Specification 7 of Appendix B. Method 11 of Appendix A shall be used for conducting the relative accuracy evaluations.

5. For Claus sulfur recovery plants with oxidation control systems or reduction control systems followed by incineration subject to sub. (5) (a) 2. a., an instrument for continuously monitoring and recording the concentration (dry basis, zero percent excess air) of SO_2 emissions into the atmosphere. The monitor shall include an oxygen monitor for correcting the data for excess air.

a. The span values for this monitor are 500 ppm SO_2 and 10% O_2.

b. The performance evaluations for the SO_2 monitor under s. NR 440.13 (3) shall use Performance Specification 2. Methods 6 and 3 shall be used for conducting the relative accuracy evaluations.

6. For Claus sulfur recovery plants with reduction control systems not followed by incineration subject to sub. (5) (a) 2. b., an instrument for continuously monitoring and recording the concentration of reduced sulfur and O_2 emissions into the atmosphere. The reduced sulfur emission shall be calculated as SO_2 (dry basis, zero percent excess air).

a. The span values for this monitor are 450 ppm reduced sulfur and 10% O_2.

b. The performance evaluations for this reduced sulfur (and O_2) monitor under s. NR 440.13 (3) shall use Performance Specification 5 of Appendix B, except the calibration drift specification is 2.5% of the span value rather than 5%. Methods 15 or 15A and Method 3 of Appendix A shall be used for conducting the relative accuracy evaluations. If Method 3 yields O_2 concentrations below 0.25% during the performance specification test, the O_2 concentration may be assumed to be zero and the reduced sulfur CEMS need not include an O_2 monitor.

7. In place of the reduced sulfur monitor under subd. 6., an instrument using an air or O_2 dilution and oxidation system to convert the reduced sulfur to SO_2 for continuously monitoring and recording the concentration (dry basis, zero percent excess air) of the resultant SO_2. The monitor shall include an oxygen monitor for correcting the data for excess oxygen.

a. The span values for this monitor are 375 ppm SO_2 and 10% O_2.

b. For reporting purposes, the SO_2 exceedance level for this monitor is 250 ppm (dry basis, zero percent excess air).

c. The performance evaluations for the SO_2 (and O_2) monitor under s. NR 440.13 (3) shall use Performance Specification 5. Methods 15 or 15A and Method 3 shall be used for conducting the relative accuracy evaluations.

8. An instrument for continuously monitoring and recording concentrations of sulfur dioxide in the gases at both the inlet and outlet of the sulfur dioxide control device from any fluid catalytic cracking unit catalyst regenerator for which the owner or operator seeks to comply with sub. (5) (b) 1. The span value of the inlet monitor shall be set at 125% of the maximum estimated hourly potential sulfur dioxide emission concentration entering the control device, and the span value of the outlet monitor shall be set at 50% of the maximum estimated hourly potential sulfur dioxide emission concentration entering the control device.

9. An instrument for continuously monitoring and recording concentrations of sulfur dioxide in the gases discharged into the atmosphere from any fluid catalytic cracking unit catalyst regenerator for which the owner or operator seeks to comply specifically with the 50 ppmv emission limit under sub. (5) (b) 1. The span value of the monitor shall be set at 50% of the maximum hourly potential sulfur dioxide emission concentration entering the control device.

10. An instrument for continuously monitoring and recording concentrations of oxygen (O_2) in the gases at both the inlet and outlet of the sulfur dioxide control device (or the outlet only if specifically complying with the 50 ppmv standard) from any fluid catalytic cracking unit catalyst regenerator for which the owner or operator has elected to comply with sub. (5) (b) 1. The span of the continuous monitoring system shall be set at 10%.

11. The continuous monitoring systems under par. (a) 8., 9. and 10. are operated and data recorded during all periods of operation of the affected facility including periods of startup, shutdown or malfunction, except for continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments.

12. The owner or operator shall follow Appendix F, Procedure 1, of 40 CFR part 60, incorporated by reference in s. NR 440.17, including quarterly accuracy determinations and daily calibration drift tests, for the continuous monitoring systems under subds. 8., 9. and 10.

13. When seeking to comply with sub. (5) (b) 1., when emission data are not obtained because of continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments, emission data will be obtained by using one of the following methods to provide emission data for a minimum of 18 hours per day in at least 22 out of 30 following successive calendar days:

a. The test methods as described in 40 CFR 60.106 (k);

b. A spare continuous monitoring system; or

c. Other monitoring systems as approved by the administrator.

(c) The average coke burn–off rate (thousands of kilograms per hour) and hours of operation shall be recorded daily for any fluid catalytic cracking unit catalyst regenerator subject to sub. (3), (4) or (5) (b) 2.

(d) For any fluid catalytic cracking unit catalyst regenerator under sub. (3) that uses an incinerator–waste heat boiler to combust the exhaust gases from the catalyst regenerator, the owner or operator shall record daily the rate of combustion of liquid or solid fossil–fuels (liters/hr or kilograms/hr) and the hours of operation during which liquid or solid fossil–fuels are combusted in the incinerator–waste heater boiler.

(e) For the purpose of reports under s. NR 440.07 (3), periods of excess emissions that shall be determined and reported are defined as follows:

Note: All averages, except for opacity, shall be determined as the arithmetic average of the applicable 1–hour averages, e.g., the rolling 3–hour average shall be determined as the arithmetic average of 3 contiguous 1–hour averages.

1. Opacity. All 1–hour periods that contain 2 or more 6–minute periods during which the average opacity as measured by the continuous monitoring system under par. (a) 1. exceeds 30%.

2. Carbon monoxide. All 1–hour periods during which the average CO concentration as measured by the CO continuous monitoring system under par. (a) 2. exceeds 500 ppm.

3. Sulfur dioxide from fuel gas combustion. a. All rolling 3–hour periods during which the average concentration of SO_2 as measured by the SO_2 continuous monitoring system under par. (a) 3. exceeds 20 ppm (dry basis, zero percent excess air); or

b. All rolling 3–hour periods during which the average concentration of H_2S as measured by the H_2S continuous monitoring system under par. (a) 4. exceeds 230 mg/dscm (0.10 gr/dscf).

4. Sulfur dioxide from Claus sulfur recovery plants.

a. All 12–hour periods during which the average concentration of SO_2 as measured by the SO_2 continuous monitoring system under par. (a) 5. exceeds 250 ppm (dry basis, zero percent excess air); or

b. All 12–hour periods during which the average concentration of reduced sulfur (as SO_2) as measured by the reduced sulfur continuous monitoring system under par. (a) 6. exceeds 300 ppm; or

c. All 12–hour periods during which the average concentration of SO_2 as measured by the SO_2 continuous monitoring system under par. (a) 7. exceeds 250 ppm (dry basis, zero percent excess air).

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter (PM) standards in sub. (3) (a) as follows:

1. The emission rate (E) of PM shall be computed for each run using the following equation:

$$E = \frac{Kc_sQ_{sd}}{R_c}$$

where:

E is the emission rate of PM, kg/1000 kg (lb/1000 lb) of coke burn–off

c_s is the concentration of PM, g/dscm (lb/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

R_c is the coke burn–off rate, kg coke/hr (1000 lb coke/hr)

K is the conversion factor, 1.0 $(kg^2/g)/(1000\ kg)$ $[10^3\ lb/(1000\ lb)]$

2. Method 5B or 5F is to be used to determine particulate matter emissions and associated moisture content from affected facilities without wet FGD systems; only Method 5B is to be used after wet FGD systems. The sampling time for each run shall be at least 60 minutes and the sampling time for each run shall be at least 0.015 dscm/min (0.53 dscf/min) except that shorter sampling times may be approved by the department when process variables or other factors preclude sampling for at least 60 minutes.

3. The coke burn–off rate (R_c) shall be computed for each run using the following equation:

$$R_c = K_1Q_r(\%CO_2 + \%CO) + K_2Q_a - K_3Q_r[(\%CO/2) + \%CO_2 + \%O_2]$$

where:

R_c is the coke burn–off rate, kg/hr (1000 lb/hr)

Q_r is the volumetric flow rate of exhaust gas from catalyst regenerator before entering the emission control system, dscm/min (dscf/min)

Q_a is the volumetric flow rate of air to FCCU regenerator, as determined from the fluid catalytic cracking unit control room instrumentation, dscm/min (dscf/min)

$\%CO_2$ is the carbon dioxide concentration percent by volume (dry basis)

%CO is the carbon monoxide concentration, percent by volume (dry basis)

$\%O_2$ is the oxygen concentration, percent by volume (dry basis)

K_1 is the material balance and conversion factor, 0.2982 (kg–min)/(hr– dscm–%) [0.0186 (lb–min)/(hr–dscf–%)]

K_2 is the material balance and conversion factor, 2.088 (kg−min)/(hr−dscm− %) [0.1303 (lb−min)/(hr−dscf−%)]

K_3 is the material balance and conversion factor, 0.0994 (kg−min)/(hr− dscm−%) [0.0062 (lb/min)/(hr−dscf−%)]

a. Method 2 shall be used to determine the volumetric flow rate (Q_r)

b. The emission correction factor, integrated sampling and analysis procedure of Method 3 shall be used to determine CO_2, CO and O_2 concentrations.

4. Method 9 and the procedures of s. NR 440.11 shall be used to determine opacity.

(c) If auxiliary liquid or solid fossil fuels are burned in an incinerator−waste heat boiler, the owner or operator shall determine the emission rate of PM permitted in sub. (3) (b) as follows:

1. The allowable emission rate (E_s) of PM shall be computed for each run using the following equation:

$$E_s = 1.0 + A\ (H/R_c)K'$$

where:

E_s is the emission rate of PM allowed, kg/1000 kg (lb/1000 lb) of coke burn−off in catalyst regenerator

1.0 is the emission standard, kg coke/1000 kg (lb coke/1000 lb)

A is the allowable incremental rate of PM emission, 0.18 g/million cal (0.10 lb/million Btu)

H is the heat input rate from solid or liquid fossil fuel, million cal/hr (million Btu/hr)

R_c is the coke burn−off rate, kg coke/hr (1000 lb coke/hr)

K′ is the conversion factor to units of standard, 1.0 (kg^2/g)/(1000 kg)[10^3lb/(1000 lb)]

2. Procedures subject to the approval of the department shall be used to determine the heat input rate.

3. The procedure in par. (b) 3. shall be used to determine the coke burn− off rate (R_c).

(d) The owner or operator shall determine compliance with the CO standard in sub. (4) (a) by using the integrated sampling technique of Method 10 to determine the CO concentration (dry basis). The sampling time for each run shall be 60 minutes.

(e) The owner or operator shall determine compliance with the H_2S standard in sub. (5) (a) 1. as follows: Method 11 shall be used to determine the H_2S concentration. The gases entering the sampling train should be at about atmospheric pressure. If the pressure in the refinery fuel gas lines is relatively high, a flow control valve may be used to reduce the pressure. If the line pressure is high enough to operate the sampling train without a vacuum pump, the pump may be eliminated from the sampling train. The sample shall be drawn from a point near the centroid of the fuel gas line. The sampling time and sample volume shall be at least 10 minutes and 0.010 dscm (0.35 dscf). Two samples of equal sampling time shall be taken at about 1− hour intervals. The arithmetic average of these 2 samples shall constitute a run For most fuel gas, sampling time exceeding 20 minutes may result in depletion of the collection solution, although fuel gases containing low concentrations of H_2S may necessitate sampling for longer periods of time.

(f) The owner or operator shall determine compliance with the SO_2 and the H_2S and reduced sulfur standards in sub. (5) (a) 2. as follows:

1. Method 6 shall be used to determine the SO_2 concentration. The concentration in mg/dscm (lb/dscf) obtained by Method 6 is multiplied by 0.3754 to obtain the concentration in ppm. The sampling point in the duct shall be the centroid of the cross section if the cross−sectional area is less than 5.00 m^2 (54 ft^2) or at a point no closer to the walls than 1.00 m (39 in.) if the cross−sectional area is 5.00 m^2 or more and the centroid is more than 1 m from the wall. The sampling time and sample volume shall be at least 10 minutes and 0.010 dscm (0.35 dscf) for each sample. Eight samples of equal sampling times shall be taken at about 30−minute intervals. The arithmetic average of these 8 samples shall constitute a run. Method 4 shall be used to determine the moisture content of the gases. The sampling point for Method 4 shall be adjacent to the sampling point for Method 6. The sampling time for each sample shall be equal to the time it takes for 2 Method 6 samples. The moisture content from this sample shall be used to correct the corresponding Method 6 samples for moisture. For documenting the oxidation efficiency of the control device for reduced sulfur compound, Method 15 shall be used following the procedures of subd. 2.

2. Method 15 shall be used to determine the reduced sulfur and H_2S concentrations. Each run shall consist of 16 samples taken over a minimum of 3 hours. The sampling point shall be the same as the described for Method 6 in subd. 1. To ensure minimum residence time for the sample inside the sample lines, the sampling rate shall be at least 3.0 lpm (0.10 cfm). The SO_2 equivalent for each run shall be calculated after being corrected for moisture and oxygen as the arithmetic average of the SO_2 equivalent for each sample during the run. Method 4 shall be used to determine the moisture content of the gases as in subd. 1. The sampling time for each sample shall be equal to the time it takes for 4 Method 15 samples.

3. The oxygen concentration used to correct the emission rate for excess air shall be obtained by the integrated sampling and analysis procedure of Method 3. The samples shall be taken simultaneously with the SO_2 reduced sulfur and H_2S, or moisture samples. The SO_2, reduced sulfur and H_2S samples shall be corrected to zero percent excess air using the equation in par. (h) 3.

(g) Each performance test conducted for the purpose of determining compliance under sub. (5) (b) shall consist of all testing performed over a 7−day period using the applicable test methods and procedures specified in this subsection. To determine compliance, the arithmetic mean of the results of all the tests shall be compared with the applicable standard.

(h) For the purpose of determining compliance with sub. (5) (b) 1., the following calculation procedures shall be used:

1. Calculate each 1−hour average concentration (dry, zero percent oxygen, ppmv) of sulfur dioxide at both the inlet and the outlet to the add−on control device as specified in s. NR 440.13 (8). These calculations are made using the emission data collected under sub. (6) (a).

2. Calculate a 7−day average (arithmetic mean) concentration of sulfur dioxide for the inlet and for the outlet to the add−on control device using all of the 1−hour average concentration values obtained during 7 successive 24−hour periods.

3. Calculate the 7−day average percent reduction using the following equation:

$$R_{SO_2} = 100\left(C_{SO_2(i)} - C_{SO_2(o)}\right)/C_{SO_2(i)}$$

where:

R_{SO_2} is the 7−day average sulfur dioxide emission reduction percent

$C_{SO_2(i)}$ is the sulfur dioxide emission concentration determined in subd. 2. at the inlet to the add−on control device, ppmv

$C_{SO_2(o)}$ is the sulfur dioxide emission concentration determined in subd. 2. at the outlet to the add−on control device, ppmv

100 is the conversion factor, decimal to percent

4. Outlet concentrations of sulfur dioxide from the add−on control device for compliance with the 50 ppmv standard, reported on a dry, O_2−free basis, shall be calculated using the pro-

cedures outlined in subds. 1. and 2., but for the outlet monitor only.

5. If supplemental sampling data are used for determining the 7–day averages under this paragraph and the data are not hourly averages, then the value obtained for each supplemental sample shall be assumed to represent the hourly average for each hour over which the sample was obtained.

6. For the purpose of adjusting pollutant concentrations to zero percent oxygen, the following equation shall be used:

$$C_{adj} = C_{meas}[20.9_c/(20.9 - \%O_2)]$$

where:

C_{adj} is the pollutant concentration adjusted to zero percent oxygen, ppm or g/dscm

C_{meas} is the pollutant concentration measured on a dry basis, ppm or g/dscm

20.9_c is the 20.9% oxygen–0.0% oxygen (defined oxygen correction basis), percent

20.9 is the oxygen concentration in air, percent

$\%O_2$ is the oxygen concentration measured on a dry basis, percent

(i) For the purpose of determining compliance with sub. (5) (b) 2., the following reference methods from 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, and calculation procedures shall be used except as provided in subd. 12.:

1. One 3–hour test shall be performed each day.

2. For gases released to the atmosphere from the fluid catalytic cracking unit catalyst regenerator:

a. Method 8 as modified in subd. 3. for the concentration of sulfur oxides calculated as sulfur dioxide and moisture content,

b. Method 1 for sample and velocity traverses,

c. Method 2 calculation procedures, data obtained from Methods 3 and 8, for velocity and volumetric flow rate, and

d. Method 3 for gas analysis.

3. Method 8 shall be modified by the insertion of a heated glass fiber filter between the probe and first impinger. The probe liner and glass fiber filter temperature shall be maintained above 160°C (320°F). The isopropanol impinger shall be eliminated. Sample recovery procedures described in Method 8 for container No. 1 shall be eliminated. The heated glass fiber filter also shall be excluded; however, rinsing of all connecting glassware after the heated glass fiber filter shall be retained and included in container No. 2. Sampled volume shall be at least 1 dscm.

4. For Method 3, the integrated sampling technique shall be used.

5. Sampling time for each run shall be at least 3 hours.

6. All testing shall be performed at the same location. Where the gases discharged by the fluid catalytic cracking unit catalyst regenerator pass through an incinerator–waste heat boiler in which auxiliary or supplemental gaseous, liquid or solid fossil fuel is burned, testing shall be conducted at a point between the regenerator outlet and the incinerator–waste heat boiler. An alternative sampling location after the waste heat boiler may be used if alternative coke burn–off rate equations, and, if requested, auxiliary/supplemental fuel SO_x credits, have been submitted to and approved by the department prior to sampling.

7. Coke burn–off rate shall be determined using the procedures specified under par. (b) 3., unless subd. 6. applies.

8. Calculate the concentration of sulfur oxides as sulfur dioxide using equation 8–3 in Section 6.5 of Method 8 to calculate and report the total concentration of sulfur oxides as sulfur dioxide (C_{SO_x}).

9. Sulfur oxides emission rate calculated as sulfur dioxide shall be determined for each test run by the following equation:

$$E_{SO_x} = C_{SO_x}Q_{sd}/1,000$$

where:

E_{SO_x} is the sulfur oxides emission rate calculated as sulfur dioxide, kg/hr

C_{SO_x} is the sulfur oxides emission concentration calculated as sulfur dioxide, g/dscm

Q_{sd} is the dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr

1,000 is the conversion factor, g to kg

10. Sulfur oxides emissions calculated as sulfur dioxide per 1,000 kg coke burn–off in the fluid catalytic cracking unit catalyst regenerator shall be determined for each test run by the following equation:

$$R_{SO_x} = (E_{SO_x}/R_c)$$

where:

R_{SO_x} is the sulfur oxides emissions calculated as sulfur dioxide, kg/1000 kg coke burn–off

E_{SO_x} is the sulfur oxides emission rate calculated as sulfur dioxide, kg/hr

R_c is the coke burn–off rate, 1,000 kg/hr

11. Calculate the 7–day average sulfur oxides emission rate as sulfur dioxide per 1,000 kg of coke burn–off by dividing the sum of the individual daily rates by the number of daily rates summed.

12. An owner or operator may, upon approval by the administrator, use an alternative method for determining compliance with sub. (5) (b) 2., as provided in s. NR 440.08 (2). Any requests for approval shall include data to demonstrate to the administrator that the alternative method would produce results adequate for the determination of compliance.

(j) For the purpose of determining compliance with sub. (5) (b) 3., the following analytical methods and calculation procedures shall be used:

1. One fresh feed sample shall be collected once per 8–hour period.

2. Fresh feed samples shall be analyzed separately by using any one of the following applicable analytical test methods: ASTM D129–64 (reapproved 1978), ASTM D1552–83, ASTM D2622–87 or ASTM D1266–87. These methods are incorporated by reference in s. NR 440.17. The applicable range of some of these ASTM methods is not adequate to measure the levels of sulfur in some fresh feed samples. Dilution of samples prior to analysis with verification of the dilution ratio is acceptable upon prior approval of the department.

3. If a fresh feed sample cannot be collected at a single location, then the fresh feed sulfur content shall be determined as follows:

a. Individual samples shall be collected once per 8–hour period for each separate fresh feed stream charged directly into the riser or reactor of the fluid catalytic cracking unit. For each sample location the fresh feed volumetric flow rate at the time of collecting the fresh feed sample shall be measured and recorded. The same method for measuring volumetric flow rate shall be used at all locations.

b. Each fresh feed sample shall be analyzed separately using the methods specified under subd. 2.

c. Fresh feed sulfur content shall be calculated for each 8–hour period using the following equation:

$$S_f = \sum_{i=1}^{n} \frac{S_i Q_i}{Q_f}$$

where:

S_f is the fresh feed sulfur content expressed in percent by weight of fresh feed

n is the number of separate fresh feed streams charged directly to the riser or reactor of the fluid catalytic cracking unit

Q_f is the total volumetric flow rate of fresh feed charged to the fluid catalytic cracking unit

S_i is the fresh feed sulfur content expressed in percent by weight of fresh feed for the "ith" sampling location

Q_i is the volumetric flow rate of fresh feed stream for the "ith" sampling location

4. Calculate a 7–day average (arithmetic mean) sulfur content of the fresh feed using all of the fresh feed sulfur content values obtained during 7 successive 24–hour periods.

(8) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to sub. (5) (b) shall notify the department of the specific provisions of sub. (5) (b) with which the owner or operator elects to comply. Notification shall be submitted with the notification of initial startup required by s. NR 440.07(1) (c). If an owner or operator elects at a later date to comply with an alternative provision of sub. (5) (b), then the department shall be notified by the owner or operator in the quarterly, or semiannual, report described in pars. (c) and (d) for the quarter during which the change occurred.

(b) Each owner or operator subject to sub. (5) (b) shall record and maintain the following information:

1. If complying with sub. (5) (b) 1.:

a. All data and calibrations from continuous monitoring systems located at the inlet and outlet to the control device, including the results of the daily drift tests and quarterly accuracy assessments required under Appendix F, Procedure 1 of 40 CFR part 60, incorporated by reference in s. NR 440.17;

b. Measurements obtained by supplemental sampling required under sub. (6) (a) 13. and 40 CFR 60.106 (k) for meeting minimum data requirements; and

c. The written procedures for the quality control program required by Appendix F, Procedure 1 of 40 CFR part 60, incorporated by reference in s. NR 440.17.

2. If complying with sub. (5) (b) 2., measurements obtained in the daily Method 8 testing, or those obtained by alternative measurement methods, if sub. (7) (i) 12. applies.

3. If complying with sub. (5) (b) 3., data obtained from the daily feed sulfur tests.

4. Each 7–day rolling average compliance determination.

(c) Each owner or operator subject to sub. (5) (b) shall submit a report each quarter except as provided by par. (d). The following information shall be contained in each quarterly report:

1. Any 7–day period during which:

a. The average percent reduction and average concentration of sulfur dioxide on a dry, O_2–free basis in the gases discharged to the atmosphere from any fluid cracking unit catalyst regenerator for which the owner or operator seeks to comply with sub. (5) (b) 1. is below 90% and above 50 ppmv, as measured by the continuous monitoring system prescribed under sub. (6) (a) 8., or above 50 ppmv, as measured by the outlet continuous monitoring system prescribed under sub. (6) (a) 9. The average percent reduction and average sulfur dioxide concentration shall be determined using the procedures specified under sub. (7) (h);

b. The average emission rate of sulfur dioxide in the gases discharged to the atmosphere from any fluid catalytic cracking unit catalyst regenerator for which the owner or operator seeks to comply with sub. (5) (b) 2. exceeds 9.8 kg SO_x per 1,000 kg coke burn–off, as measured by the daily testing prescribed under sub. (7) (i). The average emission rate shall be determined using the procedures specified under sub. (7) (i); and

c. The average sulfur content of the fresh feed for which the owner or operator seeks to comply with sub. (5) (b) 3. exceeds 0.30% by weight. The fresh feed sulfur content, a 7–day rolling average, shall be determined using the procedures specified under sub. (7) (j).

2. Any 30–day period in which the minimum data requirements specified in sub. (5) (d) are not obtained.

3. For each 7–day period during which an exceedance has occurred as defined in par. (c) 1. a. to c. and 2.:

a. The date that the exceedance occurred;

b. An explanation of the exceedance;

c. Whether the exceedance was concurrent with a startup, shutdown or malfunction of the fluid catalytic cracking unit or control system; and

d. A description of the corrective action taken, if any.

4. If subject to sub. (5) (b) 1.:

a. The dates for which and brief explanations as to why fewer than 18 valid hours of data were obtained for the inlet continuous monitoring system;

b. The dates for which and brief explanations as to why fewer than 18 valid hours of data were obtained for the outlet continuous monitoring system;

c. Identification of times when hourly averages have been obtained based on manual sampling methods;

d. Identification of the times when the pollutant concentration exceeded the full span of the continuous monitoring system;

e. Description of any modifications to the continuous monitoring system that could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17; and

f. Results of daily drift tests and quarterly accuracy assessments as required under Appendix F, Procedure 1 of 40 CFR part 60, incorporated by reference in s. NR 440.17.

5. If subject to sub. (5) (b) 2., for each day in which a Method 8 sample result was not obtained, the date for which and brief explanation as to why a Method 8 sample result was not obtained, for approval by the department.

6. If subject to sub. (5) (b) 3., for each 8–hour shift in which a feed sulfur measurement was not obtained, the date for which and brief explanation as to why a feed sulfur measurement was not obtained, for approval by the department.

(d) If no exceedances, as defined in par. (c) 1. a. to c. and 2., occur in a quarter, and if the owner or operator has not changed the standard under sub. (5) (b) under which compliance is obtained, then the owner or operator may submit a semiannual report in which a statement is included that states that no exceedances had occurred during the affected quarter or quarters. If the owner or operator elects to comply with an alternative provision of sub. (5) (b), a quarterly report shall be submitted for the quarter during which a change occurred.

(e) For any periods for which sulfur dioxide or oxides emissions data are not available, the owner or operator of the affected facility shall submit a signed statement indicating if any changes were made in operation of the emission control system during the period of data unavailability which could affect the ability of the system to meet the applicable emission limit. Operations of the control system and affected facility during periods of data unavailability shall be compared with operation of the control system and affected facility before and following the period of data unavailability.

(f) The owner or operator of the affected facility shall submit a signed statement certifying the accuracy and completeness of the information contained in the report.

(9) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08(4) shall apply to the initial performance test specified under par. (c), but not to the daily performance tests required thereafter as specified in par. (d). Section NR 440.08(6) does not apply when determining compliance with the standards specified under sub. (5) (d). Section NR 440.08(6) does not apply when determining compliance with the standards specified under sub. (5) (b). Performance tests conducted for the purpose of determining compliance under sub. (5) (b) shall be conducted according to the applicable procedures specified under sub. (7).

(b) Owners or operators who seek to comply with sub. (5) (b) 3. shall meet that standard at all times, including periods of startup, shutdown and malfunctions.

(c) The initial performance test shall consist of the initial 7–day average calculated for compliance with sub. (5) (b) 1., 2. or 3.

(d) After conducting the initial performance test prescribed under s. NR 440.08, the owner or operator of a fluid catalytic cracking unit catalyst regenerator subject to sub. (5) (b) shall conduct a performance test for each successive 24–hour period thereafter. The daily performance tests shall be conducted according to the appropriate procedures specified under sub. (7). In the event that a sample collected under sub. (7) (i) or (j) is accidentally lost or conditions occur in which one of the samples is discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other circumstances beyond the owner or operators' control, compliance may be determined using available data for the 7–day period.

(e) Each owner or operator subject to sub. (5) (b) who has demonstrated compliance with one of the provisions of sub. (5) (b) but at a later date seeks to comply with another of the provisions of sub. (5) (b) shall begin conducting daily performance tests as specified under par. (d) immediately upon electing to become subject to one of the other provisions of sub. (5) (b). The owner or operator shall furnish the department a written notification of the change in a quarterly report that shall be submitted for the quarter in which the change occurred.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), (3) (a) 1., (6) (a) 2., (7) (a) 1. a. and 2., (d) (intro.) and 2., Register, September, 1990, No. 417, eff. 10–1–90; am. (1) (b), (6) (c) and (d), cr. (1) (c) to (e), (2) (c) to (f) and (q), (5) (b) to (d), (8) and (9), renum. (2) (c) to (L) to be (2) (g) to (p), r. and recr. (3) (a) (intro.), (4) to (6) (a), (e) and (7), Register, July, 1993, No. 451, eff. 8–1–93; am. (3) (a) (intro.), (4) (a), (5) (a) (intro.), December, 1995, No. 480, eff. 1–1–96**; corrections in (6) and (8) made under s. 13.93 (2m) (b) 7., Register, November, 1999, No. 527.**

NR 440.27 Storage vessels for petroleum liquids for which construction, reconstruction or modification commenced after June 11, 1973, and prior to May 19, 1978. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which this section applies is each storage vessel for petroleum liquids which has a storage capacity of greater than 151,416 liters (40,000 gallons).

(b) This section does not apply to storage vessels for petroleum or condensate stored, processed or treated, or stored, processed and treated at a drilling and production facility prior to custody transfer.

(c) Subject to the requirements of this section is any facility under par. (a) which:

1. Has a capacity greater than 151,416 liters (40,000 gallons), but not exceeding 246,052 liters (65,000 gallons), and commences construction or modification after March 8, 1974, and prior to May 19, 1978.

2. Has a capacity greater than 246,052 liters (65,000 gallons) and commences construction or modification after June 11, 1973, and prior to May 19, 1978.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(b) "Custody transfer" means the transfer of produced petroleum or condensate, or both, after processing or treating, or both, in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(c) "Drilling and production facility" means all drilling and servicing equipment, wells, flow lines, separators, equipment, gathering lines, and auxiliary nontransportation–related equipment used in the production of petroleum but does not include natural gasoline plants.

(d) "Floating roof" means a storage vessel cover consisting of a double deck, pontoon single deck, internal floating cover or covered floating roof, which rests upon and is supported by the petroleum liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank wall.

(e) "Hydrocarbon" means any organic compound consisting predominantly of carbon and hydrogen.

(f) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(g) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM D396–78, gas turbine fuel oils Nos. 2–GT through 4–GT as specified in ASTM D2880–78, or diesel fuel oils Nos. 2–D and 4–D as specified in ASTM D975–78. These 3 ASTM methods are incorporated by reference in s. NR 440.17.

(h) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

(i) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323–82, incorporated by reference in s. NR 440.17.

(j) "Storage vessel" means any tank, reservoir or container used for the storage of petroleum liquids, but does not include:

1. Pressure vessels which are designed to operate in excess of 15 pounds per square inch gauge without emissions to the atmosphere except under emergency conditions.

2. Subsurface caverns or porous rock reservoirs, or

3. Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

(k) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Publication 2517, Evaporation Loss from External Floating Roof Tanks, Second Edition, February 1980, incorporated by reference in s. NR 440.17.

(L) "Vapor recovery system" means a vapor gathering system capable of collecting all hydrocarbon vapors and gases discharged from the storage vessel and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of any storage vessel to which this section applies shall store petroleum liquids as follows:

1. If the true vapor pressure of the petroleum liquid, as stored, is equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia), the storage vessel shall be equipped with a floating roof, a vapor recovery system or their equivalents.

2. If the true vapor pressure of the petroleum liquid as stored is greater than 570 mm Hg (11.1 psia), the storage vessel shall be equipped with a vapor recovery system or its equivalent.

(4) MONITORING OF OPERATIONS. (a) Except as provided in par. (d), the owner or operator subject to this section shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Publication 2517, incorporated by reference in s. NR 440.17, unless the department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from one or more samples.

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method is to be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this subsection:

1. Each owner or operator of each affected facility which stores petroleum liquids with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

2. Each owner or operator of each affected facility equipped with a vapor recovery and return or disposal system in accordance with the requirements of sub. (3).

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.) and (i), Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (k) and (4) (b), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.28 Storage vessels for petroleum liquids for which construction, reconstruction or modification commenced after May 18, 1978, and prior to July 23, 1984. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which this section applies is each storage vessel for petroleum liquids which has a storage capacity greater than 151,416 liters (40,000 gallons) and for which construction is commenced after May 18, 1978.

(b) Each petroleum liquid storage vessel with a capacity of less than 1,589,873 liters (420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer is not an affected facility and, therefore, is exempt from the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(b) "Custody transfer" means the transfer of produced petroleum or condensate, or both, after processing or treating, or both, in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(c) "Liquid–mounted seal" means a foam or liquid–filled primary seal mounted in contact with the liquid between the tank wall and the floating roof continuously around the circumference of the tank.

(d) "Metallic shoe seal" includes but is not limited to a metal sheet held vertically against the tank wall by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(e) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(f) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM D396–78, gas turbine fuel oils Nos. 2–GT through 4–GT as specified in ASTM D2880–78, or diesel fuel oils Nos. 2–D and 4–D as specified in ASTM D975–78. These 3 ASTM methods are incorporated by reference in s. NR 440.17.

(g) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting or reforming of unfinished petroleum derivatives.

(h) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323–82, incorporated by reference in s. NR 440.17.

(i) "Storage vessel" means each tank, reservoir or container used for the storage of petroleum liquids, but does not include:

1. Pressure vessels which are designed to operate in excess of 204.9 kPa (15 psig) without emissions to the atmosphere except under emergency conditions.

2. Subsurface caverns or porous rock reservoirs, or

3. Underground tanks if the total volume of petroleum liquids added to and taken from the tank annually does not exceed twice the volume of the tank.

(j) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid such as determined in accordance with methods described in American Petroleum Institute Publication 2517, Evaporation Loss from External Floating Roof Tanks, Second Edition, February 1980, incorporated by reference in s. NR 440.17.

(k) "Vapor–mounted seal" means a foam–filled primary seal mounted continuously around the circumference of the tank so there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of each storage vessel to which this section applies which contains a petroleum liquid which, as stored, has a true vapor pressure equal to or greater than 10.3 kPa (1.5 psia) but not greater than 76.6 kPa (11.1 psia) shall equip the storage vessel with one of the following:

1. An external floating roof, consisting of a pontoon–type or double–deck–type cover that rests on the surface of the liquid contents and is equipped with a closure device between the tank wall and the roof edge. Except as provided in subd. 1. b. 4), the closure device shall consist of 2 seals, one above the other. The lower seal is referred to as the primary seal and the upper seal is referred to as the secondary seal. The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the

roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

a. The primary seal shall be either a metallic shoe seal, a liquid–mounted seal, or a vapor–mounted seal. Each seal shall meet the following requirements:

1) The accumulated area of gaps between the tank wall and the metallic shoe seal or the liquid–mounted seal may not exceed 212 cm^2 per meter of tank diameter (10.0 in^2 per ft of tank diameter) and the width of any portion of any gap may not exceed 3.81 cm (1.50 in).

2) The accumulated area of gaps between the tank wall and the vapor–mounted seal may not exceed 21.1 cm^2 per meter of tank diameter (1.0 in^2 per ft of tank diameter) and the width of any portion of any gap may not exceed 1.27 cm (0.50 in).

3) One end of the metallic shoe shall extend into the stored liquid and the other end shall extend a minimum vertical distance of 61 cm (24 in) above the stored liquid surface.

4) There may be no holes, tears or other openings in the shoe, seal fabric or seal envelope.

b. The secondary seal shall meet the following requirements:

1) The secondary seal shall be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in subd. 1. b. 2).

2) The accumulated area of gaps between the tank wall and the secondary seal used in combination with a metallic shoe or liquid–mounted primary seal may not exceed 21.1 cm^2 per meter of tank diameter (1.0 in^2 per ft of tank diameter) and the width of any portion of any gap may not exceed 1.27cm (0.50 in). There may be no gaps between the tank wall and the secondary seal used in combination with a vapor–mounted primary seal.

3) There may be no holes, tears or other openings in the seal or seal fabric.

4) The owner or operator is exempted from the requirements for secondary seals and the secondary seal gap criteria when performing gap measurements or inspections of the primary seal.

c. Each opening in the roof except for automatic bleeder vents and rim space vents shall provide a projection below the liquid surface. Each opening in the roof except for automatic bleeder vents, rim space vents and leg sleeves shall be equipped with a cover, seal or lid which shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use or as described in subd. 1. d. Automatic bleeder vents shall be closed at all times when the roof is being floated off or is being landed on the roof leg supports. Rim vents shall be set to open when the roof is being floated off the roof legs supports or at the manufacturer's recommended setting.

d. Each emergency roof drain shall be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

2. A fixed roof with an internal floating type cover equipped with a continuous closure device between the tank wall and the cover edge. The cover shall be floating at all times (i.e., off the leg supports), except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the cover is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. Each opening in the cover except for automatic bleeder vents and the rim space vents shall provide a projection below the liquid surface. Each opening in the cover except for automatic bleeder vents, rim space vents, stub drains and leg sleeves shall be equipped with a cover, seal or lid which shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents shall be closed at all times when the cover is floating except when the cover is being floated off or is being landed on the leg supports. Rim vents shall be set to open only when the cover is being floated off the leg supports or at the manufacturer's recommended setting.

3. A vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95% by weight.

4. A system equivalent to those described in subd. 1., 2. or 3. as provided in sub. (5).

(b) The owner or operator of each storage vessel to which this section applies which contains a petroleum liquid which, as stored, has a true vapor pressure greater than 76.6 kPa (11.1 psia), shall equip the storage vessel with a vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95% by weight.

(4) TESTING AND PROCEDURES. (a) Except as provided in s. NR 440.08 (2), compliance with the standard prescribed in sub. (3) shall be determined as follows or in accordance with an equivalent procedure as provided in sub. (5).

1. The owner or operator of each storage vessel to which this section applies which has an external floating roof shall meet the following requirements:

a. Determine the gap areas and maximum gap widths between the primary seal and the storage vessel wall, and between the secondary seal and the storage vessel wall according to the following frequency:

1) For primary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every 5 years thereafter. All primary seal inspections or gap measurements which require the removal or dislodging of the secondary seal shall be accomplished as rapidly as possible and the secondary seal shall be replaced as soon as possible.

2) For secondary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every year thereafter.

3) If any storage vessel is out of service for a period of one year or more, subsequent refilling with petroleum liquid shall be considered initial fill for the purposes of subd. 1. a. 1) and 2).

4) Keep records of each gap measurement at the plant for a period of at least 2 years following the date of measurement. Each record shall identify the vessel on which the measurement was performed and shall contain the date of the seal gap measurement, the raw data obtained in the measurement process required by subd. 1. b. and the calculation required by subd. 1. c.

5) If either the seal gap calculated in accord with subd. 1. c. or the measured maximum seal gap exceeds the limitations specified by sub. (3), a report shall be furnished to the department within 60 days of the date of the measurement. The report shall identify the vessel and list each reason why the vessel did not meet the specifications of sub. (3). the report shall also describe the actions necessary to bring the storage vessel into compliance with the specifications of sub. (3).

b. Determine gap widths in the primary and secondary seals individually by the following procedures:

1) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

2) Measure seal gaps around the entire circumference of the tank in each place where a 1/8″ diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the tank wall and measure the circumferential distance of each such location.

3) The total surface area of each gap described in subd. 1. b. 2) shall be determined by using probes of various widths to accurately measure the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

c. Add the gap surface area of each gap location for the primary seal and the secondary seal individually. Divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the appropriate ratio in the standard in sub. (3) (a) 1. a. and b.

d. Provide the department 30 days prior notice of the gap measurement to afford it the opportunity to have an observer present.

2. The owner or operator of each storage vessel to which this section applies which has a vapor recovery and return or disposal system shall provide the following information to the department on or before the date on which construction of the storage vessel commences:

a. Emission data, if available, for a similar vapor recovery and return or disposal system used on the same type of storage vessel, which can be used to determine the efficiency of the system. A complete description of the emission measurement method used shall be included.

b. The manufacturer's design specifications and estimated emission reduction capability of the system.

c. The operation and maintenance plan for the system.

d. Any other information which will be useful to the department in evaluating the effectiveness of the system in reducing VOC emissions.

(5) ALTERNATIVE MEANS OF EMISSION LIMITATION. (a) If, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by any requirements in sub. (3), the administrator will publish in the federal register a notice permitting the use of the alternative means for purpose of compliance with that requirement.

(b) Any notice under par. (a) will be published only after notice and an opportunity for a hearing.

(c) Any person seeking permission to use an alternative means of emission limitation under this subsection shall submit to the administrator a written application including:

1. An actual emissions test that uses a full–sized or scale–model storage vessel that accurately collects and measures all VOC emissions from a given control device and that accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.

2. An engineering evaluation that the administrator determines is an accurate method of determining equivalence.

(d) The administrator may condition the permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emissions reduction as specified in sub. (3).

(e) The primary vapor–mounted seal in the "Volume–Maximizing Seal" manufactured by R.F.I. Services Corporation is approved as equivalent to the vapor–mounted seal required by sub. (3) (a) 1. a. and shall meet the gap criteria specified in sub. (3) (a) 1. a. 2). There may be no gaps between the tank wall and any secondary seal used in conjunction with the primary seal in the "Volume–Maximizing Seal."

(6) MONITORING OF OPERATIONS. (a) Except as provided in par. (d), the owner or operator subject to this section shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Publication 2517, incorporated by reference in s. NR 440.17, unless the department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from samples.

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method shall be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this subsection:

1. Each owner or operator of each storage vessel storing a petroleum liquid with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

2. Each owner or operator of each storage vessel equipped with a vapor recovery and return or disposal system in accordance with the requirements of sub. (3) (a) 3. and (b).

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.) and (h), (4) (a) 1. a. intro., r. (5) (a) and (b), renum. (5) (c) to (e), cr. (4) (a) 1. a. 4) and 5), (5) (a) to (d), Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (j) and (6) (b), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.285 Volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction or modification commenced after July 23, 1984. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in pars. (b) to (d), the affected facility to which this section applies is each storage vessel with a capacity greater than or equal to 40 cubic meters (m^3) that is used to store volatile organic liquids (VOLs) for which construction, reconstruction, or modification is commenced after July 23, 1984.

(b) Except as specified in sub. (7) (a) and (b), storage vessels with design capacity less than 75 m^3 are exempt from ss. NR 440.01 to 440.18, and from the provisions of this section.

(c) Except as specified in sub. (7) (a) and (b), vessels either with a capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure less than 3.5 kPa or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from ss. NR 440.01 to 440.18 and from the provisions of this section.

(d) This section does not apply to the following:

1. Vessels at coke oven by–product plants.

2. Pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

3. Vessels permanently attached to mobile vehicles such as trucks, railcars, barges or ships.

4. Vessels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer.

5. Vessels located at bulk gasoline plants.

6. Storage vessels located at gasoline service stations.

7. Vessels used to store beverage alcohol.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Bulk gasoline plant" means any gasoline distribution facility that has a gasoline throughput less than or equal to 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under federal requirements or federal, state, or local law, and discoverable by the department and any other person.

(b) "Condensate" means hydrocarbon liquid separated from natural gas that condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(c) "Custody transfer" means the transfer of produced petroleum or condensate, after processing or treatment in the producing operations, from storage vessels or automatic transfer facilities to pipelines or any other forms of transportation.

(d) "Fill" means the introduction of VOL into a storage vessel but not necessarily to complete capacity.

(e) "Gasoline service station" means a site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage tanks.

(f) "Maximum true vapor pressure" means the equilibrium partial pressure exerted by the stored VOL at the temperature equal to the highest calendar–month average of the VOL storage temperature for VOLs stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the national weather service for VOLs stored at the ambient temperature, as determined:

1. In accordance with the method described in American Petroleum Institute Publication 2517, Evaporation Loss From External Floating Roof Tanks, incorporated by reference in s. NR 440.17; or

2. As obtained from standard reference texts; or

3. As determined by ASTM Method D2879–83, incorporated by reference in s. NR 440.17; or

4. Any other method approved by the administrator.

(g) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(h) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery.

(i) "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases, as determined by ASTM D323–82, incorporated by reference in s. NR 440.17.

(j) "Storage vessel" means each tank, reservoir, or container used for the storage of volatile organic liquids but does not include:

1. Frames, housing, auxiliary supports, or other components that are not directly involved in the containment of liquids or vapors; or

2. Subsurface caverns or porous rock reservoirs.

(k) "Volatile organic liquid" or "VOL" means any organic liquid which can emit organic compounds except those VOLs that emit only those compounds which are excluded by name from the definition of volatile organic compound in s. NR 400.02 (162).

(L) "Waste" means any liquid resulting from industrial, commercial, mining or agricultural operations, or from community activities that is discarded or is being accumulated, stored, or physically, chemically, or biologically treated prior to being discarded or recycled.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of each storage vessel with a design capacity greater than or equal to 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 5.2 kPa but less than 76.6 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa, shall equip each storage vessel with one of the following:

1. A fixed roof in combination with an internal floating roof meeting the following specifications:

a. The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.

b. Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:

1) A foam– or liquid–filled seal mounted in contact with the liquid (liquid–mounted seal). A liquid–mounted seal means a foam– or liquid–filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the storage vessel.

2) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof. The lower seal may be vapor–mounted, but both must be continuous.

3) A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

c. Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum break vents) and the rim space vents is to provide a projection below the liquid surface.

d. Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.

e. Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.

f. Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

g. Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90% of the opening.

h. Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.

i. Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.

2. An external floating roof. An external floating roof means a pontoon–type or double–deck type cover that rests on the liquid surface in a vessel with no fixed roof. Each external floating roof shall meet the following specifications:

a. Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge. The closure device is to consist of 2 seals, one above the other. The lower seal is referred to as the primary seal, and the upper seal is referred to as the secondary seal.

1) The primary seal shall be either a mechanical shoe seal or a liquid–mounted seal. Except as provided in sub. (4) (b) 4., the seal shall completely cover the annular space between the edge of the floating roof and storage vessel wall.

2) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in sub. (4) (b) 4.

b. Except for automatic bleeder vents and rim space vents, each opening in a noncontact external floating roof shall provide a projection below the liquid surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal, or lid that is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

c. The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the storage vessel is completely emptied and subsequently refilled. The process of filling, emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

3. A closed vent system and control device meeting the following specifications:

a. The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in s. NR 440.62 (6) (b).

b. The control device shall be designed and operated to reduce inlet VOC emissions by 95% or greater. If a flare is used as the control device, it shall meet the specifications described in the general control device requirements under s. NR 440.18.

4. A system equivalent to those described in subd. 1., 2. or 3. as provided in sub. (5).

(b) The owner or operator of each storage vessel with a design capacity greater than or equal to 75 m^3 which contains a VOL that, as stored, has a maximum true vapor pressure greater than or equal to 76.6 kPa shall equip each storage vessel with one of the following:

1. A closed vent system and control device as specified in sub. (3) (a) 3.

2. A system equivalent to that described in subd. 1. as provided in sub. (5).

(4) TESTING AND PROCEDURES. The owner or operator of each storage vessel as specified in sub. (3) (a) shall meet the requirements of par. (a), (b), or (c). The applicable paragraph for a particular storage vessel depends on the control equipment installed to meet the requirements of sub. (3).

(a) After installing the control equipment required to meet sub. (3) (a) 1. (permanently affixed roof and internal floating roof), each owner or operator shall:

1. Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the storage vessel with VOL. If there are holes, tears or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the storage vessel.

2. For vessels equipped with a liquid–mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the storage vessel from service within 45 days. If a failure that is detected during inspections required under this paragraph cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30–day extension may be requested from the department in the inspection report required in sub. (6) (a) 3. A request for an extension shall document that alternate storage capacity is unavailable and specify a schedule of actions the company owner or operator shall take to assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

3. For vessels equipped with a double–seal system as specified in sub. (3) (a) 1. b. 2).

a. Visually inspect the vessel as specified in subd. 4. at least every 5 years; or

b. Visually inspect the vessel as specified in subd. 2.

4. Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes (if any), and sleeve seals (if any) each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears or other openings in the seal or the seal fabric, the secondary seal has holes, tears or other openings in the seal or the seal fabric, the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10% open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with VOL. In no event may inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of vessels undergoing annual visual inspections as specified in subds. 2. and 3. b. nor at intervals greater than 5 years in the case of vessels specified in subd. 3. a.

5. Notify the department in writing at least 30 days prior to the filling or refilling of each storage vessel for which an inspection is required by subds. 1. and 4. to afford the department the opportunity to have an observer present. If the inspection required by subd. 4. is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the storage vessel, the owner or operator shall notify the department at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the department at least 7 days prior to the refilling.

(b) After installing the control equipment required to meet sub. (3) (a) 2. (external floating roof), the owner or operator shall:

1. Determine the gap areas and maximum gap widths, between the primary seal and the wall of the storage vessel and between the secondary seal and the wall of the storage vessel according to the following frequency.

a. Measurements of gaps between the storage vessel wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the vessel or within 60 days of the initial fill with VOL and at least once every 5 years thereafter.

b. Measurements of gaps between the storage vessel wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.

c. If any source ceases to store VOL for a period of one year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of subd. 1. a. and b.

2. Determine gap widths and areas in the primary and secondary seals individually by the following procedures:

a. Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

b. Measure seal gaps around the entire circumference of the storage vessel in each place where a 0.32–cm diameter uniform probe passes freely (without forcing or binding against the seal) between the seal and the wall of the storage vessel and measure the circumferential distance of each such location.

c. The total surface area of each gap described in subd. 2. b. shall be determined by using probes of various widths to measure accurately the actual distance from the storage vessel wall to the seal and multiplying each such width by its respective circumferential distance.

3. Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the storage vessel and compare each ratio to the respective standards in subd. 4.

4. Make necessary repairs or empty the storage vessel within 45 days of identification in any inspection for seals not meeting the requirements listed in subd. 4. a.

a. The accumulated area of gaps between the storage vessel wall and the mechanical shoe or liquid–mounted primary seal may not exceed 212 cm^2 per meter of storage vessel diameter, and the width of any portion of any gap may not exceed 3.81 cm.

1) One end of the mechanical shoe is to extend into the stored liquid, and the other end is to extend a minimum vertical distance of 61 cm above the stored liquid surface.

2) There may be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

b. The secondary seal is to meet the following requirements:

1) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the storage vessel wall except as provided in subd. 2. c.

2) The accumulated area of gaps between the storage vessel wall and the secondary seal may not exceed 21.2 cm^2 per meter of storage vessel diameter, and the width of any portion of any gap may not exceed 1.27 cm.

3) There may be no holes, tears, or other openings in the seal or seal fabric.

c. If a failure that is detected during inspections required in subd. 1 cannot be repaired within 45 days, a 30–day extension may be requested from the department in the inspection report required in sub. (6) (b) 4. An extension request shall include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

5. Notify the department 30 days in advance of any gap measurements required by subd. 1. to afford the department opportunity to have an observer present.

6. Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.

a. If the external floating roof has defects, or the primary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the storage vessel with VOL.

b. For all the inspections required by this subdivision, the owner or operator shall notify the department in writing at least 30 days prior to the filling or refilling of each storage vessel to afford the department the opportunity to inspect the storage vessel prior to refilling. If the inspection required by this subdivision is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the storage vessel, the owner or operator shall notify the department at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the department at least 7 days prior to the refilling.

(c) The owner or operator of each source that is equipped with a closed vent system and control device as required in sub. (3) (a) 3. or (b) 2. (other than a flare) is exempt from s. NR 440.08 and shall meet the following requirements:

1. Submit for approval by the administrator as an attachment to the notification required by s. NR 440.07 (1) (a), or if the facility is exempt from s. NR 440.07 (1) (b), an operating plan containing the following information:

a. Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation shall include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not designated sources under this section, the efficiency demonstration shall include consideration of all vapors, gases, and liquids received by the closed vent capture system and control devices. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816°C is used to meet the 95% requirement, documentation that those conditions will exist is sufficient to meet the requirements of this paragraph.

b. A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters).

2. Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the department in accordance with subd. 1., unless the plan was modified by the department during the review process. In this case, the modified plan applies.

(d) The owner or operator of each source that is equipped with a closed vent system and a flare to meet the requirements in sub. (3) (a) 3. or (b) 2. shall meet the requirements as specified in the general control device requirements under s. NR 440.18 (5) and (6).

(5) ALTERNATIVE MEANS OF EMISSION LIMITATIONS. (a) If, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by any requirement in sub. (3), the administrator will publish in the federal register a notice permitting the use of the alternative means for purposes of compliance with that requirement.

(b) Any notice under par. (a) will be published only after notice and an opportunity for a public hearing.

(c) Any person seeking permission under this section shall submit to the administrator a written application including:

1. An actual emissions test that uses a full–sized or scale–model storage vessel that accurately collects and measures all VOC emissions from a given control device and that accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.

2. An engineering evaluation that the administrator determines is an accurate method of determining equivalence.

(d) The administrator may condition the permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emission reduction as specified in sub. (3).

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. The owner or operator of each storage vessel as specified in sub. (3) (a) shall keep records and furnish reports as required by par. (a), (b), or (c) depending upon the control equipment installed to meet the requirements of sub. (3). The owner or operator shall keep copies of all reports and records required by this section, except for the record required by par. (c) 1., for at least 2 years. The record required by par. (c) 1. will be kept for the life of the control equipment.

(a) After installing control equipment in accordance with sub. (3) (a) 1. (fixed roof and internal floating roof), the owner or operator shall meet the following requirements:

1. Furnish the department with a report that describes the control equipment and certifies that the control equipment meets the specifications of subs. (3) (a) 1. and (4) (a) 1. This report shall be an attachment to the notification required by s. NR 440.07 (1) (c).

2. Keep a record of each inspection performed as required by sub. (4) (a) 1. to 4. Each record shall identify the storage vessel on which the inspection was performed and shall contain the date the vessel was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

3. If any of the conditions described in sub. (4) (a) 2. are detected during the annual visual inspection required by sub. (4) (a) 2., a report shall be furnished to the department within 30 days of the inspection. Each report shall identify the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made.

4. After each inspection required by sub. (4) (a) 3. that finds holes or tears in the seal or seal fabric, defects in the internal floating roof, or other control equipment defects listed in sub. (4) (a) 3. b., a report shall be furnished to the department within 30 days of the inspection. The report shall identify the storage vessel and the reason it did not meet the specifications of sub. (3) (a) 1. or (4) (a) 3. and list each repair made.

(b) After installing control equipment in accordance with sub. (3) (a) 2. (external floating roof), the owner or operator shall meet the following requirements:

1. Furnish the department with a report that describes the control equipment and certifies that the control equipment meets the specifications of subs. (3) (a) 2. and (4) (b) 2. to 4. This report shall be an attachment to the notification required by s. NR 440.07 (1) (c).

2. Within 60 days of performing the seal gap measurements required by sub. (4) (b) 1., furnish the department with a report that contains:

a. The date of measurement.

b. The raw data obtained in the measurement.

c. The calculations described in sub. (4) (b) 2. and 3.

3. Keep a record of each gap measurement performed as required by sub. (4) (b). Each record shall identify the storage vessel in which the measurement was performed and shall contain:

a. The date of measurement.

b. The raw data obtained in the measurement.

c. The calculations described in sub. (4) (b) 2. and 3.

4. After each seal gap measurement that detects gaps exceeding the limitations specified by sub. (4) (b) 4., submit a report to the department within 30 days of the inspection. The report will identify the vessel and contain the information specified in par. (b) 2. and the date the vessel was emptied or the repairs made and date of repair.

(c) After installing control equipment in accordance with sub. (3) (a) 3. or (b) 1. (closed vent system and control device other than a flare), the owner or operator shall keep the following records:

1. A copy of the operating plan.

2. A record of the measured values of the parameters monitored in accordance with sub. (4) (c) 2.

(d) After installing a closed vent system and flare to comply with sub. (3), the owner or operator shall meet the following requirements:

1. A report containing the measurements required by s. NR 440.18 (6) shall be furnished to the department as required by s. NR 440.08. This report shall be submitted within 6 months of the initial startup date.

2. Records shall be kept of all periods of operation during which the flare pilot flame is absent.

3. Semiannual reports of all periods recorded under subd. 2. in which the pilot flame was absent shall be furnished to the department.

(7) MONITORING OF OPERATIONS. (a) The owner or operator shall keep copies of all records required by this section, except for the record required by par. (b) for at least 2 years. The record required by par. (b) shall be kept for the life of the source.

(b) The owner or operator of each storage vessel as specified in sub. (1) (a) shall keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. Each storage vessel with a design capacity less than 75 m^3 is subject to no provisions of this section other than those required by this paragraph.

(c) Except as provided in pars. (f) and (g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 3.6 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 15.0 kPa, shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period.

(d) Except as provided in par. (g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 5.2 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa, shall notify the department within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range.

(e) Available data on the storage temperature may be used to determine the maximum true vapor pressure as follows:

1. For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar–month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the national weather service.

2. For crude oil or refined petroleum products the vapor pressure may be obtained by the following:

a. Available data on the Reid vapor pressure and the maximum expected storage temperature based on the highest expected calendar–month average temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Publication 2517, incorporated by reference in s. NR 440.17, unless the department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample or samples.

b. The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa or with physical properties that preclude determination by the recommended method is to be determined from available data and recorded if the estimated maximum true vapor pressure is greater than 3.5 kPa.

3. For other liquids, the vapor pressure:

a. May be obtained from standard reference texts, or

b. Determined by ASTM Method D2879–83, incorporated by reference in s. NR 440.17, or

c. Measured by an appropriate method approved by the administrator, or

d. Calculated by an appropriate method approved by the administrator.

(f) The owner or operator of each vessel storing a waste mixture of indeterminate or variable composition shall be subject to the following requirements.

1. Prior to the initial filling of the vessel, the highest maximum true vapor pressure for the range of anticipated liquid compositions to be stored shall be determined using the methods described in par. (e).

2. For vessels in which the vapor pressure of the anticipated liquid composition is above the cutoff for monitoring but below the cutoff for controls as defined in sub. (3) (a), an initial physical test of the vapor pressure is required; and a physical test at least once every 6 months thereafter is required as determined by the following methods:

a. ASTM Method D2879–83, incorporated by reference in s. NR 440.17; or

b. ASTM Method D323–82 incorporated by reference in s. NR 440.17; or

c. As measured by an appropriate method as approved by the administrator.

(g) The owner or operator of each vessel equipped with a closed vent system and control device meeting the specifications of sub. (3) is exempt from the requirements of pars. (c) and (d).

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am (1) (c), (2) (f) (intro.) and (4) (a) 4., Register, July, 1993, No. 451, eff. 8–1–93; am. (2) (f) 1., (7) (e) 2. a., Register, December, 1995, No. 480, eff. 1–1–96**; am., Register, November, 1999, No. 527, eff. 12–1–99.**

NR 440.29 Secondary lead smelters. (1) APPLICABILITY AND DESIGNATIONS OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in secondary lead smelters: pot furnaces of more than 250 kg (550 lb) charging capacity, blast (cupola) furnaces and reverberatory furnaces.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Lead" means elemental lead or alloys in which the predominant component is lead.

(b) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking and tilting.

(c) "Secondary lead smelter" means any facility producing lead from a leadbearing scrap material by smelting to the metallic form.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from a blast (cupola) or reverberatory furnace any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any pot furnace any gases which exhibit 10% opacity or greater.

(4) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration during representative periods of furnace operation, including charging and tapping. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf).

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.30 Secondary brass and bronze production plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in secondary brass or bronze production plants: reverberatory and electric furnaces of 1,000 kg (2,205 lb) or greater production capacity and blast (cupola) furnaces of 250 kg/hr (550 lb/hr) or greater production capacity. Furnaces from which molten brass or bronze are cast into the shape of finished products, such as foundry furnaces, are not considered to be affected facilities.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Blast furnace" means any furnace used to recover metal from slag.

(b) "Brass or bronze" means any metal alloy containing copper as its predominant constituent, and lesser amounts of zinc, tin, lead or other metals.

(c) "Electric furnace" means any furnace which uses electricity to produce over 50% of the heat required in the production of refined brass or bronze.

(d) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking and tilting.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from a reverberatory furnace any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR. 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any blast (cupola) or electric furnace any gases which exhibit 10% opacity or greater.

(4) TEST METHODS AND PROCEDURES. (a) In conducting performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration during representative periods of charging and refining, but not during pouring of the heat. The sampling time and sample volume for each run shall be at least 120 minutes and 1.80 dscm (63.6 dscf).

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) (a), (4) (a) 3. and 4., cr. (4) (a) 5., Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro)., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.31 Primary emissions from basic oxygen process furnaces for which construction is commenced after June 11, 1973. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each basic oxygen process furnace.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Basic oxygen process furnace" or "BOPF" means any furnace with a refractory lining in which molten steel is produced by charging scrap metal, molten iron, and flux materials or alloy additions into a vessel and introducing a high volume of an oxygen–rich gas. Open hearth, blast and reverberatory furnaces are not included in this definition.

(b) "Primary emissions" means particulate matter emissions from the BOPF generated during the steel production cycle and captured by the BOPF primary control system.

(c) "Primary oxygen blow" means the period in the steel production cycle of a BOPF during which a high volume of oxygen–rich gas is introduced to the bath of molten iron by means of a lance inserted from the top of the vessel or through tuyeres in the bottom or through the bottom and sides of the vessel. This definition does not include any additional or secondary oxygen blows made after the primary blow or the introduction of nitrogen or other inert gas through tuyeres in the bottom or bottom and sides of the vessel.

(d) "Steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel and includes the following operations: scrap charging, preheating (when used), hot metal charging, primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used), tapping, and deslagging. This definition applies to an affected facility constructed, modified, or reconstructed after January 20, 1983. For an affected facility constructed, modified, or reconstructed after June 11, 1973, but on or before January 20, 1983, "steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel and includes the following operations: scrap charging, preheating (when used), hot metal charging, primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used) and tapping.

(3) STANDARD FOR PARTICULATE MATTER. (a) Except as provided under par. (b), on and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exit from a control device and exhibit 10% opacity or greater, except that an opacity of greater than 10% but less than 20% may occur once per steel production cycle.

(b) For affected facilities constructed, modified, or reconstructed after January 20, 1983, the following limits shall apply:

1. On or after the date on which the performance test under s. NR 440.08 is required to be completed, no owner or operator of an affected facility for which open hooding is the method for controlling primary emissions may cause to be discharged to the atmosphere any gases that:

a. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf), as measured for the primary oxygen blow.

b. Exit from a control device not used solely for the collection of secondary emissions, as defined in s. NR 440.315 (2), and exhibit 10% opacity or greater, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

2. On or after the date on which the performance test required by s. NR 440.08 is completed, no owner or operator of an affected facility for which closed hooding is the method for controlling primary emissions may cause to be discharged into the atmosphere any gases that:

a. Contain particulate matter in excess of 68 mg/dscm (0.030 gr/dscf), as measured for the primary oxygen blow.

b. Exit from a control device not used solely for the collection of secondary emissions, as defined in s. NR 440.315 (2), and exhibit 10% opacity or greater, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

(c) On and after the date on which the performance test required by s. NR 440.08 is completed, each owner or operator of an affected facility subject to par. (b) shall operate the primary gas cleaning system during any reblow in a manner identical to operation during the primary oxygen blow.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of an affected facility shall maintain a single time–measuring instrument which shall be used in recording daily the time and duration of each steel production cycle, and the time and duration of any diversion of exhaust gases from the main stack servicing the BOPF.

(b) The owner or operator of any affected facility that uses venturi scrubber emission control equipment shall install, calibrate, maintain, and continuously operate monitoring devices as follows:

1. A monitoring device for the continuous measurement of the pressure loss through the venturi constriction of the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within ± 250 Pa (± 1 inch water).

2. A monitoring device for the continuous measurement of the water supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within ± 5% of the design water supply pressure. The monitoring device's pressure sensor or pressure tap shall be located close to the water discharge point. The department shall be consulted for approval in advance of selecting alternative locations for the pressure sensor or tap.

3. All monitoring devices shall be synchronized each day with the time–measuring instrument used under par. (a). The chart recorder error directly after synchronization may not exceed 0.08 cm (1/32 inch).

4. All monitoring devices shall use chart recorders which are operated at a minimum chart speed of 3.8 cm/hr (1.5 in/hr).

5. All monitoring devices shall be recalibrated annually, and at other times as the department may require, in accordance with the procedures under s. NR 440.13 (2).

(c) Any owner or operator subject to requirements under par. (b) shall report to the department, on a semiannual basis, all measurements over any 3–hour period that average more than 10% below the average levels maintained during the most recent performance test conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the mass standards under sub. (3) (a) 1., (b) 1. a. or 2. a. The accuracy of the respective measurements, not to exceed the values specified in par. (b) 1. and 2., may be taken into consideration when determining the measurement results that must be reported.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The time–measuring instrument of sub. (4) shall be used to document the time and duration of each steel production cycle and each diversion period during each run.

2. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 1.50 dscm (53 dscf). Sampling shall be discontinued during periods of diversions.

a. For affected facilities that commenced construction, modification or reconstruction on or before January 20, 1983, the sampling for each run shall continue for an integral number of steel production cycles. A cycle shall start at the beginning of either the scrap preheat or the oxygen blow and shall terminate immediately before tapping.

b. For affected facilities that commenced construction, modification or reconstruction after January 20, 1983, the sampling for each run shall continue for an integral number of primary oxygen blows.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity. Observations taken during a diversion period may not be used in determining compliance with the opacity standard. Opacity observations taken at 15–second intervals immediately before and after a diversion of exhaust gases from the stack may be considered to be consecutive for the purpose of computing an average opacity for a 6–minute period.

(c) To comply with sub. (4) (c), the owner or operator shall use the monitoring devices of sub. (4) (b) 1. and 2. during the particulate runs to determine the 3–hour averages of the required measurements.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), and (a), (3) (a) (intro.), (4) (b) 2. and (c), (5) (b), r. and recr. (2) (b), renum. (2) (c) to be (2) (d) and am., cr. (2) (c), (3) (b) and (c), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b) 5., r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (b) 1., 4., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.315 Basic oxygen process steelmaking facilities for which construction is commenced after January 20, 1983. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section apply to the following affected facilities in an iron and steel plant: top–blown BOPFs and hot metal transfer stations and skimming stations used with bottom–blown or top–blown BOPFs.

(b) This section applies to any facility identified in par. (a) that commences construction, modification or reconstruction after January 20, 1983.

(c) Any BOPF subject to the provisions of this section is subject to those provisions of s. NR 440.31 applicable to affected facilities commencing construction, modification or reconstruction after January 20, 1983.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Basic oxygen process furnace" or "BOPF" means any furnace with a refractory lining in which molten steel is produced by charging scrap metal, molten iron, and flux materials or alloy additions into a vessel and by introducing a high volume of oxygen–rich gas. Open hearth, blast and reverberatory furnaces are not included in this definition.

(b) "Bottom–blown furnace" means any BOPF in which oxygen and other combustion gases are introduced to the bath of molten iron through tuyeres in the bottom of the vessel or through tuyeres in the bottom and sides of the vessel.

(c) "Fume suppression system" means the equipment comprising any system used to inhibit the generation of emissions from steelmaking facilities with an inert gas, flame or steam blanket applied to the surface of molten iron or steel.

(d) "Hot metal transfer station" means the facility where molten iron is emptied from the railroad torpedo car or hot metal car to the shop ladle. This includes the transfer of molten iron from the torpedo car or hot metal car to a mixer (or other intermediate vessel) and from a mixer (or other intermediate vessel) to the ladle. This facility is also known as the reladling station or ladle transfer station.

(e) "Primary emission control system" means the combination of equipment used for the capture and collection of primary emissions, e.g., an open hood capture system used in conjunction with a particular cleaning device such as an electrostatic precipitator or a closed hood capture system used in conjunction with a particulate matter cleaning device such as a scrubber.

(f) "Primary emissions" means particulate matter emissions from the BOPF generated during the steel production cycle which are captured by, and do not thereafter escape from the BOPF primary control system.

(g) "Primary oxygen blow" means the period in the steel production cycle of a BOPF during which a high volume of oxygen–rich gas is introduced to the bath of molten iron by means of a lance inserted from the top of the vessel. This definition does not include any additional, or secondary, oxygen blows made after the primary blow.

(h) "Secondary emission control system" means the combination of equipment used for the capture and collection of secondary emissions, e.g.:

1. An open hood system for the capture and collection of primary and secondary emissions from the BOPF, with local hooding ducted to a secondary emission collection device such as a baghouse for the capture and collection of emissions from the hot metal transfer and skimming station; or

2. An open hood system for the capture and collection of primary and secondary emissions from the furnace, plus a furnace enclosure with local hooding ducted to a secondary emission collection device, such as a baghouse, for additional capture and collection of secondary emissions from the furnace, with local hooding ducted to a secondary emission collection device, such as a baghouse for the capture and collection of emissions from hot metal transfer and skimming stations; or

3. A furnace enclosure with local hooding ducted to a secondary emission collection device such as a baghouse for the capture and collection of secondary emissions from a BOPF controlled by a closed hood primary emission control system, with local hooding ducted to a secondary emission collection device, such as baghouse, for the capture and collection of emissions from hot metal transfer and skimming stations.

(i) "Secondary emissions" means particulate matter emissions that are not captured by the BOPF primary control system, including emissions from hot metal transfer and skimming stations. This definition also includes particulate matter emissions that escape from openings in the primary emission control system, such as from lance hole openings, gaps or tears in the ductwork of the primary emission control system, or leaks in hoods.

(j) "Skimming station" means the facility where slag is mechanically raked from the top of the molten iron.

(k) "Steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel, including the following operations: scrap charging, preheating (when used), hot metal charging primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used), tapping and deslagging. Hot metal transfer and skimming operations from the next steel production cycle are also included when the hot metal transfer station or skimming station is an affected facility.

(L) "Top–blown furnace" means any BOPF in which oxygen is introduced to the bath of molten iron by means of an oxygen lance inserted from the top of the vessel.

(3) STANDARDS FOR PARTICULATE MATTER. (a) Except as provided under pars. (b) and (c), on and after the date on which the performance test under s. NR 440.08 is required to be completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any secondary emissions that:

1. Exit from the BOPF shop roof monitor (or other building openings) and exhibit greater than 10% opacity during the steel production cycle of any top–blown BOPF or during hot metal transfer or skimming operations for any bottom–blown BOPF, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

2. Exit from a control device used solely for the collection of secondary emissions from a top–blown BOPF or from hot metal transfer or skimming operations for a top–blown BOPF and contain particulate matter in excess of 23 mg/dscm (0.010 gr/dscf).

3. Exit from a control device used solely for the collection of secondary emissions from a top–blown BOPF or from hot metal transfer or skimming operations for a top–blown or a bottom–blown BOPF and exhibit more than 5% opacity.

(b) A fume suppression system used to control secondary emissions from an affected facility is not subject to par. (a) 2. and 3.

(c) A control device used to collect both primary and secondary emissions from a BOPF is not subject to par. (a) 2. and 3.

(4) MONITORING OF OPERATIONS. (a) Each owner or operator of an affected facility shall install, calibrate, operate, and maintain a monitoring device that continually measures and records for each steel production cycle the various rates or levels of exhaust ventilation at each phase of the cycle through each duct of the secondary emission capture system. The monitoring device or devices are to be placed at locations near each capture point of the secondary emission capture system to monitor the exhaust ventilation rates or levels adequately, or in alternative locations approved in advance by the department.

(b) If a chart recorder is used, the owner or operator shall use chart recorders that are operated at minimum chart speed of 3.8 cm/hr (1.5 in/hr).

(c) All monitoring devices are to be certified by the manufacturer to be accurate to within ± 10% compared to Reference Method 2, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The owner or operator shall recalibrate and check the devices annually and at other times as the department may require, in accordance with the written instructions of the manufacturer and by comparing the device against Reference Method 2, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(d) Each owner or operator subject to the requirements of par. (a) shall report on a semiannual basis all measurements of exhaust ventilation rates or levels over any 3–hour period that average more than 10% below the average rates or levels of exhaust ventilation maintained during the most recent performance test conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3) (a) 2. The accuracy of the respective measurements, not to exceed the values specified in par. (c), may be considered when determining the measurement results that are to be reported.

(e) If a scrubber primary emission control device is used to collect secondary emissions, the owner or operator shall report on a semiannual basis all measurements of exhaust ventilation rate over any 3–hour period that average more than 10% below the average levels maintained during the most recent performance text conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3) (a) 1.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standard in sub. (3) as follows:

1. Start and end times of each steel production cycle during each run shall be recorded.

Note: See sub. (6) (c) and (d) for the definitions of start and end times of a cycle.

2. Method 5 shall be used to determine the particulate matter concentration. Sampling shall be conducted only during the steel production cycle and for a sufficient number of steel production cycles to obtain a total sample volume of at least 5.67 dscm (200 dscf) for each run.

3. Method 9 and the procedures of s. NR 440.11 shall be used to determine opacity, except sections 2.4 and 2.5 of Method 9 shall be replaced with the following instructions for recording observations and reducing data:

a. Section 2.4. Opacity observations shall be recorded to the nearest 5% at 15–second intervals. During the initial performance test conducted pursuant to s. NR 440.08, observations shall be made and recorded in this manner for a minimum of 3 steel production cycles. During any subsequent compliance test, observations may be made for any number of steel production cycles, although, where conditions permit, observations will generally be made for a minimum of 3 steel production cycles.

b. Section 2.5. Opacity shall be determined as an average of 12 consecutive observations recorded at 15–second intervals. For each steel production cycle, divide the observations recorded into sets of 12 consecutive observations. Sets need not be consecutive in time, and in no case may 2 sets overlap. For each set of 12 observations, calculate the average by summing the opacity of 12 consecutive observations and dividing this sum by 12.

(c) In complying with the requirements of sub. (4) (c), the owner or operator shall conduct an initial test as follows:

1. For devices that monitor and record the exhaust ventilation rate, compare velocity readings recorded by the monitoring device against the velocity readings obtained by Method 2. Take Method 2 readings at a point or points that would properly characterize the monitoring device's performance and that would adequately reflect the various rates of exhaust ventilation. Obtain readings at sufficient intervals to obtain 12 pairs of readings for each duct of the secondary emission capture system. Compare the averages of the 2 sets to determine whether the monitoring device velocity is within ± 10% of the Method 2 average.

2. For devices that monitor the level of exhaust ventilation and record only step changes when a set point rate is reached, compare step changes recorded by the monitoring device against the velocity readings obtained by Method 2. Take Method 2 readings at a point or points that would properly characterize the performance of the monitoring device and that would adequately reflect the various rates of exhaust ventilation. Obtain readings at sufficient intervals to obtain 12 pairs of readings for each duct of the secondary emission capture system. Compare the averages of the 2 sets to determine whether the monitoring device step change is within ± 10% of the setpoint rate.

(d) To comply with sub. (4) (d) or (e), the owner or operator shall use the monitoring device of sub. (4) (a) to determine the exhaust ventilation rates or levels during the particulate matter runs and to determine a 3–hour average.

(6) COMPLIANCE PROVISIONS. (a) When determining compliance with mass and visible emission limits specified in sub. (3) (a) 2. and 3., the owner or operator of a BOPF shop that normally operates 2 furnaces with overlapping cycles may elect to operate only one furnace. If an owner or operator chooses to shut down one furnace, he or she shall be allowed a reasonable time period to adjust the production schedule before the compliance tests are conducted. The owner or operator of an affected facility may also elect to suspend shop operations not subject to this section during compliance testing.

(b) During compliance testing for mass and visible emission standards, if an owner or operator elects to shut down one furnace in a shop that normally operates 2 furnaces with overlapping cycles, the owner or operator shall operate the secondary emission control system for the furnace being tested at exhaust ventilation rates or levels for each duct of the secondary emission control system that are appropriate for single–furnace operating. Following the compliance test, the owner or operator shall operate the secondary emission control system at exhaust ventilation rates or levels for each duct of the system that are no lower than 90% of the exhaust ventilation values established during the most recent compliance test.

(c) For the purpose of determining compliance with visible and mass emission standards, a steel production cycle begins when the scrap or hot metal is charged to the vessel (whichever operation occurs first) and terminates 3 minutes after slag is emptied from the vessel into the slag pot. Consecutive steel production cycles are not required for the purpose of determining compliance. Where a hot metal transfer or skimming station is an affected facility, the steel production cycle also includes the hot metal transfer or skimming operation for the next steel production cycle for the affected vessel. Visible emission observations for both hot metal transfer and skimming operations begin with the start of the operation and terminate 3

(d) For the purpose of determining compliance with visible emission standards specified in sub. (3) (a) 1. and 3., the starting and stopping times of regulated process operations shall be determined and the starting and stopping times of visible emissions data sets shall be determined accordingly.

(e) To determine compliance with sub. (3) (a) 1., select the data sets yielding the highest and second highest 3–minute average opacities for each steel production cycle. Compliance is achieved if the highest 3–minute average for each cycle observed is less than 20% and the second highest 3–minute average is 10% or less.

(f) To determine compliance with sub. (3) (a) 2., determine the concentration of particulate matter in exhaust gases exiting the secondary emission collection device with Reference Method 5 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17. Compliance is achieved if the concentration of particulate matter does not exceed 23 mg/dscm (0.010 gr/dscf).

(g) To determine compliance with sub. (3) (a) 3., construct consecutive 3–minute averages for each steel production cycle. Compliance is achieved if no 3–minute average is more than 5%.

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93; am. (5) (c) 1., 2., Register, December, 1995, No. 480, eff. 1–1–96**; correction in (2) made under s. 13.93 (2m) (b) 1., Stats., Register, November, 1999, No. 527.**

NR 440.32 Sewage treatment plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility is each incinerator that combusts wastes containing more than 10% sewage sludge (dry basis) produced by municipal sewage treatment plants, or each incinerator that charges more than 1000 kg (2205 lb) per day municipal sewage sludge (dry basis).

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms have the meanings given in s. NR 440.02.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of any sewage sludge incinerator subject to the provisions of this section may discharge or cause the discharge into the atmosphere of:

1. Particulate matter at a rate in excess of 0.65 g/kg dry sludge input (1.30 lb/ton dry sludge input).

2. Any gases which exhibit 20% opacity or greater.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any sludge incinerator subject to the provisions of this section shall:

1. Install, calibrate, maintain, and operate a flow measuring device which can be used to determine either the mass or volume of sludge charged to the incinerator. The flow measuring device shall be certified by the manufacturer to have an accuracy of ± 5% over its operating range. Except as provided in par. (d), the flow measuring device shall be operated continuously and data recorded during all periods of operation of the incinerator.

2. Provide access to the sludge charged so that a well–mixed representative grab sample of the sludge can be obtained.

3. Install, calibrate, maintain and operate a weighing device for determining the mass of any municipal solid waste charged to the incinerator when sewage sludge and municipal solid waste are incinerated together. The weighing device shall have an accuracy of ± 5% over its operating range.

(b) The owner or operator of any multiple hearth, fluidized bed or electric sludge incinerator subject to the provisions of this section shall comply with the requirements of par. (a) and:

1. For incinerators equipped with a wet scrubbing device, install calibrate, maintain and operate a monitoring device that continuously measures and records the pressure drop of the gas flow through the wet scrubbing device. Where a combination of wet scrubbers is used in series, the pressure drop of the gas flow through the combined system shall be continuously monitored. The device used to monitor scrubber pressure drop shall be certified by the manufacturer to be accurate within ±250 pascal (±1 inch water gauge) and shall be calibrated on an annual basis in accordance with the manufacturer's instructions.

2. Install, calibrate, maintain and operate a monitoring device that continuously measures and records the oxygen content of the incinerator exhaust gas. The oxygen monitoring shall be located upstream of any rabble shaft cooling air inlet into the incinerator exhaust gas stream, fan, ambient air recirculation damper, or any other source of dilution air. The oxygen monitoring device shall be certified by the manufacturer to have a relative accuracy of ±5% over its operating range and shall be calibrated according to method or methods prescribed by the manufacturer at least once each 24–hour operating period.

3. Install, calibrate, maintain and operate temperature measuring devices at every hearth in multiple hearth furnaces; in the bed and outlet of fluidized bed incinerators; and in the drying, combustion and cooling zones of electric incinerators. For multiple hearth furnaces, a minimum of one thermocouple shall be installed in each hearth in the cooling and drying zones, and a minimum of 2 thermocouples shall be installed in each hearth in the combustion zone. For electric incinerators, a minimum of one thermocouple shall be installed in the drying zone and one in the cooling zone, and a minimum of 2 thermocouples shall be installed in the combustion zone. Each temperature measuring device shall be certified by the manufacturer to have an accuracy of ±5% over its operating range. Except as provided in par. (d), the temperature monitoring devices shall be operated continuously and data recorded during all periods of operation of the incinerator.

4. Install, calibrate, maintain and operate a device for measuring the fuel flow to the incinerator. The flow measuring device shall be certified by the manufacturer to have an accuracy of ±5% over its operating range. Except as provided in par. (d), the fuel flow measuring device shall be operated continuously and data recorded during all periods of operation of the incinerator.

5. Except as provided in par. (d), collect and analyze a grab sample of the sludge fed to the incinerator once per day. The dry sludge content and the volatile solids content of the sample shall be determined in accordance with the method specified under sub. (5) (b) 5., except that the determination of volatile solids, step 3.b. of the method, may not be deleted.

(c) The owner or operator of any multiple hearth, fluidized bed or electric sludge incinerator subject to the provisions of this section shall retain the following information and make it available for inspection by the department for a minimum of 2 years:

1. For incinerators equipped with a wet scrubbing device, a record of the measured pressure drop of the gas flow through the wet scrubbing device, as required by par. (b) 1.

2. A record of the measured oxygen content of the incinerator exhaust gas, as required by par. (b) 2.

3. A record of the rate of sludge charged to the incinerator, the measured temperatures of the incinerator, the fuel flow to the incinerator, and the total solids and volatile solids content of the sludge charged to the incinerator, as required by pars. (a) 1. and (b) 3., 4. and 5.

(d) The owner or operator of any multiple hearth, fluidized bed, or electric sludge incinerator subject to the provisions of this section from which the particulate matter emission rate measured during the performance test required under sub. (5) (d) is less than or equal to 0.38 g/kg of dry sludge input (0.75 lb/ton) shall be required to comply with the requirements in pars. (a) to (c) during all periods of operation of this incinerator following the performance test except that:

1. Continuous operation of the monitoring devices and data recorders in pars. (a) 1. and (b) 3. and 4. is not required.

2. Daily sampling and analysis of sludge feed in par. (b) 5. is not required.

3. Recordkeeping specified in par. (c) 3. is not required.

(e) The owner or operator of any sludge incinerator other than a multiple hearth, fluidized bed or electric incinerator or any sludge incinerator equipped with a control device other than a wet scrubber shall submit to the administrator for approval a plan for monitoring and recording incinerator and control device operation parameters. The plan shall be submitted to the administrator:

1. No later than 90 days after October 6, 1988, for sources which have provided notification of commencement of construction prior to October 6, 1988.

2. No later than 90 days after the notification of commencement of construction, for sources which provide notification of commencement of construction on or after October 6, 1988.

3. At least 90 days prior to the date on which the new control device becomes operative, for sources switching to a control device other than a wet scrubber.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60 and Appendix B of 40 CFR part 61, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter emission standards in sub. (3) as follows:

1. The emission rate (E) of particulate matter for each run shall be computed using the following equation:

$$E = K(c_s Q_{sd})/S$$

where:

E is the emission rate of particulate matter, g/kg (lb/ton) of dry sludge input

c_s is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

S is the charging rate of dry sludge during the run, kg/hr (lb/hr)

K is the conversion factor, 1.0 g/g [4.409 lb^2/g–ton)]

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf).

3. The dry sludge charging rate (S) for each run shall be computed using either of the following equations:

$$S = K_m S_m R_{dm}/\theta$$
$$S = K_v S_v R_{dv}/\theta$$

where:

S is the charging rate of dry sludge, kg/hr (lb/hr)

S_m is the total mass of sludge charged, kg (lb)

R_{dm} is the average mass of dry sludge per unit mass of sludge charged, mg/mg (lb/lb)

θ is the duration of run, min

K_m is the conversion factor, 60 min/hr

S_v is the total volume of sludge charged, m^3 (gal)

R_{dv} is the average mass of dry sludge per unit volume of sludge charged, mg/liter (lb/ft^3)

K_v is the conversion factor, 60×10^{-3} (liter–kg–min)/(m^3–mg–hr)[8.021 (ft^3–min)/(gal–hr)]

4. The flow measuring device described in sub. (4) (a) 1. shall be used to determine the total mass (S_m) or volume (S_v) of sludge charged to the incinerator during each run. If the flow measuring device is on a time rate basis, readings shall be taken and recorded at 5–minute intervals during the run and the total charge of sludge shall be computed using the following equations, as applicable:

$$S_m = \sum_{i=1}^{n} Q_{mi}/\theta_i$$
$$S_v = \sum_{i=1}^{n} Q_{vi}/\theta_i$$

where:

Q_{mi} is the average mass flow rate calculated by averaging the flow rates at the beginning and end of each interval "i", kg/min (lb/min)

Q_{vi} is the average volume flow rate calculated by averaging the flow rates at the beginning and end of each interval "i", m^3/min (gal/min)

θ_i is the duration of interval "i", min

5. Samples of the sludge charged to the incinerator shall be collected in nonporous jars at the beginning of each run and at approximately 1–hour intervals thereafter until the test ends, and Method 2540 G., "Total, Fixed, and Volatile Solids in Solid and Semisolid Samples", in Standard Methods for the Examination of Water and Wastewater, 17th edition, 1989, incorporated by reference in s. NR 440.17, shall be used to determine dry sludge content of each sample (total solids residue), except that:

a. Evaporating dishes shall be ignited to at least 103°C rather than the 550°C specified in step 3.a.1).

b. Determination of volatile solids, step 3.b., may be deleted.

c. The quantity of dry sludge per unit sludge charged shall be determined in terms of mg/liter (lb/ft^3) or mg/mg (lb/lb).

d. The average dry sludge content shall be the arithmetic average of all the samples taken during the run.

6. Method 9 and the procedures described in s. NR 440.11 shall be used to determine opacity.

(d) The owner or operator of any sludge incinerator subject to the provisions of this section shall conduct a performance test during which the monitoring and recording devices required under sub. (4) (a) 1. and (b) 1. to 4., are installed and operating and for which the sampling and analysis procedures required under sub. (4) (b) 5. are performed. The owner or operator shall provide the department at least 30 days prior notice of the performance test to afford the department the opportunity to have an observer present.

1. For incinerators that commenced construction or modification on or before April 18, 1986, the performance test shall be conducted by October 1, 1989 unless the monitoring and recording devices required under sub. (4) (a) 1. and (b) 1. to 4. were installed and operating and the sampling and analysis procedures required under sub. (4) (b) 5. were performed during the most recent performance test and a record of the measurements taken during the performance test is available.

2. For incinerators that commence construction or modification after April 18, 1986, the date of the performance test shall be determined by the requirements in s. NR 440.08.

(6) REPORTING. (a) The owner or operator of any multiple hearth, fluidized bed or electric sludge incinerator subject to the provisions of this section shall submit to the department semiannually a report in writing which contains the following:

1. A record of average scrubber pressure drop measurements for each period of 15 minute duration or more during which the pressure drop of the scrubber was less than, by a percentage specified in subd. 1. a. or b., as applicable, the average scrubber pressure drop measured during the most recent performance test. The percent reduction in scrubber pressure drop for which a report is required shall be determined as follows:

a. For incinerators that achieved an average particulate matter emission rate of 0.38 kg/Mg (0.75 lb/ton) dry sludge input or less during the most recent performance test, a scrubber pressure drop reduction of more than 30% from the average scrubber pressure drop recorded during the most recent performance test shall be reported.

b. For incinerators that achieved an average particulate matter emission rate of greater than 0.38 kg/Mg (0.75 lb/ton) dry sludge input during the most recent performance test, a percent reduction in pressure drop greater than that calculated according to the following equation shall be reported:

$$P = -111E + 72.15$$

where:

P is the percent reduction in pressure drop, and

E is the average particulate matter emissions (kg/megagram)

2. A record of average oxygen content in the incinerator exhaust gas for each period of 1–hour duration or more that the oxygen content of the incinerator exhaust gas exceeds the average oxygen content measured during the most recent performance test by more than 3%.

(b) The owner or operator of any multiple hearth, fluidized bed or electric sludge incinerator from which the average particulate matter emission rate measured during the performance test required under sub. (5) (d) exceeds 0.38 g/kg of dry sludge input (0.75 lb/ton of dry sludge input) shall include in the report for each calendar day that a decrease in scrubber pressure drop or increase in oxygen content of exhaust gas is reported a record of the following:

1. Scrubber pressure drop averaged over each 1–hour incinerator operating period.

2. Oxygen content in the incinerator exhaust averaged over each 1–hour incinerator operating period.

3. Temperatures of every hearth in multiple hearth incinerators; of the bed and outlet of fluidized bed incinerators; and of the drying, combustion and cooling zones of electric incinerators averaged over each 1–hour incinerator operating period.

4. Rate of sludge charged to the incinerator averaged over each 1–hour incinerator operating period.

5. Incinerator fuel use averaged over each 8–hour incinerator operating period.

6. Moisture and volatile solids content of the daily grab sample of sludge charged to the incinerator.

(c) The owner or operator of any sludge incinerator other than a multiple hearth, fluidized bed or electric incinerator or any sludge incinerator equipped with a control device other than a wet scrubber shall include in the semiannual report a record of control device operation measurements, as specified in the plan approved under sub. (4) (e).

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (a) 1., cr. (4) (b) to (e) and (6), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93; am. (5) (d) 2., r. (5) (d) 3. to 5., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.33 Primary copper smelters. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary copper smelters: dryer, roaster, smelting furnace, and copper converter.

(b) Any facility under par. (a) that commences construction or modifications after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Calcine" means the solid materials produced by a roaster.

(b) "Copper converter" means any vessel to which copper matte is charged and oxidized to copper.

(c) "Dryer" means any facility in which a copper sulfide ore concentrate charge is heated in the presence of air to eliminate a portion of the moisture from the charge, provided less than 5% of the sulfur contained in the charge is eliminated in the facility.

(d) "Fossil fuel" means natural gas, petroleum, coal and any form of solid, liquid or gaseous fuel derived from such materials for the purpose of creating useful heat.

(e) "High level of volatile impurities" means a total smelter charge containing more than 0.2 weight percent arsenic, 0.1 weight percent antimony, 4.5 weight percent lead or 5.5 weight percent zinc, on a dry basis.

(f) "Primary copper smelter" means any installation or any intermediate process engaged in the production of copper from copper sulfide ore concentrates through the use of pyrometallurgical techniques.

(g) "Reverberatory smelting furnace" means any vessel in which the smelting of copper sulfide ore concentrates or calcines is performed and in which the heat necessary for smelting is provided primarily by combustion of fossil fuel.

(h) "Roaster" means any facility in which a copper sulfide ore concentrate charge is heated in the presence of air to eliminate a significant portion (5% or more) of the sulfur contained in the charge.

(i) "Smelting" means processing techniques for the melting of a copper sulfide ore concentrate or calcine charge leading to the formation of separate layers of molten slag, molten copper, or copper matte, or all 3.

(j) "Smelting furnace" means any vessel in which the smelting of copper sulfide ore concentrate or calcines is performed and in which the heat necessary for smelting is provided by an electric current, rapid oxidation of a portion of the sulfur contained in the concentrate as it passes through an oxidizing atmosphere, or the combustion of a fossil fuel.

(k) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(L) "Total smelter charge" means the weight (dry basis) of all copper sulfide ore concentrates processed at a primary copper smelter, plus the weight of all other solid materials introduced into the roasters and smelting furnaces at a primary copper smelter, except calcine, over a one–month period.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dryer any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any roaster, smelting furnace or copper converter any gases which contain sulfur dioxide in excess of 0.065% by volume, except as provided in pars. (b) and (c).

(b) Reverberatory smelting furnaces are exempt from par. (a) during periods when the total smelter charge at the primary copper smelter contains a high level of volatile impurities.

(c) A change in the fuel combusted in a reverberatory smelting furnace may not be considered a modification under this chapter.

(5) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dryer any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary copper smelter subject to sub. (4) (b) shall keep a monthly record of the total smelter charge and the weight percent (dry basis) of arsenic, antimony, lead and zinc contained in this charge. The analytical methods and procedures employed to determine the weight of the total smelter charge and the weight percent of arsenic, antimony, lead and zinc shall be approved by the department and shall be accurate to within ± 10%.

(b) The owner or operator of any primary copper smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any dryer. The span of this system shall be set at 80 to 100% opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster, smelting furnace or copper converter subject to sub. (4) (a). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13 (3) shall be completed prior to the initial performance test required under s. NR 440.08.

b. For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13 (3), the reference method referred to under the Relative Accuracy Test Procedure in Performance Specification 2 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, shall be Method 6 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gas used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B and for calibration checks under s. NR 440.13 (4) shall be sulfur dioxide.

(c) Six–hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 4 consecutive 6–hour periods of each operating day. Each 6–hour average shall be determined as the arithmetic mean of the appropriate 6 contiguous one–hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (b).

(d) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as follows:

1. Opacity. Any 6–minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (b), exceeds the standard under sub. (5) (a).

2. Sulfur dioxide. All 6–hour periods during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under sub. (4), exceed the level of the standard. The department may not consider emissions in excess of the level of the standard for less than or equal to 1.5% of the 6–hour periods during the quarter as indicative of a potential violation of s. NR 440.11 (4), provided the affected facility, including air pollution control equipment, is maintained and operated in a manner consistent with good air pollution control practice for minimizing emissions during these periods. Emissions in excess of the level of the standard during periods of startup, shutdown and malfunction may not be included within the 1.5%.

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter, sulfur dioxide (SO_2) and visible emission standards in subs. (3) to (5) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

2. The continuous monitoring system of sub. (6) (b) 2. shall be used to determine the SO_2 concentrations on a dry basis. The sampling time for each run shall be 6 hours, and the average SO_2 concentration shall be computed for the 6–hour period as in sub. (6) (c). The monitoring system drift during the run may not exceed 2% of the span value.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.) and (6) (d) 2., Register, September, 1990, No. 417, eff. 10–1–90; am. (6) (b) 2. a. and b., r. and recr. (7), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.34 Primary zinc smelters. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary zinc smelters: roaster and sintering machine.

(b) Any facility under par. (a) that commences construction or modification after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Primary zinc smelter" means any installation engaged in the production, or any intermediate process in the production, of zinc or zinc oxide from zinc sulfide ore concentrates through the use of pyrometallurgical techniques.

(b) "Roaster" means any facility in which a zinc sulfide ore concentrate charge is heated in the presence of air to eliminate a significant portion (more than 10%) of the sulfur contained in the charge.

(c) "Sintering machine" means any furnace in which calcines are heated in the presence of air to agglomerate the calcines into a hard porous mass called "sinter."

(d) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any roaster any gases which contain sulfur dioxide in excess of 0.065% by volume.

(b) Any sintering machine which eliminates more than 10% of the sulfur initially contained in the zinc sulfide ore concentrates will be considered as a roaster under par. (a).

(5) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary zinc smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any sintering machine. The span of this system shall be set at 80 to 100% opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster subject to sub. (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13 (3) shall be completed prior to the initial performance test required under s. NR 440.08.

b. For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13 (3), the reference method referred to under the Relative Accuracy Test Procedure in Performance Specification 2 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, shall be Method 6 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gas used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B and for calibration checks under s. NR 440.13 (4) shall be sulfur dioxide.

(b) Two–hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 12 consecutive 2–hour periods of each operating day. Each 2–hour average shall be determined as the arithmetic mean of the appropriate 2 contiguous one–hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (a).

(c) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as follows:

1. Opacity. Any 6–minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (a) exceeds the standard under sub. (5).

2. Sulfur dioxide. Any 2–hour period, as described in par. (b), during which the average emission of sulfur dioxide, as measured by continuous monitoring system installed under par. (a) exceeds the standard under sub. (4).

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter, sulfur dioxide (SO_2) and visible emission standards in subs. (3) to (5) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

2. The continuous monitoring system of sub. (6) (a) 2. shall be used to determine the SO_2 concentrations on a dry basis. The sampling time for each run shall be 2 hours, and the average SO_2 concentration for the 2–hour period shall be computed as in sub. (6) (b). The monitoring system drift during the run may not exceed 2% of the span value.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (6) (a) 2. a. and b., r. and recr. (7), Register, July, 1993, No. 451, eff. 8–1–93; am. (6) (a) 2. b., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.35 Primary lead smelters. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary lead smelters: sintering machine, sintering machine discharge end, blast furnace, dross reverberatory furnace, electric smelting furnace and converter.

(b) Any facility under par. (a) that commences construction or modification after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Blast furnace" means any reduction furnace to which sinter is charged and which forms separate layers of molten slag and lead bullion.

(b) "Converter" means any vessel which lead concentrate or bullion is charged and refined.

(c) "Dross reverberatory furnace" means any furnace used for the removal or refining of impurities from lead bullion.

(d) "Electric smelting furnace" means any furnace in which the heat necessary for smelting of the lead sulfide ore concentrate charge is generated by passing an electric current through a portion of the molten mass in the furnace.

(e) "Primary lead smelter" means any installation or any intermediate process engaged in the production of lead from lead sulfide ore concentrates through the use of pyrometallurgical techniques.

(f) "Sinter bed" means the lead sulfide ore concentrate charge within a sintering machine.

(g) "Sintering machine" means any furnace in which a lead sulfide ore concentrate charge is heated in the presence of air to eliminate sulfur contained in the charge and to agglomerate the charge into a hard porous mass called "sinter."

(h) "Sintering machine discharge end" means any apparatus which receives sinter as it is discharged from the conveying grate of a sintering machine.

(i) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blast furnace, dross reverberatory furnace or sintering machine discharge end any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine, electric smelting furnace, or converter gases which contain sulfur dioxide in excess of 0.065% by volume.

(5) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary lead smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end. The span of this system shall be set at 80 to 100% opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any sintering machine, electric furnace or converter subject to sub. (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13 (3) shall be completed prior to the initial performance test required under s. NR 440.08.

b. For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13 (3), the reference method referred to under the Relative Accuracy Test Procedure in Performance Specification 2 of 40 CFR part 60,

Appendix B, incorporated by reference in s. NR 440.17, shall be Method 6 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gas used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B and for calibration checks under s. NR 440.13 (4) shall be sulfur dioxide.

(b) Two–hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 12 consecutive 2–hour periods of each operating day. Each 2–hour average shall be determined as the arithmetic mean of the appropriate 2 contiguous one–hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (a).

(c) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as follows:

1. Opacity. Any 6–minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (a), exceeds the standard under sub. (5) (a).

2. Sulfur dioxide. Any 2–hour period, as described in par. (b), during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under par. (a), exceeds the standard under sub. (4).

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter, sulfur dioxide (SO_2) and visible emission standards in subs. (3) to (5) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

2. The continuous monitoring system of sub. (6) (a) 2. shall be used to determine the SO_2 concentrations on a dry basis. The sampling time for each run shall be 2 hours, and the average SO_2 concentration for the 2–hour period shall be computed as in sub. (6) (b). The monitoring system drift during the run may not exceed 2% of the span value.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (6) (a) 2. a. and b., r. and recr. (7), Register, July, 1993, No. 451, eff. 8–1–93; am. (6) (a) 2. b., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.36 Primary aluminum reduction plants.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facilities in primary aluminum reduction plants to which this section applies are potroom groups and anode bake plants.

(b) Any facility under par. (a) that commences construction or modification after October 23, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Aluminum equivalent" means an amount of aluminum which can be produced from a Mg of anodes produced by an anode bake plant as determined by sub. (6) (b) 4. b.

(b) "Anode bake plant" means a facility which produces carbon anodes for use in a primary aluminum reduction plant.

(c) "Potroom" means a building unit which houses a group of electrolytic cells in which aluminum is produced.

(d) "Potroom group" means an uncontrolled potroom, a potroom which is controlled individually, or a group of potrooms or potroom segments ducted to a common control system.

(e) "Primary aluminum reduction plant" means any facility manufacturing aluminum by electrolytic reduction.

(f) "Primary control system" means an air pollution control system designed to remove gaseous and particulate fluorides from exhaust gases which are captured at the cell.

(g) "Roof monitor" means that portion of the roof of a potroom where gases not captured at the cell exit from the potroom.

(h) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (6) or by equivalent or alternative methods.

(3) STANDARDS FOR FLUORIDES. (a) On and after the date on which the initial performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases containing total fluorides, as measured according to s. NR 440.08, in excess of:

1. 1.0 kg/Mg (2.0 lb/ton) of aluminum produced for potroom groups at Soderberg plants, except that emissions between 1.0 kg/Mg and 1.3 kg/Mg (2.6 lb/ton) shall be considered in compliance if the owner or operator demonstrates that exemplary operation and maintenance procedures were used with respect to the emission control system and that proper control equipment was operating at the affected facility during the performance tests;

2. 0.95 kg/Mg (1.9 lb/ton) of aluminum produced for potroom groups at prebake plants, except that emissions between 0.95 kg/Mg and 1.25 kg/Mg (2.5 lb/ton) shall be considered in compliance if the owner or operator demonstrates that exemplary operation and maintenance procedures were used with respect to the emission control system and that proper control equipment was operating at the affected facility during the performance test; and

3. 0.050 kg/Mg (0.10 lb/ton) of aluminum equivalent for anode bake plants.

(b) Within 30 days of any performance test which reveals emissions which fall between the 1.0 kg/Mg and 1.3 kg/Mg levels in par. (a) 1. or between to 0.95 kg/Mg and 1.25 kg/Mg levels in par. (a) 2., the owner or operator shall submit a report to the department indicating whether all necessary control devices were on–line and operating properly during the performance test, describing the operating and maintenance procedures followed, and setting forth any explanation for the excess emissions.

(4) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any potroom group any gases which exhibit 10% opacity or greater, or

2. From any anode bake plant any gases which exhibit 20% opacity or greater.

(5) MONITORING OF OPERATIONS. (a) The owner or operator of any affected facility subject to the provisions of this section shall install, calibrate, maintain and operate monitoring devices which can be used to determine daily the weight of aluminum and anode produced. The weighing devices shall have an accuracy of ± 5% over their operating range.

(b) The owner or operator of any affected facility shall maintain a record of daily production rates of aluminum and anodes, raw material feed rates, and cell or potline voltages.

(c) Following the initial performance test as required under s. NR 440.08 (1), an owner or operator shall conduct a performance test at least once each month during the life of the affected facility, except when malfunctions prevent representative sampling, as provided under s. NR 440.08 (3). The owner or operator shall give the department at least 15 days advance notice of each test. The department may require additional testing under ch. NR 439.

Note: Under 40 CFR 60.195 (b), an owner or operator may petition the administrator to establish an alternate testing requirement that requires testing less frequently than once each month for a primary control system or an anode bake plant if it can be shown that their emissions have low variability during day–to–day operations. The alternative testing requirement must be published in the federal register and include a testing schedule and, in the case of a primary control system, the method to be used to determine primary control system emissions for the purpose of performance tests.

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides and visible emission standards in subs. (3) and (4) as follows:

1. The emission rate (E_p) of total fluorides from potroom groups shall be computed for each run using the following equation:

$$E_p = [(C_s\,Q_{sd})_1 + (C_s\,Q_{sd})_2]/(PK)$$

where:

E_p is the emission rate of total fluorides from a potroom group, kg/Mg (lb/ton)

C_s is the concentration of total fluorides, mg/dscm (mg/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the aluminum production rate, Mg/hr (ton/hr)

K is the conversion factor, 10^6 mg/kg (453,600 mg/lb)

1 is the subscript for primary control system effluent gas

2 is the subscript for secondary control system or roof monitor effluent gas

2. The emission rate (E_b) of total fluorides from anode bake plants shall be computed for each run using the following equation:

$$E_b = (C_s\,Q_{sd})/(P_eK)$$

where:

E_b is the emission rate of total fluorides, kg/Mg (lb/ton) of aluminum equivalent

C_s is the concentration of total fluorides, mg/dscm (mg/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P_e is the aluminum equivalent for anode production rate, Mg/hr (ton/hr)

K is the conversion factor, 10^6 mg/kg (453,600 mg/lb)

3. Method 13A or 13B shall be used for ducts or stacks and Method 14 for roof monitors not employing stacks or pollutant collection systems, to determine the total fluorides concentration (C_s) and volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 8 hours and 6.80 dscm (240 dscf) for potroom groups and at least 4 hours and 3.40 dscm (120 dscf) for anode bake plants.

4. The monitoring devices of sub. (5) (a) shall be used to determine the daily weight of aluminum and anode produced.

a. The aluminum production rate (P) shall be determined by dividing 720 hours into the weight of aluminum tapped from the affected facility during a period of 30 days before and including the final run of a performance test.

b. The aluminum equivalent production rate (P_e) for anodes shall be determined as 2 times the average weight of anode produced during a representative oven cycle divided by the cycle time. An owner or operator may establish a multiplication factor other than 2 by submitting production records of the amount of aluminum produced and the concurrent weight of anodes consumed by the potrooms.

5. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (6) (a), Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (3) (a) 3., (6) (a), r. (6) (b), Register, September, 1990, No. 417, eff. 10–1–90; renum. (6) (a)to be (5) (c), cr. (6) (a) and (b), r. (6) (c) to (i), Register, July, 1993, No. 451, eff. 8–1–93**; correction in (2) (a) made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.37 Phosphate fertilizer industry: wet–process phosphoric acid plants.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each wet–process phosphoric acid plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: reactors, filters, evaporators and hotwells.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorus pentoxide, fed to the process.

(b) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(c) "Wet–process phosphoric acid plant" means any facility manufacturing phosphoric acid by reacting phosphate rock and acid.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases to which contain total fluorides in excess of 10.0 g/metric ton of equivalent P_2O_5 feed (0.020 lb/ton).

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any wet–process phosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which can be used to determine the mass flow of phosphorous–bearing feed material to the process. The monitoring device shall have an accuracy of ±5% over its operating range.

(b) The owner or operator of any wet–process phosphoric acid plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus bearing feed using a monitoring device for measuring mass flow rate which meets the requirements of par. (a) and then by proceeding according to sub. (5) (b) 3.

(c) The owner or operator of any wet–process phosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of ± 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. The emission rate (E) of total fluorides shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

where:

E is the emission rate of total fluorides, g/metric ton (lb/ton) of equivalent P_2O_5 feed

C_{si} is the concentration of total fluorides from emission point "i", mg/dscm (mg/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (dscf/hr)

N is the number of emission points associated with the affected facility

P is the equivalent P_2O_5 feed rate, metric ton/hr (ton/hr)

K is the conversion factor, 1000 mg/g (453,600 mg/lb)

2. Method 13A or 13B shall be used to determine the total fluorides concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas from each of the emission points. The sampling shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The equivalent P_2O_5 feed rate (P) shall be computed for each run using the following equation:

$$P = M_p R_p$$

where:

M_p is the total mass flow rate of phosphorus–bearing feed, metric ton/hr (ton/hr)

R_p is the P_2O_5 content, decimal fraction

a. The accountability system of sub. (4) (a) shall be used to determine the mass flow rate (M_p) of the phosphorus–bearing feed.

b. The Association of Official Analytical Chemists (AOAC) Method 9, incorporated by reference in s. NR 440.17, shall be used to determine the P_2O_5 content (R_p) of the feed.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.38 Phosphate fertilizer industry: superphosphoric acid plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each superphosphoric acid plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: evaporators, hotwells, acid sumps and cooling tanks.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorus pentoxide, fed to the process.

(b) "Superphosphoric acid plant" means any facility which concentrates wet–process phosphoric acid to 66% or greater P_2O_5 content by weight for eventual consumption as a fertilizer.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 5.0 g/metric ton of equivalent P_2O_5 feed (0.010 lb/ton).

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any superphosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus–bearing feed material to the process. The flow monitoring device shall have an accuracy of ± 5% over its operating range.

(b) The owner or operator of any superphosphoric acid plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus–bearing feed using a flow monitoring device meeting the requirements of par. (a) and then proceeding according to sub. (5) (b) 3.

(c) The owner or operator of any superphosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of ±5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. The emission rate (E) of total fluorides shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

where:

E is the emission rate of total fluorides, g/metric ton (lb/ton) of equivalent P_2O_5 feed

C_{si} is the concentration of total fluorides from emission point "i", mg/dscm (mg/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (dscf/hr)

N is the number of emission points associated with the affected facility

P is the equivalent P_2O_5 feed rate, metric ton/hr (ton/hr)

K is the conversion factor, 1000 mg/g (453,600 mg/lb)

2. Method 13A or 13B shall be used to determine the total fluorides concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas from each of the emission points. The sampling shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The equivalent P_2O_5 feed rate (P) shall be computed for each run using the following equation:

$$P = M_pR_p$$

where:

M_p is the total mass flow rate of phosphorus–bearing feed, metric ton/hr (ton/hr)

R_p is the P_2O_5 content, decimal fraction

a. The accountability system of sub. (4) (a) shall be used to determine the mass flow rate (M_p) of the phosphorus–bearing feed.

b. The Association of Official Analytical Chemists (AOAC) Method 9, incorporated by reference in s. NR 440.17, shall be used to determine the P_2O_5 content (R_p) of the feed.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.39 Phosphate fertilizer industry: diammonium phosphate plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each granular diammonium phosphate plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: reactors, granulators, dryers, coolers, screens and mills.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorus pentoxide, fed to the process.

(b) "Granular diammonium phosphate plant" means any plant manufacturing granular diammonium phosphate by reacting phosphoric acid with ammonia.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 30 g/metric ton of equivalent P_2O_5 feed (0.060 lb/ton).

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any granular diammonium phosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus–bearing feed material to the process. The flow monitoring device shall have an accuracy of ± 5% over its operating range.

(b) The owner or operator of any granular diammonium phosphate plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus–bearing feed using a flow monitoring device meeting the requirements of par. (a) and then by proceeding according to sub. (5) (b) 3.

(c) The owner or operator of any granular diammonium phosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the scrubbing system. The monitoring device shall have an accuracy of ± 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. The emission rate (E) of total fluorides shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si}Q_{sdi}\right)/(PK)$$

where:

E is the emission rate of total fluorides, g/metric ton (lb/ton) of equivalent P_2O_5 feed

C_{si} is the concentration of total fluorides from emission point "i", mg/dscm (mg/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (dscf/hr)

N is the number of emission points associated with the affected facility

P is the equivalent P_2O_5 feed rate, metric ton/hr (ton/hr)

K is the conversion factor, 1000 mg/g (453,600 mg/lb)

2. Method 13A or 13B shall be used to determine the total fluorides concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas from each of the emission points. The sampling shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The equivalent P_2O_5 feed rate (P) shall be computed for each run using the following equation:

$$P = M_pR_p$$

where:

M_p is the total mass flow rate of phosphorus–bearing feed, metric ton/hr (ton/hr)

R_p is the P_2O_5 content, decimal fraction

a. The accountability system of sub. (4) (a) shall be used to determine the mass flow rate (M_p) of the phosphorus–bearing feed.

b. The Association of Official Analytical Chemists (AOAC) Method 9, incorporated by reference in s. NR 440.17, shall be used to determine the P_2O_5 content (R_p) of the feed.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.40 Phosphate fertilizer industry: triple superphosphate plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each triple superphosphate plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: mixers, curing belts or dens, reactors, granulators, dryers, cookers, screens, mills and facilities which store run–of–pile triple superphosphate.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) Definitions. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorus pentoxide, fed to the process.

(b) "Run–of–pile triple superphosphate" means any triple superphosphate that has not been processed in a granulator and is composed of particles at least 25% by weight of which when not caked will pass through a 16 mesh screen.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(d) "Triple superphosphate plant" means any facility manufacturing triple superphosphate by reacting phosphate rock with phosphoric acid. A run–of–pile triple superphosphate plant includes curing and storing.

(3) Standard for fluorides. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 100 g/metric ton of equivalent P_2O_5 feed (0.20 lb/ton).

(4) Monitoring of operations. (a) The owner or operator of any triple superphosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus–bearing feed material to the process. The flow monitoring device shall have an accuracy of ± 5% over its operating range.

(b) The owner or operator of any triple superphosphate plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus–bearing feed using a flow monitoring device meeting the requirements of par. (a) and then by proceeding according to sub. (5) (b) 3.

(c) The owner or operator of any triple superphosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of ± 5% over its operating range.

(5) Test methods and procedures. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. The emission rate (E) of total fluorides shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

where:

E is the emission rate of total fluorides, g/metric ton (lb/ton) of equivalent P_2O_5 feed

C_{si} is the concentration of total fluorides from emission point "i", mg/dscm (mg/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (dscf/hr)

N is the number of emission points associated with the affected facility

P is the equivalent P_2O_5 feed rate, metric ton/hr (ton/hr)

K is the conversion factor, 1000 mg/g (453,600 mg/lb)

2. Method 13A or 13B shall be used to determine the total fluorides concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas from each of the emission points. The sampling shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The equivalent P_2O_5 feed rate (P) shall be computed for each run using the following equation:

$$P = M_p R_p$$

where:

M_p is the total mass flow rate of phosphorus–bearing feed, metric ton/hr (ton/hr)

R_p is the P_2O_5 content, decimal fraction

a. The accountability system of sub. (4) (a) shall be used to determine the mass flow rate (M_p) of the phosphorus–bearing feed.

b. The Association of Official Analytical Chemists (AOAC) Method 9, incorporated by reference in s. NR 440.17, shall be used to determine the P_2O_5 content (R_p) of the feed.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am (2) (intro.) and (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.41 Phosphate fertilizer industry: granular triple superphosphate storage facilities. (1) Applicability and designation of affected facility. (a) The affected facility to which the provisions of this section apply is each granular triple superphosphate storage facility. For the purpose of this section, the affected facility includes any combination of: storage or curing piles, conveyors, elevators, screens and mills.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) Definitions. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Equivalent P_2O_5 stored" means the quantity of phosphorus, expressed as phosphorus pentoxide, being cured or stored in the affected facility.

(b) "Fresh granular triple superphosphate" means granular triple superphosphate produced no more than 10 days prior to the date of the performance test.

(c) "Granular triple superphosphate storage facility" means any facility curing or storing granular triple superphosphate.

(d) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) Standard for fluorides. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 0.25 g/hr/metric ton of equivalent P_2O_5 stored (5.0×10^{-4} lb/hr/ton of equivalent P_2O_5 stored.

(4) Monitoring of operations. (a) The owner or operator of any granular triple superphosphate storage facility subject to the provisions of this section shall maintain an accurate account of triple superphosphate in storage to permit the determination of the amount of equivalent P_2O_5 stored.

(b) The owner or operator of any granular triple superphosphate storage facility shall maintain a daily record of total equivalent P_2O_5 store by multiplying the percentage P_2O_5 content, as determined by sub. (5) (c) 3., times the total mass of granular triple superphosphate stored.

(c) The owner or operator of any granular triple superphosphate storage facility subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of ±5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) The owner or operator shall conduct performance tests required in s. NR 440.08 only when the following quantities of products are being cured or stored in the facility.

1. Total granular triple superphosphate is at least 10% of the building capacity and

2. Fresh granular triple superphosphate is at least 20% of the total amount of triple superphosphate, or

3. If the provision in subd. 2. exceeds production capabilities for fresh granular triple superphosphate, fresh granular triple superphosphate is equal to at least 5 days maximum production.

(b) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(c) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. The emission rate (E) of total fluorides shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

where:

E is the emission rate of total fluorides, g/metric ton (lb/ton) of equivalent P_2O_5 stored

C_{si} is the concentration of total fluorides from emission point "i", mg/dscm (mg/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (dscf/hr)

N is the number of emission points associated with the affected facility

P is the equivalent P_2O_5 stored, metric ton/hr (ton/hr)

K is the conversion factor, 1000 mg/g (453,600 mg/lb)

2. Method 13A or 13B shall be used to determine the total fluorides concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas from each of the emission points. The sampling shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The equivalent P_2O_5 feed rate (P) shall be computed for each run using the following equation:

$$P = M_p R_p$$

where:

M_p is the amount of product in storage, metric ton (ton)

R_p is the P_2O_5 content of product in storage, weight fraction

a. The accountability system of sub. (4) (a) shall be used to determine the amount of product (M_p) in storage.

b. The Association of Official Analytical Chemists (AOAC) Method 9, incorporated by reference in s. NR 440.17, shall be used to determine the P_2O_5 content (R_p) of the product in storage.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.42 Coal preparation plants.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to any of the following affected facilities in coal preparation plants which process more than 200 tons per day: thermal dryers, pneumatic coal–cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems and coal transfer and loading systems.

(b) Any facility under par. (a) that commences construction or modification after October 24, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Bituminous coal" means solid fossil fuel classified as bituminous coal by ASTM Designation D388–77 incorporated by reference in s. NR 440.17.

(b) "Coal" means all solid fossil fuels classified as anthracite, bituminous, subbituminous or lignite by ASTM Designation D388–77, incorporated by reference in s. NR 440.17.

(c) "Coal preparation plant" means any facility, excluding underground mining operations, which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning and thermal drying.

(d) "Coal processing and conveying equipment" means any machinery used to reduce the size of coal or to separate coal from refuse, and the equipment used to convey coal to or remove coal and refuse from the machinery. This includes, but is not limited to, breakers, crushers, screens and conveyor belts.

(e) "Coal storage system" means any facility used to store coal except for open storage piles.

(f) "Cyclonic flow" means a spiraling movement of exhaust gases within a duct or stack.

(g) "Pneumatic coal–cleaning equipment" means any facility which classifies bituminous coal by size or separates bituminous coal from refuse by application of one or more air streams.

(h) "Thermal dryer" means any facility in which the moisture content of bituminous coal is reduced by contact with a heated gas stream which is exhausted to the atmosphere.

(i) "Transfer and loading system" means any facility used to transfer and load coal for shipment.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any thermal dryer gases which:

1. Contain particulate matter in excess of 0.070 g/dscm (0.031 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any pneumatic coal cleaning equipment gases which:

1. Contain particulate matter in excess of 0.040 g/dscm (0.018 gr/dscf).

2. Exhibit 10% opacity of greater.

(c) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal gases which exhibit 20% opacity or greater.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any thermal dryer shall install, calibrate, maintain and continuously operate monitoring devices as follows:

1. A monitoring device for the measurement of the temperature of the gas stream at the exit of the thermal dryer on a continuous basis. The monitoring device shall be certified by the manufacturer to be accurate within ± 3°F.

2. For affected facilities that use venturi scrubber emission control equipment:

a. A monitoring device for the continuous measurement of the pressure loss through the venturi constriction of the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus one inch water gauge.

b. A monitoring device for the continuous measurement of the water supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within ± 5% of design water supply pressure. The pressure sensor or tap shall be located close to the water discharge point. The department may approve alternative locations.

(b) All monitoring devices under par. (a) shall be recalibrated annually in accordance with procedures under s. NR 440.13 (2).

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the total fluorides standard in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf). Sampling shall begin no less than 30 minutes after startup and shall terminate before shutdown procedures begin.

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b), r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.43 Ferroalloy production facilities.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities: electric submerged arc furnaces which produce silicon metal, ferrosilicon, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high–carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon or calcium carbide; and dust–handling equipment.

(b) Any facility under par. (a) that commences construction or modification after October 21, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Blowing tap" means any tap in which an evolution of gas forces or projects jets of flame or metal sparks beyond the ladle, runner or collection hood.

(b) "Calcium carbide" means material containing 70 to 85% calcium carbide by weight.

(c) "Calcium silicon" means that alloy as defined by ASTM Designation A495–76, incorporated by reference in s. NR 440.17.

(d) "Capture system" means the equipment (including hoods, ducts, fans, dampers, etc.) used to capture or transport particulate matter generated by an affected electric submerged arc furnace to the control device.

(e) "Charge chrome" means that alloy containing 52 to 70% by weight chromium, 5 to 8% by weight carbon, and 3 to 6% by weight silicon.

(f) "Control device" means the air pollution control equipment used to remove particulate matter generated by an electric submerged arc furnace from an effluent gas stream.

(g) "Dust–handling equipment" means any equipment used to handle particulate matter collected by the air pollution control device (and located at or near such device) serving any electric submerged arc furnace subject to this section.

(h) "Electric submerged arc furnace" means any furnace wherein electrical energy is converted to heat energy by transmission of current between electrodes partially submerged in the furnace charge.

(i) "Ferrochrome silicon" means that alloy as defined by ASTM Designation A482–76, incorporated by reference in s. NR 440.17.

(j) "Ferromanganese silicon" means that alloy containing 63 to 66% by weight manganese, 28 to 32% by weight silicon, and a maximum of 0.08% by weight carbon.

(k) "Ferrosilicon" means that alloy as defined by ASTM Designation A100–69 (reapproved 1974), incorporated by reference in s. NR 440.17, grades A, B, C, D and E which contains 50 or more percent by weight silicon.

(L) "Furnace charge" means any material introduced into the electric submerged arc furnace, and may consist of, but is not limited to, ores, slag, carbonaceous material and limestone.

(m) "Furnace cycle" means the time period from completion of a furnace product tap to the completion of the next consecutive product tap.

(n) "Furnace power input" means the resistive electrical power consumption of an electric submerged arc furnace as measured in kilowatts.

(o) "High–carbon ferrochrome" means that alloy as defined by ASTM Designation A101–73, incorporated by reference in s. NR 440.17, grades HC1 through HC6.

(p) "Product change" means any change in the composition of the furnace charge that would cause the electric submerged arc furnace to become subject to a different mass standard applicable under this section.

(q) "Silicomanganese" means that alloy as defined by ASTM Designation A483–64 (reapproved 1974), incorporated by reference in s. NR 440.17.

(r) "Silicomanganese zirconium" means that alloy containing 60 to 65% by weight silicon, 1.5 to 2.5% by weight calcium, 5 to 7% by weight zirconium, 0.75 to 1.25% by weight aluminum, 5 to 7% by weight manganese, and 2 to 3% by weight barium.

(s) "Silicon metal" means any silicon alloy containing more than 96% silicon by weight.

(t) "Silvery iron" means any ferrosilicon, as defined by ASTM Designation A100–69 (reapproved 1974) incorporated by reference in s. NR 440.17, which contains less than 30% silicon.

(u) "Slag" means the more or less completely fused and vitrified matter separated during the reduction of a metal from its ore.

(v) "Standard ferromanganese" means that alloy as defined by ASTM Designation A99–76, incorporated by reference in s. NR 440.17.

(w) "Tapping" means the removal of slag or product from the electric submerged arc furnace under normal operating conditions such as removal of metal under normal pressure and movement by gravity down the spout into the ladle.

(x) "Tapping period" means the time duration from initiation of the process of opening the tap hole until plugging of the tap hole is complete.

(y) "Tapping station" means that general area where molten product or slag is removed from the electric submerged arc furnace.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which:

1. Exit from a control device and contain particulate matter in excess of 0.45 kg/MW–hr (0.99 lb/MW–hr) while silicon metal, ferrosilicon, calcium silicon or silicomanganese zirconium is being produced.

2. Exit from a control device and contain particulate matter in excess of 0.23 kg/MW–hr (0.51 lb/MW–hr) while high–carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, calcium carbide, ferrochrome silicon, ferromanganese silicon or silvery iron is being produced.

3. Exit from a control device and exhibit 15% opacity or greater.

4. Exit from an electric submerged arc furnace and escape the capture system and are visible without the aid of instruments. The requirements of this subdivision apply only during periods when flow rates are being established under sub. (6) (d).

5. Escape the capture system at the tapping station and are visible without the aid of instruments for more than 40% of each tapping period. There are no limitations on visible emissions under this subdivision when a blowing tap occurs. The requirements of this subdivision apply only during periods when flow rates are being established under sub. (6) (d).

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dust–handling equipment any gases which exhibit 10% opacity or greater.

(4) STANDARD FOR CARBON MONOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which contain, on a dry basis, 20 or greater volume % of carbon monoxide. Combustion of such gases under conditions acceptable to the department constitutes compliance with this subsection. Acceptable conditions include, but are not limited to, flaring of gases or use of gases as fuel for other processes.

(5) EMISSION MONITORING. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from control devices.

(b) For the purpose of reports required under s. NR 440.07 (3), the owner or operator shall report as excess emissions all 6–minute periods in which the average opacity is 15% or greater.

(c) The owner or operator subject to the provisions of this section shall submit a written report of any product change to the department. Reports of product changes shall be postmarked not later than 30 days after implementation of the product change.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any electric submerged arc furnace subject to the provisions of this section shall maintain daily records of the following information:

1. Product being produced.

2. Description of constituents of furnace charge, including the quantity, by weight.

3. Time and duration of each tapping period and the identification of material tapped (slag or product).

4. All furnace power input data obtained under par. (b).

5. All flow rate data obtained under par. (c) or all fan motor power consumption and pressure drop data obtained under par. (e).

(b) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a device to measure and continuously record the furnace power input. The furnace power input may be measured at the output or input side of the transformer. The device must have an accuracy of ± 5% over its operating range.

(c) The owner or operator subject to the provisions of this section shall install, calibrate and maintain a monitoring device that continuously measures and records the volumetric flow rate through each separately ducted hood of the capture system, except as provided under par. (e). The owner or operator of an electric submerged arc furnace that is equipped with a water cooled cover which is designed to contain and prevent escape of the generated gas and particulate matter shall monitor only the volumetric flow rate through the capture system for control of emissions from the tapping station. The owner or operator may install monitoring devices in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device shall have an accuracy of ± 10% over its normal operating range and shall be calibrated according to the manufacturer's instructions. The department may require the owner or operator to demonstrate the accuracy of the monitoring device relative to Methods 1 and 2 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(d) When performance tests are conducted under the provisions of s. NR 440.08 to demonstrate compliance with the standards under sub. (3) (a) 4. and 5., the volumetric flow rate through each separately ducted hood of the capture system shall be determined using the monitoring device required under par. (c). The volumetric flow rates shall be determined for furnace power input levels at 50 and 100% of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the volumetric flow rate at or above the appropriate levels for that furnace power input level determined during the most recent performance test. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the exhaust flow rates through the capture system over the tapping station at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under s. NR 440.08.

(e) The owner or operator may as an alternative to par. (c) determine the volumetric flow rate through each fan of the capture system from the fan power consumption, pressure drop across the fan and the fan performance curve. Only data specific to the operation of the affected electric submerged arc furnace shall be acceptable for demonstration of compliance with the requirements of this paragraph. The owner or operator shall maintain on file a permanent record of the fan performance curve (prepared for a specific temperature) and shall:

1. Install, calibrate, maintain and operate a device to continuously measure and record the power consumption of the fan motor (measured in kilowatts), and

2. Install, calibrate, maintain and operate a device to continuously measure and record the pressure drop across the fan. The fan power consumption and pressure drop measurements shall be synchronized to allow real time comparisons of the data. The monitoring devices shall have an accuracy of ±5% over their normal operating ranges.

(f) The volumetric flow rate through each fan of the capture system shall be determined from the fan power consumption, fan pressure drop, and fan performance curve specified under par. (e), during any performance test required under s. NR 440.08 to demonstrate compliance with the standards under sub. (3) (a) 4. and 5. The owner or operator shall determine the volumetric flow rate at a representative temperature for furnace power input levels of 50 and 100% of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test for that furnace power input level. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under s. NR 440.08. The department may require the owner or operator to verify the fan performance curve by monitoring necessary fan operating parameters and determining the gas volume moved relative to Methods 1 and 2 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(g) All monitoring devices required under pars. (c) and (e) shall be checked for calibration annually in accordance with the procedures under s. NR 440.13 (2).

(7) TEST METHODS AND PROCEDURES. (a) During any performance test required in s. NR 440.08, the owner or operator may not allow gaseous diluents to be added to the effluent gas stream after the fabric in an open pressurized fabric filter collector unless the total gas volume flow from the collector is accurately determined and considered in the determination of emissions.

(b) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(c) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{N} C_{si} Q_{sdi} \right) / (PK)$$

where:

E is the emission rate of particulate matter, kg/MW−hr (lb/MW−hr)

N is the total number of exhaust streams at which emissions is quantified

C_{si} is the concentration of particulate matter from exhaust stream "i", g/dscm (g/dscf)

Q_{sdi} is the volumetric flow rate of effluent gas from exhaust stream "i", dscm/hr (dscf/hr)

P is the average furnace power input, MW

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5 shall be used to determine the particulate matter concentration (C_{si}) and volumetric flow rate (Q_{sdi}) of the effluent gas, except that the heating systems specified in sections 2.1.2 and 2.1.6 of Method 5 are not to be used when the carbon monoxide content of the gas stream exceeds 10% by volume, dry basis. If a flare is used to comply with sub. (4), the sampling site shall be upstream of the flare. The sampling time shall include an integral number of furnace cycles.

a. When sampling emissions from open electric submerged arc furnaces with wet scrubber control devices, sealed electric submerged arc furnaces or semienclosed electric arc furnaces, the sampling time and sample volume for each run shall be at least 60 minutes and 1.80 dscm (63.6 dscf).

b. When sampling emissions from other types of installations, the sampling time and sample volume for each run shall be at least 200 minutes and 5.70 dscm (200 dscf).

3. The measurement device of sub. (6) (b) shall be used to determine the average furnace power input (P) during each run.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

5. The emission rate correction factor, integrated sampling procedures of Method 3B shall be used to determine the CO concentration. The sample shall be taken simultaneously with each particulate matter sample.

(d) During the particulate matter run, the maximum open hood area, in hoods with segmented or otherwise moveable sides, under which the process is expected to be operated and remain in compliance with all standards shall be recorded. Any future operation of the hooding system with open areas in excess of the maximum is not permitted.

(e) To comply with sub. (6) (d) or (f), the owner or operator shall use the monitoring devices in sub. (6) (c) or (e) to make the required measurements as determined during the performance test.

History: Cr. Register, January, 1984, No. 337, eff. 2−1−84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10−1−90; r. and recr. (7), Register, July, 1993, No. 451, eff. 8−1−93.

NR 440.44 Steel plants: electric arc furnaces constructed after October 21, 1974, and on or before August 17, 1983. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces and dust−handling systems.

(b) The provisions of this section apply to each affected facility identified under par. (a) that commenced construction, modification, or reconstruction after October 21, 1974 and on or before August 17, 1983.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Capture system" means the equipment (including ducts, hoods, fans, dampers, etc.) used to capture or transport particulate matter generated by an EAF to the air pollution control device.

(b) "Charge" means the addition of iron and steel scrap or other materials into the top of an electric arc furnace.

(c) "Charging period" means the time period commencing at the moment an EAF starts to open and ending either 3 minutes after the EAF roof is returned to its closed position or 6 minutes after commencement of opening of the roof, whichever is longer.

(d) "Control device" means the air pollution control equipment used to remove particulate matter generated by one or more EAFs from the effluent gas stream.

(e) "Direct shell evacuation system" means any system that maintains a negative pressure within the EAF above the slag or metal and ducts these emissions to the control device.

(f) "Dust–handling equipment" means any equipment used to handle particulate matter collected by the control device and located at or near the control device for an EAF subject to this section.

(g) "Electric arc furnace" or "EAF" means any furnace that produces molten steel and heats the charge materials with electric arcs from carbon electrodes. Furnaces that continuously feed direct–reduced iron ore pellets as the primary source of iron are not affected facilities within the scope of this definition.

(h) "Heat time" means the period commencing when scrap is charged to an empty EAF and terminating when the EAF tap is completed.

(i) "Meltdown and refining" means that phase of the steel production cycle when charge material is melted and undesirable elements are removed from the metal.

(j) "Meltdown and refining period" means the time period commencing at the termination of the initial charging period and ending at the initiation of the tapping period, excluding any intermediate charging periods.

(k) "Shop" means the building which houses one or more EAFs.

(L) "Shop opacity" means the arithmetic average of 24 or more opacity observations of emissions from the shop taken in accordance with Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, for the applicable time periods.

(m) "Tap" means the pouring of molten steel from an EAF.

(n) "Tapping period" means the time period commencing at the moment an EAF begins to tilt to pour and ending either 3 minutes after an EAF returns to an upright position or 6 minutes after commencing to tilt, whichever is longer.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an electric arc furnace any gases which:

1. Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf).

2. Exit from a control device and exhibit 3% opacity or greater.

3. Exit from a shop and, due solely to operations of any EAFs, exhibit 6% opacity or greater except:

a. Shop opacity less than 20% may occur during charging periods.

b. Shop opacity less than 40% may occur during tapping periods.

c. Opacity standards of this subdivision apply only during periods when pressures and either control system fan motor amperes and damper positions or flow rate are being established under sub. (5) (c) and (g).

d. Where the capture system is operated such that the roof of the shop is closed during the charge and the tap, and emissions to the atmosphere are prevented until the roof is opened after completion of the charge or tap, the shop opacity standards of this subdivision apply when the roof is opened and continue to apply for the length of time defined by the charging or tapping periods, or both.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from dust–handling equipment any gases which exhibit 10% opacity or greater.

(4) EMISSION MONITORING. (a) A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from control devices shall be installed, calibrated, maintained and operated by the owner or operator subject to the provisions of this section.

(b) For the purpose of reports under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as all 6–minute periods during which the average opacity is 3% or greater.

(c) A continuous monitoring system is not required on any modular, multiple–stack, negative–pressure or positive–pressure fabric filter if observations of the opacity of the visible emissions from the control device are performed by a certified visible emissions observer as follows: Visible emission observations shall be conducted at least once per day when the furnace is operating in the melting and refining period. These observations shall be taken in accordance with Method 9, and, for at least 3 6–minute periods, the opacity shall be recorded for any point where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emission, only one set of 3 6–minute observations will be required. In this case, Method 9 observations shall be made for the site of highest opacity that directly relates to the cause, or location, of visible emissions observed during a single incident. Records shall be maintained of any 6–minute average that is in excess of the emission limit specified in sub. (3) (a).

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall maintain records daily of the following information:

1. Time and duration of each charge;

2. Time and duration of each tap;

3. All flow rate data obtained under par. (b), or equivalent obtained under 40 CFR 60.274 (d); and

4. All pressure data obtained under par. (e).

(b) Except as provided under 40 CFR 60.274 (d), the owner or operator subject to the provisions of this section shall check and record on a once–per–shift basis the furnace static pressure (if a direct shell evacuation or DEC system is in use) and either check and record the control system fan motor amperes and damper positions on a once–per–shift basis; or install, calibrate and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring devices may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. Flow rate monitoring devices shall have an accuracy of ± 10% over their normal operating range and shall be calibrated according to the manufacturer's instructions. The department may require the owner or operator to demonstrate the accuracy of the monitoring devices relative to Methods 1 and 2 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(c) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (3) (a) 3., and at any other time, the department may require that either the control system fan motor amperes and all damper positions or the volumetric flow rate through each separately ducted hood shall be determined during all periods in which the hood is operated for the purpose of capturing emissions from the EAF subject to par. (b). The owner or operator may petition the department for reestablishment of these parameters whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the parameters were previously established are no longer applicable. The values of these parameters as determined during the most recent demonstration of compliance shall be maintained at the appropriate level for each applicable period. Operation at other than baseline values may be subject to the requirements of sub. (7) (a).

Note: Under 40 CFR 60.274 (d), the owner or operator may petition the administrator to approve any alternative method that will provide a continuous record of operation of each emission capture system.

(e) The owner or operator shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of hole in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork, and fan erosion). Any deficiencies shall be noted and proper maintenance performed.

(f) Where emissions during any phase of the heat time are controlled by use of a direct shell evacuation system, the owner or operator shall install, calibrate and maintain a monitoring device that continuously records the pressure in the free space inside the EAF. The pressure shall be recorded as 15–minute integrated averages. The monitoring device may be installed in any appropriate location in the EAF such that reproducible results will be obtained. The pressure monitoring device shall have an accuracy of ± 5 mm of water gauge over its normal operating range and shall be calibrated according to the manufacturer's instructions.

(g) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (3) (a) 3. and at any other time the department may require, the pressure in the free space inside the furnace shall be determined during the meltdown and refining periods using the monitoring device under par. (e). The owner or operator may petition the department for reestablishment of the 15–minute integrated average pressure whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the pressures were previously established are no longer applicable. The pressure determined during the most recent demonstration of compliance shall be maintained at all times the EAF is operating in a meltdown and refining period. Operation at higher pressures may be considered by the department to be unacceptable operation and maintenance of the affected facility.

(h) Where the capture system is designed and operated such that all emissions are captured and ducted to a control device, the owner or operator will not be subject to the requirements of this subsection.

(i) During any performance test required under s. NR 440.08 and for any report thereof required under sub. (6) (c) or to determine compliance with sub. (3) (a) 3., the owner or operator shall monitor the following information for all heats covered by the test:

1. Charge weights and materials, and tap weights and materials;

2. Heat times, including start and stop times, and a log of process operation, including periods of no operation during testing and the pressure inside the furnace where direct–shell evacuation systems are used;

3. Control device operation log; and

4. Continuous monitor data or Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, data.

(6) TEST METHODS AND PROCEDURES. (a) During performance tests required in s. NR 440.08, the owner or operator may not add gaseous diluent to the effluent gas after the fabric in any pressurized fabric collector, unless the amount of dilution is separately determined and considered in the determination of emissions.

(b) When emissions from any EAF are combined with emissions from facilities not subject to the provisions of this section but controlled by a common capture system and control device, the owner or operator shall use either or both of the following procedures during a performance test:

Note: See also sub. (7) (b).

1. Determine compliance using the combined emissions.

2. Use a method that is acceptable to the department and that compensates for the emissions from the facilities not subject to the provisions of this section.

(c) When emissions from any EAF are combined with emissions from facilities not subject to the provisions of this section, the owner or operator shall use either or both of the following procedures to demonstrate compliance with sub. (3) (a) 3.:

1. Determine compliance using the combined emissions.

2. Shut down operation of facilities not subject to the provisions of this section during the performance test.

(d) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(e) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used for negative–pressure fabric filters and other types of control devices and Method 5D shall be used for positive–pressure fabric filters to determine the particulate matter concentration and, if applicable, the volumetric flow rate of the effluent gas. The sampling time and sample volume for each run shall be at least 4 hours and 4.5 dscm (160 dscf) and, when a single EAF is sampled, the sampling time shall include an integral number of heats.

2. When more than one control device serves the EAF being tested, the concentration of particulate matter shall be determined using the following equation:

$$c_{st} = \left(\sum_{i=1}^{n} (c_{si} Q_{sdi}) \right) / \sum_{i=1}^{n} Q_{sdi}$$

where:

c_{st} is the average concentration of particulate matter, mg/dscm (gr/dscf)

c_{si} is the concentration of particulate matter from control device "i", mg/dscm (gr/dscf)

n is the total number of control devices tested

Q_{sdi} is the volumetric flow rate of stack gas from control device "i", dscm/hr (dscf/hr)

3. Method 9 and the procedures of s. NR 440.11 shall be used to determine opacity.

4. To demonstrate compliance with sub. (3) (a) 1. to 3., the test runs shall be conducted concurrently, unless inclement weather interferes.

(f) To comply with sub. (5) (c), (f), (g) and (i), the owner or operator shall obtain the information in these paragraphs during the particulate matter runs.

(g) Where emissions from any EAFs are combined with emissions from facilities not subject to the provisions of this section but controlled by a common capture system and control device, the owner or operator may use any of the following procedures during a performance test:

1. Base compliance on control of the combined emissions.

2. Utilize a method acceptable to the department which compensates for the emissions from the facilities not subject to the provisions of this section.

3. Any combination of the criteria of subds. 1. and 2.

(h) Where emissions from any EAFs are combined with emissions from facilities not subject to the provisions of this section, the owner or operator may use any of the following procedures for demonstrating compliance with sub. (3) (a) 3.:

1. Base compliance on control of the combined emissions.

2. Shut down operation of facilities not subject to the provisions of this section.

3. Any combination of the criteria of subds. 1. and 2.

(i) Visible emissions observations of modular, multiple–stack, negative pressure or positive pressure fabric filters shall occur at least once per day of operation. The observations shall occur when the furnace is operating in the melting and refining period. These observations shall be taken in accordance with Method 9 and, for at least three 6–minute periods, the opacity shall be recorded for any point(s) where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emissions, only one set of three 6–minute observations will be required. In this case Reference Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6–minute average that is in excess of the emission limit specified in sub. (3) (a).

(j) Unless the presence of inclement weather makes concurrent testing infeasible the owner or operator shall conduct concurrently the performance tests required under s. NR 440.08 to demonstrate compliance with sub. (3) (a) 1., 2., and 3.

(7) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Operation at a furnace static pressure that exceeds the value established under sub. (5) (f) and either operation of control system fan motor amperes at values exceeding ± 15% of the value established under sub. (5) (c) or operation at flow rates lower than those established under sub. (5) (c) may be considered by the department to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the department semiannually.

(b) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (6) (b) 2. or a combination of sub. (6) (b) 1. and 2. the owner or operator shall obtain approval from the department of the procedure(s) that will be used to determine compliance. Notification of the procedure to be used must be postmarked 30 days prior to the performance test.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) (a) and (b), (20. (g), (3) (a) 3. intro., a. to c., (5) (b) and (c), (6) (a) 1., 3. and 4., (b) (b) and (c), renum. (5) (e), (f) and (g) to be (5) (f), (g) and (h), cr. (4) (c), (5) (e) and (i), (6) (a) 5., (6) (i) and (j) and (7), Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (a) (intro.), (4) (c) and (5) (c), r. (5) (d), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4) (c) and (6) (a) to (f), am. (5) (i) 4. and (7) (b), Register, July, 1993, No. 451, eff. 8–1–93**; correction in (5) (a) and (b) made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.445 Steel plants: electric arc furnaces and argon–oxygen decarburization vessels constructed after August 17, 1983. (1) APPLICABILITY. (a) The provisions of this section are applicable to the following facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces, argon–oxygen decarburization vessels and dust–handling systems.

(b) The provisions of this section apply to each affected facility identified in par. (a) that commences construction, modification, or reconstruction after August 17, 1983.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Argon–oxygen decarburization vessel" (AOD vessel) means any closed–bottom, refractory–lined converter vessel with submerged tuyeres through which gaseous mixtures containing argon and oxygen or nitrogen may be blown into molten steel for further refining.

(b) "Capture system" means the equipment (including ducts, hoods, fans, dampers, etc.) used to capture or transport particulate matter generated by an electric arc furnace or AOD vessel to the air pollution control device.

(c) "Charge" means the addition of iron and steel scrap or other materials into the top of an electric arc furnace or the addition of molten steel or other materials into the top of an AOD vessel.

(d) "Control device" means the air pollution control equipment used to remove particulate matter from the effluent gas stream generated by an electric arc furnace or AOD vessel.

(e) "Direct–shell evacuation control system" (DEC system) means a system that maintains a negative pressure within the electric arc furnace above the slag or metal and ducts emissions to the control device.

(f) "Dust–handling system" means equipment used to handle particulate matter collected by the control device for an electric arc furnace or AOD vessel subject to this section. For the purposes of this section the dust–handling system shall consist of the control device dust hoppers, the dust–conveying equipment, any central dust storage equipment, the dust–treating equipment (e.g., pug mill, pelletizer), dust transfer equipment (from storage to truck) and any secondary control devices used with the dust transfer equipment.

(g) "Electric arc furnace" (EAF) means a furnace that produces molten steel and heats the charge materials with electric arcs from carbon electrodes. For the purposes of this section an EAF shall consist of the furnace shell and roof and the transformer. Furnaces that continuously feed direct–reduced iron ore pellets as the primary source of iron are not affected facilities within the scope of this definition.

(h) "Heat cycle" means the period beginning when scrap is charged to an empty EAF and ending when the EAF tap is completed or beginning when molten steel is charged to an empty AOF vessel and ending when the AOD vessel tap is completed.

(i) "Melting" means that phase of steel production cycle during which the iron and steel scrap is heated to the molten state.

(j) "Negative–pressure fabric filter" means a fabric filter with the fans on the downstream side of the filter bags.

(k) "Positive–pressure fabric filter" means a fabric filter with the fans on the upstream side of the filter bags.

(L) "Refining" means the phase of the steel production cycle during which undesirable elements are removed from the molten steel and alloys are added to reach the final metal chemistry.

(m) "Shop" means the building which houses one or more EAF's or AOD vessels.

(n) "Shop opacity" means the arithmetic average of 24 observations of the opacity of emissions from the shop taken in accordance with Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(o) "Tap" means the pouring of molten steel from an EAF or AOD vessel.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an EAF or an AOD vessel any gases which:

1. Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf);

2. Exit from a control device and exhibit 3% opacity or greater; and

3. Exit from a shop and, due solely to the operations of any affected EAF(s) or AOD vessel(s), exhibit 6% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from the dust–handling system any gases that exhibit 10% opacity or greater.

(4) EMISSION MONITORING. (a) Except as provided under pars. (b) and (c) a continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the control device(s) shall be installed, calibrated, maintained and operated by the owner or operator subject to the provisions of this section.

(b) No continuous monitoring system is required on any control device serving the dust–handling system.

(c) A continuous monitoring system for the measurement of opacity is not required on modular, multiple–stack, negative–pressure or positive–pressure fabric filters if observations of the opacity of the visible emissions from the control device are performed by a certified visible emission observer as follows: Visible emission observations are conducted at least once per day when the furnace is operating in the melting and refining period. These observations shall be taken in accordance with Method 9, and, for at least 3 6–minute periods, the opacity shall be recorded for any point where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emissions, only one set of 3 6–minute observations will be required. In this case, Method 9 observations shall be made for the site of highest opacity that directly relates to the cause, or location, of visible emissions observed during a single incident. Records shall be maintained of any 6–minute average that is in excess of the emission limit specified in sub. (3).

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall maintain records of the following information:

1. All data obtained under par. (b); and

2. All monthly operational status inspections performed under par. (c).

(b) Except as provided under par. (d), the owner or operator subject to the provisions of this section shall check and record on a once–per–shift basis the furnace static pressure (if DEC system is in use) and either check and record the control system fan motor amperes and damper position and a once–per–shift basis, or install, calibrate and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring device may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device shall have an accuracy of ± 10% over its normal operating range and shall be calibrated according to the manufacturer's instructions. The department may require the owner or operator to demonstrate the accuracy of the monitoring device relative to Methods 1 and 2 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards under sub. (3) (a) 3. and at any other time, the department may require that either the control system fan motor amperes and all damper positions or the volumetric flow rate through each separately ducted hood shall be determined during all periods in which a hood is operated for the purpose of capturing emissions from the affected facility subject to par. (b). The owner or operator may petition the department for reestablishment of these parameters whenever the owner or operator can demonstrate to the department's satisfaction that the affected facility operating conditions upon which the parameters were previously established are no longer applicable. The values of these parameters as determined during the most recent demonstration of compliance shall be maintained at the appropriate level for each applicable period. Operation at other than baseline values may be subject to the requirements of sub. (7) (c).

(d) The owner or operator shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork and fan erosion). Any deficiencies shall be noted and proper maintenance performed.

Note: Under 40 CFR 60.274a (e), the owner or operator may petition the administrator to approve any alternative to monthly operational status inspections that will provide a continuous record of the operation of each emission capture system.

(f) If emissions during any phase of the heat time are controlled by the use of a DEC system the owner or operator shall install, calibrate and maintain a monitoring device that allows the pressure in the free space inside EAF to be monitored. The monitoring device may be installed in any appropriate location in the EAF or DEC duct prior to the introduction of ambient air such that reproducible results will be obtained. The pressure monitoring device shall have an accuracy of ±5mm of water gauge over its normal operating range and shall be calibrated according to the manufacturer's instruction.

(g) When the owner or operator of an EAF controlled by a DEC is required to demonstrate compliance with the standard under sub. (3) (a) 3., and at any other time the department may require the pressure in the free space inside the furnace shall be determined during the melting and refining period(s) using the monitoring device required under par. (f). The owner or operator may petition the department for reestablishment of the 15–minute integrated average of the pressure whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the pressures were previously established over no longer applicable. The pressure determined during the most recent demonstration of compliance shall be maintained at all times when the EAF is operating in a meltdown and refining period. Operation at higher pressures may be considered by the department to be unacceptable operation and maintenance of the affected facility.

(h) During any performance test required under s. NR 440.08 and for any report thereof required by sub. (6) (d), or to determine compliance with sub. (3) (a) 3., the owner or operator shall monitor the following information for all heats covered by the test:

1. Charge weights and materials and tap weights and materials;

2. Heat times, including start and stop times, and a log of process operation including periods of no operation during testing and the pressure inside an EAF when direct–shell evacuation control system are used;

3. Control device operation log; and

4. Continuous monitor or Reference Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, data.

(6) TEST METHODS AND PROCEDURES. (a) During performance tests required in s. NR 440.08, the owner or operator may not add gaseous diluents to the effluent gas stream after the fabric in any pressurized fabric filter collector, unless the amount of dilution is separately determined and considered in the determination of emissions.

(b) When emissions from any EAF or AOD vessel are combined with emissions from facilities not subject to the provisions of this section but controlled by a common capture system and control device, the owner or operator shall use either or both of the following procedures during a performance test:

Note: See also sub. (7) (e).

1. Determine compliance using the combined emissions.

2. Use a method that is acceptable to the department and that compensates for the emissions from the facilities not subject to the provisions of this section.

(c) When emission from any EAF or AOD vessel are combined with emissions from facilities not subject to the provisions of this section, the owner or operator shall demonstrate compliance with sub. (3) (a) 3. based on emissions from only the affected facility.

(d) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(e) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used for negative–pressure fabric filters and other types of control devices and Method 5D shall be used for positive–pressure fabric filters to determine the particulate matter concentration and volumetric flow rate of the effluent gas. The sampling time and sample volume for each run shall be at least 4 hours and 4.50 dscm (160 dscf) and, when a single EAF or AOD vessel is sampled, the sampling time shall include an integral number of heats.

2. When more than one control device serves the EAF being tested, the concentration of particulate matter shall be determined using the following equation:

$$c_{st} = \left(\sum_{i=1}^{n} (c_{si} Q_{sdi}) \right) / \sum_{i=1}^{n} Q_{sdi}$$

where:

c_{st} is the average concentration of particulate matter, mg/dscm (gr/dscf)

c_{si} is the concentration of particulate matter from control device "i", mg/dscm (gr/dscf)

n is the total number of control devices tested

Q_{sdi} is the volumetric flow rate of stack gas from control device "i", dscm/hr (dscf/hr)

3. Method 9 and the procedures of s. NR 440.11 shall be used to determine opacity.

4. To demonstrate compliance with sub. (3) (a) 1. to 3., the test runs shall be conducted concurrently, unless inclement weather interferes.

(f) To comply with sub. (5) (c) and (f) to (h), the owner or operator shall obtain the information required in these paragraphs during the particulate matter runs.

(g) Any control device subject to the provisions of this section shall be designed and constructed to allow measurement of emissions using applicable test methods and procedures.

(h) Where emissions from any EAF or AOD vessel are combined with emissions from facilities not subject to the provisions of this section but controlled by a common capture system and control device the owner or operator may use any of the following procedures during a performance test:

1. Base compliance on control of the combined emissions;

2. Utilize a method acceptable to the department that compensates for the emissions from the facilities not subject to the provisions of this section or;

3. Any combination of the criteria of subd. 1. and 2.

(i) Where emissions from any EAF or AOD vessel are combined with emissions from facilities not subject to the provisions of this section determinations of compliance with sub. (3) (a) 3. will only be based upon emissions originating from the affected facility(ies).

(j) Unless the presence of inclement weather makes concurrent testing infeasible the owner or operator shall conduct concurrently the performance tests required under s. NR 440.08 to demonstrate compliance with sub. (3) (a) 1., 2. and 3.

(7) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Records of the measurements required in sub. (5) must be retained for at least 2 years following the date of the measurement.

(b) Each owner or operator shall submit a written report of exceedances of the control device opacity to the department semiannually. For the purposes of these reports exceedances are defined as all 6–minute periods during which the average opacity is 3% or greater.

(c) Operation at a furnace static pressure that exceeds the value established under sub. (5) (g) and either operation of control system fan motor amperes at values exceeding ± 15% of the value established under sub. (5) (c) or operation at flow rates lower than those established under sub. (5) (c) may be considered by the department to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the department semiannually.

(e) When the owner or operator of an EAF or AOD is required to demonstrate compliance with the standard under sub. (6) (b) 2. or a combination of sub. (6) (b) 1. and 2. the owner or operator shall obtain approval from the department of the procedure that will be used to determine compliance. Notification of the procedure to be used shall be postmarked 30 days prior to the performance test.

(f) For the purpose of this section the owner or operator shall conduct the demonstration of compliance with sub. (3) (a) and furnish the department a written report of the results of the test. This report shall include the following information:

1. Facility name and address;

2. Plant representative;

3. Make and model of process, control device, and continuous monitoring equipment;

4. Flow diagram of process and emission capture equipment including other equipment or process(es) ducted to the same control device;

5. Rated (design) capacity of process equipment;

6. Those data required under sub. (5) (h):

a. List of charge and tap weights and materials;

b. Heat times and process log;

c. Control device operation log; and

d. Continuous monitor or Reference Method data.

7. Test dates and test times;

8. Test company;

9. Test company representative;

10. Test observers from outside agency;

11. Description of test methodology used, including any deviation from standard reference methods;

12. Schematic of sampling location;

13. Number of sampling points;

14. Description of sampling equipment;

15. Listing of sampling equipment calibrations and procedures;

16. Field and laboratory data sheets;

17. Description of sample recovery procedures;

18. Sampling equipment leak check results;

19. Description of quality assurance procedures;

20. Description of analytical procedures;

21. Notation of sample blank corrections; and

22. Sample emission calculations.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (3) (b), (4) (b) and (c), r. (5) (e) and (7) (d) Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4) (c) and (6) (a) to (c), renum. (6) (d) to be (f) (f), r. (6) (e) and (f), cr. (6) (d) to (f), am. (7) (e), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.45 Kraft pulp mills. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in kraft pulp mills: digester system, brown stock washer system, multiple–effect evaporator system, recovery furnace, smelt dissolving tank, lime kiln and condensate stripper system. In pulp mills where kraft pulping is combined with neutral sulfite semichemical pulping, the provisions of this section are applicable when any portion of the material charged to an affected facility is produced by the kraft pulping operation.

(b) Except as noted in sub. (4) (a) 1. d., any facility under par. (a) that commences construction or modification after September 24, 1976, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Black liquor oxidation system" means the vessels used to oxidize, with air or oxygen, the black liquor, and associated storage tanks.

(b) "Black liquor solids" means the dry weight of the solids which enter the recovery furnace in the black liquor.

(c) "Brown stock washer system" means brown stock washers and associated knotters, vacuum pumps and filtrate tanks used to wash the pulp following the digester system. Diffusion washers are excluded from this definition.

(d) "Condensate stripper system" means a column and associated condensers used to strip, with air or steam, TRS compounds from condensate streams from various processes within a kraft pulp mill.

(e) "Cross recovery furnace" means a furnace used to recover chemicals consisting primarily of sodium and sulfur compounds by burning black liquor which on a quarterly basis contains more than 7 weight percent of the total pulp solids from the neutral sulfite semichemical process and has a green liquor sulfidity of more than 28%.

(f) "Digester system" means each continuous digester or each batch digester used for the cooking of wood in white liquor, and associated flash tanks, below tanks, chip steamers and condensers.

(g) "Green liquor sulfidity" means the sulfidity of the liquor which leaves the smelt dissolving tank.

(h) "Kraft pulp mill" means any stationary source which produces pulp from wood by cooking or digesting wood chips in a water solution of sodium hydroxide and sodium sulfide (white liquor) at high temperature and pressure. Regeneration of the cooking chemicals through a recovery process is also considered part of the kraft pulp mill.

(i) "Lime kiln" means a unit used to calcine lime mud, which consists primarily of calcium carbonate, into quicklime, which is calcium oxide.

(j) "Multiple–effect evaporator system" means the multiple–effect evaporators and associated condensers and hotwells used to concentrate the spent cooking liquid that is separated from the pulp (black liquor).

(k) "Neutral sulfite semichemical pulping operation" means any operation in which pulp is produced from wood by cooking or digesting wood chips in a solution of sodium sulfite and sodium bicarbonate, followed by mechanical defibrating (grinding).

(L) "Recovery furnace" means either a straight kraft recovery furnace or a cross recovery furnace, and includes the direct–contact evaporator for a direct–contact furnace.

(m) "Smelt dissolving tank" means a vessel used for dissolving the smelt collected from the recovery furnace.

(n) "Straight kraft recovery furnace" means a furnace used to recover chemicals consisting primarily of sodium and sulfur compounds by burning black liquor which on a quarterly basis contains 7 weight percent or less of the total pulp solids from the neutral sulfite semichemical process or has green liquor sulfidity of 28% or less.

(o) "Total reduced sulfur" or "TRS" means the sum of the sulfur compounds hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide that are released during the kraft pulping operation and measured by Reference Method 16 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any recovery furnace any gases which:

a. Contain particulate matter in excess of 0.10 g/dscm (0.044 gr/dscf) corrected to 8% oxygen.

b. Exhibit 35% opacity or greater.

2. From any smelt dissolving tank any gases which contain particulate matter in excess of 0.10 g/kg black liquor solids, dry weight (0.20 lb/ton black liquor solids, dry weight).

3. From any lime kiln any gases which contain particulate matter in excess of:

a. 0.15 g/dscm (0.067 gr/dscf) corrected to 10% oxygen, when gaseous fossil fuel is burned.

b. 0.30 g/dscm (0.13 gr/dscf) corrected to 10% oxygen, when liquid fossil fuel is burned.

(4) STANDARD FOR TOTAL REDUCED SULFUR (TRS). (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any digester system, brown stock washer system, multiple–effect evaporator system or condensate stripper system any gases which contain TRS in excess of 5.0 ppm by volume on a dry basis, corrected to 10% oxygen, unless the following conditions are met:

a. The gases are combusted in a lime kiln subject to the provisions of subd. 5.; or

b. The gases are combusted in a recovery furnace subject to the provisions of subd. 2. or 3.; or

c. The gases are combusted with other waste gases in an incinerator or other device, or combusted in a lime kiln or recovery furnace not subject to the provisions of this section, and are subjected to a minimum temperature of 1200° F for at least 0.5 second; or

d. It has been demonstrated to the department's satisfaction by the owner or operator that incinerating the exhaust gases from a new, modified or reconstructed brown stock washer system in an existing facility is technologically or economically not feasible. Any exempt system shall become subject to the provisions of this section if the facility is changed so that the gases can be incinerated.

e. The gases from the digester system, brown stock washer system or condensate stripper system are controlled by a means other than combustion. In this case, these systems may not discharge any gases to the atmosphere which contain TRS in excess of 5.0 ppm by volume on a dry basis, corrected to the actual oxygen content of the untreated gas stream.

f. The uncontrolled exhaust gases from a new, modified, or reconstructed digester system contain TRS less than 0.0050 g/kg air dried pulp (0.010 lb/ton air dried pulp).

2. From any straight kraft recovery furnace any gases which contain TRS in excess of 5.0 ppm by volume on a dry basis, corrected to 8% oxygen.

3. From any cross recovery furnace any gases which contain TRS in excess of 25 ppm by volume on a dry basis, corrected to 8% oxygen.

4. From any smelt dissolving tank any gases which contain TRS in excess of 0.016 g/kg black liquor solids, as H_2S (0.033 lb/ton black liquor solids, as H_2S).

5. From any lime kiln any gases which contain TRS in excess of 8.0 ppm by volume on a dry basis, corrected to 10% oxygen.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate the following continuous monitoring systems:

1. A continuous monitoring system to monitor and record the opacity of the gases discharged into the atmosphere from any recovery furnace. The span of this system shall be set at 70% opacity.

2. Continuous monitoring systems to monitor and record the concentration of TRS emissions on a dry basis and the percent of oxygen by volume on a dry basis in the gases discharged into the atmosphere from any lime kiln, recovery furnace, digester system, brown stock washer system, multiple–effect evaporator system, or condensate stripper system, except where the provisions of sub. (4) (a) 1. c. or d. apply. These systems shall be located downstream of the control devices and the spans of these continuous monitoring systems shall be set:

a. At a TRS concentration of 30 ppm for the TRS continuous monitoring system, except that for any cross recovery furnace the span shall be set at 50 ppm.

b. At 20% oxygen for the continuous oxygen monitoring system.

(b) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. For any incinerator, a monitoring device which measures the combustion temperature at the point of incineration of effluent gases which are emitted from any digester system, brown stock washer system, multiple–effect evaporator system, black liquor oxidation system or condensate stripper system where the provisions of sub. (4) (a) 1.c. apply. The monitoring device shall be certified by the manufacturer to be accurate within ± one percent of the temperature being measured.

2. For any lime kiln or smelt dissolving tank using a scrubber emission control device:

a. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the control equipment. The monitoring device shall be certified by the manufacturer to be accurate to within a gauge pressure of ± 500 pascals (ca. 2 inches water gauge pressure).

b. A monitoring device for the continuous measurement of the scrubbing liquid supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within ± 15% of design scrubbing liquid supply pressure. The pressure sensor or tap shall be located close to the scrubber liquid discharge point. The department may approve alternative locations.

(c) Any owner or operator subject to the provisions of this section shall, except where the provisions of sub. (4) (a) 1. d. or 4. apply:

1. Calculate and record on a daily basis 12–hour average TRS concentrations for the 2 consecutive periods of each operating day. Each 12–hour average shall be determined as the arithmetic mean of the appropriate 12 contiguous one–hour average total reduced sulfur concentrations provided by each continuous monitoring system installed under par. (a) 2.

2. Calculate and record on a daily basis 12–hour average oxygen concentrations for the 2 consecutive periods of each operating day for the recovery furnace and lime kiln. These 12–hour averages shall correspond to the 12–hour average TRS concentrations under subd. 1. and shall be determined as an arithmetic mean of the appropriate 12 contiguous one–hour average oxygen concentrations provided by each continuous monitoring system installed under par. (a) 2.

3. Correct all 12–hour average TRS concentrations to 10 volume percent oxygen, except that all 12–hour average TRS concentration from a recovery furnace shall be corrected to 8 volume percent using the following equation:

$$C_{corr} = C_{meas} \times (21 - X)/(21 - Y)$$

where:

C_{corr} is the concentration corrected for oxygen

C_{meas} is the concentration uncorrected for oxygen

X is the volumetric oxygen concentration in percentage to be corrected to (8% for recovery furnaces and 10% for lime kilns, incinerators, or other devices)

Y is the measured 12–hour average volumetric oxygen concentration

4. Record once per shift measurements obtained from the continuous monitoring devices installed under par. (b) 2.

(d) For the purpose of reports required under s. NR 440.07 (3), any owner or operator subject to the provisions of this section shall report semiannually periods of excess emissions as follows:

1. For emission from any recovery furnace, periods of excess emissions are:

a. All 12–hour average TRS concentrations above 5 ppm by volume for straight kraft recovery furnaces and above 25 ppm by volume for cross recovery furnaces.

b. All 6–minute average opacities that exceed 35%.

2. For emissions from any lime kiln, periods of excess emissions are all 12–hour average TRS concentration above 8 ppm by volume.

3. For emissions from any digester system, brown stock washer system, multiple–effect evaporator system or condensate stripper system, period of excess emissions are:

a. All 12–hour average TRS concentrations above 5 ppm by volume unless the provisions of sub. (4) (a) 1. a., b. or d. apply; or

b. All periods in excess of 5 minutes and their duration during which the combustion temperature at the point of incineration is less than 1200° F where the provisions of sub. (4) (a) 1. c. apply.

(e) The department may not consider periods of excess emissions reported under par. (d) to be indicative of a violation of s. NR 440.11 (4), provided that:

1. The percent of the total number of possible contiguous periods of excess emissions in a quarter (excluding periods of startup, shutdown, or malfunction and periods when the facility is not operating) during which excess emissions occur does not exceed:

a. One percent for TRS emissions from recovery furnaces.

b. Six percent for average opacities from recovery furnaces.

2. The department determines that the affected facility, including air pollution control equipment, is maintained and operated in a manner which is consistent with good air pollution control practice for minimizing emissions during periods of excess emissions.

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures in this subsection, except as provided in s. NR 440.08(2). Acceptable alternative methods and procedures are given in par. (f).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) (a) 1. and 3. as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf). Water shall be used as the cleanup solvent instead of acetone in the sample recovery procedure. The particulate concentration shall be corrected to the appropriate oxygen concentration according to sub. (5) (c) 3.

2. The emission rate correction factor, integrated sampling and analysis procedure of Method 3B shall be used to determine the oxygen concentration. The gas sample shall be taken at the same time and at the same traverse points as the particulate sample.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) The owner or operator shall determine compliance with the particulate matter standard in sub. (3) (a) 2. as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = c_s \, Q_{sd}/BLS$$

where:

E is the emission rate of particulate matter, g/kg (lb/ton) of BLS

c_s is the concentration of particulate matter, g/dsm (lb/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

BLS is the black liquor solids (dry weight) feed rate, kg/hr (ton/hr)

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume shall be at least 60 minutes and 0.90 dscm (31.8 dscf). Water shall be used instead of acetone in the sample recovery.

3. Process data shall be used to determine the black liquor solids (BLS) feed rate on a dry weight basis.

(d) The owner or operator shall determine compliance with the TRS standards in sub. (4), except sub. (4) (a) 1. f. and 4., as follows:

1. Method 16 shall be used to determine the TRS concentration. The TRS concentration shall be corrected to the appropriate oxygen concentration using the procedure in sub. (5) (c) 3. The sampling time shall be at least 3 hours, but no longer than 6 hours.

2. The emission rate correction factor, integrated sampling and analysis procedure of Method 3B shall be used to determine the oxygen concentration. The sample shall be taken over the same time period as the TRS samples.

3. When determining whether a furnace is a straight kraft recovery furnace or a cross recovery furnace, TAPPI Method T624, incorporated by reference in s. NR 440.17, shall be used to determine sodium sulfide, sodium hydroxide, and sodium carbonate. These determinations shall be made 3 times daily from the green liquor, and the daily average values shall be converted to sodium oxide (Na_2O) and substituted into the following equation to determine the green liquor sulfidity:

$$GLS = 100C_{Na_2S}/\left(C_{Na_2S} + C_{NaOH} + C_{Na_2CO_3}\right)$$

where:

GLS is the green liquor sulfidity, percent

C_{Na_2S} is the concentration of Na_2S as Na_2O, mg/liter (gr/gal)

C_{NaOH} is the concentration of NaOH as Na_2O, mg/liter (gr/gal)

$C_{Na_2CO_3}$ is the concentration of Na_2CO_3 as Na_2O, mg/liter (gr/gal)

(e) The owner or operator shall determine compliance with the TRS standards in sub. (4) (a) 1. f. and 4. as follows:

1. The emission rate (E) of TRS shall be computed for each run using the following equation:

$$E = C_{TRS}FQ_{sd}/P$$

where:

E is the emission rate of TRS, g/kg (lb/ton) of BLS or ADP

C_{TRS} is the average combined concentration of TRS, ppm

F is the conversion factor, 0.001417 g H_2S/m^3 ppm (0.0844×10^{-6} lb H_2S/ft^3ppm)

Q_{sd} is the volumetric flow rate of stack gas, dscm/hr (dscf/hr)

P is the black liquor solids feed or pulp production rate, kg/hr (ton/hr)

2. Method 16 shall be used to determine the TRS concentration (C_{TRS}).

3. Method 2 shall be used to determine the volumetric flow rate (Q_{sd}) of the effluent gas.

4. Process data shall be used to determine the black liquor feed rate or the pulp production rate (P).

(f) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. For Method 5, Method 17 may be used if a constant value of 0.009 g/dscm (0.004 gr/dscf) is added to the results of Method 17 and the stack temperature is no greater than 205°C (400°F).

2. For Method 16, Method 16A or 16B may be used if the sampling time is 60 minutes.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (4) (a) 1. f. and (6) (d) 5., Register, September, 1986, No. 369, eff. 10–1–86; am. (1) (a) and (b), (2) (intro.) and (c), (3) (a) 2., (4) (a) 1. intro., d. and f., 2., 4. and 5., (5) (a) 2. intro., (b) 1., (a) (intro.), 3. intro. and b., (6) (d) 1., cr. (5) (c) 4., r. recr. (6) (d) 3., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (6), Register, July, 1993, No. 451, eff. 8–1–93; **correction in (6) (d) made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.46 Glass manufacturing plants. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Each glass melting furnace is an affected facility to which the provisions of this section apply.

(b) Any facility under par. (a) that commences construction or modification after June 15, 1979, is subject to the requirements of this section.

(c) This section does not apply to hand glass melting furnaces, glass melting furnaces designed to produce less than 4,550 kilograms of glass per day and all–electric melters.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02, unless otherwise required by the context.

(a) "All–electric melter" means a glass melting furnace in which all the heat required for melting is provided by electric current from electrodes submerged in the molten glass, although some fossil fuel may be charged to the furnace as raw material only.

(b) "Borosilicate recipe" means glass product composition of the following approximate ranges of weight proportions: 60 to 80% silicon dioxide, 4 to 10% total R_2O (e.g., Na_2O and K_2O), 5 to 35% boric oxides and 0 to 13% other oxides.

(c) "Container glass" means glass made of soda–lime recipe, clear or colored, which is pressed or blown, or both, into bottles, jars, ampoules and other products listed under SIC code 3221 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17.

(cm) "Experimental furnace" means a glass melting furnace with the sole purpose of operating to evaluate glass melting processes, technologies, or glass products. An experimental furnace does not produce glass that is sold (except for further research and development purposes) or that is used as a raw material for nonexperimental furnaces.

(d) "Flat glass" means glass made of soda–lime recipe and produced into continuous flat sheets and other products listed under SIC code 3211 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17.

(dm) "Flow channels" means appendages used for conditioning and distributing molten glass to forming apparatuses and are a permanently separate source of emissions such that no mixing of emissions occurs with emissions from the melter cooling system prior to their being vented to the atmosphere.

(e) "Glass melting furnace" means a unit comprising a refractory vessel in which raw materials are charged, melted at high temperature, refined and conditioned to produce molten glass. The unit includes foundations, superstructure and retaining walls, raw material charger systems, heat exchangers, melter cooling system, exhaust system, refractory brick work, fuel supply and electrical boosting equipment, integral control systems and instrumentation and appendages for conditioning and distributing molten glass to forming apparatuses. The forming apparatuses, including the float bath used in flat glass manufacturing and flow channels in wool fiberglass and textile manufacturing, are not considered part of the glass melting furnace.

(f) "Glass produced" means the weight of the glass pulled from the glass melting furnace.

(g) "Hand glass melting furnace" means a glass furnace where the molten glass is removed from the furnace by a glassworker using a blowpipe or a pontil.

(h) "Lead recipe" means glass product composition of the following ranges of weight proportions: 50 to 50% silicon dioxide, 18 to 35% lead oxides, 5 to 20% total R_2O (e.g., Na_2O and K_2O), 0 to 8% total R_2O_3 (e.g., Al_2O_3), 0 to 15% total RO (e.g., CaO, MgO), other than lead oxide, and 5 to 10% other oxides.

(i) "Pressed and blown glass" means glass which is pressed, blown, or both, including textile fiberglass, noncontinuous flat glass, noncontainer glass and other products listed under SIC code 3229 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17. It is separated into glass of borosilicate recipe, glass of soda–lime and lead recipes, glass of opal, fluoride and other recipes.

(j) "Rebricking" means cold replacement of damaged or worn refractory parts of the glass melting furnace. Rebricking includes replacement of the refractories comprising the bottom, sidewalls or roof of the melting vessel; replacement of refractory work in the heat exchanger; and replacement of refractory portions of the glass conditioning and distribution system.

(k) "Soda–lime recipe" means glass product composition of the following ranges of weight proportions: 60 to 75% silicon dioxide, 10 to 17% total R_2O (e.g., Na_2O and K_2O), 8 to 20% total RO but not to include any PbO (e.g., CaO and MgO), 0 to 8% total R_2O_3 (e.g., Al_2O_3) and 1 to 5% other oxides.

(km) "Textile fiberglass" means fibrous glass in the form of continuous strands having uniform thickness.

(ks) "With modified–processes" means using any technique designed to minimize emissions without the use of add–on pollution controls.

(L) "Wool fiberglass" means fibrous glass of random texture, including fiberglass insulation, and other products listed under SIC code 3296 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of a glass melting furnace subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any glass melting furnace fired exclusively with either a gaseous fuel or a liquid fuel, particulate matter at emission rates exceeding those specified in Table 1, Column 2 and Column 3, respectively, or

2. From any glass melting furnace, fired simultaneously with gaseous and liquid fuels, particulate matter at emission rates exceeding STD as specified by the following equation:

$$STD = X\,[1.3\,(Y) + (Z)]$$

where:

STD is the particulate matter emission limit, g of particulate/kg of glass produced

X is the emission rate specified in Table 1 for furnaces fired with gaseous fuel (Column 2)

Y is the decimal fraction of liquid fuel heating value to total (gaseous and liquid) fuel heating value fired in the glass melting furnaces as determined in sub. (7) (b) (joules/joules)

Z is equal to (1–Y)

Table 1 — Emission Rates
[g of particulate/kg of glass produced]

Col. 1 — Glass manufacturing plant industry segment	Col. 2— Furnace fired with gaseous fuel	Col. 3— Furnace fired with liquid fuel
Container glass	0.10	0.13
Pressed and blown glass		
(a) Borosilicate Recipes	0.50	0.65
(b) Soda–Lime and Lead Recipes	0.10	0.13
(c) Other–Than Borosilicate, Soda–Lime, and Lead Recipes (including opal,fluoride and other recipes)	0.25	0.325
Wool fiberglass	0.25	0.325
Flat glass	0.225	0.225

(b) Conversion of a glass melting furnace to the use of liquid fuel may not be considered a modification for the purposes of s. NR 440.14.

(c) Rebricking and the cost of rebricking may not be considered a reconstruction for the purposes of s. NR 440.15.

(d) An owner or operator of an experimental furnace is not subject to the requirements of this section.

(e) During routine maintenance of add–on pollution controls an owner or operator of a glass melting furnace subject to the provisions of sub. (3) (a) is exempt from the provisions of this subsection if:

1. Routine maintenance in each calendar year does not exceed 6 days;

2. Routine maintenance is conducted in a manner consistent with good air pollution control practices for minimizing emissions; and

3. A report is submitted to the department 10 days before the start of the routine maintenance (if 10 days cannot be provided the report must be submitted as soon as practicable) and the report contains an explanation of the schedule of the maintenance.

(4) STANDARDS FOR PARTICULATE MATTER FROM GLASS MELTING FURNACE WITH MODIFIED–PROCESSES. (a) An owner or operator of a glass melting furnaces with modified–processes is not subject to the provisions of sub. (3) if the affected facility complies with the provision of this subsection.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of a glass melting furnace with modified processes subject to the provisions of this section may cause to be discharged into the atmosphere from the affected facility:

1. Particulate matter at emission rates exceeding 0.50 gram of particulate per kilogram of glass produced (g/kg) as measured according to par. (e) for container glass, flat glass and pressed and blown glass with a soda–lime recipe melting furnace.

2. Particulate matter at emission rates exceeding 1.0 g/kg as measured according to par. (e) for pressed and blown glass with a borosilicate recipe melting furnace.

3. Particulate matter at emission rates exceeding 0.50 g/kg as measured according to par. (e) for textile fiberglass and wool fiberglass melting furnaces.

(c) The owner or operator of an affected facility that is subject to emission limits specified under par. (b) shall:

1. Install, calibrate, maintain and operate a continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the affected facility.

2. During the performance test required to be conducted by s. NR 440.08 conduct continuous opacity monitoring during each test run.

3. Calculate 6–minute opacity averages from 24 or more data points equally spaced over each 6–minute period during the test runs.

4. Determine, based on the 6–minute opacity averages, the opacity value corresponding to the 97.5% upper confidence level of a normal distribution of average opacity values.

5. For the purposes of s. NR 440.07 report to the department as excess emissions all of the 6–minute periods during which the average opacity, as measured by the continuous monitoring system installed under par. (c) 1., exceeds the opacity value corresponding to the 97.5% upper confidence level determined under par. (c) 4.

(d) 1. After receipt and consideration of written application the department may approve alternative continuous monitoring systems for the measurement of one or more process or operating parameters that is or are demonstrated to enable accurate and representative monitoring of an emission limit specified in par. (b) 1.

2. After the department approves an alternative continuous monitoring system for an affected facility, the requirements of par. (c) 1. to 5. will not apply for that affected facility.

3. An owner or operator may redetermine the opacity value corresponding to the 97.5% upper confidence level as described in par. (c) 4. if the owner or operator:

a. Conducts continuous opacity monitoring during each test run of a performance test that demonstrates compliance with an emission limit of par. (b),

b. Recalculates the 6–minute opacity averages as described in par. (c) 3., and

c. Uses the redetermined opacity value corresponding to the 97.5% upper confidence level for the purposes of par. (c) 5.

(e) Test methods and procedures as specified under sub. (7) shall be used to determine compliance with this section except that to determine compliance for any glass melting furnace using modified processes and fired with either a gaseous fuel or a liquid fuel containing less than 0.50 weight percent sulfur, Method 5 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used with the probe and filter holder heating system in the sampling train set to provide a gas temperature of 120 ±14°C.

(7) TEST METHODS AND PROCEDURES. (a) If a glass melting furnace with modified processes is changed to one without modified processes or if a glass melting furnace without modified processes is changed to one with modified processes, the owner or operator shall notify the department at least 60 days before the change is schedule to occur.

(b) When gaseous and liquid fuels are fired simultaneously in a glass melting furnace, the owner or operator shall determine the applicable standard under sub. (3) (a) 2. as follows:

1. The ratio (Y) of liquid fuel heating value to total (gaseous and liquid) fuel heating value fired in the glass melting furnaces shall be computed for each run using the following equation:

$$Y = (H_l L)/(H_l L + H_g G)$$

where:

Y is the decimal fraction of liquid fuel heating value to total fuel heating value

H_l is the gross calorific value of liquid fuel, J/kg

H_g is the gross calorific value of gaseous fuel, J/kg

L is the liquid flow rate, kg/hr

G is the gaseous flow rate, kg/hr

2. Suitable methods shall be used to determine the rates (L and G) of fuels burned during each test period and a material balance over the glass melting furnace shall be used to confirm the rates.

3. American Society of Testing and Materials (ASTM) Method D240–76 (liquid fuels) and D1826–77 (gaseous fuels), incorporated by reference in s. NR 440.17, as applicable, shall be used to determine the gross calorific values.

(c) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(d) The owner or operator shall determine compliance with the particulate matter standards in subs. (3) and (4) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s Q_{sd} - A)/P$$

where:

E is the emission rate of particulate matter, g/kg

c_s is the concentration of particulate matter, g/dsm

Q_{sd} is the volumetric flow rate, dscm/hr

A is the zero production rate correction = 227 g/hr for container glass, pressed and blown (soda–lime and lead) glass, and pressed and blown (other than borosilicate, soda–lime and lead) glass

= 454 g/hr for pressed and blown (borosilicate) glass, wool fiberglass, and flat glass

P is the glass production rate, kg/hr

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf). The probe and filter holder heating system may be set to provide a gas temperature no greater than 177 ± 14°C (350 ± 25°F), except under the conditions specified in sub. (4) (e).

3. Direct measurement or material balance using good engineering practice shall be used to determine the amount of glass pulled during the performance test. The rate of glass produced is defined as the weight of glass pulled from the affected facility during the performance test divided by the number of hours taken to perform the performance test.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (b), (e), (h) and (k), (7) (a) (intro.), cr. (2) (cm), (dm), (km), (ks), (3) (d) and (e), (4) and (7) (g),Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (3) (a) 1., 2. and Table, (4) (b), (intro.), 1. and 3., Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (c), (d), (i) and (L), (3) (a) 2. and Table 1, r. and recr. (7), Register, May, 1993, No. 450, eff. 8–1–93.

NR 440.47 Grain elevators. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each affected facility at any grain terminal elevator or any grain storage elevator, except as provided under sub. (5) (b). The affected facilities are each truck unloading station, truck loading station, barge and ship unloading station, barge and ship loading station, railcar loading station, railcar unloading station, grain dryer and all grain handling operations.

(b) Any facility under par. (a) which commences construction, modification or reconstruction after August 3, 1978 is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Capture system" means the equipment such as sheds, hoods, ducts, fans, dampers, etc. used to collect particulate matter generated by an affected facility at a grain elevator.

(b) "Column dryer" means any equipment used to reduce the moisture content of grain in which the grain flows from the top to the bottom in one or more continuous packed columns between 2 perforated metal sheets.

(c) "Fugitive emission" means the particulate matter which is not collected by a capture system and is released directly into the atmosphere from an affected facility at a grain elevator.

(d) "Grain" means corn, wheat, sorghum, rice, rye, oats, barley and soybeans.

(e) "Grain elevator" means any plant or installation at which grain is unloaded, handled, cleaned, dried, stored or loaded.

(f) "Grain handling operations" include bucket elevators or legs (excluding legs used to unload barges or ships), scale hoppers and surge bins (garners), turn heads, scalpers, cleaners, trippers, and the headhouse and other such structures.

(g) "Grain loading station" means that portion of a grain elevator where the grain is transferred from the elevator to a truck, railcar, barge or ship.

(h) "Grain storage elevator" means any grain elevator located at any wheat flour mill, wet corn mill, dry corn mill (human consumption), rice mill or soybean oil extraction plant which has a permanent grain storage capacity of 35,200 m^3 (ca. 1 million bushels).

(i) "Grain terminal elevator" means any grain elevator which has a permanent storage capacity of more than 88,100 m^3 (ca. 2.5 million U.S. bushels), except those located at animal food manufacturers, pet food manufacturers, cereal manufacturers, breweries and livestock feedlots.

(j) "Grain unloading station" means that portion of a grain elevator where the grain is transferred from a truck, railcar, barge or ship to a receiving hopper.

(k) "Permanent storage capacity" means grain storage capacity which is inside a building, bin or silo.

(L) "Process emission" means the particulate matter which is collected by a capture system.

(m) "Rack dryer" means any equipment used to reduce the moisture content of grain in which the grain flows from the top to the bottom in a cascading flow around rows of baffles or racks.

(n) "Railcar" means railroad hopper car or boxcar.

(o) "Unloading leg" means a device which includes a bucket–type elevator which is used to remove grain from a barge or ship.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the 60th day of achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere any gases which exhibit greater than zero percent opacity from any:

1. Column dryer with column plate perforation exceeding 2.4 mm diameter (ca. 0.094 inch).

2. Rack dryer in which exhaust gases pass through a screen filter coarser than 50 mesh.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility except a grain dryer any process emission which:

1. Contains particulate matter in excess of 0.023 g/dscm (ca. 0.010 gr/dscf).

2. Exhibits greater than zero percent opacity.

(c) On and after the 60th day of achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere any fugitive emission from:

1. Any individual truck unloading station, railcar unloading station, or railcar loading station, which exhibits greater than 5% opacity.

2. Any grain handling operation which exhibits greater than zero percent opacity.

3. Any truck loading station which exhibits greater than 10% opacity.

4. Any barge or ship loading station which exhibits greater than 20% opacity.

(d) The owner or operator of any barge or ship unloading station shall operate as follows:

1. The unloading leg shall be enclosed from the top (including the receiving hopper) to the center line of the bottom pulley and ventilation to a control device shall be maintained on both sides of the leg and the grain receiving hopper.

2. The total rate of air ventilated shall be at least 32.1 actual cubic meters per cubic meter of grain handling capacity (ca. 40 ft^3/bushel).

3. Rather than meet the requirements of subds. 1. and 2., the owner or operator may use other methods of emission control if it is demonstrated to the administrator's satisfaction that they would reduce emissions of particulate matter to the same level or less.

(4) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Acceptable alternative methods and procedures are given in par. (c).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration and the volumetric flow rate of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 1.70 dscm (60 dscf). The probe and filter holder shall be operated without heaters.

2. Method 2 shall be used to determine the ventilation volumetric flow rate.

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. For Method 5, Method 17 may be used.

(5) MODIFICATIONS. (a) The factor 6.5 shall be used in place of "annual asset guidelines repair allowance percentage," to determine whether a capital expenditure as defined by in s. NR 440.02 has been made to an existing facility.

(b) For purposes of this chapter, the following physical changes or changes in the method of operation may not by themselves be considered a modification of any existing facility described under sub. (1) (a):

1. The addition of gravity loadout spouts to existing grain storage or grain transfer bins.

2. The installation of automatic grain weighing scales.

3. Replacement of motor and drive units driving existing grain handling equipment.

4. The installation of permanent storage capacity with no increase in hourly grain handling capacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am (2) (intro.), (3) (b) 1. and (d) 3., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (4), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.48 Surface coating of metal furniture.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each metal furniture surface coating operation in which organic coatings are applied.

(b) This section applies to each affected facility identified in par. (a) on which construction, modification or reconstruction is commenced after November 28, 1980.

(c) Any owner or operator of a metal furniture surface coating operation that uses less than 3,842 liters of coating (as applied) per year and keeps purchase or inventory records or other data necessary to substantiate annual coating usage shall be exempt from all other provisions of this section. These records shall be maintained at the source for a period of at least 2 years.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Bake oven" means a device which uses heat to dry or cure coatings.

2. "Dip coating" means a method of applying coatings in which the part is submerged in a tank filled with the coatings.

3. "Electrodeposition" or "EDP" means a method of applying coatings in which the part is submerged in a tank filled with the coatings and in which an electrical potential is used to enhance deposition of the coatings on the part.

4. "Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coatings.

5. "Flashoff area" means the portion of a surface coating operation between the coating application area and bake oven.

6. "Flow coating" means a method of applying coatings in which the part is carried through a chamber containing numerous nozzles which direct unatomized streams of coatings from many different angles onto the surface of the part.

7. "Organic coating" means any coating used in a surface coating operation, including dilution solvents, from which volatile organic compound emissions occur during the application or the curing process. For the purpose of this section, powder coatings are not included in this definition.

8. "Powder coating" means any surface coating which is applied as a dry powder and is fused into a continuous coating film through the use of heat.

9. "Spray application" means a method of applying coatings by atomizing and directing the atomized spray toward the part to be coated.

10. "Surface coating operation" means the system on a metal furniture surface coating line used to apply and dry or cure an organic coating on the surface of the metal furniture part or product. The surface coating operation may be a prime coat or a topcoat operation and includes the coating application station or stations, flashoff area and curing oven.

11. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a part or product to the total amount of coating solids used.

12. "VOC content" means the proportion of a coating that is volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter of coating solids.

13. "VOC emissions" means the mass of volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter

of applied coating solids, emitted from a metal furniture surface coating operation.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. C_s = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b = the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon).

3. C_f = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c = density of each coating, as received (kilograms per liter).

5. D_d = density of each diluent VOC solvent (kilograms per liter).

6. D_r = density of VOC solvent recovered by an emission control device (kilograms per liter).

7. E = VOC destruction efficiency of the control device (fraction).

8. F = the proportion of total VOCs emitted by an affected facility that enters the control device (fraction).

9. G = the volume–weighted average mass of VOCs in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter).

10. L_c = the volume of each coating consumed, as received (liters).

11. L_d = the volume of each diluent VOC solvent added to coatings (liters).

12. L_r = the volume of VOC solvent recovered by an emission control device (liters).

13. L_o = the volume of coating solids consumed (liters).

14. M_d = the mass of diluent VOC solvent consumed (kilograms).

15. M_o = the mass of VOCs in coatings consumed as received (kilograms).

16. M_f = the mass of VOCs recovered by an emission control device (kilograms).

17. N = the volume–weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

18. Q_s = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

19. Q_b = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

20. Q_f = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

21. R = the overall VOC emission reduction achieved for an affected facility (fraction).

22. T = the transfer efficiency (fraction).

23. V_s = the proportion of solids in each coating (or input stream) as received (fraction by volume).

24. W_o = the proportion of VOCs in each coating (or input stream) as received (fraction by weight).

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) On and after the date on which the initial performance test required to be conducted by s. NR 440.08 (1) is completed, no owner or operator subject to the provisions of this section may cause the discharge into the atmosphere of VOC emissions from any metal furniture surface coating operation in excess of 0.90 kilogram of VOC per liter of coating solids applied.

(4) PERFORMANCE TESTS AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (6) do not apply to the performance test procedures required by this section.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 (1) and thereafter a performance test each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining monthly volume–weighted average emissions of VOCs in kilograms per liter of coating solids applied (G).

1. An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the emissions limit specified under sub. (3). The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coating using Reference Method 24. The owner or operator shall determine the volume of coating and the mass of VOC solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Calculate the volume–weighted average of the total mass of VOCs consumed per unit volume of coating solids applied (G) during each calendar month for each affected facility, except as provided under subds. 2. and 3. Each monthly calculation shall be considered a performance test. Except as provided in subd. 1. d., the volume–weight average of the total mass of VOCs consumed per unit volume of coating solids applied (G) each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOCs used (M_o+ M_d) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calendar month

m is the number of different diluent VOC solvents used during the calendar month

2) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

where:

n is the number of different coatings used during the calendar month.

Select the appropriate transfer efficiency from Table 1. If the owner or operator can demonstrate to the satisfaction of the department that other transfer efficiencies other than those shown are appropriate, the department shall approve their use on a case–

by–case basis. Transfer efficiency values for application methods not listed below shall be determined by the department on a case–by–case basis. An owner or operator shall submit sufficient data for the department to judge the accuracy of the transfer efficiency claims.

Table 1 — Transfer Efficiencies

Application methods	**Transfer efficiency (T)**
Air atomized spray	0.25
Airless spray	0.25
Manual electrostatic spray	0.60
Nonrotational automatic electrostatic spray .	0.70
Rotating head electrostatic spray (manual and automatic)	0.80
Dip coat and flow coat	0.90
Electrodeposition	0.95

Where more than one application method is used within a single surface coating operation the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the department and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n}\sum_{k=1}^{p} L_{cik}V_{sik}T_{k}}{L_{s}}$$

where:

n is the number of coatings used

p is the number of application methods used

3) Calculate the volume–weighted average mass of VOCs consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_{o} + M_{d}}{L_{s}T}$$

b. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

c. Where the volume–weighted average mass of VOC discharged to the atmosphere per unit volume of coating solids applied (N) is less than or equal to 0.90 kilogram per liter, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance provided no VOCs are added to the coatings during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOCs (e.g., incinerator) to comply with the emission limit specified under sub. (3).

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in 1), 2) and 3) of this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test providing control device and capture system operating conditions have not changed. The procedure in 1), 2) and 3) of this subparagraph shall be repeated when directed by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOCs emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} C_{bi}Q_{bi}}{\sum_{i=1}^{n} C_{bi}Q_{bi} + \sum_{j=1}^{m} C_{fj}Q_{fj}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{m} C_{aj}Q_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

3) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

b. Calculate the volume–weighted average of the total mass of VOCs per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1. a. 1), 2) and 3).

c. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\,(1\text{–}R)$$

d. If the volume weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

3. An owner or operator shall use the following procedure for any affected facility which uses a control device that recovers the VOCs (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the total mass of VOCs consumed $(M_{o} + M_{d})$ and the volume–weighted average of the total mass of VOCs per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1. a. 1), 2) and 3).

b. Calculate the total mass of VOCs recovered (M_{r}) during each calendar month using the following equation:

$$M_{r} = L_{r}D_{r}$$

c. Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

d. Calculate the volume–weighted average mass of VOCs emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in subd. 2. c.

e. If the weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility which uses a capture system and an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices according to the following procedures:

1. Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

2. Each temperature measurement device shall be installed, calibrated and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of 0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

3. Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) The owner or operator of an affected facility which uses a capture system and a solvent recovery system to comply with the emission limits specified under sub. (3) shall install the equipment necessary to determine the total volume of VOC solvent recovered daily.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08 (1) apply only to the initial performance test. Each owner or operator subject to the provisions of this section shall include the following data in the report of the initial performance test required under s. NR 440.08 (1):

1. Except as provided in subd. 2., the volume–weighted average mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4) (c) 1. d., a list of the coatings used during a period of one calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or supplied by the manufacturer of the coating, and the minimum transfer efficiency of any coating application equipment used during the month.

3. For each affected facility where compliance is achieved through the use of an incineration system, the following additional information shall be reported:

a. The proportion of total VOCs emitted that enters the control device (F).

b. The VOC reduction efficiency of the control device (E).

c. The average combustion temperature or the average temperature upstream and downstream of the catalyst bed, and

d. A description of the method used to establish the amount of VOCs captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through the use of a solvent recovery system, the following additional information shall be reported:

a. The volume of VOC solvent recovered (L_r), and

b. The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify, record, and submit a written report to the department every calendar quarter of each instance in which the volume–weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3). If no such instances have occurred during a particular quarter, a report stating this shall be submitted to the department semiannually.

(c) Following the initial performance test, the owner or operator of an affected facility shall identify, record, and submit at the frequency specified in s. NR 440.07(3) the following:

1. Where compliance with sub. (3) is achieved through the use of thermal incineration, each 3–hour period when metal furniture is being coated during which the average temperature of the device was more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under sub. (4).

2. Where compliance with sub. (3) is achieved through the use of catalytic incineration, each 3–hour period when metal furniture is being coated during which the average temperature of the device immediately before the catalyst bed is more than 28°C below the average temperature of the device immediately before the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4). Additionally, when metal furniture is being coated, all 3–hour periods during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4) will be recorded.

3. For thermal and catalytic incinerators, if no periods as described in subds. 1. and 2. occur, the owner or operator shall state this in the report.

(d) Each owner or operator subject to the provisions of this section shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration each owner or operator shall maintain at the source daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2) shall be used to determine compliance with sub. (3) as follows:

1. Method 24, or coating manufacturer's formulation data for use in the determination of VOC content of each batch of coating as applied to the surface of the metal parts but in case of an inconsistency between the Method 24 results and the formulation data, the Method 24 results will govern,

2. Method 25 for the measurement of VOC concentration,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be at least a one liter sample in a one liter container taken at a point where the sample will be representative of the coating material as applied to the surface of the metal part.

(c) For Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the minimum sampling time for each of 3 runs shall be 60 minutes and the minimum sample volume shall be 0.003 dry standard cubic meters except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve testing of representative stacks on a case–by–case basis if the owner or operator can demonstrate to the satisfaction of the department that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (1) (c), am. (2) (a) (intro.) and (b) (intro.), Register September, 1990, No. 417, eff. 10–1–90; r. and recr. (6) (b), renum. (6) (c) to be (6) (d), cr. (6) (c), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.50 Stationary gas turbines. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities: all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour, based on the lower heating value of the fuel fired.

(b) Any facility under par. (a) which commences construction, modification, or reconstruction after October 3, 1977, is subject to the requirements of this section except as provided in sub. (3) (e) and (j).

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) “Base load” means the load level at which a gas turbine is normally operated.

(b) “Combined cycle gas turbine” means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water or generate steam.

(c) “Efficiency” means the gas turbine manufacturer’s rated heat rate at peak load in terms of heat input per unit of power output based on the lower heating value of the fuel.

(d) “Electric utility stationary gas turbine” means any stationary gas turbine constructed for the purpose of supplying more than one–third of its potential electric output capacity to any utility power distribution system for sale.

(e) “Emergency fuel” is a fuel fired by a gas turbine only during circumstances, such as natural gas supply curtailment or breakdown of delivery system, that make it impossible to fire natural gas in the gas turbine.

(f) “Emergency gas turbine” means any stationary gas turbine which operates as a mechanical or electrical power source only when the primary power source for a facility has been rendered inoperable by an emergency situation.

(g) “Fire–fighting turbine” means any stationary gas turbine that is used solely to pump water for extinguishing fires.

(h) “Garrison facility” means any permanent military installation.

(i) “Gas turbine model” means a group of gas turbines having the same nominal air flow, combuster inlet pressure, combuster inlet temperature, firing temperature, turbine inlet temperature and turbine inlet pressure.

(j) “ISO standard day conditions” means 288° Kelvin, 60% relative humidity and 101.3 kilopascals pressure.

(k) “Ice fog” means an atmospheric suspension of highly reflective ice crystals.

(m) “Offshore platform gas turbines” means any stationary gas turbine located on a platform in an ocean.

(n) “Peak load” means 100% of the manufacturer’s design capacity of the gas turbine at ISO standard day conditions.

(p) “Regenerative cycle gas turbine” means any stationary gas turbine that recovers thermal energy from the exhaust gases and utilizes the thermal energy to preheat air prior to entering the combustor.

(q) “Simple cycle gas turbine” means any stationary gas turbine which does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, or which does not recover heat from the gas turbine exhaust gases to heat water or generate steam.

(r) “Stationary gas turbine” means any simple cycle gas turbine, regenerative cycle gas turbine or any gas turbine portion of a combined cycle steam/electric generating system that is not self–propelled. It may, however, be mounted on a vehicle for portability.

(s) “Turbines employed in oil or gas production or oil or gas transportation” means any stationary gas turbine used to provide power to extract crude oil or natural gas, or both, from the earth or to move crude oil or natural gas, or both, or products refined from these substances through pipelines.

(3) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required by s. NR 440.08 is completed, every owner or operator subject to the provisions of this section, as specified in pars. (b), (c) and (d), shall comply with one of the following, except as provided in pars. (e) through (L).

1. No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$\mathrm{STD} = 0.0075\frac{(14.4)}{\mathrm{Y}} + \mathrm{F}$$

where:

STD is the allowable $\mathrm{NO_x}$ emissions (percent by volume at 15% oxygen and on a dry basis)

Y is the manufacturer’s rated heat rate at manufacturer’s rated load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility (the value of Y may not exceed 14.4 kilojoules per watt hour)

F is the $\mathrm{NO_x}$ emission allowance for fuel–bound nitrogen as defined in subd. 3.

2. No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$\mathrm{STD} = 0.0150\frac{(14.4)}{\mathrm{Y}} + \mathrm{F}$$

where:

STD is the allowable $\mathrm{NO_x}$ emissions (percent by volume at 15% oxygen and on a dry basis)

Y is the manufacturer’s rated heat rate at manufacturer’s rated peak load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility (the value of Y may not exceed 14.4 kilojoules per watt hour)

F is the $\mathrm{NO_x}$ emission allowance for fuel–bound nitrogen as defined in subd. 3.

3. F shall be defined according to the nitrogen content of the fuel as follows:

Fuel–Bound Nitrogen (percent by weight)	F (NO_X percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	$0.004 + 0.0067(N - 0.1)$
$N > 0.25$	0.005

where N is the nitrogen content of the fuel (percent by weight), or manufacturers may develop custom fuel–bound nitrogen allowances for each gas turbine model they manufacture. These fuel–bound nitrogen allowances shall be substantiated with data and must be approved for use by the administrator before the initial performance test required by s. NR 440.08.

Note: The administrator will publish notices of approval of custom fuel–bound nitrogen allowances in the federal register.

(b) Electric utility stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired except as provided in par. (d) shall comply with the provisions of par. (a) 1.

(c) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired shall comply with the provisions of par. (a) 2.

(d) Electric utility stationary gas turbines with a manufacturer's rated base load at ISO conditions of 30 megawatts or less except as provided in par. (b) shall comply with the provisions of par. (a) 2.

(e) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired and that have commenced construction prior to October 3, 1982 are exempt from par. (a).

(f) Stationary gas turbines using water or steam injection for control of NO_X emissions are exempt from par. (a) when ice fog is deemed a traffic hazard by the owner or operator of the gas turbine.

(g) Emergency gas turbines, military gas turbines for use in other than a garrison facility, military gas turbines installed for use as military training facilities and fire fighting gas turbines are exempt from par. (a).

(h) Stationary gas turbines engaged by manufacturers in research and development of equipment for both gas turbine emission control techniques and gas turbine efficiency improvements may be exempted from par. (a) on a case–by–case basis by the department.

(i) Exemptions from the requirements of par. (a) may be granted on a case–by–case basis as determined by the department in specific geographical areas where mandatory water restrictions are required by governmental agencies because of drought conditions. These exemptions may be allowed only while the mandatory water restrictions are in effect.

(j) Stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour that commenced construction, modification or reconstruction between the dates of October 3, 1977, and January 27, 1982, and were required in the September 10, 1979 federal register (44 FR 52792) to comply with 40 CFR 60.332 (a) (1), except electric utility stationary gas turbines, are exempt from par. (a).

(k) Stationary gas turbines with a heat input greater than or equal to 10.7 gigajoules per hour (10 million Btu/hour) when fired with natural gas are exempt from par. (a) 2. when being fired with an emergency fuel.

(L) Regenerative cycle gas turbines with a heat input less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) are exempt from par. (a).

(4) STANDARD FOR SULFUR DIOXIDE. On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, every owner or operator subject to the provisions of this section shall comply with one or the other of the following conditions:

(a) No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% oxygen and on a dry basis.

(b) No owner or operator subject to the provisions of this section may burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8% by weight.

(5) MONITORING OF OPERATIONS. (a) The owner or operator of any stationary gas turbine subject to the provisions of this section and using water injection to control NO_x emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and ratio of water to fuel being fired in the turbine. This system shall be accurate to within ± 5.0% and must be approved by the department.

(b) The owner or operator of any stationary gas turbine subject to the provisions of this section shall monitor sulfur content and nitrogen content of the fuel being fired in the turbine. The frequency of determination of these values shall be as follows:

1. If the turbine is supplied its fuel from a bulk storage tank, the values shall be determined on each occasion that fuel is transferred to the storage tank from any other source.

2. If the turbine is supplied its fuel without intermediate bulk storage the values shall be determined and recorded daily. Owners, operators or fuel vendors may develop custom schedules for determination of the values based on the design and operation of the affected facility and the characteristics of the fuel supply. These custom schedules shall be substantiated with data and must be approved by the department before they can be used to comply with this paragraph.

(c) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as follows:

1. Nitrogen oxides. Any one–hour period during which the average water–to–fuel ratio, as measured by the continuous monitoring system, falls below the water–to–fuel ratio determined to demonstrate compliance with sub. (3) by the performance test required in s. NR 440.08 or any period during which the fuel–bound nitrogen of the fuel is greater than the maximum nitrogen content allowed by the fuel–bound nitrogen allowance used during the performance test required in s. NR 440.08. Each report shall include the average water–to–fuel ratio, average fuel consumption, ambient conditions, gas turbine load and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures developed under sub. (6) (a).

2. Sulfur dioxide. Any daily period during which the sulfur content of the fuel being fired in the gas turbine exceeds 0.8%.

3. Ice fog. Each period during which an exemption provided in sub. (3) (f) is in effect shall be reported in writing to the department quarterly. For each period, the ambient conditions existing during the period, the date and time the air pollution control system was deactivated and the date and time the air pol-

lution control system was reactivated shall be reported. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

4. Emergency fuel. Each period during which an exemption provided in sub. (3) (k) is in effect shall be included in the report required in s. NR 440.07 (3). For each period, the type, reasons, and duration of the firing of the emergency fuel shall be reported.

(6) TEST METHODS AND PROCEDURES. (a) To compute the nitrogen oxides emissions, the owner or operator shall use analytical methods and procedures that are accurate to within 5% and are approved by the department to determine the nitrogen content of the fuel being fired.

(b) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided for in s. NR 440.08(2). Acceptable alternative methods and procedures are given in par. (f).

(c) The owner or operator shall determine compliance with the nitrogen oxides and sulfur dioxide standards in subs. (3) and (4) (a) as follows:

1. The nitrogen oxides emission rate (NO_x) shall be computed for each run using the following equation:

$$NO_x = (NO_{xo})(P_r/P_o)^{0.5}e^{19(H_o-0.00633)}(288K/T_a)^{1.53}$$

where:

NO_x is the emission rate of NO_x at 15% O_2 and ISO standard ambient conditions, volume percent

NO_{xo} is the observed NO_x concentration, ppm by volume

P_r is the reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg

P_o is the observed combustor inlet absolute pressure at test, mm Hg

H_o is the observed humidity of ambient air, g H_2O/g air

T_a is the ambient temperature, K

2. The monitoring device of sub. (5) (a) shall be used to determine the fuel consumption and the water–to–fuel ratio necessary to comply with sub. (3) at 30, 50, 75 and 100% of peak load or at 4 points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer.

3. Method 20 shall be used to determine the nitrogen oxides, sulfur dioxide and oxygen concentrations. The span values shall be 300 ppm of nitrogen oxide and 21% oxygen. The NO_x emissions shall be determined at each of the load conditions specified in subd. 2.

(d) The owner or operator shall determine compliance with the sulfur content standard in sub. (4) (b) as follows: ASTM D2880–78 shall be used to determine the sulfur content of liquid fuels and ASTM D1072–80, D3031–81, D4084–82 or D3246–81 shall be used for the sulfur content of gaseous fuels, incorporated by reference in s. NR 440.17. The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis, with verification of the dilution ratio, may be used, subject to the approval of the department.

(e) To meet the requirements of sub. (5) (b), the owner or operator shall use the methods specified in pars. (a) and (d) to determine the nitrogen and sulfur contents of the fuel being burned. The analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor or any other qualified agency.

(f) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. Instead of using the equation in par. (c) 1., manufacturers may develop ambient condition correction factors to adjust the nitrogen oxides emission level measured by the performance test as provided in s. NR 440.08 to ISO standard day conditions. These factors are developed for each gas turbine model they manufacture in terms of combustion inlet pressure, ambient air pressure, ambient air humidity, and ambient air temperature. They shall be substantiated with data and shall be approved for use by the administrator before the initial performance test required by s. NR 440.08. Notices of approval of custom ambient condition correction factors will be published in the federal register by the administrator.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (3) (d), renum. (6) (b) 2. to be 2. a. and am., cr. (6) (b) 2. b., Register, September, 1986, No. 369, eff. 10–1–86; renum. (1) to be (1) (a), cr. (1) (b), am. (2) (intro.), (3) (a) 3., (6) (a) 1. b. and (b) 2. a., r. (2) (o), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (6), Register, July, 1993, No. 451, eff. 7–1–93; am. (3) (a) 3., (j), (5) (c) 3., Register, December, 1995, No. 480, eff. 1–1–96**; correction in (6) (f) 1. made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.51 Lime manufacturing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each rotary lime kiln used in the manufacture of lime.

(b) The provisions of this section are not applicable to facilities used in the manufacture of lime at kraft pulp mills.

(c) Any facility under par. (a) that commences construction or modification after May 3, 1977, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Lime manufacturing plant" means any plant which uses a rotary lime kiln to produce lime product from limestone by calcination.

(b) "Lime product" means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime and dead–burned dolomite.

(c) "Positive–pressure fabric filter" means a fabric filter with the fans on the upstream side of the filter bags.

(d) "Rotary lime kiln" means a unit with an inclined rotating drum which is used to produce a lime product from limestone by calcination.

(e) "Stone feed" means limestone feedstock and millscale or other iron oxide additives that become part of the product.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any rotary lime kiln any gases which:

1. Contain particulate matter in excess of 0.30 kilogram per megagram of stone feed (0.60 lb/ton).

2. Exhibit greater than 15% opacity when exiting from a dry emission control device.

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system, except as provided in pars. (b) and (c), to monitor and record the opacity of a representative portion of the gases discharged into the atmosphere from any rotary lime kiln. The span of this system shall be set at 40% opacity.

(b) The owner or operator of any rotary lime kiln having a control device with a multiple stack exhaust or a roof monitor may, in lieu of the continuous opacity monitoring requirements of par. (a), monitor visible emissions at least once per day of operation by using a certified visible emissions observer who, for each site where visible emissions are observed, will perform 3 Reference Method 9 tests and record the results. (Reference Method 9 of 40 CFR part 60, Appendix A, is incorporated by reference in s. NR 440.17). Visible emission observation shall occur during normal operation of the rotary lime kiln at least once per day. For at least 3 6–minute periods, the opacity shall be recorded for any points where visible emissions are observed, and the corresponding feed rate of the kiln shall also be recorded. Records shall be maintained of any 6–minute average that is in excess of the emissions specified in sub. (3) (a).

(c) The owner or operator of any rotary lime kiln using a wet scrubbing emission control device subject to the provisions of this section may not be required to monitor the opacity of the gases discharged as required in par. (a), but shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device shall be accurate within ± 250 pascals (one inch of water).

2. A monitoring device for continuous measurement of the scrubbing liquid supply pressure to the control device. The monitoring device shall be accurate within ± 5% of the design scrubbing liquid supply pressure.

(d) For the purpose of conducting a performance test under s. NR 440.08 the owner or operator of any lime manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate a device for measuring the mass rate of stone feed to any affected rotary lime kiln. The measuring device used shall be accurate within ± 5% of the mass rate over its operating range.

(e) For the purpose of reports required under s. NR 440.07(3) periods of excess emissions that shall be reported are defined as all 6–minute periods during which the average opacity of the plume from any lime kiln subject to par. (a) is greater than 15% or, in the case of wet scrubbers, any period in which the scrubber pressure drop is greater than 30% below the rate established during the performance test. If visible emission observations are made according to par. (b), reports of excess emissions shall be submitted semiannually.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) (a) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s\ Q_{sd})/PK)$$

where:

E is the emission rate of particulate matter, kg/Mg (lb/ton) of stone feed

c_s is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the stone feed rate, Mg/hr (ton/hr)

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5 shall be used at negative–pressure fabric filters and other types of control devices and Method 5D shall be used as positive–pressure fabric filters to determine the particulate matter concentration (c_s) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.90 dscm (31.8 dscf).

3. The monitoring device of sub. (4) (d) shall be used to determine the stone feed rate (P) for each run.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) During the particulate matter run, the owner or operator shall use the monitoring devices in sub. (4) (c) 1. and 2. to determine the average pressure loss of the gas stream through the scrubber and the average scrubbing liquid supply pressure.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (1) (a), (2), (3) (a), (4) and (5), Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (4) (b) and (5) (c), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (e), r. and recr. (5), Register, June, 1993, No. 450, eff. 8–1–93.

NR 440.52 Lead–acid battery manufacturing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the affected facilities listed in par. (b) at any lead–acid battery manufacturing plant that produces or has the design capacity to produce in one day (24 hours) batteries containing an amount of lead equal to or greater than 5.9 Mg (6.5 tons).

(b) The provisions of this section are applicable to the following affected facilities used in the manufacture of lead–acid storage batteries:

1. Grid casting facility.
2. Paste mixing facility.
3. Three–process operation facility.
4. Lead oxide manufacturing facility.
5. Lead reclamation facility.
6. Other lead–emitting operations.

(c) Any facility under par. (b) that commences construction or modification after January 14, 1980, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Grid casting facility" means the facility which includes all lead melting pots and machines used for casting the grid used in battery manufacturing.

(b) "Lead–acid battery manufacturing plant" means any plant that produces a storage battery using lead and lead compounds for the plates and sulfuric acid for the electrolyte.

(c) "Lead oxide manufacturing facility" means a facility that produces lead oxide from lead, including product recovery.

(d) "Lead reclamation facility" means the facility that remelts lead scrap and casts it into lead ingots for use in the battery manufacturing process, and which is not a furnace affected under s. NR 440.29.

(e) "Other lead–emitting operation" means any lead–acid battery manufacturing plant operation from which lead emissions are collected and ducted to the atmosphere and which is not part of a grid casting, lead oxide manufacturing, lead reclamation, paste mixing, 3–process operation facility or a furnace affected under s. NR 440.29.

(f) "Paste mixing facility" means the facility including lead oxide storage, conveying, weighing, metering and charging operations; paste blending, handling and cooling operations; and plate pasting, takeoff, cooling and drying operations.

(g) "Three–process operation facility" means the facility including those processes involved with plate stacking, burning or strap casting, and assembly of elements into the battery case.

(3) STANDARDS FOR LEAD. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any grid casting facility any gases that contain lead in excess of 0.40 milligram of lead per dry standard cubic meter of exhaust (0.000176 gr/dscf).

2. From any paste mixing facility any gases that contain in excess of 1.00 milligram of lead per dry standard cubic meter of exhaust (0.00044 gr/dscf).

3. From any 3–process operation facility any gases that contain in excess of 1.00 milligram of lead per dry standard cubic meter of exhaust (0.00044 gr/dscf).

4. From any lead oxide manufacturing facility any gases that contain in excess of 5.0 milligrams of lead per kilogram of lead feed (0.010 lb/ton).

5. From any lead reclamation facility any gases that contain in excess of 4.50 milligrams of lead per dry standard cubic meter of exhaust (0.00198 gr/dscf).

6. From any other lead–emitting operation any gases that contain in excess of 1.00 milligram per dry standard cubic meter of exhaust (0.00044 gr/dscf).

7. From any affected facility other than a lead reclamation facility any gases with greater than zero percent opacity measured according to Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, and rounded to the nearest whole percentage.

8. From any lead reclamation facility any gases with greater than 5% opacity, measured according to Method 9 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, and rounded to the nearest whole percentage.

(b) When 2 or more facilities at the same plant (except the lead oxide manufacturing facility) are ducted to a common control device, an equivalent standard for the total exhaust from the commonly controlled facilities shall be determined as follows:

$$S_e = \sum_{a=1}^{N} S_a(Q_{sd_a}/Q_{sd_T})$$

where:

S_e is the equivalent standard for the total exhaust stream

S_a is the actual standard for each exhaust stream ducted to the control device

N is the total number of exhaust streams ducted to the control device

Q_{sd_a} is the dry standard volumetric flow rate of the effluent gas stream from each facility ducted to the control device

Q_{sd_T} is the total dry standard volumetric flow rate of all effluent gas streams ducted to the control device

(4) MONITORING OF EMISSIONS AND OPERATIONS. The owner or operator of any lead–acid battery manufacturing facility subject to the provisions of this section and controlled by scrubbing systems shall install, calibrate, maintain and operate a monitoring device or devices that measure and record the pressure drop across the scrubbing systems at least once every 15 minutes. The monitoring device shall have an accuracy of ± 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the lead standards in sub. (3), except sub. (3) (a) 4., as follows:

1. Method 12 shall be used to determine the lead concentration and, if applicable, the volumetric flow rate (Q_{sda}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

2. When different operations in a 3–process operation facility are ducted to separate control devices, the lead emission concentration (C) from the facility shall be determined as follows:

$$C = \left(\sum_{a=1}^{N}(C_a Q_{sda})\right) / \sum_{a=1}^{N} Q_{sda}$$

where:

C is the concentration of lead emissions for the entire facility, mg/dscm (gr/dscf)

C_a is the concentration of lead emissions from facility "a", mg/dscm (gr/dscf)

Q_{sda} is the volumetric flow rate of effluent gas from facility "a", dscm/hr (dscf/hr)

N is the total number of control devices to which separate operations in the facility are ducted

3. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity. The opacity numbers shall be rounded off to the nearest whole percentage.

(c) The owner or operator shall determine compliance with the lead standard in sub. (3) (a) 4. as follows:

1. The emission rate (E) from lead oxide manufacturing facility shall be computed for each run using the following equation:

$$E = \left(\sum_{i=1}^{M}(C_{Pbi} Q_{sdi})\right) / (PK)$$

where:

E is the emission rate of lead, mg/kg (lb/ton) of lead charged

C_{Pbi} is the concentration of lead from emission point "i", mg/dscm

Q_{sdi} is the volumetric flow rate of effluent gas from emission point "i", dscm/hr (sdcf/hr)

M is the number of emission points in the affected facility

P is the lead feed rate to the facility, kg/hr (ton/hr)

K is the conversion factor, 1.0 mg/mg (453,600 mg/lb)

2. Method 12 shall be used to determine the lead concentration (C_{Pb}) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The average lead feed rate (P) shall be determined for each run using the following equation:

$$P = NW/\theta$$

where:

N is the number of lead pigs (ingots) charged

W is the average mass of a pig, kg (ton)

θ is the duration of run, hr

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93**; correction in (5) (b) 1. made under s. 13.93 (2m) (b) 7., Stats., Register, November, 1999, No. 527.**

NR 440.525 Metallic mineral processing plants.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in metallic mineral processing plants: each crusher and screen in open–pit mines; each crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, truck loading station, truck unloading station, railcar loading station and railcar unloading station at the mill or concentrator with the following exceptions. All facilities located in underground mines are exempted from the provisions of this section. At uranium ore processing plants all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this section.

(b) An affected facility under par. (a) that commences construction or modification after August 24, 1982, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Bucket elevator" means a conveying device for metallic minerals consisting of a head and foot assembly that supports and drives an endless single or double strand chain or belt to which buckets are attached.

(b) "Capture system" means the equipment used to capture and transport particulate matter generated by one or more affected facilities to a control device.

(c) "Control device" means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities at a metallic mineral processing plant.

(d) "Conveyor belt transfer point" means a point in the conveying operation where the metallic mineral or metallic mineral concentrate is transferred to or from a conveyor belt except where the metallic mineral is being transferred to a stockpile.

(e) "Crusher" means a machine used to crush any metallic mineral and includes feeders or conveyors located immediately below the crushing surfaces. Crushers include, but are not limited to, the following types: jaw, gyratory, cone and hammermill.

(f) "Enclosed storage area" means any area covered by a roof under which metallic minerals are stored prior to future processing or loading.

(g) "Metallic mineral concentrate" means a material containing metallic compounds in concentrations higher than naturally occurring in ore but requiring additional processing if pure metal is to be isolated. A metallic mineral concentrate contains at least one of the following metals in any of its oxidation states and at a concentration that contributes to the concentrate's commercial value: aluminum, copper, gold, iron, lead, molybdenum, silver, titanium, tungsten, uranium, zinc and zirconium. This definition may not be construed as requiring that material containing metallic compounds be refined to a pure metal in order for the material to be considered a metallic mineral concentrate to be covered by the standards.

(h) "Metallic mineral processing plant" means any combination of equipment that produces metallic mineral concentrates from ore. Metallic mineral processing commences with the mining of ore and includes all operations either up to and including the loading of wet or dry concentrates or solutions of metallic minerals for transfer to facilities at nonadjacent locations that will subsequently process metallic concentrates into purified metals (or other products) or up to and including all material transfer and storage operations that precede the operations that produce refined metals (or other products) from metallic mineral concentrates at facilities adjacent to the metallic mineral processing plant. This definition may not be construed as requiring that mining of ore be conducted in order for the combination of equipment to be considered a metallic mineral processing plant. (See also the definition of "metallic mineral concentrate.")

(i) "Process fugitive emissions" means particulate matter emissions from an affected facility that are not collected by a capture system.

(j) "Product packaging station" means the equipment used to fill containers with metallic compounds or metallic mineral concentrates.

(k) "Railroad loading station" means that portion of a metallic mineral processing plant where metallic minerals or metallic mineral concentrates are loaded by a conveying system into railcars.

(L) "Railcar unloading station" means that portion of a metallic mineral processing plant where metallic ore is unloaded from a railcar into a hopper, screen or crusher.

(m) "Screen" means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series and retaining oversize material on the mesh surfaces (screens).

(n) "Stack emissions" means the particulate matter captured and released to the atmosphere through a stack, chimney or flue.

(o) "Storage bin" means a facility for storage (including surge bins and hoppers) or metallic minerals prior to further processing or loading.

(p) "Surface moisture" means water that is not chemically bound to a metallic mineral or metallic mineral concentrate.

(q) "Thermal dryer" means a unit in which the surface moisture content of a metallic mineral or a metallic mineral concentrate is reduced by direct or indirect contact with a heated gas system.

(r) "Truck loading station" means that portion of a metallic mineral processing plant where metallic minerals or metallic mineral concentrates are loaded by a conveying system into trucks.

(s) "Truck unloading station" means that portion of a metallic mineral processing plant where metallic ore is unloaded from a truck into a hopper, screen, or crusher.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an affected facility any stack emissions that:

1. Contain particulate matter in excess of 0.050 grams per dry standard cubic meter.

2. Exhibit greater than 7% opacity unless the stack emissions are discharged from an affected facility using a wet scrubbing emission control device.

(b) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an affected facility any process fugitive emissions that exhibit greater than 10% opacity.

(4) RECONSTRUCTION. (a) The cost of replacement of ore–contact surfaces on processing equipment may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital cost that would be required to construct a comparable new facility" under s. NR 440.15. Ore–contact surfaces are: crushing surfaces; screen meshes; bars, and plates; conveyor belts; elevator buckets; and pan feeders.

(b) Under s. NR 440.15 the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a) that are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2–year period following August 24, 1982.

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device for the continuous measurement of the change in pressure of the gas stream through the scrubber for any affected facility using a wet scrubber emission control device. The monitoring device must be certified by the manufacturer to be accurate within ±250 pascals (±1 inch water) gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device for the continuous measurement of the scrubbing liquid flow rate to a wet scrubber for any affected facility using any type of wet scrubbing emission control device. The monitoring device must be certified by the manufacturer to be accurate within ± 5% of design scrubbing liquid flow rate and must be calibrated on at least an annual basis in accordance with manufacturer's instructions.

(6) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) The owner or operator subject to the provisions of this section shall conduct a performance test and submit to the department a written report of the results of the test as specified in s. NR 440.08 (1).

(b) During the initial performance test of a wet scrubber, and at least weekly thereafter, the owner or operator shall record the measurements of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(c) After the initial performance test of a wet scrubber the owner or operator shall submit semiannual reports to the department of occurrences when the measurements of the scrubber pressure loss or gain and liquid flow rate differ by more than ± 30% from the average obtained during the most recent performance test.

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards sub. (3) as follows:

1. Method 5 or 17 shall be used to determine the particulate matter concentration. The sample volume for each run shall be at least 1.70 dscm (60 dscf). The sampling probe and filter holder of Method 5 may be operated without heaters if the gas stream being sampled is at ambient temperature. For gas streams above ambient temperature, the Method 5 sampling train shall be operated with a probe and filter temperature slightly above the effluent temperature, up to a maximum filter temperature of 121°C (250°F), in order to prevent water condensation on the filter.

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity from stack emissions and process fugitive emissions. The observer shall read opacity only when emissions are clearly identified as emanating solely from the affected facility being observed.

(c) To comply with sub. (6) (c) the owner or operator shall use the monitoring devices in sub. (5) (a) and (b) to determine the pressure loss of the gas stream through the scrubber and scrubbing liquid flow rate at any time during each particulate matter run, and the average of the 3 determinations shall be computed.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; renum. to be NR 440.525 and r. (6) (e), am. (2) (intro.), (g), (h), (3) (a) (intro.), 1. and (b), (4) (a), Register, September, 1990, No. 417, eff. 10–1–90; am. (6) (c), r. and recr. (7), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.53 Automobile and light–duty truck surface coating operations. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in an automobile or light–duty truck assembly plant: each prime coat operation, each guide coat operation and each topcoat operation.

(b) Exempt from the provisions of this section are operations used to coat plastic body components or all–plastic automobile or light–duty truck bodies on separate coating lines. The attachment of plastic body parts to a metal body before the body is coated does not cause the metal body coating operation to be exempted.

(c) Any facility under par. (a) that commences construction, reconstruction or modification after October 5, 1979 is subject to the requirements of this section.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Applied coating solids" means the volume of dried or cured coating solids which is deposited and remains on the surface of the automobile or light–duty truck body.

2. "Automobile" means a motor vehicle capable of carrying no more than 12 passengers.

3. "Automobile and light–duty truck body" means the exterior surface of an automobile or light–duty truck including hoods, fenders, cargo boxes, doors and grill opening panels.

4. "Bake oven" means a device that uses heat to dry or cure coatings.

5. "Electrodeposition" or "EDP" means a method of applying a prime coat by which the automobile or light–duty truck body is submerged in a tank filled with coating material and an electrical field is used to effect the deposition of the coating material on the body.

6. "Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coating solids. Electrostatic spray application can be used for prime coat, guide coat or topcoat operations.

6e. "Flashoff area" means the structure on automobile and light–duty truck assembly lines between the coating application system (dip tank or spray booth) and the bake oven.

6g. "Guide coat operation" means the guide coat spray booth, flashoff area and bake ovens which are used to apply and dry or cure a surface coating between the prime coat and topcoat operation on the components of automobile and light–duty truck bodies.

6k. "Light–duty truck" means any motor vehicle rated at 3,850 kilograms gross vehicle weight or less, designed mainly to transport property.

6p. "Plastic body" means an automobile or light–duty truck body constructed of synthetic organic material.

7. "Plastic body component" means any component of an automobile or light–duty truck exterior surface constructed of synthetic organic material.

8. "Prime coat operation" means the prime coat spray booth or dip tank, flashoff area and bake oven or ovens which are used to apply and dry or cure the initial coating on components of automobile or light–duty truck bodies.

9. "Purge" or "line purge" means the coating material expelled from the spray system when clearing it.

10. "Solventborne" means a coating which contains 5% or less water by weight in its volatile fraction.

11. "Spray application" means a method of applying coatings by atomizing the coating material and directing the atomized material toward the part to be coated. Spray applications can be used for prime coat, guide coat and topcoat operations.

12. "Spray booth" means a structure housing automatic or manual spray application equipment where prime coat, guide coat or topcoat is applied to components of automobile or light–duty truck bodies.

13. "Surface coating operation" means any prime coat, guide coat or topcoat operation on an automobile or light–duty truck surface coating line.

14. "Topcoat operation" means the topcoat spray booth, flashoff area and bake oven or ovens which are used to apply and dry or cure the final coating or coatings on components of automobile and light–duty truck bodies.

15. "Transfer efficiency" means the ratio of the amount of coating solids transferred onto the surface of a part or product to the total amount of coating solids used.

16. "VOC content" means all volatile organic compounds that are in a coating expressed as kilograms of VOC per liter of coating solids.

17. "Waterborne" or "water reducible" means a coating which contains more than 5 weight percent water in its volatile fraction.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. C_{aj} = concentration of VOC (as carbon) in the effluent gas flowing through stack (j) leaving the control device (parts per million by volume).

2. C_{bi} = concentration of VOC (as carbon) in the effluent gas flowing through stack (i) entering the control device (parts per million by volume).

3. C_{fk} = concentration of VOC (as carbon) in the effluent gas flowing through exhaust stack (k) not entering the control device (parts per million by volume).

4. D_{ci} = density of each coating (i) as received (kilograms per liter).

5. D_{dj} = density of each type VOC dilution solvent (j) added to the coatings, as received (kilograms per liter).

6. D_r = density of VOC recovered from an affected facility (kilograms per liter).

7. E = VOC destruction efficiency of the control device.

8. F = fraction of total VOC which is emitted by an affected facility that enters the control device.

9. G = volume weighted average mass of VOC per volume of applied solids (kilograms per liter).

10. L_{ci} = volume of each coating (i) consumed, as received (liters).

11. L_{cil} = volume of each coating (i) consumed by each application method (l), as received (liters).

12. L_{dj} = volume of each type VOC dilution solvent (j) added to the coatings, as received (liters).

13. L_r = volume of VOC recovered from an affected facility (liters).

14. L_s = volume of solids in coatings consumed (liters).

15. M_d = total mass of VOC in dilution solvent (kilograms).

16. M_o = total mass of VOC in coatings as received (kilograms).

17. M_r = total mass of VOC recovered from an affected facility (kilograms).

18. N = volume weighted average mass of VOC per volume of applied coating solids after the control device,

$$\frac{\text{kilograms of VOC}}{\text{liter of applied solids.}}$$

19. Q_{aj} = volumetric flow rate of the effluent gas flowing through stack (j) leaving the control device (dry standard cubic meters per hour).

20. Q_{bi} = volumetric flow rate of the effluent gas flowing through stack (i) entering the control device (dry standard cubic meters per hour).

21. Q_{fk} = volumetric flow rate of the effluent gas flowing through exhaust stack (k) not entering the control device (dry standard cubic meters per hour).

22. T = overall transfer efficiency.

23. T_l = transfer efficiency for application method (l).

24. V_{si} = proportion of solids by volume in each coating (i) as received,

$$\frac{\text{liter solids}}{\text{liter coating.}}$$

25. W_{oi} = proportion of VOC by weight in each coating (i), as received,

$$\frac{\text{kilograms VOC}}{\text{kilograms coating.}}$$

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. On and after the date on which the initial performance test required by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility VOC emissions in excess of:

(a) 0.16 kilograms of VOC per liter of applied coating solids from each prime coat operation.

(b) 1.40 kilograms of VOC per liter of applied coating solids from each guide coat operation.

(c) 1.47 kilograms of VOC per liter of applied coating solids from each topcoat operation.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (6) do not apply to the performance test procedures required by this subsection.

(b) The owner or operator of an affected facility shall conduct an initial performance test in accordance with s. NR 440.08 (1), and thereafter for each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining the monthly volume weighted average mass of VOC emitted per volume of applied coating solids.

1. The owner or operator shall use the following procedures for each affected facility which does not use a capture system and a control device to comply with the applicable emission limit specified under sub. (3).

a. Calculate the volume weighted average mass of VOC per volume of applied coating solids for each calendar month for each affected facility. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or from data determined by an analysis of each coating, as received, by Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine data used in the calculation of the VOC content of coatings by Reference Method 24 or an equivalent or alternative method. The owner or operator shall determine from company records on a monthly basis the volume of coating consumed, as received, and the mass of solvent used for thinning purposes. The volume weighted average of the total mass of VOC per volume of coating solids used each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOC used in each calendar month for each affected facility by the following equation where "n" is the total number of coatings used and "m" is the total number of VOC solvents used:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}D_{ci}W_{oi} + \sum_{j=1}^{m} L_{dj}D_{dj}$$

($\Sigma L_{dj} D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

2) Calculate the total volume of coating solids used in each calendar month for each affected facility by the following equation where"n" is the total number of coatings used:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

3) Select the appropriate transfer efficiency (T) from the following tables for each surface coating operation:

Application method	Transfer efficiency
Air atomized spray (waterborne coating)	0.39
Air atomized spray (solventborne coating)	0.50
Manual electrostatic spray	0.75
Automatic electrostatic spray	0.95
Electrodeposition	1.00

The values in the table above represent an overall system efficiency which includes a total capture of purge. If a spray system uses line purging after each vehicle and does not collect any of the purge material, the following table shall be used:

Application method	Transfer efficiency
Air atomized spray (waterborne coating)	0.30
Air atomized spray (solventborne coating)	0.40
Manual electrostatic spray	0.62
Automatic electrostatic spray	0.75

Note: Under 40 CFR 60.393 (c) (1) (i) (C), if the owner or operator can justify to the administrator's satisfaction that other values for transfer efficiencies are appropriate, the administrator will approve their use on a case–by–case basis.

a) When more than one application method (l) is used on an individual surface coating operation, the owner or operator shall perform an analysis to determine an average transfer efficiency by the following equation where "n" is the total number of coatings used and "p" is the total number of application methods:

$$T = \frac{\sum_{i=1}^{n} \sum_{l=1}^{p} T_l V_{si} L_{cil}}{L_s}$$

4) Calculate the volume weighted average mass of VOC per volume of applied coating solids (G) during each calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

b. If the volume weighted average mass of VOC per volume of applied coating solids (G), calculated on a calendar month basis, is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purpose of this section.

2. The owner or operator shall use the following procedures for each affected facility which uses a capture system and a control device that destroys VOC (e.g., incinerator) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the volume weighted average mass of VOC per volume of applied coating solids (G) during each calendar month for each affected facility as described under subd. 1. a.

b. Calculate the volume weighted average mass of VOC per volume of applied solids emitted after the control device, by the following equation:

$$N = G[1 - FE]$$

1) Determine the fraction of total VOC which is emitted by an affected facility that enters the control device by using the following equation where "n" is the total number of stacks entering the control device and "p" is the total number of stacks not connected to the control device:

$$F = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi}}{\sum_{i=1}^{n} Q_{bi} C_{bi} + \sum_{k=1}^{p} Q_{fk} C_{fk}}$$

If the owner can justify to the department's satisfaction that another method will give comparable results, the department shall approve its use on a case–by–case basis.

a) In subsequent months, the owner or operator shall use the most recently determined capture fraction for the performance test.

2) Determine the destruction efficiency of the control device using values of the volumetric flow rate of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation where "n" is the total number of stacks entering the control device and "m" is the total number of stacks leaving the control device:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

a) In subsequent months, the owner or operator shall use the most recently determined VOC destruction efficiency for the performance test.

3) If an emission control device controls the emissions from more than one affected facility, the owner or operator shall measure the VOC concentration (C_{bi}) in the effluent gas entering the control device (in parts per million by volume) and the volumetric flow rate (Q_{bi}) of the effluent gas (in dry standard cubic meters per hour) entering the device through each stack. The destruction or removal efficiency determined using these data shall be applied to each affected facility served by the control device.

c. If the volume weighted average mass of VOC per volume of applied solids emitted after the control device (N) calculated on a calendar month basis is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this section.

3. The owner or operator shall use the following procedures for each affected facility which uses a capture system and a control device that recovers the VOC (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the mass of VOC $(M_o + M_d)$ used during each calendar month for each affected facility as described under subd. 1. a.

b. Calculate the total volume of coating solids (L_s) used in each calendar month for each affected facility as described under subd. 1. a.

c. Calculate the mass of VOC recovered (M_r) each calendar month for each affected facility by the following equation:

$$M_r = L_r D_r$$

d. Calculate the volume weighted average mass of VOC per volume of applied coating solids emitted after the control device during a calendar month by the following equation:

$$N = \frac{M_o + M_d - M_r}{L_s T}$$

e. If the volume weighted average mass of VOC per volume of applied solids emitted after the control device (N) calculated on a calendar month basis is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this section.

(5) MONITORING OF EMISSIONS AND OPERATIONS. The owner or operator of an affected facility which uses an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices as prescribed below:

(a) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(b) Each temperature measurement device shall be installed, calibrated and maintained according to accepted practice and the manufacturer's specifications. The device shall have an accuracy of the greater of ± 0.75% of the temperature being measured expressed in degrees Celsius or ±2.5°C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent record is produced.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator of an affected facility shall include the data outlined in subds. 1. and 2. in the initial compliance report required by s. NR 440.08.

1. The owner or operator shall report the volume weighted average mass of VOC per volume of applied coating solids for each affected facility.

2. Where compliance is achieved through the use of incineration, the owner or operator shall include the following additional data in the control device initial performance test required by s. NR 440.08 (1) or subsequent performance tests at which destruction efficiency is determined: the combustion temperature (or the gas temperature upstream and downstream of the catalyst bed), the total mass of VOC per volume of applied coating solids before and after the incinerator, capture efficiency, the destruction efficiency of the incinerator used to attain compliance with the applicable emission limit specified in sub. (3), and a description of the method used to establish the fraction of VOC captured and sent to the control device.

(b) Following the initial performance test, the owner or operator of an affected facility shall identify, record and submit a written report to the department every calendar quarter of each instance in which the volume−weighted average of the total mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3). If no instances have occurred during a particular quarter, a report stating this shall be submitted to the department semiannually. Where compliance is achieved through the use of a capture system and control device, the volume−weighted average after the control device shall be reported.

(c) Where compliance with sub. (3) is achieved through the use of incineration, the owner or operator shall continuously record the incinerator combustion temperature during coating operations for thermal incineration or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration. The owner or operator shall submit a written report at the frequency specified in s. NR 440.07 (3) and as defined as follows:

1. For thermal incinerators, every 3−hour period shall be reported during which the average temperature measured is more than 28°C less than the average temperature during the most recent control device performance test at which the destruction efficiency was determined as specified under sub. (4).

2. For catalytic incinerators, every 3−hour period shall be reported during which the average temperature immediately before the catalyst bed, when the coating system is operational, is more than 28°C less than the average temperature immediately before the catalyst bed during the most recent control device performance test at which destruction efficiency was determined as specified under sub. (4). In addition, every 3−hour period shall be reported each quarter during which the average temperature difference across the catalyst bed when the coating system is operational is less than 80% of the average temperature difference of the device during the most recent control device performance test at which destruction efficiency was determined as specified under sub. (4).

3. For thermal and catalytic incinerators, if no such periods occur, the owner or operator shall submit a negative report.

(d) The owner or operator shall notify the department 30 days in advance of any test by Reference Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(7) REFERENCE METHODS AND PROCEDURES. (a) The reference methods in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08 shall be used to conduct performance tests.

1. Reference Method 24 or an equivalent or alternative method approved by the administrator shall be used for the determination of the data used in the calculation of the VOC content of the coatings used for each affected facility. Manufacturer's formulation data is approved by the administrator as an alternative method to Method 24. In the event of dispute, Reference Method 24 shall be the referee method.

2. Reference Method 25 or an equivalent or alternative method approved by the administrator shall be used for the determination of the VOC concentration in the effluent gas entering and leaving the emission control device for each stack equipped with an emission control device and in the effluent gas leaving each stack not equipped with a control device.

3. The following methods shall be used to determine the volumetric flow rate in the effluent gas in a stack:

a. Method 1 for sample and velocity traverses,

b. Method 2 for velocity and volumetric flow rate,

c. Method 3 for gas analysis, and

d. Method 4 for stack gas moisture.

(b) For Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample must be a one−liter sample taken in a one−liter container.

(c) For Reference Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each of 3 runs shall be at least one hour. The minimum sample volume shall be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department. The department shall approve the sampling of representative stacks on a case−by−case basis if the owner or operator can demonstrate to the satisfaction of the department that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

(8) MODIFICATIONS. For purposes of this chapter, the following physical or operational changes are not, by themselves, considered modifications of existing facilities described in sub. (1) (a):

(a) Changes as a result of model year changeovers or switches to larger cars.

(b) Changes in the application of the coatings to increase coating film thickness.

History: Cr. Register, January, 1984, No. 337, eff. 2−1−84; am. (2) (a) (intro.), (b) (intro.), (4) (c) 1. a. 3), (7) (a) 1. and 2., cr. (2) (a) 6 e., 6 g., 6 k and 6 p., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (6) (b), am. (6) (c) (intro.), Register, May, 1993, No. 450, eff. 7–1–93; am. (2) (a) 10., (4) (c) 1. a., (3) (intro.), (6) (c) (intro.), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.54 Phosphate rock plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities used in phosphate rock plants which have a maximum plant production capacity greater than 3.6 megagrams per hour (4 tons/hr): dryers, calciners, grinders, and ground rock handling and storage facilities, except those facilities producing or preparing phosphate rock solely for consumption in elemental phosphorus production.

(b) Any facility under par. (a) which commences construction, modification or reconstruction after September 21, 1979, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Beneficiation" means the process of washing the rock to remove impurities or to separate size fractions.

(b) "Calciner" means a unit in which the moisture and organic matter of phosphate rock is reduced within a combustion chamber.

(c) "Dryer" means a unit in which the moisture content of phosphate rock is reduced by contact with a heated gas stream.

(d) "Grinder" means a unit which is used to pulverize dry phosphate rock to the final product size used in the manufacture of phosphate fertilizer and does not include crushing devices used in mining.

(e) "Ground phosphate rock handling and storage system" means a system which is used for the conveyance and storage of ground phosphate rock from grinders at phosphate rock plants.

(f) "Phosphate rock feed" means all material entering the process unit including moisture and extraneous material as well as the following ore minerals: fluorapatite, hydroxylapatite, chlorapatite and carbonateapatite.

(g) "Phosphate rock plant" means any plant which produces or prepares phosphate rock product by any or all of the following processes: mining, beneficiation, crushing, screening, cleaning, drying, calcining and grinding.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any phosphate rock dryer any gases which:

a. Contain particulate matter in excess of 0.030 kilogram per megagram of phosphate rock feed (0.060 lb/ton), or

b. Exhibit greater than 10% opacity.

2. From any phosphate rock calciner processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock, any gases which:

a. Contain particulate matter in excess of 0.12 kilogram per megagram of phosphate rock feed (0.23 lb/ton), or

b. Exhibit greater than 10% opacity.

3. From any phosphate rock calciner processing beneficiated rock any gases which:

a. Contain particulate matter in excess of 0.055 kilogram per megagram of phosphate rock feed (0.11 lb/ton), or

b. Exhibit greater than 10% opacity.

4. From any phosphate rock grinder any gases which:

a. Contain particulate matter in excess of 0.006 kilogram per megagram of phosphate rock feed (0.012 lb/ton), or

b. Exhibit greater than zero percent opacity.

5. From any ground phosphate rock handling and storage system any gases which exhibit greater than zero percent opacity.

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system, except as provided in pars. (b) and (c), to monitor and record the opacity of the gases discharged into the atmosphere from any phosphate rock dryer, calciner or grinder. The span of this system shall be set at 40% opacity.

(b) For ground phosphate rock storage and handling systems, continuous monitoring systems for measuring opacity are not required.

(c) The owner or operator of any affected phosphate rock facility using a wet scrubbing emission control device will not be subject to the requirements in par. (a), but shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device shall be certified by the manufacturer to be accurate within ±250 pascals (±one inch water) gauge pressure.

2. A monitoring device for the continuous measurement of the scrubbing liquid supply pressure to the control device. The monitoring device shall be accurate within ± 5% of design scrubbing liquid supply pressure.

(d) For the purpose of conducting a performance test under s. NR 440.08, the owner or operator of any phosphate rock plant subject to the provisions of this section shall install, calibrate, maintain and operate a device for measuring the phosphate rock feed to any affected dryer, calciner or grinder. The measuring device used shall be accurate to within ± 5% of the mass rate over its operating range.

(e) For the purpose of reports required under s. NR 440.07 (3), periods of excess emissions that shall be reported are defined as all 6–minute periods during which the average opacity of the plume from any phosphate rock dryer, calciner or grinder subject to par. (a) exceeds the applicable opacity limit.

(f) Any owner or operator subject to the requirements under par. (c) shall report for each calendar quarter all measurement results that are less than 90% of the average levels maintained during the most recent performance test conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3).

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided for in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s Q_{sd})/(PK)$$

where:

E is the emission rate of particulate matter kg/Mg (lb/ton) of phosphate rock feed

c_S is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the phosphate rock feed rate, Mg/hr (ton/hr)

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30 dscf).

3. The device of sub. (4) (d) shall be used to determine the phosphate rock feed rate (P) for each run.

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) To comply with sub. (4) (f), if applicable, the owner or operator shall use the monitoring devices in sub. (4) (c) 1. and 2. to determine the average pressure loss of the gas stream through the scrubber and the average scrubbing supply pressure during the particulate matter runs.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.) and (3) (a) 1. a., Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.55 Ammonium sulfate manufacture. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each ammonium sulfate dryer within an ammonium sulfate manufacturing plant in the caprolactam by–product, synthetic and coke oven by–product sectors of the ammonium sulfate industry.

(b) Any facility under par. (a) that commences construction or modification after February 4, 1980, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Ammonium sulfate dryer" means a unit or vessel into which ammonium sulfate is charged for the purpose of reducing the moisture content of the product using a heated gas stream. The unit includes foundations, super–structure, material charger systems, exhaust systems and integral control systems and instrumentation.

(b) "Ammonium sulfate feed material streams" means the sulfuric acid feed stream to the reactor/crystallizer for synthetic and coke oven by–product ammonium sulfate manufacturing plants; and means the total or combined feed streams (the oximation ammonium sulfate stream and the rearrangement reaction ammonium sulfate stream) to the crystallizer stage, prior to any recycle streams.

(c) "Ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate.

(d) "Caprolactam by–product ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate as a by–product from process streams generated during caprolactam manufacture.

(e) "Coke oven by–product ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate by reacting sulfuric acid with ammonia recovered as a by–product from the manufacture of coke.

(f) "Synthetic ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate by direct combination of ammonia and sulfuric acid.

(3) STANDARDS FOR PARTICULATE MATTER. On or after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of an ammonium sulfate dryer subject to the provisions of this section may cause to be discharged into the atmosphere, from any ammonium sulfate dryer, particulate matter at an emission rate exceeding 0.15 kilogram of particulate per megagram of ammonium sulfate produced (0.30 pound of particulate per ton of ammonium sulfate produced) and exhaust gases with greater than 15% opacity.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any ammonium sulfate manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate flow monitoring device which can be used to determine the mass flow of ammonium sulfate feed material streams to the process. The flow monitoring device shall have an accuracy of ±5% over its range. However, if the plant uses weight scales of the same accuracy to directly measure production rate of ammonium sulfate, the use of flow monitoring devices is not required.

(b) The owner or operator of any ammonium sulfate manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the emission control system. The monitoring device shall have an accuracy of ± 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s Q_{sd})/(PK)$$

where:

E is the emission rate of particulate matter, kg/Mg (lb/ton) of ammonium sulfate produced

c_s is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the production rate of ammonium sulfate, Mg/hr (ton/hr)

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5 shall be used to determine the particulate matter concentration (c_s) and volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume for each run shall be at least 60 minutes and 1.50 dscm (53 dscf).

3. Direct measurement using product weigh scales or computed from material balance shall be used to determine the rate (P) of the ammonium sulfate production. If production rate is determined by material balance, the following equations shall be used:

a. For synthetic and coke oven by–product ammonium sulfate plants:

$$P = ABCK'$$

where:

A is the sulfuric acid flow rate to the reactor/crystallizer averaged over the time period taken to conduct the run, liter/min

B is the acid density (a function of acid strength and temperature), g/cc

C is the acid strength, decimal fraction

K′ is the conversion factor, 0.0808 (Mg–min–cc)/(g–hr–liter) [0.0891 (ton– min–cc)/(g–hr–liter)]

b. For caprolactam by–product ammonium sulfate plants:

$$P = DEFK''$$

where:

D is the total combined feed stream flow rate to the ammonium crystallizer before the point where any recycle streams enter the stream averaged over the time period taken to conduct the test run, liter/min

E is the density of the process stream solution, g/liter

F is the percent mass of ammonium sulfate in the process solution, decimal fraction

K″ is the conversion factor, 6.0×10^{-5} (Mg–min)/(g–hr) [6.614×10^{-5} (ton–min)/g–hr)]

4. Method 9 and the procedures in s. NR 440.11 shall be used to determine the opacity.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am (2) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (5), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.56 Graphic arts industry: publication rotogravure printing. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which the provisions of this section apply is each publication rotogravure printing press.

(b) The provisions of this section do not apply to proof presses.

(c) Any facility under par. (a) that commences construction, modification or reconstruction after October 28, 1980 is subject to the requirements of this section.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Automatic temperature compensator" means a device that continuously senses the temperature of fluid flowing through a metering device and automatically adjusts the registration of the measured volume to the corrected equivalent volume at a base temperature.

2. "Base temperature" means an arbitrary reference temperature for determining liquid densities or adjusting the measured volume of a liquid quantity.

3. "Density" means the mass of a unit volume of liquid, expressed as grams per cubic centimeter, kilograms per liter or pounds per gallon, at a specified temperature.

4. "Gravure cylinder" means a printing cylinder with an intaglio image consisting of minute cells or indentations specially engraved or etched into the cylinder's surface to hold ink when continuously revolved through a fountain of ink.

5. "Performance averaging period" means 30 calendar days, one calendar month or 4 consecutive weeks as specified in subsections of this section.

6. "Proof press" means any device used only to check the quality of the image formation of newly engraved or etched gravure cylinders and which prints only nonsaleable items.

7. "Publication rotogravure printing press" means any number of rotogravure printing units capable of printing simultaneously on the same continuous web or substrate and includes any associated device for continuously cutting and folding the printed web, where the following saleable paper products are printed: catalogues, including mail order and premium; direct mail advertisements, including circulars, letters, pamphlets, cards and printed envelopes; display advertisements, including general posters, outdoor advertisements, car cards, window posters, counter and floor displays, point–of–purchase and other printed display material; magazines; miscellaneous advertisements, including brochures, pamphlets, catalogue sheets, circular folders, announcements, package inserts, book jackets, market circulars, magazine inserts and shopping news; newspapers, magazine and comic supplements for newspapers, and preprinted newspaper inserts, including hi–fi and spectacolor rolls and sections; periodicals; and telephone and other directories, including business reference services.

8. "Raw ink" means all purchased ink.

9. "Related coatings" means all non–ink purchased liquids and liquid–solid mixtures containing VOC solvent, usually referred to as extenders or varnishes, that are used at publication rotogravure printing presses.

10. "Rotogravure printing unit" means any device designed to print one color ink on one side of a continuous web or substrate using a gravure cylinder.

11. "Solventborne ink systems" means ink and related coating mixtures whose volatile portion consists essentially of VOC solvent with not more than 5 weight percent water, as applied to the gravure cylinder.

12. "Solvent recovery system" means an air pollution control system by which VOC solvent vapors in air or other gases are captured and directed through one or more condensers or a vessel containing beds of activated carbon or other adsorbents. For the condensation method, the solvent is recovered directly from the condenser. For the adsorption method, the vapors are adsorbed, then desorbed by steam or other media, and finally condensed and recovered.

13. "VOC" means volatile organic compound.

14. "VOC solvent" means an organic liquid or liquid mixture consisting of VOC components.

15. "Waterborne ink systems" means ink and related coating mixtures whose volatile portion consists of a mixture of VOC solvent and more than 5 weight percent water, as applied to the gravure cylinder.

(b) Symbols used in this section are defined as follows:

1. D_B = the density at the base temperature of VOC solvent used or recovered during one performance averaging period.

2. D_{ci} = the density of each color of raw ink and each related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

3. D_{di} = the density of each VOC solvent (i) added to the ink for dilution at the subject facility, at the solvent temperature when the volume of solvent used is measured.

4. D_{gi} = the density of each VOC solvent (i) used as a cleaning agent at the subject facility, at the solvent temperature when the volume of cleaning solvent used is measured.

5. D_{hi} = the density of each quantity of water (i) added at the subject facility, for dilution of waterborne ink systems at the water temperature when the volume of dilution water used is measured.

6. D_{mi} = the density of each quantity of VOC solvent and miscellaneous solventborne waste inks and waste VOC solvents (i) recovered from the subject facility, at the solvent temperature when the volume of solvent recovered is measured.

7. D_{oi} = the density of the VOC solvent contained in each raw ink and related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

8. D_{wi} = the density of the water contained in each waterborne raw ink and related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

9. L_{ci} = the measured liquid volume of each color of raw ink and each related coating (i) used at the facility of a corresponding VOC content, V_{oi} or W_{oi} with a VOC density, D_{oi}, and a coating density, D_{ci}.

10. L_{di} = the measured liquid volume of each VOC solvent (i) with corresponding density, D_{di}, added to dilute the ink used at the subject facility.

10m. L_{gi} = the measured liquid volume of each VOC solvent (i) with corresponding density, D_{gi}, used as a cleaning agent at the subject facility.

11. M_{ci} = the mass, determined by direct weighing, of each color of raw ink and each related coating (i) used at the subject facility.

12. M_d = the mass, determined by direct weighing, of VOC solvent added to dilute the ink used at the subject facility during one performance averaging period.

13. M_g = the mass, determined by direct weighing, of VOC solvent used as a cleaning agent at the subject facility during one performance averaging period.

14. M_h = the mass, determined by direct weighing, or water added for dilution with waterborne ink systems used at the subject facility during one performance averaging period.

15. M_m = the mass, determined by direct weighing, of VOC solventborne waste inks and waste VOC solvents recovered from the subject facility during one performance averaging period.

16. M_o = the total mass of VOC solvent contained in the raw inks and related coatings used at the subject facility during one performance averaging period.

17. M_r = the total mass of VOC solvent recovered from the subject facility during one performance averaging period.

18. M_t = the total mass of VOC solvent used at the subject facility during one performance averaging period.

19. M_v = the total mass of water used with waterborne ink systems at the subject facility during one performance averaging period.

20. M_w = the total mass of water contained in the waterborne raw inks and related coatings used at the subject facility during one performance averaging period.

21. P = the average VOC emission percentage for the subject facility for one performance averaging period.

22. V_{oi} = the liquid VOC content, expressed as a volume fraction of VOC volume per total volume of coating, of each color of raw ink and related coating (i) used at the subject facility.

23. V_{wi} = the water content, expressed as a volume fraction of water volume per total volume of coating, or each color of waterborne raw ink and related coating (i) used at the subject facility.

24. W_{oi} = the VOC content, expressed as a weight fraction of mass of VOC per total mass of coating, or each color of raw ink and related coating (i) used at the subject facility.

25. W_{wi} = the water content, expressed as a weight fraction of mass of water per total mass of coating, of each color of waterborne raw ink and related coating (i) used at the subject facility.

(c) The following subscripts are used in this section with the symbols in par. (b) to denote the applicable facility:

1. a = affected facility.

2. b = both affected and existing facilities controlled in common by the same air pollution control equipment.

3. e = existing facility.

4. f = all affected and existing facilities located within the same plant boundary.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. During the period of the performance test required to be conducted by s. NR 440.08 and after the date required for completion of the test, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility VOC equal to more than 16% of the total mass of VOC solvent and water used at that facility during any one performance averaging period. The water used includes only that water contained in the waterborne raw inks and related coatings and the water added for dilution with waterborne ink systems.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) The owner or operator of any affected facility shall conduct performance tests in accordance with s. NR 440.08 under the following conditions:

1. The performance averaging period for each test shall be 30 consecutive calendar days and not an average of 3 separate runs as prescribed under s. NR 440.08 (6).

2. Except as provided under pars. (f) and (g), if affected facilities routinely share the same raw ink storage and handling system with existing facilities, then temporary measurement procedures for segregating the raw inks, related coatings, VOC solvent and water used at the affected facilities shall be employed during the test. For this case, an overall emission percentage for the combined facilities as well as for only the affected facilities shall be calculated during the test.

3. For the purpose of measuring bulk storage tank quantities of each color of raw ink and each related coating used, the owner or operator of any affected facility shall install, calibrate, maintain and continuously operate during the test one or more of the following:

a. Non–resettable totalizer metering devices for indicating the cumulative liquid volumes used at each affected facility; or

b. Segregated storage tanks for each affected facility to allow determination of the liquid quantities used by measuring devices other than the press meters required under subd. 3. a.; or

c. Storage tanks to serve more than one facility with the liquid quantities used determined by measuring devices other than press meters, if facilities are combined as described under par. (d), (f) or (g).

4. The owner or operator may choose to install an automatic temperature compensator with any liquid metering device used to measure the raw inks, related coatings, water, or VOC solvent used or VOC solvent recovered.

5. Records of the measured amounts used at the affected facility and the liquid temperature at which the amounts were measured shall be maintained for each shipment of all purchased material or on at least a weekly basis for the following:

a. The raw inks and related coatings used;

b. The VOC and water content of each raw ink and related coating used as determined according to sub. (6).

c. The VOC solvent and water added to the inks used;

d. The VOC solvent used as a cleaning agent; and

e. The VOC solvent recovered.

6. The density variations with temperature of the raw inks, related coatings, VOC solvents used, and VOC solvent recovered shall be determined by the methods stipulated in sub. (6) (d).

7. The calculated emission percentage may be reported as rounded–off to the nearest whole number.

8. Printing press startups and shutdowns may not be included in the exemption provisions under s. NR 440.08 (3). Frequent periods of press startups and shutdowns are normal operations and constitute representative conditions for the purpose of a performance test.

(b) If an affected facility uses waterborne ink systems or a combination of waterborne and solventborne ink systems with a solvent recovery system, compliance shall be determined by the following procedures, except as provided in pars. (d) through (g):

1. The mass of VOC in the solventborne and waterborne raw inks and related coatings used shall be determined by the following equation:

$$(M_o)_a = \sum_{i=1}^{k} (M_{ci})_a (W_{oi})_a + \sum_{i=1}^{m} (L_{ci})_a (D_{ci})_a (W_{oi})_a + \sum_{i=1}^{n} (L_{ci})_a (V_{oi})_a (D_{oi})_a$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of VOC content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different VOC solvent densities

2. The total mass of VOC used shall be determined by the following equation:

$$(M_t)_a = (M_o)_a + \sum_{i=1}^{m} (L_{di})_a (D_{di})_a + (M_d)_a + \sum_{i=1}^{n} (L_{gi})_a (D_{gi})_a + (M_g)_a$$

where:

m and n are the respective total numbers of VOC dilution and cleaning solvents measured as used by volume with different densities

3. The mass of water in the waterborne raw inks and related coatings used shall be determined by the following equation:

$$(M_w)_a = \sum_{i=1}^{k} (M_{ci})_a (W_{wi})_a + \sum_{i=1}^{m} (L_{ci})_a (D_{ci})_a (W_{wi})_a + \sum_{i=1}^{n} (L_{ci})_a (V_{wi})_a (D_{wi})_a$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of water content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of water content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of water content or different water densities

4. The total mass of water used shall be determined by the following equation:

$$(M_v)_a = (M_w)_a + (M_h)_a + \sum_{i=1}^{m} (L_{hi})_a (D_{hi})_a$$

where:

m is the total number of water dilution additions measured as used by volume with different densities

5. The total mass of VOC solvent recovered shall be determined by the following equation:

$$(M_r)_a = (M_m)_a + \sum_{i=1}^{k} (L_{mi})_a (D_{mi})_a$$

where:

k is the total number of VOC solvents, miscellaneous solventborne waste inks, and waste VOC solvents measured as recovered by volume with different densities

6. The average VOC emission percentage for the affected facility shall be determined by the following equation:

$$P_a = \left[\frac{(M_t)_a - (M_r)_a}{(M_t)_a + (M_v)_a} \right] \times 100$$

(c) If an affected facility controlled by a solvent recovery system uses only solventborne ink systems, the owner or operator may choose to determine compliance on a direct mass or density–corrected liquid volume basis. Except as provided in pars. (d) through (g), compliance shall be determined as follows:

1. On a direct mass basis, compliance shall be determined according to par. (b), except that the water term M_v does not apply.

2. On a density–corrected liquid volume basis, compliance shall be determined by the following procedures:

a. A base temperature corresponding to that for the largest individual amount of VOC solvent used or recovered from the affected facility, or other reference temperature, shall be chosen by the owner or operator.

b. The corrected liquid volume of VOC in the raw inks and related coatings used shall be determined by the following equation:

$$(L_o)_a = \sum_{i=1}^{k} \frac{(M_{ci})_a (W_{oi})_a}{D_B} + \sum_{i=1}^{m} \frac{(L_{ci})_a (D_{ci})_a (W_{oi})_a}{D_B} + \sum_{i=1}^{n} \frac{(L_{ci})_a (V_{oi})_a (D_{oi})_a}{D_B}$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of VOC content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different amounts of VOC content or different VOC solvent densities

c. The total corrected liquid volume of VOC used shall be determined by the following equation:

$$(L_t)_a = (L_o)_a + \sum_{i=1}^{m} \frac{(L_{di})_a (D_{di})_a}{D_B} + \frac{(M_d)_a}{D_B} + \sum_{i=1}^{n} \frac{(L_{gi})_a (D_{gi})_a}{D_B} + \frac{(M_g)_a}{D_B}$$

where:

m and n are the respective total numbers of VOC dilution and cleaning solvents measured as used by volume with different densities

d. The total corrected liquid volume of VOC solvent recovered shall be determined by the following equation:

$$(L_r)_a = \frac{(M_m)_a}{D_B} + \sum_{i=1}^{k} \frac{(L_{mi})_a (D_{mi})_a}{D_B}$$

where:

k is the total number of VOC solvents, miscellaneous solventborne waste inks, and waste VOC solvents measured as recovered by volume with different densities

e. The average VOC emission percentage for the affected facility shall be determined by the following equation:

$$P_a = \left[\frac{(L_t)_a - (L_r)_a}{(L_t)_a} \right] \times 100$$

(d) If 2 or more affected facilities are controlled by the same solvent recovery system, compliance shall be determined by the procedures specified in par. (b) or (c), whichever applies, except that $(L_t)_a$ and $(L_r)_a$, $(M_t)_a$, $(M_r)_a$ and $(M_v)_a$ are the collective amounts of VOC solvent and water corresponding to all the affected facilities controlled by that solvent recovery system. The average VOC emission percentage for each of the affected facilities controlled by that same solvent recovery system shall be assumed to be equal.

(e) Except as provided under par. (f), if an existing facility and an affected facility are controlled in common by the same solvent recovery system, the owner or operator shall determine compliance by conducting a separate emission test on the existing facility and then conducting a performance test on the combined facilities as follows:

1. Before the initial startup of the affected facility and at any other time as requested by the department, the owner or operator shall conduct an emission test on the existing facility controlled by the subject solvent recovery system. The solvent recovery system may handle VOC emissions from only the existing facility not from affected facilities, during the emission test.

2. During the emission test, the affected facility shall be subject to the standard stated in sub. (3).

3. The emission test shall be conducted over a 30 consecutive calendar day averaging period according to the conditions stipulated in par. (a) 1. through 5., except that the conditions pertain to only existing facilities instead of affected facilities.

4. The owner or operator of the existing facility shall provide the department at least 30 days prior notice of the emission test to afford the department the opportunity to have an observer present.

5. The emission percentage for the existing facility during the emission test shall be determined by one of the following procedures:

a. If the existing facility uses a combination of waterborne and solventborne ink systems, the average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_e = \left[\frac{(M_t)_e - (M_r)_e}{(M_t)_e + (M_v)_e}\right] \times 100$$

where the water and VOC solvent amounts pertain to only existing facilities.

b. If the existing facility uses only solventborne ink systems, the owner or operator may choose to determine the emission percentage either on a direct mass basis or a density–corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass basis, the average VOC emission percentage shall be determined by the equation presented in subd. 5. a. On a density–corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_e = \left[\frac{(L_t)_e - (L_r)_e}{(L_t)_e}\right] \times 100$$

where the VOC solvent amounts pertain to only existing facilities.

6. The owner or operator of the existing facility shall furnish the department with a written report of the results of the emission test.

7. After completion of the separate emission test on the existing facility, the owner or operator shall conduct a performance test on the combined facilities with the solvent recovery system handling VOC emission from both the existing and affected facilities.

8. During performance test, the emission percentage for the existing facility, P_e, shall be assumed to be equal to that determined in the latest emission test. The department may request additional emission tests if any physical or operational changes occur to the existing facility.

9. The emission percentage for the affected facility during performance tests with both existing and affected facilities connected to the solvent recovery system shall be determined by one of the following procedures:

a. If the combined facility uses both waterborne and solventborne ink systems, the average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_a = \left[\frac{(M_t)_b - (M_r)_b - \frac{P_e}{100}\left[(M_t)_e + (M_v)_e\right]}{(M_t)_a + (M_v)_a}\right] \times 100$$

where $(M_t)_b$ and $(M_r)_b$ are the collective VOC solvent amounts pertaining to the combined facility.

b. If the combined facility uses only solventborne ink systems, the owner or operator may choose to determine performance of the affected facility either on a direct mass basis or a density–corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass basis, the average VOC emission percentage shall be determined by the equation presented in subd. 9. a. On a density–corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_a = \left[\frac{(L_t)_b - (L_r)_b - (L_t)_e\left(\frac{P_e}{100}\right)}{(L_t)_a}\right] \times 100$$

where $(L_t)_b$ and $(L_r)_b$ are the collective VOC solvent amounts pertaining to the combined facility.

(f) The owner or operator may choose to show compliance of the combined performance of existing and affected facilities controlled in common by the same solvent recovery system. A separate emission test for existing facilities is not required for this option. The combined performance shall be determined by one of the following procedures:

1. If the combined facility uses both waterborne and solventborne ink systems, the combined average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_b = \left[\frac{(M_t)_b - (M_r)_b}{(M_t)_b + (M_v)_b}\right] \times 100$$

2. If the combined facility uses only solventborne ink systems, the owner or operator may choose to determine performance either on a direct mass basis or a density–corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass, basis, the average VOC emission percentage shall be determined by the equation presented in subd. 1. On a density–corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_b = \left[\frac{(L_t)_b - (L_r)_b}{(L_t)_b}\right] \times 100$$

(g) If all existing and affected facilities located within the same plant boundary use waterborne ink systems or solventborne ink systems with solvent recovery systems, the owner or operator may choose to show compliance on a plantwide basis for all the existing and affected facilities together. No separate emission tests on existing facilities and no temporary segregated liquid measurement procedures for affected facilities are required for this option. The plantwide performance shall be determined by one of the following procedures:

1. If any of the facilities use waterborne ink systems, the total plant average VOC emission percentage shall be determined on a direct mass basis according to par. (b) with the following equation:

$$P_f = \left[\frac{(M_t)_f - (M_r)_a - (M_r)_e - (M_r)_b}{(M_t)_f + (M_v)_f}\right] \times 100$$

where $(M_t)_f$ and $(M_v)_f$ are the collective VOC solvent and water amounts used at all the plant facilities during the performance test.

2. If all of the plant facilities use only solventborne ink systems, the owner or operator may choose to determine performance either on a direct mass basis or a density–corrected liquid volume basis according to par. (c). On a direct mass basis, the total plant average VOC emission percentage shall be determined by the equation presented in subd. 1. On a density–corrected liquid volume basis, the total plant average VOC emission percentage shall be determined by the following equation:

$$P_f = \left[\frac{(L_t)_f - (L_r)_a - (L_r)_e - (L_r)_b}{(L_t)_f}\right] \times 100$$

where $(L_t)_f$ is the collective VOC solvent amount used at all the plant facilities during the performance test.

(5) MONITORING OF OPERATIONS AND RECORDKEEPING. (a) After completion of the performance test required under s. NR 440.08, the owner or operator of any affected facility using waterborne ink systems or solventborne ink systems with solvent recovery systems shall record the amount of solvent and water used, solvent recovered, and estimated emission percentage for each performance averaging period and shall maintain these records for 2 years. The emission percentage shall be estimated as follows:

1. The performance averaging period for monitoring of proper operation and maintenance shall be a calendar month or 4 consecutive weeks, at the option of the owner or operator.

2. If affected facilities share the same raw ink storage and handling system with existing facilities, solvent and water used, solvent recovered, and emission percentages for the combined facilities may be documented. Separate emission percentages for only the affected facilities are not required in this case. The combined emission percentage shall be compared to the overall average for the existing and affected facilities' emission percentage determined during the most recent performance test.

3. Except as provided in subd. 4., temperatures and liquid densities determined during the most recent performance test shall be used to calculate corrected volumes and mass quantities.

4. The owner or operator may choose to measure temperatures for determination of actual liquid densities during each performance averaging period. A different base temperature may be used for each performance averaging period if desired by the owner or operator.

5. The emission percentage shall be calculated according to the procedures under sub. (4) (b) through (g), whichever applies, or by a comparable calculation which compares the total solvent recovered to the total solvent used at the affected facility.

(6) TEST METHODS AND PROCEDURES. (a) The owner or operator of any affected facility using solventborne ink systems shall determine the VOC content of the raw inks and related coatings used at the affected facility by one of the following:

1. Analysis using Reference Method 24A of 40 CFR part 60, Appendix A, incorporated reference in s. NR 440.17 of routine weekly samples of raw ink and related coatings in each respective storage tank; or

2. Analysis using Reference Method 24A of Appendix A of samples of each shipment of all purchased raw inks and related coatings; or

3. Determination of the VOC content from the formulation data supplied by the ink manufacturer with each shipment of raw inks and related coatings used.

(b) The owner or operator of any affected facility using solventborne ink systems shall use the results of verification analyses by Reference Method 24A of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, to determine compliance when discrepancies with ink manufacturers' formulation data occur.

(c) The owner or operator of any affected facility using waterborne ink systems shall determine the VOC and water content of raw inks and related coatings used at the affected facility by either:

1. Determination of the VOC and water content from the formulation data supplied by the ink manufacturer with each shipment of purchased raw inks and related coatings used; or

2. Analysis of samples of each shipment of purchased raw inks and related coatings using a test method approved by the department in accordance with s. NR 440.08 (2).

(d) The owner or operator of any affected facility shall determine the density of raw inks, related coatings and VOC solvents by either:

1. Making a total of 3 determinations for each liquid sample at specified temperatures using the procedure outlined in ASTM D1475–60 (reapproved 1980), incorporated by reference in s. NR 440.17. The temperature and density shall be recorded as the arithmetic average of the 3 determinations; or

2. Using literature values, at specified temperatures, acceptable to the department.

(e) If compliance is determined according to sub. (4) (e), (f) or (g), the existing as well as affected facilities are subject to the requirements of pars. (a) through (d).

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (a) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; cr. (2) (b) 10m., Register, May, 1993, No. 450, eff. 8–1–93**; correction in (4) made under s. 13.93 (2m) 1., Stats., Register, November, 1999, No. 527.**

NR 440.565 Pressure sensitive tape and label surface coating operations.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each coating line used in the manufacture of pressure sensitive tape and label materials.

(b) Any affected facility which inputs to the coating process 45 Mg of VOC or less per 12 month period is not subject to the emission limits of sub. (3) (a) however, the affected facility is subject to the requirements of all other applicable subsections of this section. If the amount of VOC input exceeds 45 Mg per 12 month period the coating line will become subject to sub. (3) (a) and all other subsections of this section.

(c) This section applies to any affected facility which begins construction, modification, or reconstruction after December 30, 1980.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02, unless the context requires otherwise.

1. "Coating line" means any number or combination of adhesive, release, or precoat coating applicators, flashoff areas and ovens which coat a continuous web, located between a web unwind station and a web rewind station, to produce pressure sensitive tape and label materials.

3. "Coating solids applied" means the solids content of the coated adhesive, release, or precoat as measured by Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

4. "Flashoff area" means the portion of a coating line after the coating applicator and usually before the oven entrance.

5. "Fugitive volatile organic compounds" means any volatile organic compounds which are emitted from the coating applicator and flashoff areas and are not emitted in the oven.

6. "Hood or enclosure" means any device used to capture fugitive volatile organic compounds.

7. "Oven" means a chamber which uses heat or irradiation to bake, cure, polymerize, or dry a surface coating.

8. "Precoat" means a coating operation in which a coating other than an adhesive or release is applied to a surface during the production of a pressure sensitive tape or label product.

9. "Solvent applied in the coating" means all organic solvent contained in the adhesive, release and precoat formulations that is metered into the coating applicator from the formulation area.

10. "Total enclosure" means a structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions.

11. "VOC" means volatile organic compound.

(b) As used in this section, symbols not defined in this subsection have the meanings given in s. NR 440.03.

1. “a” means the gas stream vents exiting the emission control device.

2. “b” means the gas stream vents entering the emission control device.

3. “C_{aj}” means the concentration of VOC (carbon equivalent) in each gas stream (j) exiting the emission control device, in parts per million by volume.

4. “C_{bi}” means the concentration of VOC (carbon equivalent) in each gas stream (i) entering the emission control device, in parts per million by volume.

5. “C_{fk}” means the concentration of VOC (carbon equivalent) in each gas stream (k) emitted directly to the atmosphere, in parts per million by volume.

6. “G” means the calculated weighted average mass (kg) of VOC per mass (kg) of coating solids applied each calendar month.

7. “M_{ci}” means the total mass (kg) of each coating (i) applied during the calendar month as determined from facility records.

8. “M_r” means the total mass (kg) of solvent recovered for a calendar month.

9. “Q_{aj}” means the volumetric flow rate of each affluent gas stream (j) exiting the emission control device, in dry standard cubic meters per hour.

10. “Q_{bi}” means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in dry standard cubic meters per hour.

11. “Q_{fk}” means the volumetric flow rate of each effluent gas stream (k) emitted to the atmosphere, in dry standard cubic meters per hour.

12. “R” means the overall VOC emission reduction achieved for a calendar month (in percent).

13. “R_q” means the required overall VOC emission reduction (in percent).

14. “W_{oi}” means the weight fraction of organics applied of each coating (i) applied during a calendar month as determined from Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or coating manufacturer's formulation data.

15. “W_{si}” means the weight fraction of solids applied of each coating (i) applied during a calendar month as determined from Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or coating manufacturer's formulation data.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the performance test required by s. NR 440.08 has been completed each owner or operator subject to this section may:

1. Cause the discharge into the atmosphere from an affected facility not more than 0.20 kg VOC/kg of coating solids applied as calculated on a weighted average basis for one calendar month; or

2. Demonstrate for each affected facility;

a. A 90% overall VOC emission reduction as calculated over calendar months; or

b. The percent overall VOC emission reduction specified in sub. (4) (b) as calculated over a calendar month.

(4) COMPLIANCE PROVISIONS. (a) To determine compliance with sub. (3) the owner or operator of the affected facility shall calculate a weighted average of the mass of solvent used per mass of coating solids applied for one calendar month period according to the following procedures:

1. Determine the weight fraction of organics and the weight fraction of solids of each coating applied by using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or by the coating manufacturer's formulation data.

2. Compute the weighted average by the following equation:

$$G = \frac{\sum_{i=1}^{n} W_{oi}M_{ci}}{\sum_{i=1}^{n} W_{si}M_{ci}}$$

3. For each affected facility where the value of G is less than or equal to 0.20 kg VOC per kg of coating solids applied the affected facility is in compliance with sub. (3) (a) 1.

(b) To determine compliance with sub. (3) (a) 2. the owner or operator shall calculate the required overall VOC emission reduction according to the following equation:

$$R_q = \frac{G-0.20}{G} \times 100$$

If R_q is less than or equal to 90% the required overall VOC emission reduction is R_q. If R_q is greater than 90% the required overall VOC emission reduction is 90%.

(c) Where the compliance with the emission limits specified in sub. (3) (a) 2. is achieved through the use of a solvent recovery system the owner or operator shall determine the overall VOC emission reduction for a one calendar month period by the following equation:

$$R = \frac{M_r}{\sum_{i=1}^{n} W_{oi}M_{ci}} \times 100$$

If the R value is equal to or greater than the R_q value specified in par. (b) compliance with sub. (3) (a) 2. is demonstrated.

(d) Where compliance with the emission limit specified in sub. (3) (a) 2. is achieved through the use of a solvent destruction device the owner or operator shall determine calendar monthly compliance by comparing the monthly required overall VOC emission reduction specified in par. (b) to the overall VOC emission reduction demonstrated in the most recent performance test which complied with sub. (3) (a) 2. If the monthly required overall VOC emission reduction is less than or equal to the overall VOC reduction of the most recent performance test the affected facility is in compliance with sub. (3) (a) 2.

(e) Where compliance with sub. (3) (a) 2. is achieved through the use of a solvent destruction device the owner or operator shall continuously record the destruction device combustion temperature during coating operations for thermal incineration destruction devices or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration destruction devices. For thermal incineration destruction devices the owner or operator shall record all 3–hour periods (during actual coating operations) during which the average temperature of the device is more than 28°C (50°F) below the average temperature of the device during the most recent performance test complying with sub. (3) (a) 2. For catalytic incineration destruction devices the owner or operator shall record all 3–hour periods (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 38°C (100°F) below the average temperature of the device during the most recent performance test complying with sub. (3) (a) 2. and all 3–hour periods (during actual coating operations) during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference of the device during the most recent test complying with sub. (3) (a) 2.

(f) After the initial performance test required for all affected facilities under s. NR 440.08, compliance with the VOC emission limitation and percentage reduction requirements under sub. (3) is based on the average emission reduction for one calendar month. A separate compliance test is completed at the end of each calendar month after the initial performance test and a new calendar month's average VOC emission reduction is calculated to show compliance with the standard.

(g) If a common emission control device is used to recover or destroy solvent from more than one affected facility the performance of that control device is assumed to be equal for each of the affected facilities. Compliance with sub. (3) (a) 2. is determined by the methods specified in pars. (c) and (d) and is performed simultaneously on all affected facilities.

(h) If a common emission control device is used to recover solvent from an existing facility (or facilities) as well as from an affected facility (or facilities) the overall VOC emission reduction for the affected facility (or facilities) for the purpose of compliance, shall be determined by the following procedures:

1. The owner or operator of the existing facility (or facilities) shall determine the mass of solvent recovery for a calendar month period from the existing facility (or facilities) prior to the connection of the affected facility (or facilities) to the emission control device.

2. The affected facility (or facilities) shall then be connected to the emission control device.

3. The owner or operator shall determine the total mass of solvent recovery from both the existing and affected facilities over a calendar month period. The mass of solvent determined in subd. 1. from the existing facility shall be subtracted from the total mass of recovery solvent to obtain the mass of solvent recovery from the affected facility (or facilities). The overall VOC emission reduction of the affected facility (or facilities) can then be determined as specified in par. (c).

(i) If a common emission control device is used to destruct solvent from an existing facility (or facilities) as well as from an affected facility (or facilities) the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

1. The owner or operator shall operate the emission control device with both the existing and affected facilities connected.

2. The concentration of VOC (in parts per million by volume) after the common emission control device shall be determined as specified in sub. (5) (c).

(j) Startups and shutdowns are normal operation for this source category. Emissions from these operations are to be included when determining if the standard specified at sub. (3) (a) 2. is being attained.

(5) PERFORMANCE TEST PROCEDURES. (a) The performance test for affected facilities complying with sub. (3) without the use of add–on controls shall be identical to the procedures specified in sub. (4) (a).

(b) The performance test for affected facilities controlled by a solvent recovery device shall be conducted as follows:

1. The performance test shall be a one calendar month test and not the average of 3 runs as specified in s. NR 440.08 (6).

2. The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in sub. (4) (a) 2.

3. Calculate the required percent overall VOC emission reduction as specified in sub. (4) (b).

4. Inventory VOC usage and VOC recovery for a one calendar month period.

5. Determine the percent overall VOC emission reduction as specified in sub. (4) (c).

(c) The performance test for affected facilities controlled by a solvent destruction device shall be conducted as follows:

1. The performance of the solvent destruction device shall be determined by averaging the results of 3 test runs as specified in s. NR 440.08 (6).

2. Determine for each affected facility prior to each test run the weighted average mass of VOC per mass of coating solids applied being used at the facility. The weighted average shall be determined as specified in sub. (4) (a). In this application the quantities of W_{oi}, W_{si} and M_{ci} shall be determined for the time period of each test run and not a calendar month as specified in sub. (2).

3. Calculate the required percent overall VOC emission reduction as specified in sub. (4) (b).

4. Determine the percent overall VOC emissions reduction of the solvent destruction device by the following equation and procedures:

$$R = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{m} Q_{aj}C_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi} + \sum_{k=1}^{p} Q_{fk}C_{fk}} \times 100$$

a. The owner or operator of the affected facility shall construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (7) (b).

b. The owner or operator of an affected facility shall construct a temporary total enclosure around the coating line applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the department is satisfied that the enclosure is totally capturing fugitive VOC emissions then no additional total enclosure will be required for the performance test.

c. For each affected facility where the value of R is greater than or equal to the value R_q calculated in sub. (4) (b) compliance with sub. (3) (a) 2. is demonstrated.

(6) MONITORING OF OPERATIONS AND RECORDKEEPING. (a) The owner or operator of an affected facility subject to this section shall maintain a calendar month record of all coatings used and the results of the reference test methods specified in sub. (7) (a) or the manufacturer's formulation data used for determining the VOC content of those coatings.

(b) The owner or operator of an affected facility controlled by a solvent recovery device shall maintain a calendar month record of the amount of solvent applied in the coating at each affected facility.

(c) The owner or operator of an affected facility controlled by a solvent recovery device shall install, calibrate, maintain and operate a monitoring device for indicating the cumulative amount of solvent recovery by the device over a calendar month period. The monitoring device shall be accurate within ±2.0%. The owner or operator shall maintain a calendar month record of the amount of solvent recovery by the device.

(d) The owner or operator of an affected facility operating at the conditions specified in sub. (1) (b) shall maintain a 12 month record of the amount of solvent applied in the coating at the facility.

(e) The owner or operator of an affected facility controlled by a thermal incineration solvent destruction device shall install, calibrate, maintain and operate a monitoring device which continuously indicates and records the temperature of the solvent destruction device's exhaust gases. The monitoring device shall have an accuracy of the greater of ± 0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

(f) The owner or operator of an affected facility controlled by a catalytic incinerator solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed.

(g) The owner or operator of an affected facility controlled by a solvent destruction device which uses a hood or enclosure to capture fugitive VOC emissions shall install, calibrate, maintain and operate a monitoring device which continuously indicates that the hood or enclosure is operating. No continuous monitor is required if the owner or operator can demonstrate that the hood or enclosure system is interlocked with the affected facility's oven recirculation air system.

(h) Records of the measurements required in subs. (4) and (6) must be retained for at least two years following the date of the measurements.

(7) TEST METHODS AND PROCEDURES. (a) The VOC contents per unit of coating solids applied and compliance with sub. (3) (a) 1. shall be determined by either Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, and the equations specified in sub. (4) or by manufacturer's formulation data. In the event of any inconsistency between a Method 24 test and manufacturer's formulation data the Method 24 test will govern. The department may require an owner or operator to perform Method 24 tests during such months as it deems appropriate. For Reference Method 24 the coating sample must be a one liter sample taken into a one liter container at a point where the sample will be representative of the coating applied to the web substrate.

(b) Reference Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the VOC concentration, in parts per million by volume, of each effluent gas stream entering and exiting the solvent destruction device or its equivalent and each effluent gas stream emitted directly to the atmosphere. Reference Methods 1, 2, 3, and 4 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the sampling location, volumetric flow rate, molecular weight and moisture of all sampled gas streams. For Reference Method 25 the sampling time for each of three runs must be at least 1 hour. The minimum sampling volume must be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) If the owner or operator can demonstrate to the department's satisfaction that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks the department will approve testing of representative stacks on a case–by–case basis.

(8) REPORTING REQUIREMENTS. (a) For all affected facilities subject to compliance with sub. (3) the performance test data and results from the performance test shall be submitted to the department as specified in s. NR 440.08 (1).

(b) Following the initial performance test, the owner or operator of each affected facility shall submit quarterly reports to the department of exceedances of the VOC emission limits specified in sub. (3). If no exceedances occur during a particular quarter, a report stating this shall be submitted to the department semiannually.

(c) The owner or operator of each affected facility shall also submit reports at the frequency specified in s. NR 440.07(3) when the incinerator temperature drops as defined under sub. (4) (e). If no such periods occur, the owner or operator shall state this in the report.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; renum. to be NR 440.565 and am. (2) (a) (intro.) and (b) (intro.), (5) (b) 1. and (c) 1. and (6) (g), r. (8) (c), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (8) (b), cr. (8) (c), Register, June, 1993, No. 450, eff. 8–1–93.

NR 440.57 Industrial surface coating: large appliances. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each surface coating operation in a large appliance surface coating line.

(b) Any facility under par. (a) that commences construction, modification or reconstruction after December 24, 1980, is subject to the requirements of this section.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Applied coating solids" means the coating solids that adhere to the surface of the large appliance part being coated.

2. "Coating application station" means that portion of the large appliance surface coating operation where a prime coat or a topcoat is applied to large appliances parts or products (e.g., dip tank, spray booth or flow coating unit).

3. "Curing oven" means a device that uses heat to dry or cure the coatings applied to large appliance parts or products.

4. "Electrodeposition" or "EDP" means a method of coating application in which the large appliance part or product is submerged in a tank filled with coating material suspended in water and an electrical potential is used to enhance deposition of the material on the part or product.

5. "Flashoff area" means the portion of a surface coating line between the coating application station and the curing oven.

6. "Large appliance part" means any organic surface–coated metal lid, door, casing, panel or other interior or exterior metal part or accessory that is assembled to form a large appliance product. Parts subject to in–use temperatures in excess of 250°F are not included in this definition.

7. "Large appliance product" means any organic surface–coated metal range, oven, microwave oven, refrigerator, freezer, washer, dryer, dishwasher, water heater or trash compactor manufactured for household, commercial or recreational use.

8. "Large appliance surface coating line" means that portion of a large appliance assembly plant engaged in the application and curing of organic surface coatings on large appliance parts or products.

9. "Organic coating" means any coating used in a surface coating operation, including dilution solvents, from which VOC emissions occur during the application or the curing process. For the purpose of this section, powder coatings are not included in this definition.

10. "Powder coating" means any surface coating that is applied as a dry powder and is fused into a continuous coating film through the use of heat.

11. "Spray booth" means the structure housing automatic or manual spray application equipment where a coating is applied to large appliance parts or products.

12. "Surface coating operation" means the system on a large appliance surface coating line used to apply and dry or cure an organic coating on the surface of large appliance parts or products. The surface coating operation may be a prime coat or a topcoat operation and includes the coating application station or stations, flashoff area and curing oven.

13. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a large appliance part or product to the total amount of the coating solids used.

14. "VOC content" means the proportion of a coating that is volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter of coating solids.

15. "VOC emissions" means the mass of volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter of applied coating solids, emitted from a surface coating operation.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. C_a=the concentration of VOCs in a gas stream leaving a control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b=the concentration of VOCs in a gas stream entering a control device (parts per million by volume, as carbon).

3. C_f=the concentration of VOCs in a gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c=density of coating (or input stream), as received (kilograms per liter).

5. D_d=density of a VOC solvent added to coatings (kilograms per liter).

6. D_r=density of a VOC solvent recovered by an emission control device (kilograms per liter).

7. E=the VOC destruction efficiency of a control device (fraction).

8. F=the proportion of total VOCs emitted by an affected facility that enters a control device (fraction).

9. G=the volume–weighted average mass of VOCs in coatings consumed in a calendar month per unit volume of applied coating solids (kilograms per liter).

10. L_c=the volume of coating consumed, as received (liters).

11. L_d=the volume of VOC solvent added to coatings (liters).

12. L_r=the volume of VOC solvent recovered by an emission control device (liters).

13. L_s=the volume of coating solids consumed (liters).

14. M_d=the mass of VOC solvent added to coatings (kilograms).

15. M_o=the mass of VOCs in coatings consumed, as received (kilograms).

16. M_r=the mass of VOCs recovered by an emission control device (kilograms).

17. Q_a=the volumetric flow rate of a gas stream leaving a control device and entering the atmosphere (dry standard cubic meters per hour).

18. Q_b=the volumetric flow rate of a gas stream entering a control device (dry standard cubic meters per hour).

19. Q_f=the volumetric flow rate of a gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

20. R=the overall VOC emission reduction achieved for an affected facility (fraction).

21. T=the transfer efficiency (fraction).

22. V_s=the proportion of solids in a coating (or input stream), as received (fraction by volume).

23. W_o=the proportion of VOCs in a coating (or input stream), as received (fraction by weight).

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. On and after the date on which the performance test required by s. NR 440.08 is completed, no owner or operator of an affected facility subject to the provisions of this section may discharge or cause the discharge of VOC emissions that exceed 0.90 kilogram of VOCs per liter of applied coating solids from any surface coating operation on a large appliance surface coating line.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (6) does not apply to the performance test procedures required by this section.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 (1) and thereafter a performance test each calendar month for each affected facility according to the procedures in this paragraph.

1. An owner or operator shall use the following procedures for an affected facility that does not use a capture system and control device to comply with the emissions limit specified under sub. (3). The owner or operator shall determine the composition of the coatings by formulation data supplied by the coating manufacturer or by analysis of each coating, as received, using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the coating manufacturer to determine the VOC content of coatings using Reference Method 24. The owner or operator shall determine the volume of coating and the mass of VOC–solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coatings used at each facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Except as provided in subd. 1. d., the weighted average of the total mass of VOCs consumed per unit volume of coatings solids applied each calendar month shall be determined as follows:

1) Calculate the mass of VOCs consumed (M_o+ M_d) during the calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}D_{ci}W_{oi} + \sum_{i=1}^{m} L_{dj}D_{dj}$$

(ΣL_{dj} D_{dj} will be zero if no VOC–solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calender month

m is the number of different VOC solvents added to coatings during the calendar month

2) Calculate the total volume of coatings solids used (L_s) in the calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci}V_{si}$$

where:

n is the number of different coatings used during the calendar month

3) Select the appropriate transfer efficiency from Table 1. If the owner or operator can demonstrate to the satisfaction of the department that transfer efficiencies other than those shown are appropriate, the department shall approve their use on a case–by–case basis. Transfer efficiencies for application methods not listed shall be determined by the department on a case–by–case basis. An owner or operator shall submit sufficient data for the department to judge the accuracy of the transfer efficiency claims.

Table 1 — Transfer Efficiencies

Application method	Transfer efficiency (T_k)
Air atomized spray	0.40
Airless spray	0.45
Manual electrostatic spray	0.60
Flow coat	0.85
Dip coat	0.85
Nonrotational automatic electrostatic spray	0.85
Rotating head automatic electrostatic spray	0.90
Electrodeposition	0.95

Where more than one application method is used within a single surface coating operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the department and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} L_{cik} V_{sik} T_k}{L_s}$$

where:

n is the number of coatings (or input streams) used

m is the number of application methods used

4) Calculate the volume–weighted average mass of VOCs consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

b. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

c. Where the volume–weighted average mass of VOCs discharged to the atmosphere per unit volume of coating solids applied (N) is equal to or less than 0.90 kilogram per liter, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance, provided no VOCs are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOCs (e.g., incinerator) to comply with the emission limit specified under sub. (3).

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test, providing control device and capture system operating conditions have not changed. The procedure in this subparagraph shall be repeated when directed by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOCs emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} C_{bi} Q_{bi}}{\sum_{i=1}^{n} C_{bi} Q_{bi} + \sum_{k=1}^{p} C_{fk} Q_{fk}}$$

where:

n is the number of gas streams entering the control device

p is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

3) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

b. Calculate the volume–weighted average of the total mass of VOCs per unit volume of applied coating solids (G) during each calendar month for each affected facility using the equations in subd. 1. a. 1), 2), 3) if applicable, and 4).

c. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\,(1 - R)$$

d. If the volume–weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coating solids, the affected facility is in compliance.

3. An owner or operator shall use the following procedure for any affected facility that uses a control device for VOC recovery (e.g., carbon adsorber) to comply with the applicable emission limits specified under sub. (3).

a. Calculate the total mass of VOCs assumed $(M_o + M_d)$ and the volume–weighted average of the total mass of VOCs per unit volume of applied coating solids (G) during each calendar month for each affected facility using the equations in subd. 1. a. 1), 2), 3) if applicable, and 4).

b. Calculate the total mass of VOCs recovered (M_r) during each calendar month using the following equation:

$$M_r = L_r D_r$$

c. Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

d. Calculate the volume–weighted average mass of VOCs emitted to the atmosphere (N) for each calendar month for each affected facility using equation in subd. 2. c.

e. If the volume–weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coatings solids, the affected facility is in compliance. Each monthly calculation is considered a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility that uses a capture system and an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices as prescribed below:

1. Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

2. Each temperature measurement device shall be installed, calibrated and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of ± 0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

3. Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08 (1) apply only to the initial performance test. Each owner or operator subject to the provisions of this section shall include the following data in the report of the initial performance test required under s. NR 440.08 (1):

1. Except as provided in subd. 2., the volume–weighted average mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4) (b) 1. d., a list of the coatings used during a period of one calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or supplied by the coating manufacturer, and the minimum transfer efficiency of any coating application equipment used during the month.

3. For each affected facility where compliance is achieved through use of an incineration system, the following additional information shall be reported:

a. The proportion of total VOCs emitted that enters the control device (F).

b. The VOC reduction efficiency of the control device (E).

c. The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

d. A description of the method used to establish the amount of VOCs captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through use of a solvent recovery system, the following additional information shall be reported:

a. The volume of VOC solvent recovered (L_r), and

b. The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify, record and submit a written report to the department every calendar quarter of each instance in which the volume–weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3). If no instances have occurred during a particular quarter, a report stating this shall be submitted to the department semiannually.

(c) Following the initial performance test, the owner or operator of an affected facility shall identify, record and submit at the frequency specified in s. NR 440.07 (3) the following:

1. Where compliance with sub. (3) is achieved through use of thermal incineration, each 3–hour period of coating operation during which the average temperature of the device was more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under sub. (4).

2. Where compliance with sub. (3) is achieved through the use of catalytic incineration, each 3–hour period of coating operation during which the average temperature recorded immediately before the catalyst bed is more than 28°C below the average temperature at the same location during the most recent performance test at which destruction efficiency was determined as specified under sub. (4). Additionally, all 3–hour periods of coating operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4) shall be recorded.

3. For thermal and catalytic incinerators, if no periods as described in subd. 1. and 2. occur, the owner or operator shall state this in the report.

(d) Each owner or operator subject to the provisions of this section shall maintain at the source for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain at the source daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with sub. (3) as follows:

1. Method 24 or formulation data supplied by the coating manufacturer to determine the VOC content of a coating. In the event of dispute, Reference Method 24 shall be the reference method. For determining compliance only, results of Method 24 analyses of waterborne coatings shall be adjusted as described in Subsection 4.4 of Method 24.

Note: Procedures to determine VOC emissions are provided in sub. (4).

2. Method 25 for the measurement of the VOC concentration in the gas stream vent,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be a one–liter sample taken into a one–liter container at a point where the sample will be representative of the coating material.

(c) For Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the sample time for each of 3 runs shall be at least 60 minutes and the minimum sample volume shall be at least 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve sampling of representative stacks on a case–by–case basis if the owner or operator can demonstrate to the satisfaction of the department that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (a) (intro.) and (b) (intro.), Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (a) (intro.), r. and recr. (6) (b) renum. (6) (c) to be (6) (d), cr. (6) (c), Register, June, No. 450, eff. 8–1–93

NR 440.58 Metal coil surface coating. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in a metal coil surface coating operation: each prime coat operation, each finish coat operation, and each prime and finish coat operation combined when the finish coat is applied wet on wet over the prime coat and both coatings are cured simultaneously.

(b) Any facility under par. (a) that commences construction, modification or reconstruction after January 5, 1981, is subject to the requirements of this section.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Coating" means any organic material that is applied to the surface of metal coil.

2. "Coating application station" means that portion of the metal coil surface coating operation where the coating is applied to the surface of the metal coil. Included as part of the coating application stations is the flashoff area between the coating application station and the curing oven.

3. "Curing oven" means the device that uses heat or radiation to dry or cure the coating applied to the metal coil.

4. "Finish coat operation" means the coating application station, curing oven and quench station used to apply and dry or cure the final coating or coatings on the surface of the metal coil. Where only a single coating is applied to the metal coil, that coating is considered a finish coat.

5. "Metal coil surface coating operation" means the application system used to apply an organic coating to the surface of any continuous metal strip with thickness of 0.15 millimeter (mm) (0.006 in) or more that is packaged in a roll or coil.

6. "Prime coat operation" means the coating application station, curing oven and quench station used to apply and dry or cure the initial coating or coatings on the surface of the metal coil.

7. "Quench station" means that portion of the metal coil surface coating operation where the coated metal coil is cooled, usually by a water spray, after baking or curing.

8. "VOC content" means the quantity, in kilograms per liter of coating solids, of volatile organic compounds (VOCs) in a coating.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. C_a = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b = the VOC concentration on each gas stream entering the control device (parts per million by volume, as carbon).

3. C_f = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c = density of each coating, as received (kilograms per liter).

5. D_d = density of each VOC solvent added to coatings (kilograms per liter).

6. D_r = density of VOC solvent recovered by an emission control device (kilograms per liter).

7. E = VOC destruction efficiency of the control device (fraction).

8. F = the proportion of total VOCs emitted by an affected facility that enters the control device (fraction).

9. G = volume–weighted average mass of VOCs in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter).

10. L_c = the volume of each coating consumed, as received (liters).

11. L_d = the volume of each VOC solvent added to coatings (liters).

12. L_r = the volume of VOC solvent recovered by an emission control device (liters).

13. L_s = the volume of coating solids consumed (liters).

14. M_d = the mass of VOC solvent added to coatings (kilograms).

15. M_o = the mass of VOCs in coatings consumed, as received (kilograms).

16. M_r = the mass of VOCs recovered by an emission control device (kilograms).

17. N = the volume–weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

18. Q_a = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

19. Q_b = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

20. Q_f = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

21. R = the overall VOC emission reduction achieved for an affected facility (fraction).

22. S = the calculated monthly allowable emission limit (kilograms of VOC per liter of coating solids applied).

23. V_s = the proportion of solids in each coating as received (fraction by volume).

24. W_o = the proportion of VOCs in each coating, as received (fraction by weight).

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which s. NR 440.08 requires a performance test to be completed, each owner or operator subject to this section may not cause to be discharged into the atmosphere more than:

1. 0.28 kilogram VOC per liter (kg VOC/l) of coating solids applied for each calendar month for each affected facility that does not use an emission control device; or

2. 0.14 kg VOC/l of coating solids applied for each calendar month for each affected facility that continuously uses an emission control device operated at the most recently demonstrated overall efficiency; or

3. 10% of the VOCs applied for each calendar month (90% emission reduction) for each affected facility that continuously uses an emission control device operated at the most recently demonstrated overall efficiency; or

4. A value between 0.14 (or a 90% emission reduction) and 0.28 kg/VOC/l of coating solids applied for each calendar month for each affected facility that intermittently uses an emission con-

trol device operated at the most recently demonstrated overall efficiency.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (6) does not apply to the performance test.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 (1) and thereafter a performance test for each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining monthly volume–weighted average emissions of VOCs in kg/l of coating solids applied.

1. An owner or operator shall use the following procedures for each affected facility that does not use a capture system and control device to comply with the emission limit specified under sub. (3) (a) 1. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coatings to determine the VOC content of coatings using Reference Method 24 or an equivalent or alternative method. The owner or operator shall determine the volume of coating and the mass of VOC solvent added to coatings from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each affected facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Calculate the volume–weighted average of the total mass of VOCs consumed per unit volume of coating solids applied during each calendar month for each affected facility, except as provided under subd. 1. d. The weighted average of the total mass of VOCs used per unit volume of coating solids applied each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOCs used $(M_o + M_d)$ during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}D_{ci}W_{oi} + \sum_{j=1}^{m} L_{dj}D_{dj}$$

$(\Sigma L_{dj} D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calendar month

m is the number of different VOC solvents added to coatings used during the calendar month

2) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} V_{si}L_{ci}$$

where:

n is the number of different coatings used during the calendar month

3) Calculate the volume–weighted average mass of VOCs used per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s}$$

b. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

c. Where the volume–weighted average mass of VOCs discharged to the atmosphere per unit volume of coating solids applied (N) is equal to or less than 0.28 kg/l, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, that is equal to or less than 0.28 kg/l of coating solids, the affected facility is in compliance provided no VOCs are added to the coatings during distribution or application.

2. An owner or operator shall use the following procedures for each affected facility that continuously uses a capture system and a control device that destroys VOCs (e.g., incinerator) to comply with the emission limit specified under sub. (3) (a) 2. or 3.

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed in this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test, providing control device and capture system operating conditions have not changed. The procedure in this paragraph shall be repeated when requested by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOCs emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{l} C_{bi}Q_{bi}}{\sum_{i=1}^{l} C_{bi}Q_{bi} + \sum_{i=1}^{p} C_{fi}Q_{fi}}$$

where:

l is the number of gas streams entering the control device

p is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{m} Q_{aj}C_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

The owner or operator of the affected facility shall construct the VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (7). The owner or operator of the affected facility shall construct a temporary enclosure around the coating applicator and flashoff area during the performance test for the purpose of evaluating the capture efficiency of the system. The enclosure shall be maintained at a negative pressure to ensure that all VOC emissions are measurable. If a permanent enclosure exists in the affected facility prior to the performance test and the department is satisfied that the enclosure is adequately containing VOC emissions, no additional enclosure is required for the performance test.

3) Determine overall reduction efficiency (R) using the following equation Should there be a colon after the word equation?

$$R = EF$$

If the overall reduction efficiency (R) is equal to or greater than 0.90, the affected facility is in compliance and no further computations are necessary. If the overall reduction efficiency (R) is less than 0.90, the average total VOC emissions to the atmosphere per unit volume of coating solids applied (N) shall be computed as specified in subd. 2. b., c. and d.

b. Calculate the volume–weighted average of the total mass of VOCs per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1. a. 1), 2), and 3).

c. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\,(1 - R)$$

d. If the volume–weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/l of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

3. An owner or operator shall use the following procedure for each affected facility that uses a control device that recovers the VOCs (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3) (a) 2. or 3.

a. Calculate the total mass of VOCs consumed ($M_o + M_d$) during each calendar month for each affected facility using the equation in subd. 1. a. 1).

b. Calculate the total mass of VOCs recovered (M_r) during each calendar month using the following equation:

$$M_r = L_r D_r$$

c. Calculate the overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

If the overall reduction efficiency (R) is equal to or greater than 0.90, the affected facility is in compliance and no further computation are necessary. If the overall reduction efficiency (R) is less than 0.90, the average total VOC emissions to the atmosphere per unit volume of coating solids applied (N) must be computed as described in subd. 3. d., e. and f.

d. Calculate the total volume of coating solids consumed (L_s) and the volume–weighted average of the total mass of VOCs per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1. a. 2) and 3).

e. Calculate the volume–weighted average mass of VOCs emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in subd. 2. c.

f. If the weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/l of coating solids applied, the affected facility is in compliance. Each monthly calculation i s a performance test.

4. An owner or operator shall use the following procedures for each affected facility that intermittently uses a capture system and a control device to comply with the emission limit specified in sub. (3) (a) 4.:

a. Calculate the total volume of coating solids applied without the control device in operation (L_{sn}) during each calendar month for each affected facility using the following equation:

$$L_{sn} = \sum_{i=1}^{n} V_{si} L_{ci}$$

where:

n is the number of coatings used during the calendar month without the control device in operation

b. Calculate the total volume of coating solids applied with the control device in operation (L_{sc}) during each calendar month for each affected facility using the following equation:

$$L_{sc} = \sum_{i=1}^{m} V_{si} L_{ci}$$

where:

m is the number of coatings used during the calendar month with the control device in operation

c. Calculate the mass of VOCs used without the control device in operation ($M_{on} + M_{dn}$) during each calendar month for each affected facility using the following equation:

$$M_{on} + M_{dn} = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

where:

n is the number of different coatings used without the control device in operation during the calendar month

m is the number of different VOC solvents added to coatings used without the control device in operation during the calendar month

d. Calculate the volume–weighted average of the total mass of VOCs consumed per unit volume of coating solids applied without the control device in operation (G_n) during each calendar month for each affected facility using the following equation:

$$G_n = \frac{M_{on} + M_{dn}}{L_{sn}}$$

e. Calculate the mass of VOCs used with the control device in operation ($M_{oc} + M_{dc}$) during each calendar month for each affected facility using the following equation:

$$M_{oc} + M_{dc} = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

where:

n is the number of different coatings used with the control device in operation during the calendar month

m is the number of different VOC–solvents added to coatings used with the control device in operation during the calendar month

f. Calculate the volume–weighted average of the total mass of VOCs used per unit volume of coating solids applied with the control device in operation (G_c) during each calendar month for each affected facility using the following equation:

$$G_c = \frac{M_{oc} + M_{dc}}{L_{sc}}$$

g. Determine the overall reduction efficiency (R) for the capture system and control device using the procedures in subd. 2. a. 1), 2) and 3) or subd. 3. a., b. and c., whichever is applicable.

h. Calculate the volume–weighted average of VOC emissions to the atmosphere (N) during each calendar month for each affected facility using the following equation:

$$N = \frac{G_n L_{sn} + G_c L_{sc} (1 - R)}{L_{sn} + L_{sc}}$$

i. Calculate the emission limit or limits for each calendar month for each affected facility using the following equation:

whichever is greater.

$$S = \frac{0.28L_{sn} + 0.1G_cL_{sc}}{L_{sn} + L_{sc}} \text{ or } \frac{0.28L_{sn} + 0.14L_{sc}}{L_{sn} + L_{sc}},$$

j. If the volume–weighted average mass of VOCs emitted to the atmosphere for each calendar month (N) is less than or equal to the calculated emission limit (S) for the calendar month, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) Where compliance with the numerical limit specified in sub. (3) (a) 1. or 2. is achieved through the use of low VOC–content coatings without the use of emission control devices or through the use of higher VOC–content coatings in conjunction with emission control devices, the owner or operator shall compute and record the average VOC content of coatings applied during each calendar month for each affected facility according to the equations provided in sub. (4).

(b) Where compliance with the limit specified in sub. (3) (a) 4. is achieved through the intermittent use of emission control devices, the owner or operator shall compute and record for each affected facility the average VOC content of coatings applied during each calendar month according to the equations provided in sub. (4).

(c) If thermal incineration is used, each owner or operator subject to the provisions of this section shall install, calibrate, operate and maintain a device that continuously records the combustion temperature of any effluent gases incinerated to achieve compliance with sub. (3) (a) 2., 3. or 4. This device shall have an accuracy of ± 2.5°C or ± 0.75% of the temperature being measured expressed in degrees Celsius, whichever is greater. Each owner or operator shall also record all periods (during actual coating operations) in excess of 3 hours during which the average temperature in any thermal incinerator used to control emissions from an affected facility remains more than 28°C (50°F) below the temperature at which compliance with sub. (3) (a) 2., 3. or 4. was demonstrated during the most recent measurement of incinerator efficiency required by s. NR 440.08. The records required by s. NR 440.07 shall identify each such occurrence and its duration. If catalytic incineration is used, the owner or operator shall install, calibrate, operate and maintain a device to monitor and record continuously the gas temperature both upstream and downstream of the incinerator catalyst bed. This device shall have an accuracy of ± 2.5°C or ± 0.75% of the temperature being measured expressed in degrees Celsius, whichever is greater. During coating operations, the owner or operator shall record all periods in excess of 3 hours where the average difference between the temperature upstream and downstream of the incinerator catalyst bed remains below 80% of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or when the inlet temperature falls more than 28°C (50°F) below the temperature at which compliance with sub. (3) (a) 2., 3. or 4. was demonstrated during the most recent measurement of incinerator efficiency required by s. NR 440.08. The records required by s. NR 440.07 shall identify each such occurrence and its duration.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Where compliance with the numerical limit specified in sub. (3) (a) 1., 2. or 4. is achieved through the use of low VOC–content coatings without emission control devices or through the use of higher VOC–content coatings in conjunction with emission control devices, each owner or operator subject to the provisions of this section shall include in the initial compliance report required by s. NR 440.08 the weighted average of the VOC content of coatings used during a period of one calendar month for each affected facility. Where compliance with sub. (3) (a) 4. is achieved through the intermittent use of a control device, reports shall include separate values of the weighted average VOC content of coatings used with and without the control device in operation.

(b) Where compliance with sub. (3) (a) 2., 3. or 4. is achieved through the use of an emission control device that destroys VOCs, each owner or operator subject to the provisions of this section shall include the following data in the initial compliance report required by s. NR 440.08:

1. The overall VOC destruction rate used to attain compliance with sub. (3) (a) 2., 3. or 4. and the calculated emission limit used to attain compliance with sub. (3) (a) 4.; and

2. The combustion temperature of the thermal incinerator or the gas temperature, both upstream and downstream of the incinerator catalyst bed, used to attain compliance with sub. (3) (a) 2., 3. or 4.

(c) Following the initial performance test, the owner or operator of an affected facility shall identify, record and submit a written report to the department every calendar quarter of each instance in which the volume–weighted average of the local mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3). If no instances have occurred during a particular quarter, a report stating this shall be submitted to the department semiannually.

(d) The owner or operator of each affected facility shall also submit reports at the frequency specified in s. NR 440.07(3) when the incinerator temperature drops as defined under sub. (5) (c). If no periods occur, the owner or operator shall state this in the report.

(e) Each owner or operator subject to the provisions of this section shall maintain at the source for a period of at least 2 years, records of all data and calculations used to determine monthly VOC emissions from each affected facility and to determine the monthly emission limit where applicable. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with sub. (3) as follows:

1. Reference Method 24, or data provided by the formulator of the coating for determining the VOC content of each coating as applied to the surface of the metal coil. In the event of a dispute, Reference Method 24 shall be the reference method. When VOC content of waterborne coatings, determined by Reference Method 24, is used to determine compliance of affected facilities, the results of the Reference Method 24 analysis shall be adjusted as described in Section 4.4 of Reference Method 24.

2. Reference Method 25, both for measuring the VOC concentration in each gas stream entering and leaving the control device on each stack equipped with an emission control device and for measuring the VOC concentration in each gas stream emitted directly to the atmosphere,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be at least a one–liter sample taken at a point where the sample will be representative of the coating as applied to the surface of the metal coil.

(c) For Method 25 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time shall be at least 60 minutes, and the minimum sample volume shall be at least 0.003 dry standard cubic meter (DSCM); however, shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve testing of representative stacks on a case–by–case basis if the owner or operator can demonstrate to the satisfaction of the department that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (a) (intro.), (b) (intro.) and (4) (c) 2. a. 2), Register, September, 1990, No. 417, eff. 10–1–90; renum. (6) (c) to be (6) (e), cr. (6) (c) and (d), Register, June, 1993, No. 450, eff. 8–1–93.

NR 440.59 Asphalt processing and asphalt roofing manufacture. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The affected facilities to which this section applies are each saturator and each mineral handling and storage facility at asphalt roofing plants; and each asphalt storage tank and each blowing still at asphalt processing plants, petroleum refineries and asphalt roofing plants.

(b) Any saturator or mineral handling and storage facility under par. (a) that commences construction or modification after November 18, 1980 is subject to the requirements of this section. Any asphalt storage tank or blowing still that processes or stores, or both processes and stores, asphalt used for roofing only or for roofing and other purposes, and that commences construction or modification after November 18, 1980 is subject to the requirements of this section. Any asphalt storage tank or blowing still that processes or stores, or both processes and stores, only nonroofing asphalts and that commences construction or modification after May 26, 1981 is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) “Afterburner” or “A/B” means an exhaust gas incinerator used to control emissions of particulate matter.

(b) “Asphalt processing” means the storage and blowing of asphalt.

(c) “Asphalt processing plant” means a plant which blows asphalt for use in the manufacture of asphalt products.

(d) “Asphalt roofing plant” means a plant which produces asphalt roofing products (shingles, roll roofing, siding or saturated felt).

(e) “Asphalt storage tank” means any tank used to store asphalt at asphalt roofing plants, petroleum refineries and asphalt processing plants. Storage tanks containing cutback asphalts (asphalts diluted with solvents to reduce viscosity for low temperature applications) and emulsified asphalts (asphalts dispersed in water with an emulsifying agent) are not included.

(f) “Blowing still” means the equipment in which air is blown through asphalt flux to change the softening point and penetration rate.

(g) “Catalyst” means a substance which, when added to asphalt flux in a blowing still, alters the penetrating–softening point relationship or increases the rate of oxidation of the flux.

(h) “Coating blow” means the process in which air is blown through hot asphalt flux to produce coating asphalt. The coating blow starts when the air is turned on and stops when the air is turned off.

(i) “Electrostatic precipitator” or “ESP” means an air pollution control device in which solid or liquid particulates in a gas stream are charged as they pass through an electric field and precipitated on a collection surface.

(j) “High velocity air filter” or “HVAF” means an air pollution control filtration device for the removal of sticky, oily or liquid aerosol particulate matter from exhaust gas streams.

(k) “Mineral handling and storage facility” means the areas in asphalt roofing plants in which minerals are unloaded from a carrier, the conveyor transfer points between the carrier and the storage silos and the storage silos.

(L) “Saturator” means the equipment in which asphalt is applied to felt to make asphalt roofing products. The term saturator includes the saturator, wet looper and coater.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which s. NR 440.08 (2) requires a performance test to be completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any saturator:

1. Particulate matter in excess of:

a. 0.040 kilograms of particulate per megagram of asphalt shingle or mineral–surfaced roll roofing produced, or

b. 0.40 kilograms per megagram of saturated felt or smooth–surfaced roll roofing produced;

2. Exhaust gases with opacity greater than 20%; and

3. Any visible emissions from a saturator capture system for more than 20% of any period of consecutive valid observations totaling 60 minutes. Saturators that were constructed before November 18, 1980 and that have not been reconstructed since that date and that become subject to this section through modification are exempt from the visible emissions standard. Saturators that have been newly constructed or reconstructed since November 18, 1980 are subject to the visible emissions standard.

(b) On and after the date on which s. NR 440.08 (2) requires a performance test to be completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blowing still:

1. Particulate matter in excess of 0.67 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still; and

2. Particulate matter in excess of 0.71 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still and when No. 6 fuel oil is fired in the afterburner; and

3. Particulate matter in excess of 0.60 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst; and

4. Particulate matter in excess of 0.64 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst and when No. 6 fuel oil is fired in the afterburner; and

5. Exhaust gases with an opacity greater than zero percent unless an opacity limit for the blowing still when fuel oil is used to fire the afterburner has been established by the department in accordance with the procedures in 40 CFR 60.474 (g).

(c) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any asphalt storage tank exhaust gases with opacity greater than zero percent, except for one consecutive 15–minute period in any 24–hour period when the transfer lines are being blown for cleaning. The control device may not be bypassed during this 15–minute period. If, however, the emissions from any asphalt storage tank or tanks are ducted to a control device for a saturator, the combined emissions shall meet the emission limit contained in par. (a) during the time the saturator control device is operating. At any other time the asphalt storage tank or tanks shall meet the opacity limit specified in this paragraph for storage tanks.

(d) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any mineral handling and storage facility emissions with opacity greater than one percent.

(4) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section, and using either an electrostatic precipitator or a high velocity air filter to meet either the emission limit in sub. (3) (a) 1. or (b) 1., or both, shall continuously monitor and record the temperature of the gas at the inlet of the control device. The temperature monitoring instrument shall have an accuracy of ± 15°C over its range.

(b) The owner or operator subject to the provisions of this section and using an afterburner to meet either the emission limit in sub. (3) (a) 1. or (b) 1., or both, shall continuously monitor and record the temperature in the combustion zone of the afterburner. The monitoring instrument shall have an accuracy of ± 10°C over its range.

(c) An owner or operator subject to the provisions of this section and using a control device not mentioned in pars. (a) and (b) shall provide to the department information describing the operation of the control device and the process parameter or parameters which would indicate proper operation and maintenance of the device. The department may require continuous monitoring and determine the process parameters to be monitored.

(d) The industry is exempted from the quarterly reports required under s. NR 440.07 (3). The owner or operator is required to record and report the operating temperature of the control device during the performance test and, as required by s. NR 440.07 (5), maintain a file of the temperature monitoring results for at least 2 years.

(5) TEST METHODS AND PROCEDURES. (a) For saturators, the owner or operator shall conduct performance tests required in s. NR 440.08 as follows:

1. If the final product is shingle or mineral–surfaced roll roofing, the tests shall be conducted while 106.6–kg (235–lb) shingle is being produced.

2. If the final product is saturated felt or smooth–surfaced roll roofing, the tests shall be conducted while 6.8–kg (15–lb) felt is being produced.

3. If the final product is fiberglass shingle, the test shall be conducted while a nominal 100–kg (220–lb) shingle is being produced.

(b) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08(2).

(c) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_sQ_{sd})/(PK)$$

where:

E is the emission rate of particulate matter, kg/Mg

c_s is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P is the asphalt roofing production rate or asphalt charging rate, Mg/hr (ton/hr)

K is the conversion factor, 1000 g/kg [907.2/(g–Mg)/(kg–ton)]

2. Method 5A shall be used to determine the particulate matter concentration (c_s) and volumetric flow rate (Q_{sd}) of the effluent gas. For a saturator, the sampling time and sample volume for each run shall be at least 120 minutes and 3.00 dscm (106 dscf), and for the blowing still, at least 90 minutes or the duration of the coating blow or non–coating blow, whichever is greater, and 2.25 dscm (79.4 dscf).

3. For the saturator, the asphalt roofing production rate (P) for each run shall be determined as follows: The amount of asphalt roofing produced on the shingle or saturated felt process lines shall be obtained by direct measurement. The asphalt roofing production rate is the amount produced divided by the time taken for the run.

4. For the blowing still, the asphalt charging rate (P) shall be computed for each run using the following equation:

$$P = (Vd)/(K'\theta)$$

where:

P is the asphalt charging rate to blowing still, Mg/hr (ton/hr)

V is the volume of asphalt charged, m^3 (ft^3)

d is the density of asphalt, kg/m^3 (lb/ft^3)

K' is the conversion factor, 1000 kg/Mg (2000 lb/ton)

θ here is the duration of test run, hr

a. The volume (V) of asphalt charged shall be measured by any means accurate to within 10%.

b. The density (d) of the asphalt shall be computed using the following equation:

$$d = K''(1056.1 - 0.6176°\,C)$$

where:

°C is the temperature at the start of the blow, °C

K″ is 1.0 [0.06243 (lb–m^3)/(ft^3–kg)]

5. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(d) The department shall determine compliance with the standards in sub. (3) (a) 3. by using Method 22, modified so that readings are recorded every 15 seconds for a period of consecutive observations during representative conditions, in accordance with s. NR 440.08 (3), totaling 60 minutes. A performance test shall consist of one run.

(e) The owner or operator shall use the monitoring device in sub. (4) (a) or (b) to monitor and record continuously the temperature during the particulate matter run and shall report the results to the department with the performance test results.

(f) If at a later date the owner or operator believes the emission limits in sub. (3) (a) and (b) are being met even though the temperature measured in accordance with sub. (4) (a) and (b) is exceeding that measured during the performance test, the owner or operator may submit a written request to the department to repeat the performance test and procedure outlined in par. (c).

Note: Under 40 CFR 60.474 (g), if fuel oil is to be used to fire an afterburner used to control emissions from a blowing still, the owner or operator may petition the administrator in accordance with 40 CFR 60.11 (e), to establish an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. To obtain this opacity standard, the owner or operator must request the administrator to determine opacity during an initial, or subsequent, performance test when fuel oil is used to fire the afterburner. Upon receipt of the results of the performance test, the administrator will made a finding concerning compliance with the mass standard for the blowing still. If the administrator finds that the facility was in compliance with the mass standard during the performance test but failed to meet the zero opacity standard, the administrator will establish and promulgate in the Federal Register an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. When the afterburner is fired with natural gas, the zero percent opacity remains the applicable opacity standard.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; am. (2) (intro.), (3) (a) 1. a. and b. and (5) (k), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (d), r. and recr. (5), Register, July, 1993, No. 451, eff. 7–1–93.

NR 440.62 Equipment leaks of VOC in the synthetic organic chemicals manufacturing industry.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 1. The provisions of this section apply to affected facilities in the synthetic organic chemicals manufacturing industry.

2. The group of all equipment (defined in sub. (2)) within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction or modification after January 5, 1981, shall be subject to the requirements of this section.

(c) Addition or replacement of equipment for the purpose of process improvement which is accomplished without a capital expenditure is not by itself considered a modification under this section.

(d) 1. If an owner or operator applies for one of the exemptions in this paragraph the owner or operator shall maintain records as required in sub. (7) (i).

2. Any affected facility that has the design capacity to produce less than 1,000 Mg/yr is exempt from sub. (3).

3. If an affected facility produces heavy liquid chemicals only from heavy liquid feed or raw materials it is exempt from sub. (3).

4. Any affected facility that produces beverage alcohol is exempt from sub. (3).

5. Any affected facility that has no equipment in VOC service is exempt from sub. (3).

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Capital expenditure" means, in addition to the definition in s. NR 440.02 (6), an expenditure for a physical or operational change to an existing facility that:

1. Exceeds P, the product of the facility's replacement cost, R, and an adjusted annual asset guideline repair allowance, A, as reflected by the following equation:

$$P = R \times A,$$

where

a. The adjusted annual asset guideline repair allowance, A, is the product of the percent of the replacement cost, Y, and the applicable basic annual asset guideline repair allowance, B, as reflected by the following equation:

$$A = Y \times (B/100);$$

b. The percent Y is determined from the following equation:

$$Y = 1.0 - 0.575 \log X,$$

where X is 1982 minus the year of construction; and

c. The applicable basic annual asset guideline repair allowance, B, is selected from the following table consistent with the applicable section:

Table for Determining Applicable Value of B

Section applicable to facility	Value of B to be used in equation
This section	12.5
NR 440.647	12.5
NR 440.66	7.0
NR 440.682	4.5

(b) "Closed vent system" means a system that is not open to the atmosphere and that is composed of piping, connections and, if necessary, flow inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device.

(c) "Connector" means flanged, screwed, welded, or other joined fittings used to connect two pipe lines or a pipe line and a piece of process equipment.

(d) "Control device" means an enclosed combustion device, vapor recovery system, or flare.

(e) "Distance piece" means an open or enclosed casing through which the piston rod travels, separating the compressor cylinder from the crankcase.

(f) "Double block and bleed system" means two blocks valves connected in series with a bleed valve or line that can vent the line between the two block valves.

(g) "Equipment" means each pump, compressor, pressure relief device, sampling connection system, open–ended valve or line, valve and flange or other connection in VOC service and any devices or systems required by this section.

(h) "First attempt at repair" means to take rapid action for the purpose of stopping or reducing leakage of organic material to atmosphere using best practices.

(i) "In gas/vapor service" means that the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

(j) "In heavy liquid service" means that the piece of equipment is not in gas vapor service or in light liquid service.

(k) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in sub. (6) (e).

(L) "Liquids dripping" means any visible leakage from the seal including spraying, misting, clouding and ice formation.

(m) "Open–ended valve or line" means any valve, except safety relief valves, having one side of the valve seat in contact with process fluid and one side open to the atmosphere, either directly or through open piping.

(n) "Pressure release" means the emission of materials resulting from system pressure being greater than set pressure of the pressure relief device.

(o) "Process improvement" means routine changes made for safety and occupational health requirements, for energy savings, for better utility, for ease of maintenance and operation, for correction of design deficiencies, for bottleneck removal, for changing product requirements, or for environmental control.

(p) "Process unit" means components assembled to produce, as intermediate or final products, one or more of the chemicals listed in Table A of sub. (10). A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

(q) "Process unit shutdown" means a work practice or operational procedure that stops production from a process unit or part of a process unit. An unscheduled work practice or operational procedure that stops production from a process unit or part of a process unit for less than 24 hours is not a process unit shutdown. The use of spare equipment and technically feasible bypassing of equipment without stopping production are not process unit shutdowns.

(r) "Quarter" means a 3−month period; the first quarter concludes on the last full month during the 180 days following initial startup.

(s) "Repaired" means that equipment is adjusted, or otherwise altered, in order to eliminate a leak as indicated by one of the following: an instrument reading of 10,000 ppm or greater, indication of liquids dripping, or indication by a sensor that a seal or barrier fluid system has failed.

(t) "Replacement cost" means the capital needed to purchase all the depreciable components in a facility.

(u) "Sensor" means a device that measures a physical quantity such as temperature, pressure, flow rate, pH, or liquid level.

(v) "In−situ sampling systems" means nonextractive samplers or in−line samplers.

(w) "Synthetic organic chemicals manufacturing industry" means the industry that produces, as intermediates or final products, one or more of the chemicals listed in Table A of sub. (10).

(x) "In−vacuum service" means that equipment is operating at an internal pressure which is at least 5 kilopascals (kPa) below ambient pressure.

(y) "Volatile organic compounds" or "VOC" means, for the purpose of this section, any reactive organic compounds as defined in s. NR 440.02 (35).

(z) "In VOC service" means that the piece of equipment contains or contacts a process fluid that is at least 10% VOC by weight. (The provisions of sub. (6) (d) specify how to determine that a piece of equipment is not in VOC service.)

(3) STANDARDS. (a) *General.* 1. Each owner or operator subject to the provisions of this section shall demonstrate compliance with the requirements of pars. (a) to (j) for all equipment within 180 days of initial startup.

2. Compliance with pars. (a) to (j) will be determined by review of records and reports, review of performance test results and inspection using the methods and procedures specified in sub. (6).

3. An owner or operator may apply to the administrator for a determination of equivalence of a means of emission limitation to the requirements of par. (b), (c), (e), (f), (g), (h) or (j) under 40 CFR 60.484, as in effect on July 1, 1994. If the administrator makes a determination that a means of emission limitation is at least equivalent, the owner or operator shall notify the department of that determination and comply with its requirements rather than the requirements of par. (b), (c), (e), (f), (g), (h) or (j).

4. Equipment that is in vacuum service is excluded from the requirements of pars. (b) to (j) if it is identified as required in sub. (7) (e) 5.

(b) *Pumps in light liquid service.* 1. a. Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in sub. (6) (b), except as provided in par. (a) 3. and subds. 4., 5. and 6.

b. Each pump in light liquid service shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal.

2. a. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

b. If there are indications of liquids dripping from the pump seal a leak is detected.

3. a. When a leak is detected it shall be repaired as soon as practicable but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

4. Each pump equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from the requirements of subd. 1. provided the following requirements are met:

a. Each dual mechanical seal system is:

1) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure; or

2) Equipment with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of par. (j); or

3) Equipped with a system that purges the barrier fluid into a process stream with a zero VOC emissions to the atmosphere.

b. The barrier fluid system is in heavy liquid service or is not in VOC service.

c. Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

d. Each pump is checked by visual inspection each calendar week for indications of liquids dripping from the pump seals.

e. 1) Each sensor as described in subd. 4. c. is checked daily or is equipped with an audible alarm, and

2) The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

f. 1) If there are indications of liquids dripping from the pump seal or the sensor indicates failure of the seal system, the barrier fluid system, or both based on the criterion determined in subd. 4. e. 2) a leak is detected.

2) When a leak is detected it shall be repaired as soon as practicable but no later than 15 calendar days after it is detected, except as provided in par. (i).

3) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

5. Any pump that is designated as described in sub. (7) (e) 1. and 2. for no detectable emission, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subds. 1., 3. and 4. if the pump:

a. Has no externally actuated shaft penetrating the pump housing,

b. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 ppm above ground as measured by the methods specified in sub. (6) (c), and

c. Is tested for compliance with sub. (6) (e) 2. initially upon designation, annually and at other times requested by the department.

6. If any pump is equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a control device that complies with the requirements of par. (j) it is exempt from the requirements of subds. 1. to 5.

(c) *Compressors.* 1. Each compressor shall be equipped with a seal system that includes a barrier fluid system that prevents leakage of VOC to the atmosphere, except as provided in par. (a) 3. and subds. 8. and 9.

2. Each compressor seal system as required in subd. 1. shall be:

a. Operated with a barrier fluid at a pressure that is greater than the compressor stuffing box pressure; or

b. Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements of par. (j); or

c. Equipped with a system that purges the barrier fluid into a process stream with zero VOC emissions to the atmosphere.

3. The barrier fluid system shall be in heavy liquid service or may not be in VOC service.

4. Each barrier fluid system as described in subd. 1. shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.

5. a. Each sensor as required in subd. 4. shall be checked daily or shall be equipped with an audible alarm.

b. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

6. If the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined under subd. 5. b. a leak is detected.

7. a. When a leak is detected it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

8. A compressor is exempt from the requirements of subds. 1. and 2. if it is equipped with a closed vent system capable of capturing and transporting any leakage from the seal to a control device that complies with the requirements of par. (j), except as provided in subd. 9.

9. Any compressor that is designated as described in sub. (7) (e) 1. and 2. for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subds. 1. to 8. if the compressor:

a. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background, as measured by the methods specified in sub. (6) (c); and

b. Is tested for compliance with subd. 9. a. initially upon designation, annually and at other times requested by the department.

10. Any existing reciprocating compressor in a process unit which becomes an affected facility under provisions of s. NR 440.14 or 440.15 is exempt from subds. 1., 2., 3., 4., 5. and 8. provided the owner or operator demonstrates that recasting the distance piece or replacing the compressor are the only options available to bring the compressor into compliance with the provisions of subds. 1., 2., 3., 4., 5. and 8.

(d) *Pressure relief devices in gas/vapor service.* 1. Except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background, as determined by the methods specified in sub. (6) (c).

2. a. After each pressure release the pressure relief device shall be returned to a condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as soon as practicable but no later than 5 calendar days after the pressure release, as provided in par. (i).

b. No later than 5 calendar days after the pressure release the pressure relief device shall be monitored to confirm the conditions of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, by the methods specified in sub. (6) (c).

3. Any pressure relief device that is equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device as described in par. (j) is exempted from the requirements of this paragraph.

(e) *Sampling connection systems.* 1. Each sampling connection system shall be equipped with a closed purge system or closed vent system, except as provided in par. (a) 3.

2. Each closed purge system or closed system as required in subd. 1. shall:

a. Return the purged process fluid directly to the process line with zero VOC emissions to the atmosphere; or

b. Collect and recycle the purged process fluid with zero VOC emissions to the atmosphere; or

c. Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of par. (j).

3. In situ−sampling systems are exempt from subd. 1. and 2.

(f) *Open−ended valves or lines.* 1. a. Each open−ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in par. (a) 3.

b. The cap, blind flange, plug, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open−ended valve or line.

2. Each open−ended valve or line equipped with a second valve shall be operated with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

3. When a double block−and−bleed system is being used the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with subd. 1. at all times.

(g) *Valves in gas/vapor service in light liquid service.* 1. Each valve shall be monitored monthly to detect leaks by the methods specified in sub. (6) (b) and shall comply with subds. 2. to 5., except as provided in subds. 6., 7. and 8., subs. (4) (a) and (b) and par. (a) 3.

2. In an instrument reading of 10,000 ppm or greater is measured a leak is detected.

3. a. Any valve for which a leak is not detected for 2 successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected.

b. If a leak is detected the valve shall be monitored monthly until a leak is not detected for 2 successive months.

4. a. When a leak is detected it shall be repaired as soon as practicable, but no later than 15 calendar days after the leak is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

5. First attempts at repair include, but are not limited to, the following best practices where practicable:

a. Tightening of bonnet bolts;

b. Replacement of bonnet bolts;

c. Tightening of packing gland nuts;

d. Injection of lubricant into lubricated packing.

6. Any valve that is designated as described in sub. (7) (e) 2. for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subd. 1. if the valve:

a. Has no external actuating mechanism in contact with the process fluid;

b. Is operated with emission less than 500 ppm above background as determined by the method specified in sub. (6) (c), and

c. Is tested for compliance with subd. 6. b. initially upon designation, annually, and at other times requested by the department.

7. Any valve that is designated as described in sub. (7) (f) 2. as a difficult–to–monitor valve is exempt from the requirements of subd. 1. if:

a. The owner or operator of the valve demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with subd. 1., and

b. The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe–to–monitor times.

8. Any valve that is designated as described in sub. (7) (f) 2. as a difficult–to–monitor valve, is exempt from the requirements of subd. 1. if:

a. The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface.

b. The process unit within which the valve is located either becomes an affected facility through s. NR 440.14 or 440.15, or the owner or operator designates less than 3.0% of the total number of valves as difficult–to–monitor, and

c. The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

(h) *Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service and flanges and other connectors.* 1. Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service and flanges and other connectors shall be monitored within 5 days by the method specified in sub. (6) (b) if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method.

2. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

3. a. When a leak is detected it shall be repaired as soon as practicable but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. The first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

4. First attempts at repair include, but are not limited to, the best practices described under par. (g) 5.

(i) *Delay of repair.* 1. Delay of repair of equipment for which leaks have been detected will be allowed if the repair is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown.

2. Delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in VOC service.

3. Delay of repair for valves will be allowed if:

a. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair, and

b. When repair procedures are effected, the purged material is collected and destroyed or recovered in a control device complying with par. (j).

4. Delay of repair for pumps will be allowed if:

a. Repair requires the use of a dual mechanical seal system that includes a barrier fluid system, and

b. Repair is completed as soon as practicable but not later than 6 months after the leak was detected.

5. Delay of repair beyond a process unit shutdown will be allowed for a valve if valve assembly replacement is necessary during the process unit shutdown, valve assembly supplies have been depleted and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

(j) *Closed vent systems and control devices.* 1. Owners or operators of closed vent systems and control devices used to comply with provisions of this section shall comply with the provisions of this paragraph.

2. Vapor recovery systems (e.g., condensers and adsorbers) shall be designed and operated to recover the VOC emissions vented to them with an efficiency of 95% or greater.

3. Enclosed combustion devices shall be designed and operated to reduce the VOC emissions vented to them with an efficiency of 95% or greater or to provide a minimum residence time of 0.75 seconds at a minimum temperature of 816°C.

4. Flares used to comply with this section shall comply with the requirements of s. NR 440.18.

5. Owners or operators of control devices used to comply with the provisions of this section shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.

6. a. Closed vent system shall be designed and operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined by the methods specified in sub. (6) (c).

b. Closed vent systems shall be monitored to determine compliance with this section initially in accordance with s. NR 440.08, annually and at other times requested by the department.

7. Closed vent systems and control devices used to comply with provisions of this section shall be operated at all times when emissions may be vented to them.

(4) ALTERNATIVE STANDARDS FOR VALVES. (a) *Allowable percentage of valves leaking.* 1. An owner or operator may elect to comply with an allowable percentage of valves leaking of equal to or less than 2.0%.

2. The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of valves leaking:

a. An owner or operator shall notify the department that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in sub. (8) (d).

b. A performance test as specified in subd. 3. shall be conducted initially upon designation, annually, and at other times requested by the department.

c. If a valve leak is detected it shall be repaired in accordance with sub. (3) (g) 4. and 5.

3. Performance tests shall be conducted in the following manner:

a. All valves in gas/vapor and light liquid service within the affected facility shall be monitored within 1 week by the methods specified in sub. (6) (b).

b. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

c. The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service within the affected facility.

4. Owners and operators who elect to comply with this alternative standard may not have an affected facility with a leak percentage greater than 2.0%.

(b) *Skip period leak detection and repair.* 1. a. An owner or operator may elect to comply with one of the alternative work practices specified in subd. 2. b. and c.

b. An owner or operator shall notify the department before implementing one of the alternative work practices, as specified in sub. (8) (d).

2. a. An owner or operator shall comply initially with the requirements for valves in gas/vapor service and valves in light liquid service, as described in sub. (3) (g).

b. After 2 consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0 an owner or operator may begin to skip 1 of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

c. After 5 consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0 an owner or operator may begin to skip 3 of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

d. If the percent of valves leaking is greater than 2.0 the owner or operator shall comply with the requirements as described in sub. (3) (g) but can again elect to use this subsection.

e. The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and valves for which repair has been delayed by the total number of valves subject to the requirements of this paragraph.

f. An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

Note: Under 40 CFR 60.484, each owner or operator subject to the provisions of this section may apply to the administrator for determination of equivalence for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in this section. Manufacturers of equipment used to control equipment leaks of VOC may apply to the administrator for determination of equivalence for any equivalent means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the equipment, design and operational requirements of this section. The administrator will make an equivalence determination according to the provisions of 40 CFR 60.484 (b), (c), (d) and (e).

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall determine compliance with the standards in subs. (3) and (4) as follows:

1. Method 21 shall be used to determine the presence of leaking sources. The instrument shall be calibrated before use each day of its use by the procedures specified in Method 21. The following calibration gases shall be used:

a. Zero air (less than 10 ppm of hydrocarbon in air); and

b. A mixture of methane or n–hexane and air at a concentration of about, but less than, 10,000 ppm methane or n–hexane.

(c) The owner or operator shall determine compliance with the no detectable emission standards in sub. (3) (b) 5., (c) 9., (d), (g) 6. and (j) 5. as follows:

1. The requirements of par. (b) shall apply.

2. Method 21 shall be used to determine the background level. All potential leak interfaces shall be traversed as close to the interface as possible. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 ppm for determining compliance.

(d) The owner or operator shall test each piece of equipment unless he or she demonstrates that a process unit is not in VOC series, that is, that the VOC content would never be reasonably expected to exceed 10% by weight. For purposes of this demonstration, the following methods and procedures shall be used:

1. Procedures that conform to the general methods in ASTM E168–67, E169– 63 or E260–73, incorporated by reference in s. NR 440.17, shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment.

2. Organic compounds that are considered by the department to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the VOC content of the process fluid.

3. Engineering judgment may be used to estimate the VOC content, if a piece of equipment has not been shown previously to be in service. If the department disagrees with the judgment, subds. 1. and 2. shall be used to resolve the disagreement.

(e) The owner or operator shall demonstrate that an equipment is in light liquid service by showing that all the following conditions apply:

1. The vapor pressure of one or more of the components is greater than 0.3 kPa at 20°C. Standard reference texts or ASTM D2879–83, incorporated by reference in s. NR 440.17, shall be used to determine the vapor pressures.

2. The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 20°C is equal to or greater than 20% by weight.

3. The fluid is a liquid at operating conditions.

(f) Samples used in conjunction with pars. (d), (e) and (g) shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in the flare.

(g) The owner or operator shall determine compliance with the standards for flares as follows:

1. Methods 22 shall be used to determine visible emissions.

2. A thermocouple or any other equivalent device shall be used to monitor the presence of a pilot flame in the flare.

3. The maximum permitted velocity (V_{max}) for air–assisted flares shall be computed using the following equation:

$$V_{max} = 8.706 + 0.7084\ H_T$$

where:

V_{max} is the maximum permitted velocity, m/sec

H_T is the net heating value of the gas being combusted, MJ/scm

4. The net heating value (H_T) of the gas being combusted in a flare shall be computed as follows:

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

where :

K is the conversion constant,

$$1.740 \times 10^{-7} \frac{(1)}{(ppm)} \frac{(g\text{–}mole)}{(scm)} \frac{(MJ)}{(kcal)}$$

C_i is the concentration of sample component “i”, ppm

H_i is the net heat of combustion of sample component “i” at 25°C and 760 mm Hg, kcal/g–mole

5. Method 18 and ASTM D2504–67, incorporated by reference in s. NR 440.17, shall be used to determine the concentration of sample component “i” .

6. ASTM D2382–76, incorporated by reference in s. NR 440.17, shall be used to determine the net heat of combustion of

component "i" if published values are not available or cannot be calculated.

7. Method 2, 2A, 2C or 2D, as appropriate, shall be used to determine the actual exit velocity of a flare. If needed, the unobstructed (free) cross– sectional area of the flare tip shall be used.

(7) RECORDKEEPING REQUIREMENTS. (a) 1. Each owner or operator subject to the provisions of this section shall comply with the recordkeeping requirements of this section.

2. An owner or operator of more than one affected facility subject to the provisions of this section may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.

(b) When each leak is detected as specified in subs. (3) (b), (c), (g), (h) and (4) (b) the following requirements apply:

1. A weather proof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

2. The identification on a value may be removed after it has been monitored for 2 successive months as specified in sub. (3) (g) 3. and no leak has been detected during those 2 months.

3. The identification on equipment except on valve may be removed after it has been repaired.

(c) When each leak is detected as specified in subs. (3) (b), (c), (g), (h) and (4) (b) the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

1. The instrument and operator identification numbers and the equipment identification number.

2. The date the leak was detected and the dates each attempt to repair the leak.

3. Repair methods applied in each attempt to repair the leak.

4. "Above 10,000" if the maximum instrument reading measured by the methods specified in sub. (6) (a) after each repair attempt is equal to or greater than 10,000 ppm.

5. "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

6. The signature of the owner or operator (or designate) whose decision it was that repair could not be affected without a process shutdown.

7. The expected date of successful repair of the leak if a leak is not repaired within 15 days.

8. Dates of process unit shutdown that occur while the equipment is unrepaired.

9. The date of successful repair of the leak.

(d) The following information pertaining to the design requirements for closed vent systems and control devices described in sub. (3) (j) shall be recorded and kept in a readily accessible location:

1. Detailed schematics, design specifications and piping and instrumentation diagrams.

2. The dates and descriptions of any changes in the design specifications.

3. A description of the parameter or parameters monitored as required in sub. (3) (j) 5., to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter (or parameters) was selected for the monitoring.

4. Periods when the closed vent systems and control devices required in sub. (3) (b), (c), (d) and (e) are not operated as designed, including periods when a flare pilot light does not have a flame.

5. Dates of startups and shutdowns of the closed vent systems and control devices required in sub. (3) (b), (c), (d) and (e).

(e) The following information pertaining to all equipment subject to the requirements in sub. (3) (a) to (j) shall be recorded in a log that is kept in a readily accessible location:

1. A list of identification numbers for equipment subject to the requirements of this section.

2. a. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of sub. (3) (b) 5., (c) 9. and (g) 6.

b. The designation of equipment as subject to the requirements of sub. (3) (b) 5., (c) 9., or (g) 6. shall be signed by the owner or operator.

3. A list of equipment identification numbers for pressure relief devices required to comply with sub. (3) (d).

4. a. The dates of each compliance test as required in sub. (3) (b) 5., (c) 9., (d) and (g) 6.

b. The background level measured during each compliance test.

c. The maximum instrument reading measured at the equipment during each compliance test.

5. A list of identification numbers for equipment in vacuum service.

(f) The following information pertaining to all valves subject to the requirements of sub. (3) (g) 7. and 8. shall be recorded in a log that is kept in a readily accessible location:

1. A list of identification numbers for valves that are designated as unsafe–to–monitor, an explanation for each valve stating why the valve is unsafe–to–monitor and the plan for monitoring each valve.

2. A list of identification numbers for valves that are designated as difficult–to–monitor, an explanation for each valve stating why the valve is difficult–to–monitor and the schedule for monitoring each valve.

(g) The following information shall be recorded for valves complying with sub. (4) (b).

1. A schedule of monitoring.

2. The percent of valves found leaking during each monitoring period.

(h) The following information shall be recorded in a log that is kept in a readily accessible location.

1. Design criterion required in sub. (3) (b) 4. e. and (c) 5. b. and explanation of the design criterion; and

2. Any changes to this criterion and the reasons for the changes.

(i) The following information shall be recorded in a log that is kept in a readily accessible location for use in determining exemptions as provided in sub. (1) (d):

1. An analysis demonstrating the design capacity of the affected facility,

2. A statement listing the feed or raw materials and products from the affected facilities and an analysis demonstrating whether these chemicals are heavy liquids or beverage alcohol, and

3. An analysis demonstrating that equipment is not VOC service.

(j) Information and data used to demonstrate that a piece of equipment is not in VOC service shall be recorded in a log that is kept in a readily accessible location.

(k) The provisions of s. NR 440.07 (2) and (4) do not apply to affected facilities subject to this section.

(8) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall submit semiannual reports to the department beginning 6 months after the initial start up date.

(b) The initial semiannual report to the department shall include the following information:

1. Process unit identification.

2. Number of valves subject to the requirements of sub. (3) (g), excluding those valves designated for no detectable emissions under the provisions of sub. (3) (g) 6.

3. Number of pumps subject to the requirements of sub. (3) (b), excluding those pumps designated for no detectable emissions under the provisions of sub. (3) (b) 5. and those pumps complying with sub. (3) (b) 6.

4. Number of compressors subject to the requirements of sub. (3) (c), excluding those compressors designated for no detectable emissions under the provisions of sub. (3) (c) 9. and those compressors complying with sub. (3) (c) 8.

(c) All semiannual reports to the department shall include the following information summarized from the information in sub. (7):

1. Process unit identification.

2. For each month during the semiannual reporting period.

a. Number of valves for which leaks were detected as described in sub. (3) (g) 2. or (4) (b),

b. Number of valves for which leaks were not repaired as required in sub. (3) (g) 4. a.,

c. Number of pumps for which leaks were detected as described in sub. (3) (b) 2. and 4. f. 1),

d. Number of pumps for which leaks were not repaired as required in sub. (3) (b) 3. a. and 4. f. 2),

e. Number of compressors for which leaks were detected as described in sub. (3) (c) 6.,

f. Number of compressors for which leaks were not repaired as required in sub. (3) (c) 7. a., and

g. The facts that explain each delay of repair and, where appropriate, why a process unit shutdown was technically infeasible.

3. Dates of process unit shutdowns which occurred within the semiannual reporting period.

4. Revisions to items reported according to par. (b) if changes have occurred since the initial report or subsequent revisions to the initial report.

(d) An owner or operator electing to comply with the provisions of sub. (4) (a) and (b) shall notify the department of the alternative standard selected 90 days before implementing either of the provisions.

(e) An owner or operator shall report the results of all performance tests in accordance with s. NR 440.08. The provisions of s. NR 440.08 (4) do not apply to affected facilities subject to the provisions of this section except that an owner or operator must notify the department of the schedule for the initial performance tests at least 30 days before the initial performance tests.

(9) RECONSTRUCTION. For the purpose of this section:

(a) The cost of the following frequently replaced components of the facility may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable new facility" under s. NR 440.15: pump seals, nuts and bolts, rupture disks and packings.

(b) Under s. NR 440.15 the "fixed capital cost of new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a) which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2–year period following the applicability date for the appropriate section. (See the "applicability and designation of affected facility" subsection of the appropriate section.) For purposes of this paragraph "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(10) LIST OF CHEMICALS PRODUCED BY AFFECTED FACILITIES. (a) The chemicals listed in Table A are produced, as intermediates or final products, by process units covered under this section. The applicability date for process units producing one or more of these chemicals is January 5, 1981.

Table A

CAS No.[a]	Chemical
105–57–7	Acetal
75–07–0	Acetaldehyde
107–89–1	Acetaldol
60–35–5	Acetamide
103–84–4	Acetanilide
64–19–7	Acetic acid
108–24–7	Acetic anhydride
67–64–1	Acetone
75–86–5	Acetone cyanohydrin
75–05–8	Acetonitrile
98–86–2	Acetophenone
75–36–5	Acetyl chloride
74–86–2	Acetylene
107–02–8	Acrolein
79–06–1	Acrylamide
79–10–7	Acrylic acid
107–13–1	Acrylonitrile
124–04–9	Adipic acid
111–69–3	Adiponitrile
(b)	Alkyl naphthalenes
107–18–6	Allyl alcohol
107–05–1	Allyl chloride
1321–11–5	Aminobenzoic acid
111–41–1	Aminoethylethanolamine
123–30–8	p–Aminophenol
628–63–7, 123–92–2	Amyl acetates
71–41–0[c]	Amyl alcohols
110–58–7	Amyl amine
543–59–9	Amyl chloride
110–66–7[c]	Amyl mercaptans
1322–06–1	Amyl phenol
62–53–3	Aniline
142–04–1	Aniline hydrochloride
29191–52–4	Anisidine
100–66–3	Anisole
118–92–3	Anthranilic acid
84–65–1	Anthraquinone
100–52–7	Benzaldehyde
55–21–0	Benzamide

CAS No.[a]	Chemical
71–43–2	Benzene
98–48–6	Benzenedisulfonic acid
98–11–3	Benzenesulfonic acid
134–81–6	Benzil
76–93–7	Benzilic acid
65–85–0	Benzoic acid
119–53–9	Benzoin
100–47–0	Benzonitrile
119–61–9	Benzophenone
98–07–7	Benzotrichloride
98–88–4	Benzoyl chloride
100–51–6	Benzyl alcohol
100–46–9	Benzylamine
120–51–4	Benzyl benzoate
100–44–7	Benzyl chloride
98–87–3	Benzyl dichloride
92–52–4	Biphenyl
80–05–7	Bisphenol A
10–86–1	Bromobenzene
27497–51–4	Bromonaphthalene
106–99–0	Butadiene
106–98–9	1–Butene
123–86–4	n–Butyl acetate
141–32–2	n–Butyl acrylate
71–36–3	n–Butyl alcohol
78–92–2	s–Butyl alcohol
75–65–0	t–Butyl alcohol
109–73–9	n–Butylamine
13952–84–6	s–Butylamine
75–64–9	t–Butylamine
98–73–7	p–tert–Butyl benzoic acid
107–88–0	1,3–Butylene glycol
123–72–8	n–Butyraldehyde
107–92–6	Butyric acid
106–31–0	Butyric anhydride
109–74–0	Butyronitrile
105–60–2	Caprolactam
75–1–50	Carbon disulfide
558–13–4	Carbon tetrabromide
56–23–5	Carbon tetrachloride
9004–35–7	Cellulose acetate
79–11–8	Chloroacetic acid
108–42–9	m–Chloroaniline
95–51–2	o–Chloroaniline
106–47–8	p–Chloroaniline
35913–09–8	Chlorobenzaldehyde
108–90–7	Chlorobenzene
118–91–2, 535–80–8, 74–11–3[c]	Chlorobenzoic acid
2136–81–4, 2136–89–2, 5216–25–1[c]	Chlorobenzotrichloride
1321–03–5	Chlorobenzoyl chloride
25497–29–4	Chlorodifluoromethane
75–45–6	Chlorodifluoroethane
67–66–3	Chloroform
25586–43–0	Chloronaphthalene
88–73–3	o–Chloronitrobenzene
100–00–5	p–Chloronitrobenzene
25167–80–0	Chlorophenols
126–99–8	Chloroprene
7790–94–5	Chlorosulfonic acid
108–41–8	m–Chlorotoluene
95–49–8	o–Chlorotoluene
106–43–4	p–Chlorotoluene
75–72–9	Chlorotrifluoromethane
108–39–4	m–Cresol
95–48–7	o–Cresol
106–44–5	p–Cresol
1319–77–3	Cresols (mixed)
1319–77–3	Cresylic acid
4170–30–3	Crotonaldehyde
3724–65–0	Crotonic acid
98–82–8	Cumene
80–15–9	Cumene hydroperoxide
372–09–8	Cyanoacetic acid
506–77–4	Cyanogen chloride
108–80–5	Cyanuric acid
108–77–0	Cyanuric chloride
110–82–7	Cyclohexane
108–93–0	Cyclohexanol
108–94–1	Cyclohexanone
110–83–8	Cyclohexene
108–91–8	Cyclohexylamine
111–78–4	Cyclooctadiene
112–30–1	Decanol
123–42–2	Diacetone alcohol
27576–04–1	Diaminobenzoic acid
95–76–1, 95–82–9, 554–00–7, 608–27–5, 608–31–1, 626–43–7, 27134–27–6, 57311–92–9[c]	Dichloroaniline
541–73–1	m–Dichlorobenzene
95–50–1	o–Dichlorobenzene
106–46–7	p–Dichlorobenzene
75–71–8	Dichlorodifluoromethane
111–44–4	Dichloroethyl ether
107–06–2	1,2–Dichloroethane (EDC)
96–23–1	Dichlorohydrin
26952–23–8	Dichloropropene
101–83–7	Dicyclohexylamine
109–89–7	Diethylamine
111–46–6	Diethylene glycol
112–36–7	Diethylene glycol diethyl ether
111–96–6	Diethylene glycol dimethyl ether
112–34–5	Diethylene glycol monobutyl ether
124–17–7	Diethylene glycol monobutyl ether acetate
111–90–0	Diethylene glycol monoethyl ether
112–15–2	Diethylene glycol monoethyl ether acetate
111–77–3	Diethylene glycol monomethyl ether
64–67–5	Diethyl sulfate
75–37–6	Difluoroethane
25167–70–8	Diisobutylene
26761–40–0	Diisodecyl phthalate
27554–26–3	Diisooctyl phthalate
674–82–8	Diketene
124–40–3	Dimethylamine
121–69–7	N,N–Dimethylaniline
115–10–6	N,N–Dimethyl ether
68–12–2	N,N–Dimethylformamide
57–14–7	Dimethylhydrazine
77–78–1	Dimethyl sulfate
75–18–3	Dimethyl sulfide
67–68–5	Dimethyl sulfoxide
120–61–6	Dimethyl terephthalate
99–34–3	3,5–Dinitrobenzoic acid

51–28–5	Dinitrophenol
25321–14–6	Dinitrotoluene
123–91–1	Dioxane
646–06–0	Dioxilane
CAS No.[a]	**Chemical**
122–39–4	Diphenylamine
101–84–8	Diphenyl oxide
102–08–9	Diphenyl thiourea
25265–71–8	Dipropylene glycol
25378–22–7	Dodecene
28675–17–4	Diodecylaniline
27193–86–8	Dodecylphenol
106–89–8	Epichlorohydrin
64–17–5	Ethanol
141–43–5[c]	Ethanolamines
141–78–6	Ethyl acetate
141–97–9	Ethyl acetoacetate
140–88–5	Ethyl acrylate
75–04–7	Ethylamine
100–41–4	Ethylbenzene
74–96–4	Ethyl bromide
9004–57–3	Ethylcellulose
75–00–3	Ethyl chloride
105–39–5	Ethyl chloroacetate
105–56–6	Ethylcyanoacetate
74–85–1	Ethylene
96–49–1	Ethylene carbonate
107–07–3	Ethylene chlorohydrin
107–15–3	Ethylenediamine
106–93–4	Ethylene dibromide
107–21–1	Ethylene glycol
111–55–7	Ethylene glycol diacetate
110–71–4	Ethylene glycol dimethyl ether
111–76–2	Ethylene glycol monobutyl ether
112–07–2	Ethylene glycol monobutyl ether acetate
110–80–5	Ethylene glycol monoethyl ether
111–15–9	Ethylene glycol monoethyl ether acetate
109–86–4	Ethylene glycol monomethyl ether
110–49–6	Ethylene glycol monomethyl ether acetate
122–99–6	Ethylene glycol monophenyl ether
2807–30–9	Ethylene glycol monopropyl ether
75–21–8	Ethylene oxide
60–29–7	Ethyl ether
104–76–7	2–Ethylhexanol
122–51–0	Ethyl orthoformate
95–92–1	Ethyl oxalate
41892–71–1	Ethyl sodium oxalacetate
50–00–0	Formaldehyde
75–12–7	Formamide
64–18–6	Formic acid
110–17–8	Fumaric acid
98–01–1	Furfural
56–81–5	Glycerol
26545–73–7	Glycerol dichlorohydrin
25791–96–2	Glycerol triether
56–40–6	Glycine
107–22–2	Glyoxal
118–74–1	Hexachlorobenzene
67–72–1	Hexachloroethane
36653–82–4	Hexadecyl alcohol
124–09–4	Hexamethylenediamine
629–11–8	Hexamethylene glycol
100–97–0	Hexamethylenetetramine
74–90–8	Hydrogen cyanide
123–31–9	Hydroquinone
99–96–7	p–Hydroxybenzoic acid
26760–64–5	Isoamylene

76–83–1	Isobutanol
110–19–0	Isobutyl acetate
115–11–7	Isobutylene
78–84–2	Isobutyraldehyde
CAS No.[a]	**Chemical**
79–31–2	Isobutyric acid
25339–17–7	Isodecanol
26952–21–6	Isooctyl alcohol
78–78–4	Isopentane
78–59–1	Isophorone
121–91–5	Isophthalic acid
78–79–5	Isoprene
67–63–0	Isopropanol
108–21–4	Isopropyl acetate
75–31–0	Isopropylamine
75–29–6	Isopropyl chloride
25168–06–3	Isopropylphenol
463–51–4	Ketene
(b)	Linear alkyl sulfonate
123–01–3	Linear alkylbenzene (Linear dodecylbenzene)
110–16–7	Maleic acid
108–31–6	Maleic anhydride
6915–15–7	Malic acid
141–79–7	Mesityl oxide
121–47–1	Metanilic acid
79–41–4	Methacrylic acid
563–47–3	Methallyl chloride
67–56–1	Methanol
79–20–9	Methyl acetate
105–45–3	Methyl acetoacetate
74–89–5	Methylamine
100–61–8	n–Methylaniline
74–83–9	Methyl bromide
37365–71–2	Methyl butynol
74–87–3	Methyl chloride
108–87–2	Methylcyclohexane
1331–22–2	Methylcyclohexanone
75–09–2	Methylene chloride
101–77–9	Methylene dianiline
101–68–8	Methylene diphenyl diisocyanate
78–93–3	Methyl ethyl ketone
107–31–3	Methyl formate
108–11–2	Methyl isobutyl carbinol
108–10–1	Methyl isobutyl ketone
80–62–6	Methyl methacrylate
77–75–8	Methylpentynol
98–83–9	α–Methyl styrene
110–91–8	Morpholine
85–47–2	α–Naphthalene sulfonic acid
120–18–3	β–Naphthalene sulfonic acid
90–15–3	α–Naphthol
135–19–3	β–Naphthol
75–98–9	Neopentanoic acid
88–74–4	o–Nitroaniline
100–01–6	p–Nitroaniline
91–23–6	o–Nitroanisole
100–17–4	p–Nitroanisole
98–95–3	Nitrobenzene
27178–83–2[c]	Nitrobenzoic acid (o, m and p)
79–24–3	Nitroethane
75–52–5	Nitromethane
88–75–5	2–Nitrophenol
25322–01–4	Nitropropane
1321–12–6	Nitrotoluene
27215–95–8	Nonene
25154–52–3	Nonylphenol
27193–28–8	Octylphenol

CAS No.[a]	Chemical
123–63–7	Paraldehyde
115–77–5	Pentaerythritol
109–66–0	n–Pentane
109–67–1	1–Pentene
127–18–4	Perchloroethylene
594–42–3	Perchloromethyl mercaptan
94–70–2	o–Phenetidine
156–43–4	p–Phenetidine
108–95–2	Phenol
98–67–9, 585–38–6, 609–46–1, 1333–39–7[c]	Phenolsulfonic acids
91–40–7	Phenyl anthranilic acid
(b)	Phenylenediamine
75–44–5	Phosgene
85–44–9	Phthalic anhydride
85–41–6	Phthalimide
108–99–6	b–Picoline
110–85–0	Piperazine
9003–29–6, 25036–29–7[c]	Polybutenes
25322–68–3	Polyethylene glycol
25322–69–4	Polypropylene glycol
123–38–6	Propionaldehyde
79–09–4	Propionic acid
71–23–8	n–Propyl alcohol
107–10–8	Propylamine
540–54–5	Propyl chloride
115–07–1	Propylene
127–00–4	Propylene chlorohydrin
78–87–5	Propylene dichloride
57–55–6	Propylene glycol
75–56–9	Propylene oxide
110–86–1	Pyridine
106–51–4	Quinone
108–46–3	Resorcinol
27138–57–4	Resorcylic acid
69–72–7	Salicylic acid
127–09–3	Sodium acetate
532–32–1	Sodium benzoate
9004–32–4	Sodium carboxymethyl cellulose
3926–62–3	Sodium chloroacetate
141–53–7	Sodium formate
139–02–6	Sodium phenate
110–44–1	Sorbic acid
100–42–5	Styrene
110–15–6	Succinic acid
110–61–2	Succinonitrile
121–57–3	Sulfanilic acid
126–33–0	Sulfolane
1401–55–4	Tannic acid
100–21–0	Terephthalic acid
79–34–5[c]	Tetrachloroethanes
117–08–8	Tetrachlorophthalic anhydride
78–00–2	Tetraethyl lead
119–64–2	Tetrahydronaphthalene
85–43–8	Tetrahydrophthalic anhydride
75–74–1	Tetramethyl lead
110–60–1	Tetramethylenediamine
110–18–9	Tetramethylethylenediamine
108–88–3	Toluene
95–80–7	Toluene–2,3–diamine
584–84–9	Toluene–2,4–diisocyanate
26471–62–5	Toluene diisocyanates (mixture)
1333–07–9	Toluenesulfonamide
104–15–4[c]	Toluenesulfonic acids
98–59–9	Toluenesulfonyl chloride
26915–12–8	Toluidines
87–61–6, 108–70–3, 120–82–1[c]	Trichlorobenzenes
71–55–6	1,1,1–Trichloroethane
79–00–5	1,1,2–Trichloroethane
79–01–6	Trichloroethylene
75–69–4	Trichlorofluoromethane
96–18–4	1,2,3–Trichloropropane
76–13–1	1,1,2–Trichloro–1,2,2–trifluoroethane
121–44–8	Triethylamine
112–27–6	Triethylene glycol
112–49–2	Triethylene glycol dimethyl ether
7756–94–7	Triisobutylene
75–50–3	Trimethylamine
57–13–6	Urea
108–05–4	Vinyl acetate
75–01–4	Vinyl chloride
75–35–4	Vinylidene chloride
25013–15–4	Vinyl toluene
1330–20–7	Xylenes (mixed)
95–47–6	o–Xylene
106–42–3	p–Xylene
1300–71–6	Xylenol
1300–73–8	Xylidine

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[a] CAS numbers refer to the Chemical Abstracts Registry numbers assigned to specific chemicals, isomers, or mixtures of chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed, whether CAS numbers have been assigned or not.

[b] No CAS number(s) have been assigned to this chemical, its isomers, or mixtures containing these chemicals.

[c] CAS numbers for some of the isomers are listed; the standards apply to all of the isomers and mixtures, even if CAS numbers have not been assigned.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (1) (c), (2) (intro.) and (a) 1. c., (3) (a) 3., (b) 4. a. and (c) 3., (4) (a) 2. intro., a. and 4., (6) (b) (intro.), (d) 1., (e) 1., (g) 5. and (9) (a), renum. (4) (b) 1. b. to g. to be 2.a. to f. and am. e. and f., r. and recr. (3) (j) 4., cr. (4) (b) 1. b., r. (5) and (8) (f), Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (a) 1. c. and (10) (a) Table A, r. and recr. (6), Register, July, 1993, No. 451, eff. 7–1–93; am. (3) (a) 3., (10), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.63 Beverage can surface coating industry. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in beverage can surface coating lines: each exterior base coat operation, each overvarnish coating operation and each inside spray coating operation.

(b) The provisions of this section apply to each affected facility which is identified in par. (a) and commences construction, modification, or reconstruction after November 26, 1980.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Beverage can" means any two–piece steel or aluminum container in which soft drinks or beer, including malt liquor, are packaged. The definition does not include containers in which fruit or vegetable juices are packaged.

2. "Exterior base coating operation" means the system on each beverage can surface coating line used to apply a coating to the exterior of a 2 piece beverage can body. The exterior base

coat provides corrosion resistance and a background for lithography or printing operations. The exterior base coat operation consists of the coating application station, flashoff area and curing oven. The exterior base coat may be pigmented or clear (unpigmented).

3. "Inside spray coating operation" means the system on each beverage can surface coating line used to apply a coating to the interior of a two–piece beverage can body. This coating provides a protective film between the contents of the beverage can and the metal can body. The inside spray coating operation consists of the coating application station, flashoff area and curing oven. Multiple applications of an inside spray coating are considered to be a single coating operation.

4. "Overvarnish coating operation" means the system on each beverage can surface coating line used to apply a coating over ink which reduces friction for automated beverage can filling equipment, provides gloss and protects the finished beverage can body from abrasion and corrosion. The overvarnish coating is applied to two–piece beverage can bodies. The overvarnish coating operation consists of the coating application station, flashoff area and curing oven.

5. "Two–piece can" means any beverage can that consists of a body manufactured from a single piece of steel or aluminum and a top. Coatings for a two–piece can are usually applied after fabrication of the can body.

6. "VOC content" means all volatile organic compounds (VOCs) that are in a coating. VOC content is expressed in terms of kilograms of VOC per liter of coating solids.

(b) Symbols used in sub. (4) are defined as follows:

1. C_a = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million as carbon).

2. C_b = the VOC concentration in each gas stream entering the control device (parts per million as carbon).

3. D_c = density of each coating, as received (kilograms per liter).

4. D_d = density of each VOC–solvent added to coatings (kilograms per liter).

5. D_r = density of VOC–solvent recovered by an emission control device (kilograms per liter).

6. E = VOC destruction efficiency of the control device (fraction).

7. F = the proportion of total VOC emitted by an affected facility which enters the control device to total emissions (fraction).

8. G = the volume–weighted average of VOC in coatings assumed in a calendar month per volume of coating solids applied (kilograms per liter of coating solids).

9. H_e = the fraction of VOC emitted at the coater and flashoff areas captured by a collection system.

10. H_h = the fraction of VOC emitted at the cure oven captured by a collection system.

11. L_c = the volume of each coating consumed, as received (liters).

12. L_d = the volume of each VOC–solvent added to coatings (liters).

13. L_r = the volume of VOC–solvent recovered by an emission control device (liters).

14. L_s = the volume of coating solids consumed (liters).

15. M_d = the mass of VOC–solvent added to coatings (kilograms).

16. M_o = the mass of VOC–solvent in coatings consumed, as received (kilograms).

17. M_r = the mass of VOC–solvent recovered by emission control device (kilograms).

18. N = the volume–weighted average mass of VOC emissions to atmosphere per unit volume of coating solids applied (kilograms per liter of coating solids).

19. Q_a = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

20. Q_b= the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

21. R = the overall emission reduction efficiency for an affected facility (fraction).

22. S_e = the fraction of VOC in coating and diluent VOC–solvent emitted at the coater and flashoff area for a coating operation.

23. S_h = the fraction of VOC in coating and diluent solvent emitted at the cure oven for a coating operation.

24. V_s = the proportion of solids in each coating, as received (fraction by volume).

25. W_o = the proportion of VOC in each coating, as received (fraction by weight).

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. On or after the date on which the initial performance test required by s. NR 440.08 (1) is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge of VOC emissions to the atmosphere that exceed the following volume–weighted calendar–month average emissions:

(a) 0.29 kilogram of VOC per liter of coating solids (2.4 pounds per gallon) from each two–piece can exterior base coating operation, except clear base coat;

(b) 0.46 kilogram of VOC per liter of coating solids (3.8 pounds per gallon) from each two–piece can clear base coating operation and from each overvarnish coating operation; and

(c) 0.89 kilogram of VOC per liter of coating solids (7.4 pounds per gallon) from each two–piece can inside spray coating operation.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) does not apply to monthly performance tests and s. NR 440.08 (6) does not apply to the performance test procedures required by this section.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 (1) and thereafter a performance test each calendar month for each affected facility.

1. The owner or operator shall use the following procedures for each affected facility that does not use a capture system and a control device to comply with the emission limit specified under sub. (3). The owner or operator shall determine the VOC–content of the coatings from formulation data supplied by the manufacturer of the coating or by an analysis of each coating as received, using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coatings using Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or an equivalent or alternative method. The owner or operator shall determine from company records the volume of coating and the mass of VOC–solvent added to coatings. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities the owner or operator shall estimate the volume of coating used at each facility

by using the average dry weight of coating, number of cans and size of cans being processed by each affected and existing facility or by other procedures acceptable to the department.

a. Calculate the volume–weighted average of the total mass of VOC per volume of coating solids used during the calendar month for each affected facility, except as provided under subd. 1. d. The volume–weighted average of the total mass of VOC per volume of coating solids used each calendar month will be determined by the following procedures.

1) Calculate the mass of VOC used (M_o+ M_d) during the calendar month for the affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}D_{ci}W_{oi} + \sum_{j=1}^{m} L_{dj}D_{dj}$$

(Σ $L_{dj}D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calendar month and

m is the number of different diluent VOC–solvents used during the calendar month

2) Calculate the total volume of coating solids used (L_s) in the calendar month for the affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci}V_{si}$$

where n is the number of different coatings used during the calendar month

3) Calculate the volume–weighted average mass of VOC per volume of solids used (G) during the calendar month for the affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s}$$

b. Calculate the volume–weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month for the affected facility by the following equation:

$$N = G$$

c. Where the value of the volume–weighted average of mass of VOC per volume of solids discharged to the atmosphere (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content equal to or less than the limit specified under sub. (3) the affected facility is in compliance provided no VOC–solvents are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for each affected facility that uses a capture system and a control device that destroys VOC (e.g., incinerator) to comply with the emission limit specified under sub. (3):

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed by this subparagraph. In subsequent months the owner or operator may use the most recently determined overall reduction efficiency for the performance test providing control device and capture system operating conditions have not changed. The procedure in this subparagraph shall be repeated when directed by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOC used by the affected facility that enters the control device using the following equation:

$$F = S_eH_e + S_hH_h$$

where H_e and H_h shall be determined by a method that has been previously approved by the administrator. The owner or operator may use the values of S_e and S_h specified in Table 1 or other values determined by a method that has been previously approved by the administrator.

Table 1. Distribution of VOC Emissions

	Emission Distribution	
Coating Operation	**Coater/ flashoff (S_e)**	**Curing Oven (S_h)**
Two–piece aluminum or steel can:		
Exterior base coat operation	0.75	0.25
Overvarnish coating operation	0.75	0.25
Inside spray coating operation	0.80	0.20

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{m} Q_{aj}C_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi}}$$

where n is the number of vents before the control device and m is the number of vents after the control device.

3) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

b. Calculate the volume–weighted average of the total mass of VOC per volume of coating solids (G) used during the calendar month for the affected facility using the equations presented in subd. 1. a.

c. Calculate the volume–weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month by the following equation:

$$N = G \times (1 - R)$$

d. If the volume–weighted average of mass of VOC emitted to the atmosphere for the calendar month (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

3. An owner or operator shall use the following procedure for each affected facility that uses a capture system and a control device that recovers the VOC (e.g. carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the volume–weighted average of the total mass of VOC per unit volume of coating solids applied (G) used during the calendar month for the affected facility using the equations presented in subd. 1.

b. Calculate the total mass of VOC recovered (M_r) during each calendar month using the following equation:

$$M_r = L_rD_r$$

c. Calculate overall reduction efficiency of the control device (R) for the calendar month for the affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

d. Calculate the volume–weighted average mass of VOC discharged to the atmosphere (N) for the calendar month for the affected facility using the equation presented in subd. 2. c.

e. If the weighted average of VOC emitted to the atmosphere for the calendar month (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

(5) MONITORING OF EMISSIONS AND OPERATIONS. The owner or operator of an affected–facility that uses a capture system and an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices as prescribed below.

(a) Where thermal incineration is used a temperature measure device shall be installed in the firebox. Where catalytic incineration is used temperature measurement devices shall be installed in the gas stream immediately before and after the catalyst bed.

(b) Each temperature measurement device shall be installed, calibrated, and maintained according to the manufacturer's specifications. The device shall have an accuracy the greater of ±0.75% of the temperature being measured expressed in degrees Celsius or ±2.5°C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of an affected facility shall include the following data in the initial compliance report required under s. NR 440.08 (1).

1. Where only coatings which individually have a VOC content equal to or less than the limits specified under sub. (3) are used, and no VOC is added to the coating during the application or distribution process, the owner or operator shall provide a list of coatings used for each affected facility and the VOC content of each coating calculated from data determined using Reference Method 24 or CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, or supplies by the manufacturers of the coatings.

2. Where one or more coating which individually have a VOC content greater than the limits specified under sub. (3) are used or where VOC are added or used in the coating process the owner or operator shall report for each affected facility the volume–weighted average of the total mass of VOC per volume of coating solids.

3. Where the compliance is achieved through the use of incineration the owner or operator shall include in the initial performance test required under s. NR 440.08 (1) the combustion temperature (or the gas temperature upstream and downstream of the catalyst bed), the total mass of VOC per volume of coating solids before and after the incinerator, the capture efficiency and the destruction efficiency of the incinerator used to attain compliance with the applicable emission limit specified under sub. (3). The owner or operator shall also include a description of the method used to establish the amount of VOC captured by the capture system and sent to the control device.

(b) Following the initial performance test, each owner or operator shall identify, record and submit quarterly reports to the department of each instance in which the volume–weighted average of the total mass of VOC per volume of coating solids, after the control device, if capture devices and control systems are used, is greater than the limit specified under sub. (3). If no instances occur during a particular quarter, a report stating this shall be submitted to the department semiannually.

(c) Following the initial performance test, the owner or operator of an affected facility shall identify, record and submit at the frequency specified in s. NR 440.07 (3) the following:

1. Where compliance with sub. (3) is achieved through the use of thermal incineration, each 3–hour period when cans are processed, during which the average temperature of the device was more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under sub. (4).

2. Where compliance with sub. (3) is achieved through the use of catalytic incineration, each 3–hour period when cans are being processed, during which the average temperature of the device immediately before the catalyst bed is more than 28°C below the average temperature of the device immediately before the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4) and all 3–hour periods, when cans are being processed, during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (5).

3. For thermal and catalytic incinerators, if no periods as described in subds. 1. and 2. occur, the owner or operator shall state this in the report.

(d) Each owner or operator subject to the provisions of this section shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility in the initial and monthly performance tests. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion chamber temperature. If catalytic incinerator is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08, shall be used to conduct performance tests.

1. Reference Method 24, an equivalent or alternative method approved by the administrator, or manufacturer's formulation for data from which the VOC content of the coatings used for each affected facility can be calculated. In the event of dispute, Reference Method 24 shall be the referee method. When VOC content of waterborne coatings, determined from data generated by Reference Method 24, is used to determine compliance of affected facilities, the results of the Method 24 analysis shall be adjusted as described in section 4.4 of Method 24.

2. Reference Method 25 or an equivalent or alternative method for the determination of the VOC concentration in the effluent gas entering and leaving the control device for each stack equipped with an emission control device. The owner or operator shall notify the department 30 days in advance when performing a test using Reference Method 25. The following reference methods are to be used in conjunction with Reference Method 25:

a. Method 1 for sample and velocity traverses,

b. Method 2 for velocity and volumetric flow rate,

c. Method 3 for gas analysis, and

d. Method 4 for stack gas moisture.

(b) For Reference Method 24, the coating sample must be a 1–liter sample collected in a 1–liter container at a point where the sample will be representative of the coating material.

(c) For Reference Method 25, the sampling time for each of three runs must be at least 1 hour. The minimum sample volume must be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department. The department will approve the sampling of representative stacks on a case–by–case basis if the owner or operator can demonstrate to the satisfaction of the department that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (a) (intro.), (b) (intro.) (3) (intro.), (4) (b) 2. a. and (7) (a) 1., r. (6) (d), Register, September, 1990, No. 417, eff. 10–1–90; r. and recr. (6) (b), renum. (6) (c) to be (6) (d), cr. (6) (c), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.64 Bulk gasoline terminals. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is the total of all the loading racks at a bulk gasoline terminal which deliver liquid product into gasoline tank trucks.

(b) Each facility under par. (a), the construction or modification of which is commenced after December 17, 1980, is subject to the provisions of this section.

(c) For purposes of this section any replacement of components of an existing facility described in par. (a), commenced before August 18, 1983 in order to comply with any emission standard adopted by the department, will not be considered a reconstruction under the provisions of s. NR 440.15.

Note: The intent of these standards is to minimize the emissions of VOC through the application of best demonstrated technologies (BDT). The numerical emission limits in this standard are expressed in terms of total organic compounds. The emission limit reflects the performance of BDT.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Bulk gasoline terminal" means any gasoline facility which receives gasoline by pipeline, ship or barge and has a gasoline throughput greater than 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under federal, state or local law and discoverable by the department and any other person.

(b) "Continuous vapor processing system" means a vapor processing system that treats total organic compounds vapors collected from gasoline tank trucks on a demand basis without intermediate accumulation in a vapor holder.

(c) "Existing vapor processing system" means a processing system (capable of achieving emissions to the atmosphere no greater than 80 milligrams of total organic compounds per liter of gasoline loaded), the construction or refurbishment of which was commenced before December 17, 1980, and which was not constructed or refurbished after that date.

(e) "Gasoline tank truck" means a delivery tank truck used at bulk gasoline terminals which is loading gasoline or which has loaded gasoline on the immediately previous load.

(f) "Intermittent vapor processing system" means a vapor processing system that employs an intermediate vapor holder to accumulate total organic compounds vapors collected from gasoline tank trucks and treats the accumulated vapors only during automatically controlled cycles.

(g) "Loading rack" means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill delivery tank trucks.

(h) "Refurbishment" means, with reference to a vapor processing system, replacement of components of, or addition of components to, the system within any 2–year period such that the fixed capital cost of the new components required for such component replacement or addition exceeds 50% of the cost of a comparable entirely new system.

(i) "Total organic compounds" means those compounds measured according to the procedures in sub. (4).

(j) "Vapor collection system" means any equipment used for containing total organic compounds vapors displaced during the loading of gasoline tank trucks.

(k) "Vapor processing system" means all equipment used for recovering or oxidizing total organic compounds vapors displaced from the affected facility.

(L) "Vapor–tight gasoline tank truck" means a gasoline tank truck which has demonstrated within the 12 preceding months that its product delivery tank will sustain a pressure change of not more than 750 pascals (75 mm of water) within 5 minutes after it is pressurized to 4,500 pascals (450 mm of water). This capability is to be demonstrated using the pressure test procedure specified in Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS (VOC) EMISSIONS FROM BULK GASOLINE TERMINALS. On and after the date on which s. NR 440.08 (1) requires a performance test to be completed the owner or operator of each bulk gasoline terminal containing an affected facility shall comply with the requirements of this subsection.

(a) Each affected facility shall be equipped with a vapor collection system designed to collect the total organic compounds vapors displaced from tank trucks during product loading.

(b) The emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 35 milligrams of total organic compounds per liter of gasoline loaded, except as noted in par. (c).

(c) For each affected facility equipped with an existing vapor processing system the emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 80 milligrams of total organic compounds per liter of gasoline loaded.

(d) Each vapor collection system shall be designed to prevent any total organic compounds vapors collected at one loading rack from passing to another loading rack.

(e) Loadings of liquid product into gasoline tank trucks shall be limited to vapor–tight gasoline tank trucks using the following procedures:

1. The owner or operator shall obtain the vapor tightness documentation described in sub. (6) (b) for each gasoline tank truck which is to be loaded at the affected facility.

2. The owner or operator shall require the tank identification number to be recorded as each gasoline tank truck is loaded at the affected facility.

3. The owner or operator shall cross–check each tank identification number obtained in subd. 2. with the file of tank vapor tightness documentation within 2 weeks after the corresponding tank is loaded.

4. The terminal owner or operator shall notify the owner or operator of each nonvapor–tight gasoline tank truck loaded at the affected facility within 3 weeks after the loading has occurred.

5. The terminal owner or operator shall take steps assuring that the nonvapor–tight gasoline tank truck will not be reloaded at the affected facility until vapor tightness documentation for that tank is obtained.

6. Alternate procedures to those described in subds. 1. to 5. for limiting gasoline tank truck loadings may be used upon application to an approval by the department.

(f) The owner or operator shall act to assure that loadings of gasoline tank trucks at the affected facility are made only into tanks equipped with vapor collection equipment that is compatible with the terminal's vapor collection system.

(g) The owner or operator shall act to assure that the terminal's and the tank truck's vapor collection systems are connected during each loading of a gasoline tank truck at the affected facility. Examples of actions to accomplish this include training drivers in the hookup procedures and posting visible reminder signs at the affected loading racks.

(h) The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 pascals (450 mm of water) during product loading. This level is not to be exceeded when measured by the procedures specified in sub. (4) (d).

(i) No pressure–vacuum vent in the bulk gasoline terminal's vapor collection system may begin to open at a system pressure less than 4,500 pascals (450 mm of water).

(j) Each calendar month the vapor collection system, the vapor processing system and each loading rack handling gasoline shall be inspected during the loading of gasoline tank trucks for total organic compounds liquid or vapor leaks. For purposes of this paragraph detection methods incorporating sight, sound, or smell are acceptable. Each detection of a leak shall be recorded and the source of the leak repaired within 15 calendar days after it is detected.

(4) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). The 3–run requirement of s. NR 440.08 (6) does not apply to this section.

(b) Immediately before the performance test required to determine compliance with sub. (3) (b), (c) and (h), the owner or operator shall use Method 21 to monitor for leakage of vapor all potential sources in the terminal's vapor collection system equipment while a gasoline tank truck is being loaded. The owner or operator shall repair all leaks with readings of 10,000 ppm (as methane) or greater before conducting the performance test.

(c) The owner or operator shall determine compliance with the standards in sub. (3) (b) and (c) as follows:

1. The performance test shall be 6 hours long during which at least 300,000 liters of gasoline is loaded. If this is not possible, the test may be continued the same day until 300,000 liters of gasoline is loaded or the test may be resumed the next day with another complete 6–hour period. In the latter case, the 300,000–liter criterion need not be met. However, as much as possible, testing should be conducted during the 6–hour period in which the highest throughput normally occurs.

2. If the vapor processing system is intermittent in operation, the performance test shall begin at a reference vapor holder level and shall end at the same reference point. The test shall include at least two startups and shutdowns of the vapor processor. If this does not occur under automatically controlled operations, the system shall be manually controlled.

3. The emission rate (E) of total organic compounds shall be computed using the following equation:

$$E = K \sum_{i=1}^{n} (V_{esi} C_{ei}) / (L10^6)$$

where:

E is the emission rate of total organic compounds, mg/liter of gasoline loaded

V_{esi} is the volume of air–vapor mixture exhausted at each interval "i", scm

C_{ei} is the concentration of total organic compounds at each interval "i", ppm

L is the total volume of gasoline loaded, liters

n is the number of testing interval

i is the emission testing interval of 5 minutes

K is the density of calibration gas, 1.83×10^6 for propane and 2.41×10^6 for butane, mg/scm

4. The performance test shall be conducted in intervals of 5 minutes. For each interval "i", readings from each measurement shall be recorded, and the volume exhausted (V_{esi}) and the corresponding average total organic compounds concentration (C_{ei}) shall be determined. The sampling system response time shall be considered in determining the average total organic compounds concentration corresponding to the volume exhausted.

5. The following methods shall be used to determine the volume (V_{esi}) air–vapor mixture exhausted at each interval:

a. Method 2B shall be used for combustion vapor processing systems.

b. Method 2A shall be used for all other vapor processing systems.

6. Method 25A or 25B shall be used for determining the total organic compounds concentration (C_{ei}) at each interval. The calibration gas shall be either propane or butane. The owner or operator may exclude the methane and ethane content in the exhaust vent by any method, for example, Method 18, approved by the department.

7. To determine the volume (L) of gasoline dispensed during the performance test period at all loading racks whose vapor emissions are controlled by the processing system being tested, terminal records or readings from gasoline dispensing meters at each loading rack shall be used.

(d) The owner or operator shall determine compliance with the standard in sub. (3) (h) as follows:

1. A pressure measurement device, liquid manometer, magnehelic gauge or equivalent instrument, capable of measuring up to 500 mm of water gauge pressure with ±2.5 mm of water precision, shall be calibrated and installed on the terminal's vapor collection system at a pressure tap located as close as possible to the connection with the gasoline tank truck.

2. During the performance test, the pressure shall be recorded every 5 minutes while a gasoline truck is being loaded; the highest instantaneous pressure that occurs during each loading shall also be recorded. Every loading position shall be tested at least once during the performance test.

(6) REPORTING AND RECORDKEEPING. (a) The tank truck vapor tightness documentation required under sub. (3) (e) 1. shall be kept on file at the terminal in a permanent form available for inspection.

(b) The documentation file for each gasoline tank shall be updated at least once per year to reflect current test results as determined by Reference Method 27 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17. This documentation shall include, as a minimum, the following information:

1. Test Title: Gasoline Delivery Tank Pressure Test – EPA Reference Method 27.

2. Tank Owner and Address.

3. Tank Identification Number.

4. Testing Location.

5. Date of Test.

6. Tester Name and Signature.

7. Witnessing Inspector, if any: Name, Signature and Affiliation.

8. Test Results: Actual Pressure Change in 5 minutes, mm of water (average for 2 runs).

(c) A record of each monthly leak inspection required under sub. (3) (j) shall be kept on file at the terminal for at least 2 years. Inspection records shall include, as a minimum, the following information:

1. Date of Inspection.

2. Findings (may indicate no leaks discovered; or location, nature, and severity of each leak).

3. Leak determination method.

4. Corrective Action (date each leak repaired; reasons for any repair interval in excess of 15 days).

5. Inspector Name and Signature.

(d) The terminal owner or operator shall keep documentation of all notifications required under sub. (3) (e) 4. on file of the terminal for at least 2 years.

(f) The owner or operator of an affected facility shall keep records of all replacements or additions of components performed on an existing vapor processing system for at least 3 years.

(7) RECONSTRUCTION. For purposes of this section:

(a) The cost of the following frequently replaced components of the affected facility may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable entirely new facility" under s. NR 440.15: pump seals, loading arm gaskets and swivels, coupler gaskets, overfill sensor couplers and cables, flexible vapor hoses and grounding cables and connectors.

(b) Under s. NR 440.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components, except components specified in par. (a), which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2–year period following December 17, 1980. For purposes of this paragraph "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (2) (intro.), (3) (i) and (7) ()a), renum. (2) (d) to NR 400.02 (43), Register, September, 1990, No. 417, eff. 10–1–90; am. (3) (h) and (7) (b), r. and recr. (4), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.642 New residential wood heaters. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each wood heater manufactured on or after July 1, 1988, or sold at retail on or after July 1, 1990. The provisions of this section do not apply to wood heaters constructed prior to July 1, 1988, that are or have been owned by a noncommercial owner for personal use.

(b) Each affected facility shall comply with the applicable emission limits in sub. (3) unless exempted under par. (c), (d), (e), (f), (g) or (h).

(c) 1. Within a model line, an affected facility manufactured prior to July 1, 1990 is exempt from the emission limits under sub. (3) if that model line has been issued a valid certificate of compliance by the Oregon department of environmental quality prior to January 1, 1988, and meets the Oregon 1988 standards for particulate matter emissions, provided that:

a. The manufacturer requests that exemption in writing from the administrator and certifies that the information used in obtaining Oregon certification satisfied applicable requirements of the Oregon law;

b. The certification test included at least one test run at a burn rate of less than 1.25 kg/hr.

c. No changes in components that may affect emissions have been made to the model line that would require recertification under sub. (4) (k);

d. The manufacturer complies with application requirements contained in sub. (4) (b) 1., 2., 5., 6., 9. and 11., (c), (m) and (o) 2.; and

e. The manufacturer submits a copy of the certificate issued by the state of Oregon, a complete set of engineering drawings, and, at a minimum, those portions of the test report that include the emissions summary, the burn rates and the laboratory's description of how the wood heater operates.

2. Affected facilities exempted under this paragraph may not be sold at retail on or after July 1, 1992.

3. Any certificate issued under this paragraph prior to January 1, 1988, shall be modified to reflect any modifications in Oregon certification approved by the Oregon department of environmental quality prior to that date. The manufacturer shall notify the administrator of any such modifications within 30 days of the approval by the Oregon department of environmental quality.

4. Upon denying a certificate under this paragraph the administrator shall give written notice setting forth the basis for this determination to the manufacturer involved.

5. The administrator may revoke a certificate issued under this paragraph if he or she determines that any of the conditions or determinations listed in sub. (4) (L) 1. c., d., e. and f. exists, or if the state of Oregon revokes its certification.

(d) An affected facility is exempt from the applicable emission limits of sub. (3), provided that:

1. It was manufactured between July 1, 1988, and June 30, 1989;

2. The manufacturer was a manufacturer of wood heaters as of January 1, 1987, and manufactured (or, in the case of a foreign manufacturer, exported to the United States) fewer than 2,000 wood heaters between July 1, 1987, and June 30, 1988;

3. The manufacturer manufactured no more uncertified wood heaters between July 1, 1988 and June 30, 1989, than manufactured (or, in the case of a foreign manufacturer, exported to the United States) between July 1, 1987 and June 30, 1988; and

4. The affected facility is sold at retail before July 1, 1991.

5. For the purposes of this paragraph, the term "manufacturer" does not include importers of wood heaters.

(e) Affected facilities manufactured in the U.S. for export are exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4).

(f) A wood heater used for research and development purposes that is never offered for sale or sold is exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4). No more than 50 wood heaters manufactured per model line may be exempted for this purpose.

(g) A coal–only heater is exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4).

(h) The following are not affected facilities and are not subject to this section:

1. Open masonry fireplaces constructed on site.

2. Boilers,

3. Furnaces, and

4. Cookstoves.

(i) Modification or reconstruction, as defined in ss. NR 440.14 and 440.15, does not, by itself, make a wood heater an affected facility under this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "At retail" means the sale by a commercial owner of a wood heater to the ultimate purchaser.

(b) "Boiler" means a solid burning appliance used primarily for heating spaces, other than the space where the appliance is located, by the distribution through pipes of a gas or fluid heated in the appliance. The appliance shall be tested and listed as a boiler under accepted American or Canadian safety testing codes. A manufacturer may request an exemption in writing from the administrator by stating why the testing and listing requirement is not practicable and by demonstrating that this appliance is otherwise a boiler.

(c) "Coal–only heater" means an enclosed, coal–burning appliance capable of space heating, or domestic water heating, which has all of the following characteristics:

1. An opening for emptying ash that is located near the bottom or the side of the appliance.

2. A system that admits air primarily up and through the fuel bed.

3. A grate or other similar device for shaking or disturbing the fuel bed or power–driven mechanical stoker.

4. Installation instructions that state that the use of wood in stove, except for coal ignition purposes, is prohibited by law, and

5. The model is listed by a nationally recognized safety–testing laboratory for use of coal only, except for coal ignition purposes.

(d) "Commercial owner" means any person who owns or controls a wood heater in the course of the manufacture, importation, distribution, or sale of the wood heater.

(e) "Cookstove" means a wood–fired appliance that is designed primarily for cooking food and that has the following characteristics:

1. An oven, with a volume of 0.028 cubic meters (1 cubic foot) or greater, and an oven rack,

2. A device for measuring oven temperatures,

3. A flame path that is routed around the oven,

4. A shaker grate,

5. An ash pan,

6. An ash clean–out door below the oven, and

7. The absence of a fan or heat channels to dissipate heat from the appliance.

(f) "Furnace" means a solid fuel burning appliance that is designed to be located outside of ordinary living areas and that warms spaces other than the space where the appliance is located by the distribution of air heated in the appliance through ducts. The appliance shall be tested and listed as a furnace under accepted American or Canadian safety testing codes unless exempted from this provision by the administrator. A manufacturer may request an exemption in writing from the administrator by stating why the testing and listing requirement is not practicable and by demonstrating that the appliance is otherwise a furnace.

(g) "Manufactured" means completed and ready for shipment (whether or not packaged).

(h) "Manufacturer" means any person who constructs or imports a wood heater.

(i) "Model line" means all wood heaters offered for sale by a single manufacturer that are similar in all material respects.

(j) "Representative affected facility" means an individual wood heater that is similar in all material respects to other wood heaters within the model line it represents.

(k) "Sale" means the transfer of ownership or control, except that transfer of control may not constitute a sale for purposes of sub. (1) (f).

(L) "Similar in all material respects" means that the construction materials, exhaust and inlet air system and other design features are within the allowed tolerances for components identified in sub. (4) (k).

(m) "Wood heater" means an enclosed woodburning appliance capable of and intended for space heating or domestic water heating that meets all of the following criteria:

1. An air–to–fuel ratio in the combustion chamber averaging less than 35–to–1 as determined by the test procedure prescribed in sub. (5), performed at an accredited laboratory,

2. A usable firebox volume of less than 20 cubic feet,

3. A minimum burn rate less than 5 kg/hr as determined by the test procedure prescribed in sub. (5) performed at an accredited laboratory, and

4. A maximum weight of 800 kg. In determining the weight of an appliance for these purposes, fixtures and devices that are normally sold separately, such as flue pipe, chimney, and masonry components that are not an integral part of the appliance or heat distribution ducting, may not be included.

(3) STANDARDS FOR PARTICULATE MATTER. Unless exempted under sub. (1), each affected facility:

(a) Manufactured on or after July 1, 1988, or sold at retail on or after July 1, 1990, shall comply with the following particulate matter emission limits as determined by the test methods and procedures in sub. (5):

1. An affected facility equipped with a catalytic combustor any not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 5.5 g/hr.

2. An affected facility not equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 8.5 g/hr.

(b) Manufactured on or after July 1, 1990, or sold at retail on or after July 1, 1992, shall comply with the following particulate matter emission limits as determined by the test methods and procedures in sub. (5):

1. An affected facility equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 4.1 g/hr. Particulate emissions during any test run at any burn rate that is required to be used in the weighted average may not exceed the value calculated for "C" (rounded to 2 significant figures) calculated using the following equation:

a. At burn rates less than or equal to 2.82 kg/hr,

$$C = 3.55\ \text{g/kg} \times BR + 4.98\ \text{g/hr},$$

where BR is the burn rate in kg/hr

b. At burn rates greater than 2.82 kg/hr,

$$C = 15\ \text{g/hr}$$

2. An affected facility not equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 7.5 g/hr. Particulate emissions may not exceed 15 g/hr during any test run at a burn rate less than or equal to 1.5 kg/hr that is required to be used in the weighted average, and particulate emissions may not exceed 18 g/hr during any test burn at a burn rate greater than 1.5 kg/hr that is required to be used in the weighted average.

(4) COMPLIANCE AND CERTIFICATION. (a) For each model line, compliance with applicable emission limits may be determined based on testing of representative affected facilities within the model line.

(b) Any manufacturer of an affected facility may apply to the administrator for a certificate of compliance for a model line. The application shall be in writing to: Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 401 M Street SW, Washington DC 20460, Attention: Wood Heater Program. The manufacturer shall submit 2 complete copies of the application and attachments. The application shall be signed by the manufacturer, or an authorized representative, and shall contain the following:

1. The model name and/or design number,

2. Two color photographs of the tested unit (or, for models being certified under sub. (1) (c), photographs of a representative unit), one showing a front view and the other, a side view.

3. a. Engineering drawings and specifications of components that may affect emissions, including specifications for each component listed in par. (k). Manufacturers may use complete assembly or design drawings that have been prepared for other purposes, but should designate on the drawings the dimensions of each component listed in par. (k). Manufacturers shall identify tolerances of components of the tested unit listed in par. (k) 2. that are different from those specified in that paragraph, and show that such tolerances may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits.

b. A statement whether the firebox or any firebox component (other than one listed in par. (k) 3.) will be composed of different material from the material used for the firebox or firebox component in the wood heater on which certification testing was performed and a description of any such differences.

c. For applications to certify a model line of catalytic wood heaters to meet the emission limits in sub. (3) (b), a statement describing the manufacturer's program to ensure consistency in the size of any gap in the catalyst bypass mechanism. The statement shall describe, in narrative form, the components of the system that affect the size of the gap, any specifications for critical dimensions of any such components, and the procedure the manufacturer will use to ensure consistency in the size of the catalyst bypass gap.

4. All documentation pertaining to a valid certification test, including the complete test report and, for all test runs: raw data sheets, laboratory technician notes, calculations, and test results. Documentation shall include the items specified in the applicable test methods. Recommended formats and guidance materials are available from the administrator.

5. For catalytic wood heaters, a copy of the catalytic combustor warranty,

6. A statement that the manufacturer will conduct a quality assurance program for the model line which satisfies the requirements of par. (o).

7. A statement describing how the tested unit was sealed by the laboratory after the completion of certification testing, and

8. A statement that the manufacturer will notify the accredited laboratory if the application for certification is granted, within 30 days of receipt of notification from the U.S. environmental protection agency.

9. Statements that the wood heaters manufactured under this certificate will be:

a. Similar in all material respects to the wood heater submitted for certification testing, and

b. Will be labeled as prescribed in sub. (7).

10. For catalytic wood heaters, a statement that the warranty, access and inspection, and temperature monitoring provisions in pars. (c), (d), and (m) will be met.

11. A statement that the manufacturer will comply with the recordkeeping and reporting requirements in sub. (8).

12. A written estimate of the number of wood heaters that the manufacturer anticipates will be produced annually for the first 2 production years. Compliance with this provision may be obtained by designating one of the following ranges:

a. Less than 2,500,

b. 2,500 to 4,999,

c. 5,000 to 9,999,

d. 10,000 to 49,999,

e. 50,000 or greater; and

13. At the beginning of each test run in a certification test series, 2 photographs of the fuel load: One before and one after it is placed in the wood heater. One of the photographs shall show the front view of the wood load and the other shall show the side view.

14. For manufacturers seeking certification of model lines under sub. (4) (e) to meet the emission limits in sub. (3) (b), a statement that the manufacturer has entered into a contract with an accredited laboratory which satisfied the requirements of par. (g).

(c) If the affected facility is a catalytic wood heater, the warranty for the catalytic combustor shall include the replacement of the combustor and any prior replacement combustor without charge to the consumer for:

1. Two years from the date the consumer purchased the heater for any defects in workmanship or materials that prevent the combustor from functioning when installed and operated properly in the wood heater, and

2. Three years from the date the consumer purchased the heater for thermal crumbling or disintegration of the substrate material for heaters manufactured after July 1, 1990.

(d) The manufacturer of an affected facility equipped with a catalytic combustor shall provide for a means to allow the owner to gain access readily to the catalyst for inspection or replacement purposes and shall document in the application for certification how the catalyst is replaced.

(e) 1. The administrator shall issue a certificate of compliance for a model line if he or she determines, based on all information submitted by the applicant and any other relevant information available, that:

a. A valid certification test has demonstrated that the wood heater representative of the model line complies with the applicable particulate emission limits in sub. (3),

b. Any tolerances or materials for components listed in pars. (k) 2. or 3. that are different from those specified in those paragraphs may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits, and

c. The requirements of pars. (b), (c), (d), and (m) have been met. The program described under par. (b) 3. c. shall be deemed a tolerance specified in the certified design.

2. Upon denying certification under this paragraph, the administrator shall give written notice to the manufacturer setting forth the basis for the determination.

(f) To be valid, a certification test shall be:

1. Announced to the administrator in accordance with sub. (5) (e),

2. Conducted by a testing laboratory accredited by the administrator pursuant to sub. (6),

3. Conducted on a wood heater similar in all material respects to other wood heaters of the model line that is to be certified, and

4. Conducted in accordance with the test methods and procedure specified in sub. (5).

(g) To have a wood heater model certified under sub. (4) (e) to meet the emission limits in sub. (3) (b), a manufacturer shall enter into a contract with the accredited laboratory that performed the certification test, under which the laboratory will:

1. Conduct the random compliance audit test at no cost to the manufacturer if the U.S. environmental protection agency selects that laboratory to conduct the test, or

2. Pay the manufacturer the reasonable cost of a random compliance audit test (as determined by the U.S. environmental protection agency) if the U.S. environmental protection agency selects any other laboratory to conduct the test.

(h) 1. a. The administrator on a monthly basis between April 1, 1987, and July 1, 1990, shall determine whether an undue certification delay exists, pursuant to subd. 2. Such determinations shall be made on or about the 20th day of the month.

b. Any failure of the administrator to make a required determination under subd. 1. a. by the 30th day of any month shall constitute a determination that an undue certification delay exists.

c. Any determination under subd. 1. a. or b. shall remain in effect until superseded by a subsequent determination, except that a determination under subd. 1. b. shall remain in effect for at least 30 days.

d. The administrator shall mail notice of all determinations under subd. 1. a. or b. to all persons who have requested in writing to receive notification.

2. An undue certification delay exists when the sum of the average testing lead time and the certification lead time is greater than 6 months.

a. The average testing lead time shall be determined from the information submitted by accredited laboratories pursuant to sub. (8) (b). The average testing lead time is the simple average of lead times reported under sub. (8) (b) 2. for the current month.

b. The certification lead time shall be an estimate, as of the date of the determination, of the time likely to be required to determine whether to issue a certificate of compliance for a complete application received on that date. This estimate shall be based on factors such as past experience, the number of applications to be processed, and the resources available for processing.

3. a. While any determination under subd. 1. that any undue certification delay exists is in effect, a manufacturer may submit an application for alternative certification.

b. An application for alternative certification shall be in writing to: Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 401 M Street SW, Washington DC 20460, Attention: Wood Heater Program. The application shall be in duplicate copies and signed by the manufacturer, or an authorized representative, and contain the following:

1) The documentation required under par. (b) 1. to 6. and 9. to 12., except that in applying par. (b) 4., par. (f) 1. and 2. does not apply,

2) Evidence of compliance with pars. (c), (d) and (m),

3) A statement that a representative affected facility for the model line in question has been tested in accordance with sub. (5) (a), and meets applicable emission limits in sub. (3). Such testing may be conducted in any laboratory of the manufacturer's choice.

4) A statement identifying the month which will be the end of the manufacturer's production year for that model,

5) Evidence that the manufacturer has scheduled with an accredited laboratory the testing required for full certification under this section at the earliest feasible date,

6) Evidence that the manufacturer has notified the accredited laboratory that the manufacturer intends to apply for alternative certification, and

7) A commitment to report the results of all valid certification tests to the administrator.

c. Test results not obtained under pressurized conditions may be adjusted for altitude according to the following formula:

$$E_A = \frac{E}{AAF}$$

where:

E_A is the adjusted emissions in g/hr

E is the measured emissions in g/hr at ALT_L

AAF is the altitude adjustment factor where

$$AAF = \frac{ALT_L - 300}{6,600} + 1.0$$

ALT_L is the altitude above mean sea level of laboratory in feet

4. a. Submission of an application for alternative certification pursuant to subd. 3. automatically renders a model line certified 30 days after receipt of the application for alternative certificate by the administrator, unless alternative certification is denied sooner, on the basis that the application is not complete, or that the test results do not show compliance with the applicable emission limits in sub. (3). Except as provided in subd. 4. b. to d., alternative certification shall expire on the earlier of:

1) The completion of the manufacturer's production year during which the administrator takes action under par. (e) on an application for certification, or

2) Twelve months after such action.

b. If, in any certification tests performed pursuant to the commitment in subd. 3. b. 5), emissions from the affected facility exceed the applicable emission limits in sub. (3) by greater than 50%, alternative certification pursuant to this paragraph shall expire 72 hours after the manufacturer receives notification from the laboratory of the test results, in accordance with subd. 4. e.

c. If, in any certification test performed under subd. 3. b., emissions from the affected facility exceed the applicable emission limits in sub. (3), alternative certification pursuant to this paragraph shall expire 72 hours after manufacturer received notification satisfying subd. 4. e. from the laboratory of the test results, if such notification is received within 100 days of the date on which the manufacturer scheduled the certification test.

d. Alternative certification shall expire 72 hours after the manufacturer receives notification from the administrator that the manufacturer has:

1) Failed to meet a scheduled commitment for certification testing,

2) Failed to complete the testing, or

3) Delayed completion of the testing by more than 14 days after certification testing began by ordering additional testing.

e. Any notification under subd. 4. b. or c. shall include a copy of a preliminary test report from the accredited laboratory. The accredited laboratory shall provide a preliminary test report to the manufacturer and to the administrator within 10 days of the completion of testing, if a wood heater exceeds the applicable emission limits in sub. (3) in certification testing.

(i) An applicant for certification may apply for a waiver of the requirement to submit the results of a certification test pursuant to par. (b) 4., if the wood heaters of the model line are similar in all material respects to another model line that has already been issued a certificate of compliance. A manufacturer that seeks a waiver of certification testing shall identify the model line that has been certified, and shall submit a copy of an agreement with the owner of the design permitting the applicant to produce wood heaters of that design.

(j) 1. Unless revoked sooner by the administrator, a certificate of compliance shall be valid:

a. Through June 30, 1990, for a model line certified as meeting emissions limits in sub. (3) (a), and

b. For 5 years from the date of issuance, for a model line certified as meeting emission limits in sub. (3) (b).

2. Upon application for renewal of certification by the manufacturer, the administrator may waive the requirement for certification testing upon determining that the model line continues to meet the requirements for certification in par. (e), or that a waiver of certification is otherwise appropriate.

3. Upon waiving certificate testing under subd. 2., the administrator shall give written notice to the manufacturer setting forth the basis for the determination.

(k) 1. A model line shall be recertified whenever any change is made in the design submitted pursuant to par. (b) 3. that is presumed to affect the particulate emission rate for that model line. The administrator may waive this requirement upon written request by the manufacturer, if he or she determines that the change may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits. The grant of such a waiver does not relieve the manufacturer of any compliance obligations under this section.

2. Any change in the indicated tolerances of any of the following components (where such components are applicable) is presumed to affect particulate emissions if that change exceeds ± 5% for any cross–sectional area relating to air introduction systems and catalyst bypass gaps unless other dimensions and cross–sectional areas are previously approved by the administrator under par. (e) 1. b.

a. Firebox: Dimensions,

b. Air introduction systems: Cross–sectional area of restrictive air inlets, outlets, and location, and method of control,

c. Baffles: Dimensions and locations,

d. Refractory/insulation: Dimensions and location,

e. Catalyst: Dimensions and location,

f. Catalyst bypass mechanism and, for model lines certified to meet the emissions limits in sub. (3) (b) catalyst bypass gap tolerances (when bypass mechanism is in closed position): Dimensions, cross–sectional area, and location,

g. Flue gas exit: Dimensions and location,

h. Door and catalyst bypass gaskets: Dimensions and fit,

i. Outer shielding and coverings: Dimensions and location,

j. Fuel feed system: For wood heaters that are designed primarily to burn wood pellets and other wood heaters equipped with a fuel feed system, the fuel feed rate, auger motor design and power rating, and the angle of the auger to the firebox, and

k. Forced air combustion system: For wood heaters so equipped, the location and horsepower of blower motors and the fan blade size.

3. Any change in the materials used for the following components is presumed to affect emissions:

a. Refractory/insulation or

b. Door and catalyst bypass gaskets.

4. A change in the make, model, or composition of a catalyst is presumed to affect emissions, unless the change has been approved in advance by the administrator, based on test data that demonstrate that the replacement catalyst is equivalent to or better than the original catalyst in terms of particulate emission reduction.

(L) 1. The administrator may revoke certification if he or she determines that the wood heaters being produced in that model line do not comply with the requirements of this section or sub. (3). Such a determination shall be based on all available evidence, including:

a. Test data from a retesting of the original unit on which the certification test was conducted,

b. A finding that the certification test was not valid,

c. A finding that the labeling of the wood heater does not comply with the requirements of par. (f),

d. Failure by the manufacturer to comply with reporting and recordkeeping requirements under sub. (8),

e. Physical examination showing that a significant percentage of production units inspected are not similar in all material respects to the representative affected facility submitted for testing, or

f. Failure of the manufacturer to conduct a quality assurance program in conformity with par. (o).

2. Revocation of certification under this paragraph may not take effect until the manufacturer concerned has been given written notice by the administrator setting forth the basis for the proposed determination and an opportunity to request a hearing under sub. (10).

3. Determination to revoke certification based upon audit testing shall be made only in accordance with par. (p).

(m) A catalytic wood heater shall be equipped with a permanent provision to accommodate a commercially available temperature sensor which can monitor combustor gas stream temperatures within or immediately downstream, i.e. within 2.54 centimeters (1 inch), of the combustor surface.

(n) Any manufacturer of an affected facility subject under sub. (1) (b) to the applicable emission limits of this section that does not belong to a model line certified under this section shall cause that facility to be tested in an accredited laboratory in accordance with par. (f) 1., 2. and 4. before it leaves the manufacturer's possession and shall report the results to the administrator.

(o) 1. For each certified model line, the manufacturer shall conduct a quality assurance program which satisfies the following requirements:

2. Except as provided in subd. 5., the manufacturer or authorized representative shall inspect at least one from every 150 units produced within a model line to determine that the wood heater is within applicable tolerances for all components that affect emissions as listed in par. (k) 2.

3. a. Except as provided in subd. 3. c. or 5., the manufacturer or authorized representative shall conduct an emission test on a randomly selected affected facility produced within a model line certified under par. (e) or (h) on the following schedule:

If weighted average certification test results were —	If yearly production per model is —	
	<2500	≥ 2500
70% or less of standard	When directed by EPA, not to exceed once every 10,000 stoves.	Every 10,000 stoves or triennially (whichever is more frequent).
Within 30% of standard	Every 5,000 stoves.	Every 5,000 stoves or annually (whichever is more frequent).

b. Emission tests shall be conducted in conformity with sub. (5) (a) using either approved method for measuring particulate matter as provided in sub. (5). The manufacturer shall notify the U.S. environmental protection agency by U.S. mail that an emissions test required pursuant to this paragraph will be conducted within one week of the mailing of the notification.

c. If the manufacturer stated pursuant to par. (b) 3. that the firebox or any firebox component would be composed of a different material than the material used in the wood heater on which certification testing was performed, the first test shall be performed before 1,000 wood heaters are produced. The manufacturer shall submit a report of the results of this emission test to the administrator within 45 days of the completion of testing.

4. The manufacturer shall take remedial measures, as appropriate, when inspection or testing pursuant to this paragraph indicates that affected facilities within the model line are not within applicable tolerances or do not comply with applicable emission limits. Manufacturers shall record the problem identified, the extent of the problem, the remedial measures taken, and the effect of such remedial measures as projected by the manufacturer or determined by any additional testing.

5. a. If 2 consecutive passing tests are conducted under either subd. 2. or 3., the required frequency of testing under the applicable paragraph shall be modified as follows: Skip every other required test.

b. If 5 consecutive passing tests are conducted under the modified schedule provided for in subd. 5. a., the required frequency of testing under the applicable paragraph shall be further modified as follows: Skip 3 consecutive required tests after each required test that is conducted.

c. Testing shall resume on the frequency specified in subd. 2. or 3. as applicable, if a test failure results during any test conducted under a modified schedule.

6. If emissions tests under this paragraph are conducted at an altitude different from the altitude at which certification tests were conducted, and are not conducted under pressurized conditions, the results shall be adjusted for altitude in accordance with par. (h) 3. c.

(p) 1. a. The administrator shall after July 1, 1990, select for random compliance audit testing certified wood heater model lines that have not already been subject to a random compliance audit under this paragraph. The administrator may not select more than one model line under this program for every 5 model lines for which certification is granted under par. (e) to meet the emission limits in sub. (3) (b). No accredited laboratory may test or bear the expense of testing, as provided in the contract described in par. (g), more than one model line from every 5 model lines tested by the laboratory for which certification was granted. The administrator shall use a procedure that ensures that the selection process is random.

b. The administrator may, by means of a neutral selection scheme, select model lines certified under par. (b) or (e), for selective enforcement audit testing under this paragraph. Prior to July 1, 1990, the administrator shall only select a model line for a selective enforcement audit on the basis of information indicating that affected facilities within the model line may exceed the applicable emission limit in sub. (3).

2. The administrator shall randomly select for audit testing 5 production wood heaters from each model line selected under this paragraph. These wood heaters shall be selected from completed units ready for shipment from the manufacturer's facility (whether or not the units are in a package or container). The wood heaters shall be sealed upon selection and remain sealed until they are tested or until the audit is completed. The wood heaters shall be numbered in the order that they were selected.

3. a. The administrator shall test, or direct the manufacturer to test, the first of the 5 wood heaters selected under subd. 2. in a laboratory accredited under sub. (6) that is selected pursuant to subd. 4.

b. The expense of the random compliance audit test shall be the responsibility of the wood heater manufacturer. A manufacturer may require the laboratory that performed the certification test to bear the expense of a random compliance audit test by means of the contract required under par. (g). If the laboratory with which the manufacturer had a contract has ceased business due to bankruptcy or is otherwise legally unable to honor the contract, the administrator may not select any of that manufacturer's model lines for which certification testing has been conducted by that laboratory for a random compliance audit test.

c. The test shall be conducted using the same test method and procedure used to obtain certification. If the certification test consisted of more than one particulate sampling test method, the administrator may use either one of these methods for the purpose of audit testing. If the test is performed in a pressure vessel, air pressure in the pressure vessel shall be maintained within 1% of the average of the barometric pressures recorded for each individual test run used to calculate the weighted average emission rate for the certification test. The administrator shall notify the manufacturer at least one week prior to any test under this paragraph, and allow the manufacturer or authorized representatives to observe the test.

4. a. Except as provided in this paragraph, the administrator may select any accredited laboratory for audit testing. The following contains a nesting potential redrafting situation

b. 1) The administrator shall select the accredited laboratory that performed the test used to obtain certification for audit testing, until the administrator has amended this section based upon a determination pursuant to subd. 4. b. 2) to allow testing at another laboratory. If another laboratory is selected pursuant to this subdivision, and the overall precisions of the test method and procedure is greater than ± 1 gram per hour of the weighted average at laboratories below 304 meters (1,000 feet) elevation (or equivalent), the interlaboratory component of the precision shall be added to the applicable emissions standard for the purposes of this subdivision.

2) With respect to each test method and procedure set out in sub. (5) (a), the administrator shall, by July 1, 1990, publish a decision, after notice of an opportunity for comment, which either:

a) Amends this section based on a determination of the overall precision of the method and procedure, and the interlaboratory component thereof, or

b) Sets forth a determination that the available data are insufficient to determine the overall precision of the method and procedure, and the interlaboratory component thereof.

c. The administrator may not select an accredited laboratory that is located at an elevation more than 152 meters (500 feet) higher than the elevation of the laboratory which performed the test used to obtain certification, unless the audit test is performed in a pressure vessel.

5. a. If emissions from a wood heater tested under subd. 3. exceed the applicable weighted average emission limit by more than 50%, the administrator shall so notify the manufacturer that certification for that model line is suspended effective 72 hours from the receipt of the notice, unless the suspension notice is withdrawn by the administrator. The suspension shall remain in effect until withdrawn by the administrator, or 30 days from its effective date if a revocation notice under subd. 5. b. is not issued within that period, or the date of final agency action on revocation, whichever occurs earlier. The following contains a nested potential redrafting situation

b. 1) If emissions from a wood heater tested under subd. 3. exceed the applicable weighted average emission limit, the administrator shall notify the manufacturer that certification is revoked for that model line.

2) A revocation notice under subd. 5. b. 1) shall become final and effective 60 days after receipt by the manufacturer, unless it is withdrawn, a hearing is requested under sub. (10) or the deadline for requesting a hearing is extended.

3) The administrator may extend the deadline for requesting a hearing for up to 60 days for good cause.

4) A manufacturer may extend the deadline for requesting a hearing for up to 6 months, by agreeing to a voluntary suspension of certification.

c. Any notification under subd. 5. a. or b. shall include a copy of a preliminary test report from the accredited laboratory. The accredited laboratory shall provide a preliminary test report to the administrator within 10 days of the completion of testing, if a wood heater exceeds the applicable emission limit in sub. (3). The laboratory shall provide the administrator and the manufacturer, within 30 days of the completion of testing, all documentation pertaining to the test, including the complete test report and raw data sheets, laboratory technician notes, and test results for all test runs.

d. Upon receiving notification of a test failure under subd. 5. b. the manufacturer may submit some or all of the remaining 4 wood heaters selected under subd. 2. for testing at the manufacturer's own expense, in the order they were selected by the administrator, at the laboratory that performed the emissions test for the administrator.

e. Whether or not the manufacturer proceeds under subd. 5. d., the manufacturer may submit any relevant information to the administrator, including any other test data generated pursuant to this section. The manufacturer shall pay the expense of any testing performed for him or her.

f. The administrator shall withdraw any notice issued under subd. 5. b. if tests under subd. 5. d. show either:

1) That all 4 wood heaters tested for the manufacturer met the applicable weighted average emission limits, or

2) That the second and third wood heaters selected met the applicable weighted average emission limits and the average of all 3 weighted averages, including the original audit test, was below the applicable weighted average emission limits.

g. The administrator may withdraw any proposed revocation, if the administrator finds that an audit test failure has been rebutted by information submitted by the manufacturer under subd. 5. d. or e. or by any other relevant information available to the administrator.

h. Any withdrawal of a proposed revocation shall be accompanied by a document setting forth its basis.

(5) TEST METHODS AND PROCEDURES. Test methods and procedures in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with the standards and requirements for certification under subs. (3) and (4) as follows:

(a) Method 28 shall be used to establish the certification test conditions and the particulate matter weighted emission values.

(b) Emission concentrations may be measured with either:

1. Method 5G if a dilution tunnel sampling location is used, or

2. Method 5H if a stack location is used.

(c) Method 28A shall be used to determine that a wood combustion unit qualifies under the definition of wood heater in sub. (2) (m). If such a determination is necessary, this test shall be conducted by an accredited laboratory.

(e) 1. The manufacturer of an affected facility shall notify the administrator of the date that certification testing is scheduled to begin. A notice from the testing lab containing the information required in sub. (4) (f) 1. may be used to satisfy this requirement. This notice shall be submitted at least 30 days before the start of testing. The notification of testing shall be in writing, and include the manufacturer's name and address, the testing laboratory's name, the model name and number or, if unavailable, some other way to distinguish between models, and the dates of testing.

2. Any emission testing conducted on the wood heater for which notice was delivered shall be presumed to be certification testing if such testing occurs on or after the scheduled date of testing and before a test report is submitted to the administrator. If certification testing is interrupted for more than 24 hours, the laboratory shall notify the administrator by telephone, as soon as practicable, and also by letter, stating why the testing was interrupted and when it is expected to be resumed.

3. A manufacturer or laboratory may change the date that testing is scheduled to begin by notifying the administrator at least 14 days before the start of testing. Notification of schedule change shall be made at least 2 working days prior to the originally scheduled test date. This notice of rescheduling shall be made by telephone or other expeditious means and shall be documented in writing and sent concurrently.

4. A model line may be withdrawn from testing before the certification test is complete, provided the wood heater is sealed in accordance with sub. (6) (g). The manufacturer shall notify the administrator 30 days before the resumption of testing.

5. The manufacturer or laboratory shall notify the administrator if a test is not completed within the time allotted as set forth in the notice of testing. The notification shall be made by the end of the allotted testing period by telephone or other expeditious means, and documented in writing sent concurrently, and shall contain the dates when the test will be resumed. Unless otherwise approved by the administrator, failure to conduct a certification test as scheduled without notifying the administrator of any schedule change 14 days prior to the schedule or revised test dates will result in voiding the notification. In the case of a voided notification, the manufacturer shall provide the administrator with a second notification at least 30 days prior to the new test dates. The administrator may waive the requirement for advance notice for test resumptions.

(f) The testing laboratory shall allow the manufacturer to observe certification testing. However, manufacturers may not involve themselves in the conduct of the test after the pretest burn (as defined by Method 28) has begun. Communications between the manufacturer and laboratory personnel regarding operation of the wood heater shall be limited to written communications transmitted prior to the first pretest burn of the certification series. Written communications between the manufacturer and laboratory personnel may be exchanged during the certification test only if deviations from the test procedures are observed that constitute improper conduct of the test. All communications shall be included in the test documentation required to be submitted under sub. (4) (b) 4. and shall be consistent with instructions provided in the owner's manual required under sub. (7) (k), except to the extent that they address details of the certification tests that would not be relevant to owners.

(6) LABORATORY ACCREDITATION. (a) 1. A laboratory may apply for accreditation by the administrator to conduct wood heater certifications tests pursuant to sub. (4). The application shall be in writing to: Emission Measurement Branch (MD–13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attn: Wood Heater Laboratory Accreditation.

2. If accreditation is denied under this section, the administrator shall give written notice to the laboratory setting forth the basis for the determination.

(b) In order for a test laboratory to qualify for accreditation the laboratory shall:

1. Submit its written application providing the information related to laboratory equipment and management and technical experience of laboratory personnel. Applications from laboratories shall establish that:

a. Laboratory personnel have a total of one year of relevant experience in particulate measurement, including at least 3 months experience in measuring particulate emissions from wood heaters,

b. The laboratory has the equipment necessary to perform testing in accordance with either sub. (5) (b) 1. or 2., and

c. Laboratory personnel have experience in test management or laboratory management.

2. Have no conflict of interest and receive no financial benefit from the outcome of certification testing conducted pursuant to sub. (4).

3. Agree to enter into a contract as described in sub. (4) (g) with each wood heater manufacturer for whom a certification test has been performed.

5. Demonstrate proficiency to achieve reproducible results with at least one test method and procedure in sub. (5) (b) by:

a. Performing a test consisting of at least 8 test runs (2 in each of the 4 burn rate categories) on a wood heater identified by the administrator,

b. Providing the administrator at least 30 days prior notice of the test to afford the administrator the opportunity to have an observer present, and

c. Submitting to the administrator all documentation pertaining to the test including a complete test report and raw data sheets, laboratory technical notes, and test results for all test runs.

6. Be located in the continental United States.

7. Agree to participate annually in a proficiency testing program conducted by the administrator.

8. Agree to allow the administrator access to observe certification testing.

9. Agree to comply with a reporting and recordkeeping requirement that affect testing laboratories, and

10. Agree to accept the reasonable cost of a random compliance audit test (as determined by the administrator) if it is selected to conduct the random compliance audit test of a model line originally tested for certification at another laboratory.

(c) Laboratories accredited by the state of Oregon prior to January 1, 1988, may be accredited by the administrator without regard to the requirements in par. (b) 1. and 5., provided that the laboratory requests the accreditation in writing and, in addition to other applicable requirements, certifies under penalty of law that the information used in obtaining Oregon accreditation satisfied applicable requirements of Oregon law.

(e) 1. The administrator may revoke the U.S. environmental protection agency laboratory accreditation if he or she determines that the laboratory:

a. No longer satisfies the requirements for accreditation in par. (b) or (c),

b. Does not follow required procedures or practices,

c. Had falsified data or otherwise misrepresented emission data,

e. Failed to participate in a proficiency testing program, in accordance with its commitment under par. (b) 5., or

f. Failed to seal the wood heater in accordance with par. (g).

2. Revocation of accreditation under this paragraph may not take effect until the laboratory concerned has been given written notice by the administrator setting forth the basis for the proposed determination and an opportunity for a hearing under sub. (10). However, if revocation is ultimately upheld, all tests conducted by the laboratory after written notice was given may, at the discretion of the administrator, be declared invalid.

(f) Unless revoked sooner, a certificate of accreditation granted by the administrator shall be valid:

1. For 5 years from the date of issuance, for certificates issued under par. (b), or

2. Until July 1, 1990, for certificates issued under par. (c).

(g) A laboratory accredited by the administrator shall seal any wood heater on which it performed certification tests, immediately upon completion or suspension of certification testing, by using a laboratory–specific seal.

(7) PERMANENT LABEL, TEMPORARY LABEL AND OWNER'S MANUAL. (a) 1. Each affected facility manufactured on or after July 1, 1988, or offered for sale at retail on or after July 1, 1990, shall have a permanent label affixed to it that meets the requirements of this subsection.

2. Except for wood heaters subject to sub. (1) (e), (f) or (g), the permanent label shall contain the following information:

a. Month and year of manufacture,

b. Model name or number, and

c. Serial number.

3. The permanent label shall:

a. Be affixed in a readily visible or accessible location,

b. Be at least 3½ inches long and 2 inches wide,

c. Be made of a material expected to last the lifetime of the wood heater,

d. Present required information in a manner so that it is likely to remain legible for the lifetime of the wood heater, and

e. Be affixed in such a manner that it cannot be removed from the appliance without damage to the label.

4. The permanent label may be combined with any other label, as long as the required information is displayed, and the integrity of the permanent label is not compromised.

(b) If the wood heater belongs to a model line certified under sub. (4) and has not been found to exceed the applicable emission limits or tolerances through quality assurance testing, one of the following statements, as appropriate, shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified to comply with July, 1988, particulate emission standards
Not approved for sale after June 30, 1992,

or

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified to comply with July, 1990, particulate emission standards.

(c) 1. If compliance is demonstrated under sub. (1) (c), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified under s. NR 440.642 (1) (c), Wis. Adm. Code.
Not approved for sale after June 30, 1992.

2. If compliance is demonstrated under sub. (4) (h) one of the following statements, as appropriate, shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.
Certified under s. NR 440.642 (4) (h), Wis. Adm. Code, to comply with July, 1988 particulate emissions standards.
Not approved for sale after June 30, 1992.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified under s. NR 440.642 (4) (h), Wis. Adm. Code, to comply with July, 1990 particulate emissions standards.

(d) Any label statement under par. (b) or (c) constitutes a representation by the manufacturer as to any wood heater that bears it that:

1. Certification was in effect at the time the wood heater left the possession of the manufacturer,

2. The manufacturer was, at the time the label was affixed, conducting a quality assurance program in conformity with sub. (4) (o),

3. As to any wood heater individually tested for emissions by the manufacturer under sub. (4) (o) 3., that it met the applicable emissions limits, and

4. As to any wood heater individually inspected for tolerances under sub. (4) (o) 2., that the wood heater is within applicable tolerances.

(e) If an affected facility is exempt from the emission limits in sub. (3) under the provisions of sub. (1) (d), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Approved for sale until June 30, 1991.

(f) 1. If an affected facility is manufactured in the state of Wisconsin for export, the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Export stove. May not be operated within the United States.

2. If an affected facility is manufactured for use for research and development purposes as provided in sub. (1) (f), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Research Stove.
Not approved for sale.

3. If an affected facility is a coal–only heater as defined in sub. (1), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
This heater is only for burning coal.
Use of any other solid fuel except for coal ignition purposes is a violation of law.

(g) Any affected facility that does not qualify for labeling under any of pars. (b) through (f), shall bear one of the following labels:

1. If the test conducted under sub. (4) (n) indicates that the facility does not meet applicable emissions limits:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.
Not certified. Does not meet DNR particulate emission standards.
IT IS AGAINST THE LAW TO OPERATE THIS WOOD HEATER.

2. If the test conducted under sub. (4) (n) indicates that the facility does meet applicable emissions limits:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Meets DNR particulate emission standards.

3. If the facility has not been tested as required by sub. (4) (e).

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.
Not certified. Not tested. Not approved for sale.
IT IS AGAINST THE LAW TO OPERATE THIS WOOD HEATER.

(h) For affected facilities equipped with catalytic combustors, the following statement shall appear on the permanent label:

This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. Consult owner's manual for further information. It is against the law to operate this wood heater in a manner inconsistent with operating instructions in the owner's manual or if the catalytic element is deactivated or removed.

(i) An affected facility permanently labeled under par. (b) or (c) shall have attached to it a temporary label that shall contain only the following:

1. A statement indicating the compliance status of the model. The statement shall be one of the statements provided in 40 CFR part 60, Appendix I, Section 2.2.1, incorporated by reference in s. NR 440.17. Instructions on the statement to select are provided in 40 CFR part 60 in Appendix I, incorporated by reference in s. NR 440.17.

2. A graphic presentation of the composite particulate matter emission rate as determined in the certification test, or as determined by the administrator if the wood heater is certified under sub. (1) (c). The method for presenting this information is provided in 40 CFR part 60, Appendix I, Section 2.2.2, incorporated by reference in s. NR 440.17.

3. A graphic presentation of the overall thermal efficiency of the model. The method for presenting this information is provided in 40 CFR part 60, Appendix I, Section 2.2.3, incorporated by reference in s. NR 440.17. At the discretion of the manufacturer, either the actual measured efficiency of the model or its estimated efficiency may be used for purposes of this paragraph. The actual efficiency is the efficiency measured in tests conducted pursuant to 40 CFR 670.534 (d). The estimated efficiency shall be 72% if the model is catalyst–equipped and 63%

if the model is not catalyst equipped, and 78% if the model is designed to burn wood pellets for fuel. Wood heaters certified under sub. (1) (c) shall use these estimated efficiencies.

4. A numerical expression of the heat output range of the unit, in British thermal units per hour (Btu/hr) rounded to the nearest 100 Btu/hr.

a. If the manufacturer elects to report the overall efficiency of the model based on test results pursuant to subd. 3., the manufacturer shall report the heat output range measured during the efficiency test. If an accessory device is used in the certification test to achieve any low burn rate criterion specified in this section, and if this accessory device is not sold as a part of the wood heater, the heat output range shall be determined using the formula in subd. 4. b. based upon the lowest sustainable burn rate achieved without the accessory device.

b. If the manufacturer elects to use the estimated efficiency as provided in subd. 3., the manufacturer shall estimate the heat output of the model as follows:

$$HO_E = (19.140) \times \text{(Estimated overall efficiency/100)} \times BR$$

where:

HO_E is the estimated heat output in Btu/hr

BR is the burn rate in dry kilograms of test fuel per hour

5. Statements regarding the importance of operation and maintenance. Instructions regarding which statements shall be used are provided in 40 CFR part 60, Appendix I, Section 2., incorporated by reference in s. NR 440.17; and

6. The manufacturer and the identification of the model.

(j) 1. An affected facility permanently labeled under par. (e), (f) 3. or (g) shall have attached to it a temporary label that shall contain only the information provided for in 40 CFR part 60, Appendix I, section 2.3, 2.4 or 2.5, as applicable, incorporated by reference in s. NR 440.17.

2. The temporary label of an affected facility permanently labeled under par. (b), (c), (e), (f) 3. or (g) shall:

a. Be affixed to a location on the wood heater that is readily seen and accessible when the wood heater is offered for sale to consumers by any commercial owner;

b. Not be combined with any other label or information;

c. Be attached to the wood heater in such a way that it can be easily removed by the consumer upon purchase, except that the label on wood heaters displayed by a commercial owner may have an adhesive backing or other means to preserve the label to prevent its removal or destruction;

d. Be printed on 90 pound bond paper in black ink with a white background except that those for models that are not otherwise exempted which do not meet the applicable emission limits, or have not been tested pursuant to this section, shall be on a red background as described in 40 CFR part 60, Appendix I, Section 2.5, incorporated by reference in s. NR 440.17;

e. Have dimensions of 5 inches by 7 inches as described in 40 CFR part 60, Appendix I, Section 2.1, incorporated by reference in s. NR 440.17;

f. Have wording, presentation of the graphic data, and typography as presented in 40 CFR part 60, Appendix I, incorporated by reference in s. NR 440.17.

(k) 1. Each affected facility offered for sale by a commercial owner shall be accompanied by an owner's manual that shall contain the information listed in subds. 2. (pertaining to installation) and 3. (pertaining to operation and maintenance). The information shall be adequate to enable consumers to achieve optimal emissions performance. The information shall also be consistent with the operating instructions provided by the manufacturer to the laboratory for operating the wood heater during certification testing, except for details of the certification test that would not be relevant to the ultimate purchaser.

2. Installation information in the owner's manual shall state the requirements for achieving proper draft.

3. Operation and maintenance information in the owner's manual shall include:

a. Wood loading procedures, recommendations on wood selection, and warnings on what fuels not to use, such as treated wood, colored paper, cardboard, solvents, trash and garbage,

b. Fire starting procedures,

c. Proper use of air controls,

d. Ash removal procedures,

e. Instructions on gasket replacement,

f. For catalytic models, information on the following pertaining to the catalytic combustor:

1) Procedures for achieving and maintaining catalyst activity,
2) Maintenance procedures,
3) Procedures for determining deterioration or failure,
4) Procedures for replacement, and
5) Information on how to exercise warranty rights, and

g. For catalytic models, the following statement:

This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against the law to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.

4. Any manufacturer using the model language contained in 40 CFR part 60, Appendix I, incorporated by reference in s. NR 440.17, to satisfy any requirement of this paragraph shall be in compliance with that requirement, provided that the particular model language is printed in full, with only such changes as are necessary to ensure accuracy for the particular model line.

(L) Wood heaters that are affected by this section but that have been owned and operated by a noncommercial owner, are not subject to pars. (j) and (k) when offered for resale.

(8) REPORTING AND RECORDKEEPING. (a) Each manufacturer who holds a certificate of compliance under sub. (4) (e) or (h) for a model line shall maintain records containing the information required by this paragraph with respect to that model line. Each manufacturer of a model line certified under sub. (1) (c) shall maintain the information required by subds. 2. and 4. for that model line. The records and information maintained shall include:

1. For certification tests:

a. All documentation pertaining to the certification test used to obtain certification, including the full test report and raw data sheets, laboratory technician notes, calculations, and the test results for all test runs.

b. Where a model line is certified under sub. (4) (h) and later certified under sub. (4) (e), all documentation pertaining to the certification test used to obtain certification in each instance.

2. For parameter inspections conducted pursuant to sub. (4) (o) 2., information indicating the extent to which tolerances for components that affect emissions as listed in sub. (4) (k) 2. were inspected, and at what frequency, the results of such inspections, remedial actions taken, if any, and any follow–up actions such as additional inspections.

3. For emissions tests conducted pursuant to sub. (4) (o) 3., all test reports, data sheets, laboratory technician notes, calculations, and test results for all test runs, the remedial actions taken, if any, and any follow–up actions such as additional testing.

4. The number of affected facilities that are sold each year, by certified model line.

(b) 1. Each accredited laboratory shall maintain records consisting of all documentation pertaining to each certification test, including the full test report and raw data sheets, technician notes, calculations, and the test results for all test runs.

2. Each accredited laboratory shall report to the administrator by the 8th day of each month prior to July 1, 1990:

a. The number and identification of wood heaters scheduled for testing and the type of testing (e.g., U.S. environmental protection agency certification, Oregon certification, research and development testing),

b. The estimated date on which certification testing could commence for a wood heater, if such a test were requested on the first day of that month,

c. The identification of the wood heaters tested during the previous month.

3. Each accredited laboratory shall report to the administrator within 24 hours whenever a manufacturer which has notified the laboratory that it intends to apply for alternative certification for a model line fails to submit on schedule a representative unit of that model line for certification testing.

(c) Any wood heater upon which certification tests were performed based upon which certification was granted under sub. (4) (e) shall be retained (sealed and unaltered) at the manufacturer's facility for as long as the model line in question is manufactured. Any such wood heater shall be made available upon request to the administrator for inspection and testing.

(e) Any manufacturer seeking exemption under sub. (1) (d) shall maintain wood heater production records covering the period July 1, 1987 to July 1, 1989.

(f) Each manufacturer of an affected facility certified under sub. (4) shall submit a report to the administrator every 2 years following issuance of a certificate of compliance for each model line. This report shall certify that no changes in the design or manufacture of this model line have been made that require recertification under sub. (4) (k).

(g) Each manufacturer shall maintain records of the model and number of wood heaters exempted under sub. (1) (f).

(h) Each commercial owner of a wood heater previously owned by a noncommercial owner for personal use shall maintain records of the name and address of the previous owner.

(i) 1. Unless otherwise specified, all records required under this section shall be maintained by the manufacturer or commercial owner of the affected facility for a period of no less than 5 years.

2. Unless otherwise specified, all reports to the administrator required under this section shall be made to: Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 401 M Street SW, Washington DC 20460, Attention: Wood Heater Program.

3. A report to the administrator required under this section shall be deemed to have been made when it is properly addressed and mailed, or placed in the possession of a commercial courier service.

(9) PROHIBITIONS. (a) No person may operate an affected facility that does not have affixed to it a permanent label pursuant to sub. (7) (b), (c), (e), (f) 2. or 3. or (g) 2.

(b) No manufacturer may advertise for sale, offer for sale, or sell an affected facility that:

1. Does not have affixed to it a permanent label pursuant to sub. (7), or

2. Has not been tested when required by sub. (4) (n).

(c) On or after July 1, 1990, no commercial owner may advertise for sale, offer for sale, or sell an affected facility that does not have affixed to it a permanent label pursuant to sub. (7) (b), (c), (e), (f) 1. or 3., or (g) 1. or 2. No person may advertise for sale, offer for sale, or sell an affected facility labeled under sub. (7) (f) 1. except for export.

(d) 1. No commercial owner may advertise for sale, offer for sale or sell an affected facility permanently labeled under sub. (7) (b) or (c) unless:

a. The affected facility has affixed to it a removable label pursuant to sub. (7),

b. Any purchaser or transferee is provided with an owner's manual pursuant to sub. (7) (k), and

c. Any purchaser or transferee is provided with a copy of the catalytic combustor warranty (for affected facilities with catalytic combustors).

2. No commercial owner may advertise for sale, offer for sale, or sell an affected facility permanently labeled under sub. (7) (e), (f) 3., or (g), unless the affected facility has affixed to it a removable label pursuant to sub. (7). This prohibition does not apply to wood heaters affected by this section that have been previously owned and operated by a noncommercial owner.

3. A commercial owner other than a manufacturer complies with the requirements of this paragraph if the commercial owner:

a. Receives the required documentation from the manufacturer or a previous commercial owner, and

b. Provides that documentation unaltered to any person to whom the wood heater that it covers is sold or transferred.

(e) In any case in which the administrator revokes a certificate of compliance for the knowing submission of false or inaccurate information, or other fraudulent acts, the administrator may give notice of that revocation and the grounds for it to all commercial owners. From and after the date of receipt of that notice no commercial owner may sell any wood heater covered by the revoked certificate (other than to the manufacturer) unless:

1. The wood heater has been tested as required by sub. (4) (n) and labeled as required by sub. (7) (g), or

2. The model line has been recertified in accordance with this section.

(f) No person may install or operate an affected facility except in a manner consistent with the instructions on its permanent label and in the owner's manual pursuant to sub. (7) (L).

(g) No person may operate an affected facility which was originally equipped with a catalytic combustor if the catalytic element is deactivated or removed.

(h) No person may operate an affected facility that has been physically altered to exceed the tolerance limits of its certificate of compliance.

(i) No person may alter, deface, or remove any permanent label required to be affixed pursuant to sub. (7).

(10) HEARING AND APPEAL PROCEDURES. (a) 1. Any manufacturer or laboratory affected by an action listed in this subdivision may request a hearing under this subsection within 30 days following receipt of the required notification of the action when the administrator:

a. Denies an application under sub. (1) (c) or (4) (e),

b. Issues a notice of revocation of certification under sub. (4) (L),

c. Denies an application for laboratory accreditation under sub. (6), or

d. Issues a notice of revocation of laboratory accreditation under sub. (6) (e).

2. When the administrator issues a notice of revocation under sub. (4) (p), the manufacturer may request a hearing under this subsection within the time limits in sub. (4) (p) 5.

(b) Any hearing request shall be in writing, shall be signed by an authorized representative of the petitioning manufacturer or laboratory, and shall include a statement setting forth with particularity the petitioner's objection to the administrator's determination or proposed determination.

(c) 1. Upon receipt of a request for a hearing under par. (a), the administrator shall request the chief administrative law judge to designate an administrative law judge as presiding officer for the hearing. If the chief administrative law judge replies that no administrative law judge is available to perform this function, the administrator shall designate a presiding officer who has not had any prior responsibility for the matter under review, and who is not subject to the direct control or supervision of someone who has had such responsibility.

2. The hearing shall commence as soon as practicable at a time and place fixed by the presiding officer.

3. a. A motion for leave to intervene in any proceeding conducted under this section shall set forth the grounds for the proposed intervention, the position and interest of the movant and the likely impact that intervention will have on the expeditious progress of the proceeding. Any person already a party to the proceeding may file an answer to a motion to intervene, making specific reference to the factors in the foregoing sentence and subd. 3. c. within 10 days after service of the motion for leave to intervene.

b. A motion for leave to intervene in a proceeding shall ordinarily be filed before the first prehearing conference or in the absence of a prehearing conference, prior to the setting of a time and place for a hearing. Any motion filed after that time shall include, in addition to the information in subd. 3. a., a statement of good cause for the failure to file in a timely manner. The intervenor shall be bound by any agreements, arrangements and other matters previously made in the proceeding.

c. A motion for leave to intervene may be granted only if the movant demonstrates that his or her presence in the proceeding would not unduly prolong or otherwise prejudice the adjudication of the rights of the original parties, and that movant may be adversely affected by a final order. The intervenor shall become a full party to the proceeding upon the granting of leave to intervene.

d. Persons not parties to the proceeding may move for leave to file amicus curiae briefs. The movant shall state his or her interest and the reasons why the proposed amicus brief is desirable. If the motion is granted, the presiding officer or administrator shall issue an order setting the time for filing such brief. An amicus curia may participate in any briefing after his or her motion is granted, and shall be served with all briefs, reply briefs, motions and orders relating to issues to be briefed.

4. In computing any period of time prescribed or allowed in this section, the day of the event from which the designated period begins to run may not be included. Saturdays, Sundays, and federal legal holidays shall be included. When a stated time expires on a Saturday, Sunday or legal holiday, the stated time period shall be extended to include the next business day.

(d) 1. Upon appointment, the presiding officer shall establish a hearing file. The file shall consist of the notice issued by the administrator under sub. (1) (c), (4) (e), (L) or (p), or (6) (a) or (e), together with any accompanying material, the request for a hearing and the supporting data submitted therewith, and all documents relating to the request for certification or accreditation, or the proposed revocation of either.

2. The hearing file shall be available for inspection by any party, to the extent authorized by law, at the office of the presiding officer or other place designated.

(e) Any party may appear in person, or may be represented by counsel or by any other duly authorized representative.

(f) 1. The presiding officer, upon the request of any party, or at his or her discretion, may order a prehearing conference at a time and place specified to consider the following:

a. Simplification of the issues,

b. Stipulations, admissions of fact, and the introduction of documents,

c. Limitation of the number of expert witnesses,

d. Possibility of agreement disposing of all or any of the issues in dispute,

e. Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

2. The results of the conference shall be reduced to writing by the presiding officer and made part of the record.

(g) 1. Hearings shall be conducted by the presiding officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the presiding officer of irrelevant, immaterial and repetitious evidence.

2. Witnesses will not be required to testify under oath. However, the presiding officer shall call to the attention of witnesses that their statements may be subject to penalties under 18 USC 1001 for knowingly making false statements or representations or using false documents in any matter within the jurisdiction of any department or agency of the United States.

3. Any witness may be examined or cross–examined by the presiding officer, the parties, or their representatives.

4. Hearings shall be recorded verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

5. All written statements, charts, tabulations, and similar data offered in evidence at the hearings shall, upon a showing satisfactory to the presiding officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(h) 1. The presiding officer shall make an initial decision which shall include a written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the administrator without further proceedings unless there is an appeal to the administrator or motion for review by the administrator. Except as provided in subd. 3., any such appeal shall be taken within 20 days of the date the initial decision was filed.

2. On appeal from or review of the initial decision the administrator shall have all the powers which he or she would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the presiding officer for additional proceedings. The decision by the administrator shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

3. In any hearing requested under par. (a) 2., the presiding officer shall render his initial decision within 60 days of that request. Any appeal to the administrator shall be taken within 10 days of the initial decision, and the administrator shall render his decision in that appeal within 30 days of the filing of the appeal.

(11) GENERAL PROVISIONS EXCLUSIONS. The following provisions of ch. NR 440 do not apply to this section:

(a) Section NR 440.07

(b) Section NR 440.08 (1), (3), (4), (5) and (6), and

(c) Section NR 440.15 (4).

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (3) (b) 1. a., (4) (h) 3. c. and (7) (i) 4. b., Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (o) 3. a., (5) (c), Register, December, 1995, No. 480, eff. 1–1–96**; corrections in (1) (c) and (4) (L) made under s. 13.93 (2m) (b) 1., Register, November, 1999, No. 527.**

NR 440.644 Rubber tire manufacturing industry.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section, except as provided in par. (b), apply to each of the following affected facilities in rubber tire manufacturing plants that commence construction, modification, or reconstruction after January 20, 1983: each undertread cementing operation, each sidewall cementing operation, each tread end cementing operation, each bead cementing operation, each green tire spraying operation, each Michelin–A, each Michelin–B operation and each Michelin–C automatic operation.

(b) The owner or operator of each undertread cementing operation and each sidewall cementing operation in rubber tire manufacturing plants that commenced construction, modification or reconstruction after January 20, 1983, and on or before September 15, 1987, may comply with the alternate provisions in sub. (3) (b). This election shall be irreversible. The alternate provisions in sub. (3) (b) do not apply to any undertread cementing operation or sidewall cementing operation that is modified or reconstructed after September 15, 1987. The affected facilities in this paragraph are subject to all applicable provisions of this section.

(c) Although the affected facilities listed under par. (a) are defined in reference to the production of components of a "tire", as defined under sub. (2) (a), the percent emission reduction requirements and VOC use cutoffs specified under sub. (3) (a) 1., 2., 6., 7. c. and d., 8., 9. and 10. refer to the total amount of VOC used (the amount allocated to the affected facility), including the VOC used in cements and organic solvent–based green tire spray materials for tire types not listed in the definition of "tire" .

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

1. "Bead" means rubber–covered strands of wire, wound into a circular form, which ensure a seal between a tire and the rim of the wheel onto which the tire is mounted.

2. "Bead cementing operation" means the system that is used to apply cement to the bead rubber before or after it is wound into its final circular form. A bead cementing operation consists of a cement application station, such as a dip tank, spray booth and nozzles, cement trough and roller or swab applicator, and all other equipment necessary to apply cement to wound beads or bead rubber and to allow evaporation of solvent from cemented beads.

3. "Component" means a piece of tread, combined tread/ sidewall, or separate sidewall rubber, or other rubber strip that is combined into the sidewall of a finished tire.

4. "Drying area" means the area where VOC from applied cement or green tire sprays is allowed to evaporate.

5. "Enclosure" means a structure that surrounds a VOC (cement, solvent, or spray) application area and drying area, and that captures and contains evaporated VOC and vents it to a control device. Enclosures may have permanent and temporary openings.

6. "Green tire" means an assembled, uncured tire.

7. "Green tire spraying operation" means the system used to apply a mold release agent and lubricant to the inside and outside of green tires to facilitate the curing process and to prevent rubber from sticking to the curing press. A green tire spraying operation consists of a booth where spraying is performed, the spray application station, and related equipment such as the lubricant supply system.

8. "Michelin–A operation" means the operation identified as Michelin–A in the emission standards and engineering division confidential file as referenced in Docket A–80–9, Entry II–B–12.

9. "Michelin–B operation" means the operation identified as Michelin–B in the emission standards and engineering division confidential file as referenced in Docket A–80–9, Entry II–B–12.

10. "Michelin–C–automatic operation" means the operation identified as Michelin–C–automatic in the emission standards and engineering division confidential file as referenced in Docket A–80–9, Entry II–B–12.

11. "Month" means a calendar month or a prespecified period of 28 days or 35 days (utilizing a 4–4–5–week recordkeeping and reporting schedule).

12. "Organic solvent–based green tire spray" means any mold release agent and lubricant applied to the inside or outside of green tires that contains more than 12%, by weight, of VOC, as sprayed.

13. "Permanent opening" means an opening designed into an enclosure to allow tire components to pass through the enclosure by conveyor or other mechanical means, to provide access for permanent mechanical or electrical equipment, or to direct air flow into the enclosure. A permanent opening is not equipped with a door or other means of obstruction of air flow.

14. "Sidewall cementing operation" means the system used to apply cement to a continuous strip of sidewall component or any other continuous strip component (except combined bead/ sidewall component) that is incorporated into the sidewall of a finished tire. A sidewall cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to sidewall strips or other continuous strip component (except combined tread/sidewall component) and to allow evaporation of solvent from the cemented rubber.

15. "Temporary opening" means an opening into an enclosure that is equipped with a means of obstruction, such as a door, window, or port, that is normally closed.

16. "Tire" means any agricultural, airplane, industrial, mobile home, light–duty truck or passenger vehicle tire that has a bead diameter less than or equal to 0.5 m (19.7 in) and a cross section dimension less than or equal to 0.325 m (12.8 in), and that is mass produced in an assembly–line fashion.

17. "Tread end cementing operation" means the system used to apply cement to one or both ends of the tread or combined tread/sidewall component. A tread end cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to tread ends and to allow evaporation of solvent from the cemented tread ends.

18. "Undertread cementing operation" means the system used to apply cement to a continuous strip of tread or combined tread/sidewall component. An undertread cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to tread or combined tread/ sidewall strips and to allow evaporation of solvent from the cemented tread or combined tread/sidewall.

19. "VOC emission control device" means equipment that destroys or recovers VOC.

20. "VOC emission reduction system" means a system composed of an enclosure, hood, or other device for containment and capture of VOC emissions and a VOC emission control device.

21. "Water–based green tire spray" means any mold release agent and lubricant applied to the inside or outside of green tires that contains 12% or less, by weight, of VOC as sprayed.

(b) As used in this section, symbols not defined in this subsection have the meanings given in s. NR 440.03.

B_o = total number of beads cemented at a particular bead cementing affected facility for a month

C_a = concentration of VOC in gas stream in vents after a control device (parts per million by volume)

C_b = concentration of VOC in gas steam in vents before a control device (parts per million by volume)

C_f = concentration of VOC in each gas stream vented directly to the atmosphere from an affected facility or from a temporary enclosure around an affected facility (parts per million by volume)

D_c = density of cement or spray material (grams per liter)

D_r = density of VOC recovered by an emission control device (grams per liter)

E = emission control device efficiency, inlet versus outlet (fraction)

F_c = capture efficiency, VOC capture and routed to one control device versus total VOC used for an affected facility (fraction)

F_o = fraction of total mass of VOC used in a month by all facilities served by a common cement or spray material distribution system that is used by a particular affected facility served by the common distribution system

G = monthly average mass of VOC used per tire cemented or sprayed with a water–based green tire spray for a particular affected facility (grams per tire)

G_b = monthly average mass of VOC used per bead cemented for a particular bead cementing affected facility (grams per bead)

L_c = volume of cement or spray material used for a month (liters)

L_r = volume of VOC recovered by an emission control device for a month (liters)

M = total mass of VOC used for a month by all facilities served by a common cement or spray material distribution system (grams)

M_o = total mass of VOC used at an affected facility for a month (grams)

M_r = mass of VOC recovered by an emission control device for a month (grams)

N = mass of VOC emitted to the atmosphere per tire cemented or sprayed with a water–based green tire spray for an affected facility for a month (grams per tire)

N_b = mass of VOC emitted per bead cemented for an affected facility for a month (grams per bead)

Q_a = volumetric flow rate in vents after a control device (dry standard cubic meters per hour)

Q_b = volumetric flow rate in vents before a control device (dry standard cubic meters per hour)

Q_r = volumetric flow rate of each stream vented directly to the atmosphere from an affected facility or from a temporary enclosure around an affected facility (dry standard cubic meters per hour)

R = overall efficiency of an emission reduction system (fraction)

T_d = total number of days in monthly compliance period (days)

T_o = total number of tire cemented or sprayed with water–based green tire sprays at a particular affected facility for a month

W_o = weight fraction of VOC in a cement or spray material.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) *General.* On and after the date on which the initial performance test, required by s. NR 440.08, is completed, but no later than 180 days after initial startup, each owner or operator subject to the provisions of this section shall comply with the following conditions:

1. For each undertread cementing operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,870 kilograms of VOC per 28 days,
2) 4,010 kilograms of VOC per 29 days,
3) 4,150 kilograms of VOC per 30 days,
4) 4,280 kilograms of VOC per 31 days, or
5) 4,840 kilograms of VOC per 35 days.

2. For each sidewall cementing operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,220 kilograms of VOC per 28 days,
2) 3,340 kilograms of VOC per 29 days,
3) 3,450 kilograms of VOC per 30 days,
4) 3,570 kilograms of VOC per 31 days, or
5) 4,030 kilograms of VOC per 35 days.

3. For each tread end cementing operation: Discharge into the atmosphere no more than 10 grams of VOC per tire (g/tire) cementing for each month.

4. For each bead cementing operation: Discharge into the atmosphere no more than 5 grams of VOC per bead (g/bead) cemented for each month.

5. For each green tire spraying operation where only water–based sprays are used:

a. Discharge into the atmosphere no more than 1.2 grams of VOC per tire sprayed with an inside green tire spray for each month; and

b. Discharge into the atmosphere no more than 9.3 grams of VOC per tire sprayed with an outside green tire spray for each month.

6. For each green tire spraying operation where only organic solvent–based sprays are used:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,220 kilograms of VOC per 28 days,
2) 3,340 kilograms of VOC per 29 days,
3) 3,450 kilograms of VOC per 30 days,
4) 3,570 kilograms of VOC per 31 days, or
5) 4,030 kilograms of VOC per 35 days.

7. For each green tire spraying operation where both water–based and organic solvent–based sprays are used:

a. Discharge into the atmosphere no more than 1.2 grams of VOC per tire sprayed with a water–based inside green tire spray for each month; and

b. Discharge into the atmosphere no more than 9.3 grams of VOC per tire sprayed with a water–based outside green tire spray for each month; and either

c. Discharge into the atmosphere no more than 25% of the VOC used in the organic solvent–based green tire sprays (75% emission reduction) for each month; or

d. Maintain total (uncontrolled) VOC use for all organic solvent–based green tire sprays less than or equal to the levels specified under subd. 6. b.

8. For each Michelin–A operation:

a. Discharge into the atmosphere no more than 35% of the VOC used (65% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 1,570 kilograms of VOC per 28 days,
2) 1,630 kilograms of VOC per 29 days,
3) 1,690 kilograms of VOC per 30 days,
4) 1,740 kilograms of VOC per 31 days,
5) 1,970 kilograms of VOC per 35 days.

9. For each Michelin–B operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

1) 1,310 kilograms of VOC per 28 days,
2) 1,360 kilograms of VOC per 29 days,
3) 1,400 kilograms of VOC per 30 days,
4) 1,450 kilograms of VOC per 31 days, or
5) 1,640 kilograms of VOC per 35 days.

10. For each Michelin–C automatic operation:

a. Discharge into the atmosphere no more than 35% of the VOC used (65% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the levels specified under par. (a) 8. b.

(b) *Alternate standard.* 1. On and after the date on which the initial performance test, required by s. NR 440.08, is completed, but no later than 180 days after September 19, 1989, no owner or operator subject to the provisions in sub. (1) (b) may cause to be discharged into the atmosphere more than 25 grams of VOC per tire processed for each month if the operation uses 25 grams or less of VOC per tire processed and does not employ a VOC emission reduction system.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) does not apply to the monthly performance test procedures required by this section. Section NR 440.08 (4) does apply to initial performance tests and to the performance tests specified under par. (b) 2. and 3. Section NR 440.08 (6) does not apply when Method 24 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, is used.

(b) Performance tests shall be conducted as follows:

1. The owner or operator of an affected facility shall conduct an initial performance test, as required under s. NR 440.08 (1), except as described under par. (j). The owner or operator of an affected facility shall thereafter conduct a performance test each month except as described under subd. 4. and pars. (g) and (j). Initial and monthly performance tests shall be conducted according to the procedures in this subsection.

2. The owner or operator of an affected facility who elects to use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), as described under pars. (f) and (g), shall repeat the performance test when directed by the department or when the owner or operator elects to operate the capture system or control device at conditions different from the most recent determination of overall reduction efficiency. The performance test shall be conducted in accordance with the procedures described under par. (f) 2. a. to d.

3. The owner or operator of an affected facility who seeks to comply with the equipment design and performance specifications, as described under par. (j), shall repeat the performance test when directed by the department or when the owner or operator elects to operate the capture system or control device at conditions different from the most recent determination of control device efficiency or measurement of capture system retention time or face velocity. The performance test shall be conducted in accordance with the procedures described under par. (f) 2. b.

4. The owner or operator of each tread end cementing operation and each green tire spraying operation using only water–based sprays (inside and outside or both) containing less than 1.0% by weight of VOC is not required to conduct a monthly performance test as described in par. (d). In lieu of conducting a monthly performance test, the owner or operator of each tread end cementing operation and each green tire spraying operation shall submit formulation data or the results of Method 24 analysis annually to verify the VOC content of each tread end cement and each green tire spray material, provided the spraying formulation has not changed during the previous 12 months. If the spray material formulation changes, formulation data or Method 24 analysis of the new spray shall be conducted to determine the VOC content of the spray and reported within 30 days as required under sub. (7) (j).

(c) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent–based sprays are used, each Michelin–A operation, each Michelin–B operation, and each Michelin–C automatic operation where the owner or operator seeks to comply with the uncontrolled monthly VOC use (kg/mo) limits, the owner or operator shall use the following procedure to determine compliance with the applicable (depending upon duration of compliance period) uncontrolled monthly VOC use limit specified under sub. (3) (a) 1. b., 2. b., 6. b., 7. d., 8. b., 9. b. and 10. b. If both undertread cementing and sidewall cementing are performed at the same affected facility during a month, then the kg/mo limit specified under sub. (3) (a) 1. b. shall apply for that month.

1. Determine the density and weight fraction VOC (including dilution VOC) of each cement or green tire spray from its formulation or by analysis of the cement of green tire spray using Method 24 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17. If a dispute arises, the department may require an owner or operator who used formulation data to analyze the cement or green tire spray using Method 24 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) by the following procedure:

a. For each affected facility for which cement or green tire spray is delivered in batch or via a distribution system that serves only the affected facility:

$$M_o = \sum_{i=1}^{a} L_{ci} D_{ci} W_{oi}$$

where "a" equals the number of different cements or green tire sprays used during the month that are delivered in batch or via a distribution system that serves only a single affected facility.

b. For each affected facility for which cement or green tire spray is delivered via a common distribution system that also serves other affected or existing facilities:

1) Calculate the total mass of VOC used for all of the facilities served by the common distribution system for the month (M):

$$M = \sum_{i=1}^{b} L_{ci} D_{ci} W_{oi}$$

where "b" equals the number of different cements or green tire sprays used during the month that are delivered via a common distribution system that also serves other affected or existing facilities.

2) Determine the fraction (F_o) of M used at the affected facility by comparing the production records and process specifications for the material cemented or sprayed at the affected facility for the month to the production records and process specifications for the material cemented or sprayed at all other facilities served by the common distribution system for the month or by another procedure acceptable to the administrator.

3) Calculate the total monthly mass of VOC used at the affected facility for the month (M_o):

$$M_o = MF_o$$

3. Determine the time duration of the monthly compliance period (T_d).

(d) For each tread end cementing operation and each green tire spraying operation where water–based cements or sprays containing 1.0%, by weight, of VOC or more are used (inside, outside, or both) that do not use a VOC emission reduction system, the owner or operator shall use the following procedure to determine compliance with the g/tire limit specified under sub. (3) (a) 3., 5. a. and b., and 7. a. and b.

1. Determine the density and weight fraction VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as specified under par. (c) 2.

3. Determine the total number of tires cemented or sprayed at the affected facility for the month (T_o) by the following procedure:

a. For a tread end cementing operation, T_o equals the number of tread or combined tread/sidewall components that receive an application of tread end cement for the month.

b. For a green tire spraying operation that uses water–based inside green tire sprays, T_o equals the number of green tires that receive an application of water–based inside green tire spray for the month.

c. For a green tire spraying operation that uses water–based outside green tire sprays, T_o equals the number of green tires that receive an application of water–based outside green tire spray for the month.

4. Calculate the mass of VOC used per tire cemented or sprayed at the affected facility for the month (G):

$$G = \frac{M_o}{T_o}$$

5. Calculate the mass of VOC emitted per tire cemented or sprayed at the affected facility for the month (N):

$$N = G$$

(e) For each bead cementing operation that does not use a VOC emission reduction system, the owner or operator shall use the following procedure to determine compliance with the g/bead limit specified under sub. (3) (a) 4.

1. Determine the density and weight fraction of VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as specified under par. (c) 2.

3. Determine the number of beads cemented at the affected facility during the month (B_o) using production records; B_o equals the number of beads that receive an application of cement for the month.

4. Calculate the mass of VOC used per bead cemented at the affected facility for the month (G_b):

$$G_b = \frac{M_o}{B_o}$$

5. Calculate the mass of VOC emitted per bead cemented at the affected facility for the month (N_b):

$$N_b = G_b$$

(f) For each tread end cementing operation and each bead cementing operation that use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), the owner or operator shall use the following procedure to determine compliance with the emission limit specified under sub. (3) (a) 3. and 4.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under par. (d) 1. to 4., or mass of VOC used per bead cemented at the affected facility for the month (G_b), as specified under par. (e) 1. to 4.

2. Calculate the mass of VOC emitted per tire cemented at the affected facility for the month (N) or mass of VOC emitted per bead cemented for the affected facility for the month (N_b):

$$N = G(1 - R)$$
$$N_b = G_b(1 - R)$$

For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under par. (f) 2. a. to d. After the initial performance test, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test. No monthly performance tests are required. The performance test shall be repeated during conditions described under par. (b) 2.

a. The owner or operator of an affected facility shall construct a temporary enclosure around the application and drying areas during he performance test for the purpose of capturing fugitive VOC emissions. The enclosure shall be maintained at a negative pressure to ensure that all evaporated VOC are measurable. Determine the fraction (F_c) of total VOC used at the affected facility that enter the control device:

$$F_c = \frac{\sum_{i=1}^{m} C_{bi} Q_{bi}}{\sum_{i=1}^{m} C_{bi} Q_{bi} + \sum_{i=1}^{n} C_{fi} Q_{fi}}$$

where:

"m" is the number of vents from the affected facility to the control device

"n" is the number of vents from the affected facility to the atmosphere and form the temporary enclosure

b. Determine the destruction efficiency of the control device (E) by using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of control device:

$$E = \frac{\sum_{i=1}^{m} C_{bi} Q_{bi} - \sum_{i=1}^{p} C_{ai} Q_{ai}}{\sum_{i=1}^{m} C_{bi} Q_{bi}}$$

where:

"m" is the number of vents from the affected facility to the control device

"p" is the number of vents after the control device

c. Determine the overall reduction efficiency (R):

$$R = EF_c$$

d. The owner or operator of an affected facility may substitute the following procedure as an acceptable alternative to the requirements prescribed under par. (f) 2. a. This alternative procedure is acceptable only in cases where a single VOC is used and is present in the capture system. The average capture efficiency value derived from a minimum of 3 runs shall constitute a test.

1) For each run, "i", measure the mass of the material containing a single VOC used. This measurement shall be made using a scale that has both a calibration and a readability to within 1% of the mass used during the fun. This measurement may be made by filling the direct supply reservoir, for example, rollers, pumps, hoses, to a marked level at the start of the run and then refilling to the same mark from a more easily weighed container, for example, a separate supply drum, at the end of the fun. The change in mass of the supply drum would equal the mass of the material used in the run. If only the direct supply reservoir is weighed, the amount of material in or on the related application equipment shall be the same at the start and end of the run. All additions of VOC containing material shall be properly accounted for in determining the mass of material used during that run.

2) For each run, "i", measure the mass of the material containing a single VOC which is present in the direct supply reservoir and related application equipment at the start of the run, unless the ending weight fraction VOC in the material is greater than or equal to 98.5% of the starting weight fraction VOC in the material, in which case, this measurement is not required. This measurement may be made directly by emptying the direct supply reservoir and related application equipment and then filling them to a marked level from an easily weighed container, for example, a separate supply drum. The change in mass of the supply drum would equal the mass of material in the filled direct supply reservoir and related application equipment. Alternatively, this measurement may be made by weighing the direct supply reservoir and related application equipment at the start of the run and subtracting the mass of the empty direct supply reservoir and related application equipment (tare weight).

3) For each run, "i", the starting weight fraction VOC in the material shall be determined by Method 24 analysis of a sample taken from the direct supply reservoir at the beginning of the run.

4) For each run, "i", the ending weight fraction VOC in the material shall be determined by Method 24 analysis of a sample taken from the direct supply reservoir at the end of the run.

5) For each run, "i", in which the ending weight fraction VOC in the material is greater than or equal to 98.5% of the starting weight fraction VOC in the material, calculate the mass of the single VOC used (M_i) by multiplying the mass of the material used in the run by the starting weight fraction VOC of the material used in the run.

6) For each run, "i", in which the ending weight fraction VOC in the material is less than 98.5% of the starting weight fraction VOC in the material, calculate the mass of the single VOC used (M_i) as follows:

a) Calculate the mass of VOC present in the direct supply reservoir and related application equipment at the start of the run by multiplying the mass of material in the direct supply reservoir and related application equipment at the start of the run by the starting weight fraction VOC in the material for that run.

b) Calculate the mass of VOC present in the direct supply reservoir and related application equipment at the end of the run by multiplying the mass of material in the direct supply reservoir and related application equipment at the end of the run by the ending weight fraction VOC in the material for that run. The mass of material in the direct supply reservoir and related application equipment at the end of the run shall be calculated by subtracting the mass of material used in the run from the mass of material in the direct supply reservoir and related application equipment at the start of the run.

c) The mass of the single VOC used (M_i) equals the mass of VOC present in the direct supply reservoir and related application equipment at the start of the run minus the mass of VOC present in the direct supply reservoir and related application equipment at the end of the run.

7) If Method 25A is used to determine the concentration of the single VOC in the capture system, then calculate the capture efficiency (FC_i) for each run, "i", as follows:

$$FC_i = \frac{C_i \frac{W}{V} Q_i}{(M_i)(10^6)}$$

where:

C_i is the average concentration of the single VOC in the capture system during run "i" (parts per million by volume) corrected for background VOC

Note: See sub. (8) (a) 5.

W is the molecular weight of the single VOC, expressed as mg per mg–mole

V is 2.405 × 10^{-5} m^3/mg–mole, the volume occupied by one mg–mole of ideal gas at standard conditions (20°C, 1 atmosphere) on a wet basis

Q_i is the volumetric flow in m^3 in the capture system during run"i" adjusted to standard conditions (20°C, 1 atmosphere) on a wet basis

Note: See sub. (8) (a) 5.

10^6 is the ppm per unity

M_i is the mass in mg of the single VOC used during run "i"

8) If Method 25 is used to determine the concentration of the single VOC in the capture system, then calculate the capture efficiency (FC_i) for each run, "i", as follows:

$$FC_i = \frac{\frac{C_i}{(NC)(10^6)} \frac{(W)}{(V)} (Q_i)}{M_i}$$

where:

C_i is the average concentration of the single VOC in the capture system during run "i" (parts per million, as carbon, by volume) corrected for background VOC

Note: See sub. (8) (a) 5.

W is the molecular weight of the single VOC, expressed as mg per mg–mole

V is 2.405 × 10^{-5} m^3/mg–mole, the volume occupied by one mg–mole of ideal gas at standard conditions (20°C, 1 atmosphere) on a wet basis

Q_i is the volumetric flow in m^3 in the capture system during run"i" adjusted to standard conditions (20°C, 1 atmosphere) on a dry basis

Note: See sub. (8) (a) 5.

10^6 is the ppm per unity

M_i is the mass in mg of the single VOC used during run "i"

NC is the number of carbon atoms in one molecule of the single VOC

9) Calculate the average capture efficiency value, F_c, as follows:

$$F_c = \frac{\sum_{i=1}^{n} FC_i}{n}$$

where:

"n" equals the number of runs made in the test ($n > 3$). In cases where an alternative procedure in this paragraph is used, the requirements in par. (f) 2. b. and c. remain unchanged

(g) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent–based sprays are used, each Michelin–A operation, each Michelin–B operation, and each Michelin–C–automatic operation that use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), the owner or operator shall use the following procedure to determine compliance with the percent emission reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. and 10. a. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under par. (f) 2. a. to c. The performance test shall be repeated during conditions described under par. (b) 2. No monthly performance tests are required.

(h) For each tread end cementing operation and each bead cementing operation that uses a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber), the owner or operator shall use the following procedure to determine compliance with the emission limit specified under sub. (3) (a) 3. and 4.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under par. (d) 1. to 4., or the mass of VOC used per bead cemented at the affected facility for the month (G_b) as specified under par. (e) 1. to 4.

2. Calculate the total mass of VOC recovered from the affected facility for the month (M_r):

$$M_r = L_r D_r$$

3. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month:

$$R = \frac{M_r}{M_o}$$

4. Calculate the mass of VOC emitted per tire cemented at the affected facility for the month (N) or mass of VOC emitted per bead cemented at the affected facility for the month (N_b):

$$N = G(1 - R)$$
$$N_b = G_b(1 - R)$$

(i) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent–based sprays are used, each Michelin–A operation, each Michelin–B operation, and each Michelin–C–automatic operation that use a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber), the owner or operator shall use the following procedure to determine compliance with the percent reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. and 10. a.

1. Determine the density and weight fraction VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as described under par. (c) 2.

3. Calculate the total mass of VOC recovered from the affected facility for the month (M_r) as described under par. (h) 2.

4. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month as described under par. (h) 3.

(j) Rather than seeking to demonstrate compliance with the provisions of sub. (3) (a) 1. a., 2. a., 6. a., 7. c. or 9. a. using the performance test procedures described under pars. (g) and (i), an owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent–based sprays are used, or Michelin–B operation that use a VOC emission reduction system, may seek to demonstrate compliance by meeting the equipment design and performance specifications listed under subds. 1., 2., and 4. to 6. or under subds. 1. and 3. to 6. and by conducting a control device efficiency performance test to determine compliance as describe under subd. 7. The owner or operator shall conduct this performance test of the control device efficiency no later than 180 days after initial startup of the affected facility, as specified under s. NR 440.08 (1). Meeting the capture system design and performance specifications, in conjunction with operating a 95% efficient control device, is an acceptable means of demonstrating compliance with the standard. Therefore, the requirement for the initial performance test on the enclosure, as specified under s. NR 440.08 (1), is waived. No monthly performance tests are required.

1. For each undertread cementing operation, each sidewall cementing operation, and each Michelin–B operation, the cement application and drying area shall be contained in an enclosure that meets the criteria specified under subds. 2., 4. and 5. For each green tire spraying operation where organic solvent–based sprays are used, the spray application and drying area shall be contained in an enclosure that meets the criteria specified under subds. 3., 4. and 5.

2. The drying area shall be enclosed between the application area and the water bath or to the extent necessary to contain all tire components for at least 30 seconds after cement application, whichever distance is less.

3. Sprayed green tires shall remain in the enclosure for a minimum of 30 seconds after spray application.

4. A minimum face velocity of 100 feet per minute shall be maintained continuously through each permanent opening into the enclosure when all temporary enclosure openings are closed. The cross–sectional area of each permanent opening shall be divided into at least 12 equal areas, and a velocity measurement shall be performed at the centroid of each equal area with an anemometer or similar velocity monitoring device; the face velocity of each permanent opening is the average value of the velocity measurements taken. The monitoring device shall be calibrated and operated according to the manufacturer's instructions. Temporary enclosure openings shall remain closed at all time except when worker access is necessary.

5. The total area of all permanent openings into the enclosure may not exceed the area that would be necessary to maintain the VOC concentration of the exhaust gas stream at 25% of the lower explosive limit (LEL) under the following conditions:

a. The facility is operating at the maximum solvent use rate;

b. The face velocity through each permanent opening is 100 feet per minute; and

c. All temporary openings are closed.

6. All captured VOC are ducted to a VOC emission control device that is operated on a continuous basis and that achieves at least a 95% destruction or recovery efficiency.

7. The efficiency of the control device (E) for the initial performance test shall be determined by using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the control device as described under par. (f) 2. b. The control device efficiency shall be redetermined during conditions specified under par. (b) 3.

(k) Each owner or operator of an affected facility who initially elected to be subject to the applicable percent emission reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. or 10. a. and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limit specified under sub. (3) (a) 1. b., 2. b., 6. b., 7. d., 8. b., 9. b. or 10. b. shall demonstrate, using the procedures described under par. (c), that the total VOC use at the affected facility has not exceeded the applicable total (uncontrolled) monthly VOC use limit during each of the last 6 months of operation. The owner or operator shall be subject to the applicable percent emission reduction requirement until the conditions of this paragraph and sub. (7) (g) are satisfied.

(L) In determining compliance for each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation, each Michelin–A operation, each Michelin–B operation, and each Michelin–C–automatic operation, the owner or operator shall include all the VOC used, recovered, or destroyed from cements and organic solvent–based green tire sprays including those cements or sprays used for tires other than those defined under sub. (2) (a).

(m) In determining compliance for each tread end cementing operation, each bead cementing operation, and each green tire spraying operation, the owner or operator shall include only those tires defined under sub. (2) (a) when determining T_o and B_o.

(n) For each undertread cementing operation and each sidewall cementing operation that does not use a VOC emission reduction system, the owner or operator shall use the following procedure to determine compliance with the 25 g/tire limit specified in sub. (3) (b):

1. Calculate the total mass of VOC (M_o) used at the affected facility for the month by the following procedure.

a. For each affected facility for which cement is delivered in batch or via a distribution system which serves only that affected facility:

$$M_o = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi}$$

where:

“n” equals the number of different cements or sprays used during the month

b. For each affected facility for which cement is delivered via a common distribution system which also serves other affected or existing facilities:

1) Calculate the total mass (M) of VOC used for all of the facilities served by the common distribution system for the month:

$$M = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi}$$

where:

“n” equals the number of different cements or sprays used during the month

2) Determine the fraction (F_o) of “M” used by the affected facility by comparing the production records and process specifications for the material cemented at the affected facility for the month to the production records and process specifications for the material cemented at all other facilities served by the common distribution system for the month or by another procedure acceptable to the department.

3) Calculate the total monthly mass of VOC (M_o) used at the affected facility:

$$M_o = MF_o$$

2. Determine the total number of tires (T_o) processed at the affected facility for the month by the following procedure:

a. For undertread cementing, T_o equals the number of tread or combined tread/sidewall components which receive an application of undertread cement.

b. For sidewall cementing, T_o equals the number of sidewall components which receive an application of sidewall cement, divided by 2.

3. Calculate the mass of VOC used per tire processed (G) by the affected facility for the month:

$$G = \frac{M_o}{T_o}$$

4. Calculate the mass of VOC emitted per tire processed (N) for the affected facility for the month:

$$N = G$$

5. Where the value of the mass of VOC emitted per tire processed (N) is less than or equal to the 25 g/tire limit specified under sub. (3) (b), the affected facility is in compliance.

(5) MONITORING OF OPERATIONS. (a) Each owner or operator subject to the provisions of this section shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment, unless alternative monitoring procedures or requirements are approved for that facility by the department.

1. Where a thermal incinerator is used for VOC emission reduction, a temperature monitoring device equipped with a continuous recorder for the temperature of the gas stream in the combustion zone of the incinerator. The temperature monitoring device shall have an accuracy of 1% of the temperature being measured in °C or ±0.5 °C, whichever is greater.

2. Where a catalytic incinerator is used for VOC emission reduction, temperature monitoring devices, each equipped with a continuous recorder, for the temperature in the gas stream immediately before and after the catalyst bed of the incinerator. The temperature monitoring devices shall have an accuracy of 1% of the temperature being measured in °C or ±0.5 °C, whichever is greater. For an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent–based sprays are used or Michelin–B operation where a carbon adsorber is used to meet the performance requirements specified under sub. (4) (j) 6., an organics monitoring device used to indicate the concentration level or organic compounds based on a detection principle such as infrared, photoionization, or thermal conductivity, equipped with a continuous recorder, for the outlet of the carbon bed.

(b) An owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent–based sprays are used, or Michelin–B operation where a VOC recovery device other than a carbon adsorber is used to meet the performance requirement specified under sub. (4) (j) 6. shall provide to the department information describing the operation of the control device and the process parameters which would indicate proper operation and maintenance of the device. The department may request further information and shall specify appropriate monitoring procedures or requirements.

(6) RECORDKEEPING REQUIREMENTS. (a) Each owner or operator of an affected facility that uses a thermal incinerator shall maintain continuous records of the temperature of the gas stream in the combustion zone of the incinerator and records of all 3–hour periods of operation for which the average temperature of the gas stream in the combustion zone was more than 28 °C (50 °F) below the combustion zone temperature measured during the most recent determination of the destruction efficiency of the thermal incinerator that demonstrated that the affected facility was in compliance.

(b) Each owner or operator of an affected facility that uses a catalytic incinerator shall maintain:

1. Continuous records of the temperature of the gas stream both upstream and downstream of the catalyst bed of the incinerator,

2. Records of all 3–hour periods of operation of which the average temperature measured before the catalyst bed is more than 28 °C below the gas stream temperature measured before the catalyst bed during the most recent determination of destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance, and

3. Records of all 3–hour periods for which the average temperature difference across the catalyst bed is less than 80% of the temperature difference measured during the most recent determination of the destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance.

(c) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent–based sprays are used, or Michelin–B operation that uses a carbon adsorber to meet the requirements specified under sub. (4) (j) 6. shall maintain continuous records of all 3–hour periods of operation during which the average VOC concentration level or reading of organics in the exhaust gases is more than 20% greater than the exhaust gas concentration level or reading measured by the organics monitoring device during the most recent determination of the recovery efficiency of the carbon adsorber that demonstrated that the affected facility was in compliance.

(d) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tires spraying operation where organic solvent–based sprays are used, Michelin–A operation, Michelin–B operation, or Michelin–C–automatic operation who seeks to comply with a specified kg/mo uncontrolled VOC use limit shall maintain records of monthly VOC use and the number of days in each compliance period.

(e) Each owner or operator that is required to conduct monthly performance tests, as specified under sub. (4) (b) 1., shall maintain records of the results of all monthly tests.

(f) Each owner or operator of a tread end cementing operation and green tire spraying operation using water–based cements or sprays containing less than 1.0% by weight of VOC, as specified under sub. (4) (b) 4., shall maintain records of formulation data or the results of Method 24 analysis conducted to verify the VOC content of the spray.

(7) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section, at the time of notification of the anticipated initial startup of an affected facility pursuant to s. NR 440.07 (1) (b), shall provide a written report to the department declaring for each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent–based spray are used, each Michelin–A operation, each Michelin–B operation, and each Michelin–C–automatic operation the emission limit the owner or operator intends to comply with and the compliance method, where sub. (4) (j) is applicable, to be employed.

(b) Each owner or operator subject to the provisions of this section, at the time of notification of the anticipated initial startup of an affected facility pursuant to s. NR 440.07 (1) (b), shall specify the monthly schedule (each calendar month or a 4–4–5–week schedule) to be used in making compliance determinations.

(c) Each owner or operator subject to the provision of this section shall report the results of all initial performance tests, as required under s. NR 440.08 (1), and the results of the performance test required under sub. (4) (b) 2. and 3. The following data shall be included in the report for each of the performance tests:

1. For each affected facility for which the owner or operator seeks to comply with a kg/mo uncontrolled VOC use limit specified under sub. (3) (a): the monthly mass of VOC used (M_o) and the number days in the compliance period (T_d).

2. For each affected facility that seeks to comply with a g/tire or g/bead limit specified under sub. (3) (a) without the use of a VOC emission reduction system: the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (B_o), and the mass of VOC emitted per bead cemented (N_b).

3. For each affected facility that uses a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator) to comply with a g/tire or g/bead limit specified under sub. (3) (a): the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (B_o), the mass of VOC emitted per bead cemented (N_b), the mass of VOC used per tire cemented or sprayed (G), the mass of VOC per bead cemented (G_b), the emission control device efficiency (E), the capture system efficiency (F_c), the face velocity through each permanent opening for the capture system with the temporary openings closed, and the overall system emission reduction (R).

4. For each affected facility that uses a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator) to comply with a percent emission reduction requirement specified under sub. (3) (a): the emission control device efficiency (E), the capture system efficiency (F_o), the face velocity through each permanent opening in the computer system with the temporary openings closed, and the overall system emission reduction (R).

5. For each affected facility that uses a carbon adsorber to comply with a g/tire or g/bead limit specified under sub. (3) (a): the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the mass of VOC used per tire cemented or sprayed (G), the number of beads cemented (B_o), the mass of VOC used per bead (G_b), the mass of VOC recovered (M_r), the overall system emission reduction (R), the mass of VOC emitted per tire cemented or sprayed (N), and the mass of VOC emitted per bead cemented (N_b).

6. For each affected facility that uses a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber) to comply with a percent emission reduction requirement specified under sub. (3) (a): the mass of VOC used (M_o), the mass of VOC recovered (M_r), and the overall system emission reduction (R).

7. For each affected facility that elects to comply with the alternate limit specified under sub. (3) (b): The mass VOC used (M_o), the number of tires processed (T_o), and the mass of VOC emitted per tire processed (N).

(d) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent–based sprays are used, or Michelin–B operation who seeks to comply with the requirements described under sub. (4) (j) shall include in the initial compliance report a statement specifying, in detail, how each of the equipment design and performance specifications has been met. The initial compliance report also shall include the following data: the emission control device efficiency (E), the face velocity through each permanent enclosure opening with all temporary enclosure openings closed, the total area of all permanent enclosure openings, the total area of all temporary enclosure openings, the maximum solvent use rate (kg/hr), the types of VOC used, the lower explosive limit (LEL) for each VOC used, and the length of time each component is enclosed after application of cement or spray material.

(e) Each owner or operator of an affected facility shall include the following data measured by the required monitoring devices, as applicable, in the report for each performance test specified under par. (c):

1. The average combustion temperature measured at least every 15 minutes and averaged over the performance test period of incinerator destruction efficiency for each thermal incinerator.

2. The average temperature before and after the catalyst bed measured at least every 15 minutes and averaged over the performance test period of incinerator destruction efficiency for each catalytic incinerator.

3. The concentration level or reading indicated by the organics monitoring device at the outlet of the adsorber, measured at least every 15 minutes and averaged over the performance test

period of carbon adsorber recovery efficiency while the vent stream is normally routed and constituted.

4. The appropriate data to be specified by the department where a VOC recovery device other than a carbon adsorber is used.

(f) Once every 6 months each owner or operator subject to the provisions of sub. (6) shall report, as applicable:

1. Each monthly average VOC emission rate that exceeds the g/tire or g/bead limit specified under sub. (3) (a), as applicable for the affected facility.

2. Each monthly average VOC use rate that exceeds the kg/mo VOC use limit specified under sub. (3) (a) as applicable for the affected facility.

3. Each monthly average VOC emission reduction efficiency for a VOC recovery device (e.g., carbon adsorber) less than the percent efficiency limit specified under sub. (3) (a) as applicable for the affected facility.

4. Each 3−hour period of operation for which the average temperature of the gas stream in the combustion zone of a thermal incinerator, as measured by the temperature monitoring device, is more than 28 °C (50°F) below the combustion zone temperature measured during the most recent determination of the destruction efficiency of the thermal incinerator that demonstrated that the affected facility was in compliance.

5. Each 3−hour period of operation for which the average temperature of the gas stream immediately before the catalyst bed of a catalytic incinerator, as measured by the temperature monitoring device, is more than 28 °C (50 °F) below the gas stream temperature measured before the catalyst bed during the most recent determination of the destruction efficiency of the catalyst incinerator that demonstrated that the affected facility was in compliance, and any 3−hour period of which the average temperature difference across the catalyst bed (i.e., the difference between the temperatures of the gas stream immediately before and after the catalyst bed), as measured by the temperature monitoring device, is less than 80% of the temperature difference measured during the most recent determination of the destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance.

6. Each 3−hour period of operation during which the average concentration level or reading of VOCs in the exhaust gases from a carbon adsorber is more than 20% greater than the exhaust gas concentration level or reading measured by the organics monitoring device during the most recent determination of the recovery efficiency of the carbon adsorber that demonstrated that the affected facility was in compliance.

(g) Each owner or operator of an affected facility who initially elected to be subject to the applicable percent emission reduction requirement specified under sub. (3) (a) and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limits specified under sub. (3) (a) and who has satisfied the provision specified under sub. (4) (k) shall furnish the department written notification no less than 30 days in advance of the date when the owner or operator intends to be subject to the applicable VOC use limit instead of the applicable percent emission reduction requirement.

(i) The owner or operator of each undertread cementing operation and each sidewall cementing operation who qualifies for the alternate provisions as described in sub. (3) (b), shall furnish the department written notification of the election no less than 60 days after September 19, 1989.

(j) The owner or operator of each tread end cementing operation and each green tire spraying (inside, outside, or both) operation using water−based sprays containing less than 1.0%, by weight, of VOC as described in sub. (4) (b) 1. shall furnish the department, within 60 days initially and annually thereafter, formulation data or Method 24 results to verify the VOC content of the water−based sprays in use. If the spray formulation changes before the end of the 12−month period, formulation data or Method 24 results to verify the VOC content of the spray shall be reported within 30 days.

(8) TEST METHODS AND PROCEDURES. (a) The test methods in Appendix A, of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with sub. (3) (a) as follows:

1. Method 24 or formulation data for the determination of the VOC content of cements or green tire spray materials. In the event of dispute, Method 24 shall be the reference method. For Method 24, the cement or green tire spray sample shall be a 1−liter sample collected in a 1−liter container at a point where the sample will be representative of the material as applied in the affected facility.

2. Method 25 as the reference method for the determination of VOC concentrations in each stack, both entering and leaving an emission control device. The owner or operator shall notify the department 30 days in advance of any test by Method 25. For Method 25, the sampling time for each of 3 runs shall be at least one hour. Method 1 shall be used to select the sampling site, and the sampling point shall be the centroid of the duct or at a point no closer to the walls than one meter. The minimum sample volume shall be 0.003 dry standard cubic meter (dscm) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

3. Method 2, 2A, 2C, or 2D, as appropriate, as the reference method for determination of the flow rate of the stack gas. The measurement site shall be the same as the Method 25 sampling. A velocity traverse shall be made once per run within the hour that the Method 25 sample is taken.

4. Method 4 for determination of stack gas moisture.

5. Method 25 or Method 25A for determination of the VOC concentration in a capture system prior to a control device when only a single VOC is present, as described in sub. (4) (f) 2. d. 7) and 8). The owner or operator shall notify the department 30 days in advance of any test by either Method 25 or Method 25A. Method 1 shall be used to select the sampling site and the sampling point shall be the centroid of the duct or at a point no closer to the walls than 1 meter. Method 2, 2A, 2C or 2D, as appropriate, shall be used as the test method for the concurrent determination of gas flow rate in the capture system.

a. For Method 25, the sampling time for each run shall be at least 1 hour. For each run, a concurrent sample shall be taken immediately upwind of the application area to determine the background VOC concentration of air drawn into the capture system. Subtract this reading from the reading obtained in the capture system for that run. The minimum sample volume shall be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variable or other factors, may be approved by the department. Use Method 3 to determine the moisture content of the stack gas.

b. For Method 25A, the sampling time for each run shall be at least 1 hour. Instrument calibration shall be performed by the procedure given in Method 25A using the single VOC present in the capture system. A different calibration gas may be used if the results are corrected using an experimentally determined response factor comparing the alternative calibration gas to the single VOC used in the process. After the instrument has been calibrated, determine the background VOC concentration of the air drawn into the capture system immediately upwind of the application area for each run. The instrument does not need to recalibrated for the background measurement. Subtract this reading from the reading obtained in the capture system for that run. The Method 25A results shall only be used in the alternative procedure for determination of capture efficiency described under sub. (4) (f) 2. d. 7).

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b) 1. and 2., (d) (intro.), (f) 2. (intro.), (j) (intro.) and 1., r. and recr. (1) (a) and (b), cr. (3) (b), (4) (b) 4., (f) 2. d. and (n), (6) (f), (7) (c) 7., (i), (j) and (8) (a) 5., Register, July, 1993, No. 451, eff. 8–1–93**; correction in (4) (b) 1. and (k) made under s. 13.93 (2m) (b) 7., Register, November, 1999, No. 527.**

NR 440.647 Volatile organic compound (VOC) emissions from the polymer manufacturing industry. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section apply to affected facilities involved in the manufacture of polypropylene, polyethylene, polystyrene, or poly(ethylene terephthalate) as defined in sub. (2). The affected facilities designated as follows for polypropylene and polyethylene are inclusive of all equipment used in the manufacture of these polymers, beginning with raw materials preparation and ending with product storage, and cover all emissions emanating from such equipment:

1. For process emissions from any polypropylene and polyethylene manufacturing process that uses a continuous process, the affected facilities are each of the following process sections: each raw materials preparation section, each polymerization reaction section, each material recovery section, each product finishing section and each product storage section. These process sections are affected facilities for process emissions that are emitted continuously and for process emissions that are emitted intermittently.

2. For process emissions from polystyrene manufacturing processes that use a continuous process, the affected facilities are each material recovery section. These process sections are affected facilities for only those process emissions that are emitted continuously.

3. For process emissions from poly(ethylene terephthalate) manufacturing processes that use a continuous process, the affected facilities are each polymerization reaction section. If the process uses dimethyl terephthalate, then each material recovery section is also an affected facility. If the process uses terephthalic acid, then each raw materials preparation section is also an affected facility. These process sections are affected facilities for only those process emissions that are emitted continuously.

4. For VOC emissions from equipment leaks from polypropylene, polyethylene and polystyrene (including expandable polystyrene) manufacturing processes, the affected facilities are each group of fugitive emissions equipment, as defined in sub. (2), within any process unit, as defined in sub. (2). This section does not apply to VOC emissions from equipment leaks from polyethylene terephthalate manufacturing processes.

a. Affected facilities with a design capacity to produce less than 1,000 Mg/yr shall be exempt from sub. (4).

b. Addition or replacement of equipment for the purposes of improvement which is accomplished without a capital expenditure will not by itself be considered a modification under sub. (4).

(b) The applicability date identifies when an affected facility becomes subject to a standard. Usually, a standard has a single applicability date. However, some polypropylene and polyethylene affected facilities have a September 30, 1987, applicability date and others have a January 10, 1989, applicability date. The following paragraphs identify the applicability dates for all affected facilities subject to this section.

1. Polypropylene and polyethylene. Each process section in a polypropylene or polyethylene production process is a potential affected facility for both continuous and intermittent emissions. The applicability date depends on when the process section was constructed, modified or reconstructed and, in some instances, on the type of production process.

a. The applicability date for any polypropylene or polyethylene affected facility that is constructed, modified or reconstructed after January 10, 1989, regardless of the type of production process being used, is January 10, 1989.

b. Only some polypropylene or polyethylene process sections that are constructed, modified or reconstructed on or before January 10, 1989, but after September 30, 1987, are affected facilities. These process sections, and the type of emissions to be controlled, are identified by an "X" in Table 1. The applicability date for the process sections and the emissions to be controlled that are identified by an 'X' in Table 1 is September 30, 1987. Since the affected facilities that have a September 30, 1987, applicability date are determined by the type of production process (for example, liquid phase, gas phase), each owner or operator shall identify the particular production process that applies to his or her particular process.

Table 1. Polypropylene and Polyethylene Affected Facilities with September 30, 1987, Applicability Date

Polymer	Production Process	Process Section	Emissions Continuous	 Intermittent
Polypropylene	Liquid phase	Raw Materials Preparation	X	—
		Material Recovery	X	—
		Polymerization Reaction	X	X
		Product Finishing	X	—
		Product Storage	—	—
Polypropylene	Gas Phase	Raw Materials Preparation	—	—
		Polymerization Reaction	—	X
		Material Recovery	X	—
		Product Finishing	—	—
		Product Storage	—	—
Low Density Polyethylene	High Pressure	Raw Materials Preparation	—	X
		Polymerization Reaction	—	X
		Material Recovery	—	X
		Product Finishing	—	X
		Product Storage	—	X
Low Density Polyethylene	Low Pressure	Raw Materials Preparation	X	X
		Polymerization Reaction	—	X
		Material Recovery	—	—
High Density Polyethylene	Gas Phase	Product Finishing	X	—
		Product Storage	—	—
High Density Polyethylene	Liquid Phase Slurry	Raw Materials Preparation	—	X
		Polymerization Reaction	—	—
		Material Recovery	X	—
		Product Finishing	X	—
		Product Storage	—	—
High Density Polyethylene	Liquid Phase Solution	Raw Materials Preparation	X	X
		Polymerization Reaction	—	X
		Material Recovery	X	X
		Product Finishing	—	—
		Product Storage	—	—

Note: "X" denotes that process section is an affected facility for continuous or intermittent emissions or both, as shown, which has a September 30, 1987, applicability date.

"—" denotes that process section is not considered an affected facility for continuous or intermittent emissions or both, as shown, if the process section is constructed, modified, or reconstructed after September 30, 1987, and on or before January 10, 1989. These process sections are affected facilities if they are constructed, modified, or reconstructed after January 10, 1989.

2. Polystyrene. The applicability date for each polystyrene affected facility is September 30, 1987.

3. Poly(ethylene terephthalate). The applicability date for each poly(ethylene terephthalate) affected facility is September 30, 1987.

(c) Any facility under par. (a) that commences construction, modification or reconstruction after its applicability date as identified under par. (b) is subject to the requirements of this section, except as provided in par. (d) to (f).

(d) Any polypropylene or polyethylene affected facility with a September 30, 1987, applicability date that commenced construction, modification or reconstruction after September 30, 1987, and on or before January 10, 1989, with an uncontrolled emission rate, as defined in footnote a to Table 2, at or below those identified in Table 2 is not subject to the requirements of sub. (3) unless and until its uncontrolled emission rate exceeds that rate listed for it in Table 2 or it is modified or reconstructed after January 10, 1989. At such time, such facility becomes subject to sub. (3) and the procedures identified in sub. (3) (a) shall be used to determine the control of emissions from the facility.

Table 2. Maximum Uncontrolled Threshold Emission Rates[a]

Production Process	Process Section	Uncontrolled Emission Rate, kg TOC/Mg product
Polypropylene, liquid phase process	Raw Materials Preparation	0.15[b]
	Polymerization Reaction	0.14[b],0.24[c]
	Material Recovery	0.19[b]
	Product Finishing	1.57[b]
Polypropylene, gas phase process	Polymerization Reaction	0.12[c]
	Material Recovery	0.02[b]
Low Density Polyethylene, high pressure process	Raw Materials Preparation	0.41[d]
	Polymerization Reaction	([e])
	Material Recovery	([e])
	Product Finishing	([e])
	Product Storage	([e])
Low Density Polyethylene, low pressure process	Raw Materials Preparation	0.05[f]
	Polymerization Reaction	0.03[g]
	Production Finishing	0.01[b]
High Density Polyethylene, liquid phase slurry process	Raw Materials Preparation	0.25[c]
	Material Recovery	0.11[b]
	Product Finishing	0.41[b]

Table 2. Maximum Uncontrolled Threshold Emission Rates[a] (continued)

Production Process	Process Section	Uncontrolled Emission Rate, kg TOC/Mg product
High Density Polyethylene, liquid phase solution process	Raw Materials Preparation Polymerization Reaction Material Recovery	0.24[f] 0.16[c] 1.68[f]
High Density Polyethylene, gas phase process	Raw Materials Preparation Polymerization Reaction Product Finishing	0.05[f] 0.03[g] 0.01[b]
Polystyrene, continuous process	Material Recovery	0.05[b,h]
Poly(ethylene terephthalate), dimethyl terephthalate process	Material Recovery Polymerization Reaction	0.12[b,h] 1.80[h,i,j]
Poly(ethylene terephthalate), terephthalic acid process	Raw Materials Preparation Polymerization Reaction	([l]) 1.80[h,j,m] 3.92[h,k,m]

[a] "Uncontrolled emission rate" refers to the emission rate of a vent stream that vents directly to the atmosphere and to the emission rate of a vent stream to the atmosphere that would occur in the absence of any add–on control devices but after any material recovery devices that constitute part of the normal material recovery operations in a process line where potential emissions are recovered for recycle or resale.

[b] Emission rate applies to continuous emissions only.

[c] Emission rate applies to intermittent emissions only.

[d] Total emission rate for non–emergency intermittent emissions from raw materials preparation, polymerization reaction, material recovery, product finishing, and product storage process sections.

[e] See footnote d.

[f] Emission rate applies to both continuous and intermittent emissions.

[g] Emission rate applies to non–emergency intermittent emissions only.

[h] Applies to modified or reconstructed affected facilities only.

[i] Includes emissions from the cooling water tower.

[j] Applies to a process line producing low viscosity poly(ethylene terephthalate).

[k] Applies to a process line producing high viscosity poly(ethylene terephthalate).

[l] See footnote m.

[m] Applies to the sum of emissions to the atmosphere from the polymerization reaction section (including emissions from the cooling water tower) and the raw materials preparation section (i.e., the esterifiers).

(e) 1. Modified or reconstructed affected facilities at polystyrene and poly(ethylene terephthalate) plants with uncontrolled emission rates at or below those identified in Table 2 are exempt from the requirements of sub. (3) unless and until its uncontrolled emission rate exceeds that rate listed for it in Table 2. This exemption does not apply to new polystyrene or poly(ethylene terephthalate) affected facilities.

2. Emissions from modified or reconstructed affected facilities that are controlled by an existing control device and that have uncontrolled emission rates greater than the uncontrolled threshold emission rates identified in Table 2 are exempt from the requirements of sub. (3) unless and until the existing control device is modified, reconstructed or replaced.

(f) No process section of an experimental process line is considered an affected facility for continuous or intermittent process emissions.

(g) Individual vent streams that emit continuous emissions with uncontrolled annual emissions of less than 1.6 Mg/yr or with a weight percent TOC of less than 0.10% from a new, modified or reconstructed polypropylene or polyethylene affected facility are exempt from the requirements of sub. (3) (a) 1. If at a later date, an individual stream's uncontrolled annual emissions become 1.6 Mg/yr or greater, if the stream was exempted on the basis of the uncontrolled annual emissions exemption, or VOC concentration becomes 0.10 weight percent or higher, if the stream was exempted on the basis of the VOC concentration exemption, then the stream is subject to the requirements of sub. (3).

(h) Emergency vent streams, as defined in sub. (2) from a new, modified or reconstructed polypropylene or polyethylene affected facility are exempt from the requirements of sub. (3) (a) 2.

(i) An owner or operator of a polypropylene or polyethylene affected facility that commenced construction, modification or reconstruction after September 30, 1987, and on or before January 10, 1989, and that is in a process line in which more than one type of polyolefin, that is, polypropylene, low density polyethylene, high density polyethylene or their copolymers, is produced shall select one of the polymer/production process combinations in Table 1 for purposes of determining applicable affected facilities and uncontrolled threshold emission rates.

Note: The numerical emission limits in these standards are expressed in terms of total organic compounds, measured as total organic compounds less methane and ethane.

(2) DEFINITIONS. (a) As used in this section, all terms not defined shall have the meaning given them in s. NR 440.02 or in s. NR 440.62, and the following terms shall have the specific meanings given them.

1. "Boiler" means any enclosed combustion device that extracts useful energy in the form of steam.

2. "Capital expenditure" means, in addition to the definition in s. NR 440.02, an expenditure for a physical or operational change to an existing facility that exceeds P, the product of the facility's replacement cost, R, and an adjusted annual asset guideline repair allowance, A, as reflected by the following equation:

$$P = R \times A,$$

where:

a. The adjusted annual asset guideline repair allowance, A, is the product of the percent of the replacement cost, Y, and the applicable basic annual asset guideline repair allowance, B, as reflected by the following equation:

$$A = Y \times (B/100);$$

b. The percent Y is determined from the following equation:

$$Y = 1.0 - 0.57 \log X,$$

where X is 1986 minus the year of construction; and

c. The applicable basic annual asset guideline repair allowance, B, is equal to 12.5.

3. "Car–sealed" means, for purposes of these standards, a seal that is placed on the device used to change the position of a valve, for example, from opened to closed, such that the position of the valve cannot be changed without breaking the seal and requiring the replacement of the old seal once broken with a new seal.

4. "Closed vent system" means a system that is not open to the atmosphere and that is composed of piping, connections and, if necessary, flow inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device.

5. "Continuous emissions" means any gas stream containing VOC that is generated essentially continuously when the process line or any piece of equipment in the process line is operating.

6. "Continuous process" means polymerization process in which reactants are introduced in a continuous manner and products are removed either continuously or intermittently at regular intervals so that the process can be operated and polymers produced essentially continuously.

7. "Control device" means an enclosed combustion device, vapor recovery system or flare.

8. "Copolymer" means a polymer that has 2 different repeat units in its chain.

9. "Decomposition" means, for the purposes of these standards, an event in a polymerization reactor that advances to the point where the polymerization reaction becomes uncontrollable, the polymer begins to break down (decompose), and it becomes necessary to relieve the reactor instantaneously in order to avoid catastrophic equipment damage or serious adverse personnel safety consequences.

10. "Decomposition emissions" refers to those emissions released from a polymer production process as the result of a decomposition or during attempts to prevent a decomposition.

11. "Emergency vent stream" means, for the purposes of these standards, an intermittent emission that results from a decomposition, attempts to prevent decompositions, power failure, equipment failure or other unexpected cause that requires immediate venting of gases from process equipment in order to avoid safety hazards or equipment damage. This includes intermittent vents that occur from process equipment where normal operating parameters, for example, pressure or temperature, are exceeded such that the process equipment cannot be returned to normal operating conditions using the design features of the system and venting must occur to avoid equipment failure or adverse safety personnel consequences and to minimize adverse effects of the runaway reaction. This does not include intermittent vents that are designed into the process to maintain normal operating conditions of process vessels including those vents that regulate normal process vessel pressure.

12. "End finisher" means a polymerization reaction vessel operated under very low pressures, typically at pressures of 2 torr or less, in order to produce high viscosity poly(ethylene terephthalate). An end finisher is preceded in a high viscosity poly(ethylene terephthalate) process line by one or more polymerization vessels operated under less severe vacuums, typically between 5 and 10 torr. A high viscosity poly(ethylene terephthalate) process line may have one or more end finishers.

13. "Existing control device" means, for the purposes of these standards, an air pollution control device that has been in operation on or before September 30, 1987, or that has been in operation between September 30, 1987, and January 10, 1989, on those continuous or intermittent emissions from a process section that is marked by an "—" in Table 1 of this section.

14. "Existing control device is reconstructed" means, for the purposes of these standards, the capital expenditure of at least 50% of the replacement cost of the existing control device.

15. "Existing control device is replaced" means, for the purposes of these standards, the replacement of an existing control device with another control device.

16. "Expandable polystyrene" means a polystyrene bead to which a blowing agent has been added using either an in–situ suspension process or a post–impregnation suspension process.

17. "Experimental process line" means a polymer or copolymer manufacturing process line with the sole purpose of operating to evaluate polymer manufacturing processes, technologies or products. An experimental process line does not produce a polymer or resin that is sold or that is used as a raw material for nonexperimental process lines.

18. "Flame zone" means that portion of the combustion chamber in a boiler occupied by the flame envelope.

19. "Fugitive emissions equipment" means each pump, compressor, pressure relief device, sampling connection system, open–ended valve or line, valve and flange or other connector in VOC service and any devices or systems required by s. NR 440.62.

20. "Gas phase process" means a polymerization process in which the polymerization reaction is carried out in the gas phase; that is, the monomers are gases in a fluidized bed of catalyst particles and granular polymer.

21. "High density polyethylene" or "HDPE" means a thermoplastic polymer or copolymer comprised of at least 50% ethylene by weight and having a density of greater than 0.940 g/cm^3.

22. "High pressure process" means the conventional production process for the manufacture of low density polyethylene in which a reaction pressure of about 15,000 psig or greater is used.

23. "High viscosity poly(ethylene terephthalate)" means poly(ethylene terephthalate) that has an intrinsic viscosity of 0.9 or higher and is used in such applications as tire cord and seat belts.

24. "Incinerator" means an enclosed combustion device that is used for destroying VOC.

25. "In–situ suspension process" means a manufacturing process in which styrene, blowing agent and other raw materials are added together within a reactor for the production of expandable polystyrene.

26. "Intermittent emissions" means those gas streams containing VOC that are generated at intervals during process line operation and includes both planned and emergency releases.

27. "Liquid phase process" means a polymerization process in which the polymerization reaction is carried out in the liquid phase; that is, the monomers and any catalyst are dissolved or suspended in a liquid solvent.

28. "Liquid phase slurry process" means a liquid phase polymerization process in which the monomers are in solution, completely dissolved, in a liquid solvent, but the polymer is in the form of solid particles suspended in the liquid reaction mixture during the polymerization reaction; sometimes called a particle form process.

29. "Liquid phase solution process" means a liquid phase polymerization process in which both the monomers and polymer are in solution, completely dissolved in the liquid reaction mixture.

30. "Low density polyethylene" or "LDPE" means a thermoplastic polymer or copolymer comprised of at least 50% ethylene by weight and having a density of 0.940 g/cm^3 or less.

31. "Low pressure process" means a production process for the manufacture of low density polyethylene in which a reaction pressure markedly below that used in a high pressure process is used. Reaction pressure of current low pressure processes typically go up to about 300 psig.

32. "Low viscosity poly(ethylene terephthalate)" means a poly(ethylene terephthalate) that has an intrinsic viscosity of less than 0.75 and is used in such applications as clothing, bottle and film production.

33. "Material recovery section" means the equipment that recovers unreacted or by–product materials from any process section for return to the process line, off–site purification, treatment or sale. Equipment designed to separate unreacted or by–product material from the polymer product are to be included in this process section, provided at least some of the material is recovered for reuse in the process, off–site purification or treatment, or sale, at the time the process section becomes an affected facility. Otherwise such equipment are to be assigned to one of the other process sections, as appropriate. Equipment that treats recovered materials are to be included in this process section, but equipment that also treats raw materials are not to be included in this process section. The latter equipment are to be included in the raw materials preparation section. If equipment is used to return unreacted or by–product material directly to the same piece of process equipment from which it was emitted, then that equip-

ment is considered part of the process section that contains the process equipment. If equipment is used to recover unreacted or by−product material from a process section and return it to another process section or a different piece of process equipment in the same process section or sends it off−site for purification, treatment or sale, then such equipment are considered part of a material recovery section. Equipment used for the on−site recovery of ethylene glycol from poly(ethylene terephthalate) plants, however, are not included in the material recovery section, but are covered under the standards applicable to the polymerization reaction section as described in sub. (3) (c) 1. b. 1) or 2. b. 1).

34. "Operating day" means, for the purposes of these standards, any calendar day during which equipment used in the manufacture of polymer was operating for at least 8 hours or one labor shift, whichever is shorter. Only operating days shall be used in determining compliance with the standards specified in sub. (3) (c) 1. b. 2), 3), 2. b. 2) and 3). Any calendar day in which equipment is used for less than 8 hours or one labor shift, whichever is less, is not an "operating day" and may not be used as part of the rolling 14−day period for determining compliance with the standards specified in sub. (3) (c) 1. b. 2), 3), 2. b. 2) and 3).

35. "Polyethylene" means a thermoplastic polymer or copolymer comprised of at least 50% ethylene by weight.

Note: See low density polyethylene and high density polyethylene.

36. "Poly(ethylene terephthalate)" or "PET" means a polymer or copolymer comprised of at least 50% bis−(2−hydroxyethyl)−terephthalate (BHET) by weight.

37. "Poly(ethylene terephthalate) (PET) manufacture using dimethyl terephthalate" means the manufacturing of poly(ethylene terephthalate) based on the esterification of dimethyl terephthalate (DMT) with ethylene glycol to form the intermediate monomer bis−(2−hydroxyethyl)−terephthalate (BHET) that is subsequently polymerized to form PET.

38. "Poly(ethylene terephthalate) (PET) manufacture using terephthalic acid" means the manufacturing of poly(ethylene terephthalate) based on the esterification reaction of terephthalic acid (TPA) with ethylene glycol to form the intermediate monomer bis−(2−hydroxyethyl)−terephthalate (BHET) that is subsequently polymerized to form PET.

39. "Polymerization reaction section" means the equipment designed to cause monomers to react to form polymers, including equipment designed primarily to cause the formation of short polymer chains (oligomers or low polymers), but not including equipment designed to prepare raw materials for polymerization, for example, esterification vessels. For the purposes of these standards, the polymerization reaction section begins with the equipment used to transfer the materials from the raw materials preparation section and ends with the last vessel in which polymerization occurs. Equipment used for the on−site recovery of ethylene glycol from poly(ethylene terephthalate) plants, however, are included in this process section, rather than in the material recovery process section.

40. "Polypropylene" or "PP" means a thermoplastic polymer or copolymer comprised of at least 50% propylene by weight.

41. "Polystyrene" or "PS" means a thermoplastic polymer or copolymer comprised of at least 80% styrene or para−methylstyrene by weight.

42. "Post−impregnation suspension process" means a manufacturing process in which polystyrene beads are first formed in a suspension process, washed, dried or otherwise finished and then added with a blowing agent to another reactor in which the beads and blowing agent are reacted to produce expandable polystyrene.

43. "Process heater" means a device that transfers heat liberated by burning fuel to fluids contained in tubular coils, including all fluids except water that is heated to produce steam.

44. "Process line" means a group of equipment assembled that can operate independently if supplied with sufficient raw materials to produce polypropylene, polyethylene, polystyrene (general purpose, crystal or expandable) or poly(ethylene terephthalate) or one of their copolymers. A process line consists of the equipment in the following process sections, to the extent that these process sections are present at a plant: raw materials preparation, polymerization reaction, product finishing, product storage and material recovery.

45. "Process section" means the equipment designed to accomplish a general but well−defined task in polymer production. Process sections include raw materials preparation, polymerization reaction, material recovery, product finishing and product storage and may be dedicated to a single process line or common to more than one process line.

46. "Process unit" means equipment assembled to perform any of the physical and chemical operations in the production of polypropylene, polyethylene, polystyrene (general purpose, crystal or expandable) or poly(ethylene terephthalate) or one of their copolymers. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product. Examples of process units are raw materials handling and monomer recovery.

47. "Product finishing section" means the equipment that treats, shapes or modifies the polymer or resin to produce the finished end product of the particular facility, including equipment that prepares the product for product finishing. For the purposes of these standards, the product finishing section begins with the equipment used to transfer the polymerized product from the polymerization reaction section and ends with the last piece of equipment that modifies the characteristics of the polymer. Product finishing equipment may accomplish product separation, extruding and pelletizing, cooling and drying, blending, additives introduction, curing or annealing. Equipment used to separate unreacted or by−product material from the product are to be included in this process section, provided the material separated from the polymer product is not recovered at the time the process section becomes an affected facility. If the material is being recovered, then the separation equipment are to be included in the material recovery section. Product finishing does not include polymerization, the physical mixing of the pellets to obtain a homogenous mixture of the polymer except as provided in this subdivision or the shaping, such as fiber spinning, molding or fabricating, or modification, such as fiber stretching and crimping, of the finished end product. If physical mixing occurs in equipment located between product finishing equipment, that is, before all the chemical and physical characteristics have been 'set' by virtue of having passed through the last piece of equipment in the product finishing section, then the equipment is to be included in this process section. Equipment used to physically mix the finished product that is located after the last piece of equipment in the product finishing section is part of the product storage section.

48. "Product storage section" means the equipment that is designed to store the finished polymer or resin end product of the particular facility. For the purposes of these standards, the product storage section begins with the equipment used to transfer the finished product out of the product finishing section and ends with the containers used to store the final product. Any equipment used after the product finishing section to recover unreacted or by−product material are to be considered part of a material recovery section. Product storage does not include any intentional modification of the characteristics of any polymer or resin product, but does include equipment that provides a uni-

form mixture of product, provided the equipment is used after the last product finishing piece of equipment. This process section also does not include the shipment of a finished polymer or resin product to another facility for further finishing or fabrication.

49. "Raw materials preparation section" means the equipment located at a polymer manufacturing plant designed to prepare raw materials, such as monomers and solvents, for polymerization. For the purposes of these standards, this process section begins with the equipment used to transfer raw materials from storage and recovered material from material recovery process sections, and ends with the last piece of equipment that prepares the material for polymerization. The raw materials preparation section may include equipment that accomplishes purification, drying or other treatment of raw materials or of raw and recovered materials together, activation of catalysts, and esterification including the formation of some short polymer chains (oligomers), but does not include equipment that is designed primarily to accomplish the formation of oligomers, the treatment of recovered materials alone or the storage of raw materials.

50. "Recovery system" means an individual unit or series of material recovery units, such as absorbers, condensers and carbon adsorbers, used for recovering volatile organic compounds.

51. "Total organic compounds" or "TOC" means those compounds measured according to the procedures specified in sub. (6).

52. "Uncontrolled emission rate" means the emission rate of a vent stream that vents directly to the atmosphere and the emission rate of a vent stream to the atmosphere that would occur in the absence of any add–on control devices but after any material recovery devices that constitute part of the normal material recovery operations in a process line where potential emissions are recovered for recycle or resale.

53. "Vent stream" means any gas stream released to the atmosphere directly from an emission source or indirectly either through another piece of process equipment or a material recovery device that constitutes part of the normal recovery operations in a polymer process line where potential emissions are recovered for recycle or resale, and any gas stream directed to an air pollution control device. The emissions released from an air pollution control device are not considered a vent stream unless, as noted in this subdivision, the control device is part of the normal material recovery operations in a polymer process line where potential emissions are recovered for recycle or resale.

54. "Volatile organic compounds" or "VOC" means, for the purposes of these standards, any reactive organic compounds as defined in s. NR 440.02.

(3) STANDARDS: PROCESS EMISSIONS. (a) Each owner or operator of a polypropylene, low density polyethylene or high density polyethylene process line containing a process section subject to the provisions of this section shall comply with the provisions in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first.

1. Continuous emissions. For each vent stream that emits continuous emissions from an affected facility as defined in sub. (1) (a) 1., the owner or operator shall use the procedures identified in subd. 1. b. and c. for determining which continuous emissions are to be controlled and which level of control listed in subd. 1. a. is to be met. The owner or operator shall use the procedures identified in subd. 1. b. and c. each time a process section is constructed, modified or reconstructed at the plant site.

a. Level of control. Continuous emission streams determined to be subject to control pursuant to the procedures identified in subd. 1. b. and c., as applicable, shall meet one of the control levels identified in subd. 1. a. 1) to 4). The procedures in subd. 1. b. and c. identify which level of control may be met. The level of control identified in subd. 1. a. 4) is limited to certain continuous emission streams, which are identified through the procedures in subd. 1. b. and c.

1) Reduce emissions of total organic compounds (minus methane and ethane) (TOC) by 98 weight percent, or to a concentration of 20 parts per million by volume (ppmv) on a dry basis, whichever is less stringent. The TOC is expressed as the sum of the actual compounds, not carbon equivalents. If an owner or operator elects to comply with the 20 ppmv standard, the concentration shall include a correction to 3% oxygen only when supplemental combustion air is used to combust the vent stream.

2) Combust the emissions in a boiler or process heater with a design heat input capacity of 150 million Btu/hr or greater by introducing the vent stream into the flame zone of the boiler or process heater. If a boiler or process heater of lesser design heat capacity may be used, it shall demonstrate compliance with subd. 1. a. 1).

3) Combust the emissions in a flare that meets the conditions specified in s. NR 440.18. If the flare is used to control both continuous and intermittent emissions, the flare shall meet the conditions specified in s. NR 440.18 at all times, that is, when controlling continuous emissions alone or when controlling both continuous and intermittent emissions.

4) Vent the emissions to a control device located on the plant site.

b. Uncontrolled continuous emissions. For each vent stream that emits continuous emissions from an affected facility as defined in sub. (1) (a) 1. and that is not controlled in an existing control device, the owner or operator shall use the procedures identified in Table 3 to identify those continuous emissions from each constructed, modified or reconstructed affected facility that are to be controlled. The owner shall include in the procedure all uncontrolled continuous vent streams from previously constructed, modified, or reconstructed affected facilities at the plant site each time a process section is constructed, modified or reconstructed at the plant site. In applying the procedures shown in Table 3, the stream characteristics may be either measured or calculated as specified in sub. (6) (d). For modified or reconstructed affected facilities, these stream characteristics are to be determined after a modification or reconstruction determination has been made by the department, but before any actual changes have been undertaken, and then again after the actual changes have been made. Figure 1 provides a summary overview of the control determination procedure described in Table 3.

Table 3

Procedure for Determining Control and Applicable Standard for Continuous Emission Streams From New, Modified, or Reconstructed Polypropylene and Polyethylene Affected Facilities

Procedure[a]	Applicable TOC Weight Percent Range	Control/No Control Criteria	Applicable Standard
1. Sum of all uncontrolled streams with TOC weight percent within the applicable weight percent range from all affected facilities at a plant site.	0.10 < 5.5	1. If total combined uncontrolled emissions are equal to or greater than the calculated threshold emissions (CTE)[b], control	1. sub. (3) (a) 1. a. 1), 2) or 3)
2. Calculate total uncontrolled annual emissions for each weight percent range. For modified or affected facilities, use the total uncontrolled emissions after modification or reconstruction.		2. If total combined uncontrolled emission are less than the CTE[b], control only individual streams with volume flow rates of 8 scfm or less.	2. sub. (3) (a) 1. a. 1) to 4)
3. Calculate composite TOC concentration (weight percent) for streams in the 0.10 to less than 5.5 weight percent range and for streams in the 5.5 to less than 20 weight percent range. For modified or reconstructed affected facilities, calculate the composite VOC concentration before and after modification and reconstruction.	5.5 < 20	1. If total combined uncontrolled emissions are equal to or greater than CTE[b], control.	1. sub. (3) (a) 1. a. 1), 2) or 3)
		2. If total combined uncontrolled emissions are less than the CTE[b], control only individual streams with volume flow rates of 8 scfm or less.	2. sub (3) (a) 1. a. 1) to 4)
4. Select the higher of the two TOC concentrations for each weight percent range for vent streams from a modified or reconstructed affected facility	20 to 100	1. If total combined uncontrolled emissions are equal to or greater than 18.2 Mg/yr, control.	1. sub. (3) (a) 1. a. 1), 2) or 3)
5. Calculate the threshold emissions for the 0.10 to less than 5.5 weight percent range and for the 5.5 to less than 20 weight percent range using the respective composite TOC concentration selected above.		2. If total combined uncontrolled emissions are less than 18.2 Mg/yr, control.	2. sub. (3) (a) 1. a. 1) to 4)

[a] Individual streams excluded under sub. (1) (g) from the requirements of sub. (3) are to be excluded from all calculations in this table. This paragraph exempts all individual emission streams with individual uncontrolled annual emission rates of less than 1.6 Mg/yr and all individual emission streams with individual TOC concentrations of less than 0.10% TOC by weight.

[b] For the 0.10 to less than 5.5 weight percent range, the following equations are used:

If the percent composite TOC concentration is . . .	Use this equation to calculate threshold emissions . . .
0.10 < 0.12	$(a \times 7.5 \times 10^{6}) + 226$
0.12 < 0.2	$(b \times 58.3) + 116.8$
0.2 < 0.3	$(c \times 3020) + 71.8$
0.3 < 0.4	$(d \times 547) + 54.5$
0.4 < 0.6	48.3 + 31 (0.6 − weight percent TOC)
0.6 < 5.5	48.3

where

$a = (0.12 - \text{weight percent TOC})^{2.5}$

$$b = \frac{\left[\dfrac{0.18}{\text{weight percent TOC}}\right]^{0.5} - 1}{\text{weight percent TOC}}$$

$c = (0.3 - \text{weight percent TOC})^{2}$

$d = (0.4 - \text{weight percent TOC})^{1.5}$

For the 5.5 to less than 20 weight percent range, the following equations are used:

If the percent composite TOC concentration is . . .	Use this equation to calculate threshold emissions . . .
5.5 < 7.0	(e × 740) + 31
7.0 < 9.0	(f × 324) + 25.0
9.0 < 20	(g × 125) + 18.2

where:

$$e = \frac{\left[\dfrac{7.0}{\text{weight percent TOC}}\right]^{0.5} - 1}{\text{weight percent TOC}}$$

$$f = \frac{\left[\dfrac{9.0}{\text{weight percent TOC}}\right]^{0.5} - 1}{\text{weight percent TOC}}$$

$$g = \frac{\left[\dfrac{20.0}{\text{weight percent TOC}}\right]^{0.5} - 1}{\text{weight percent TOC}}$$

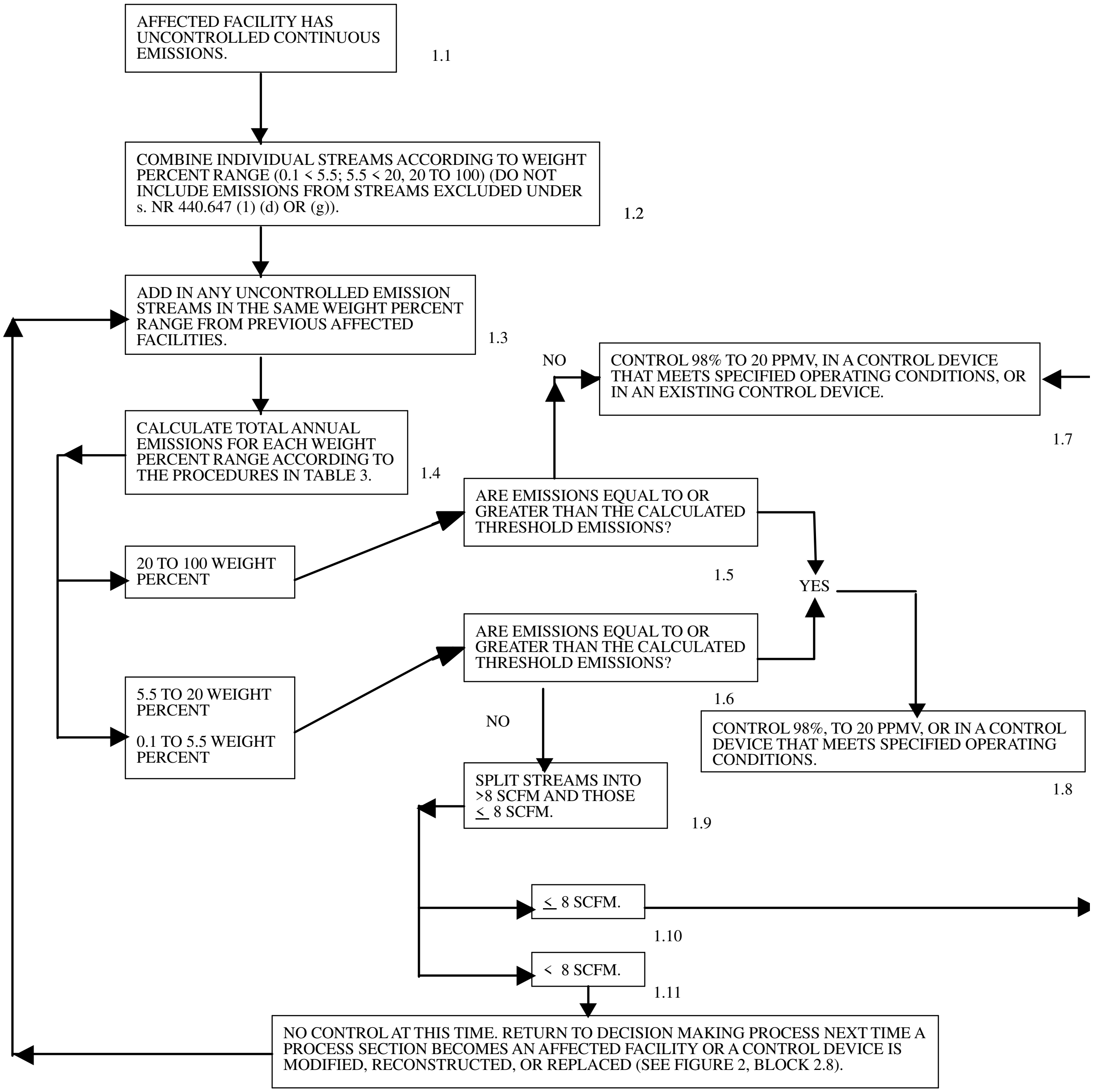
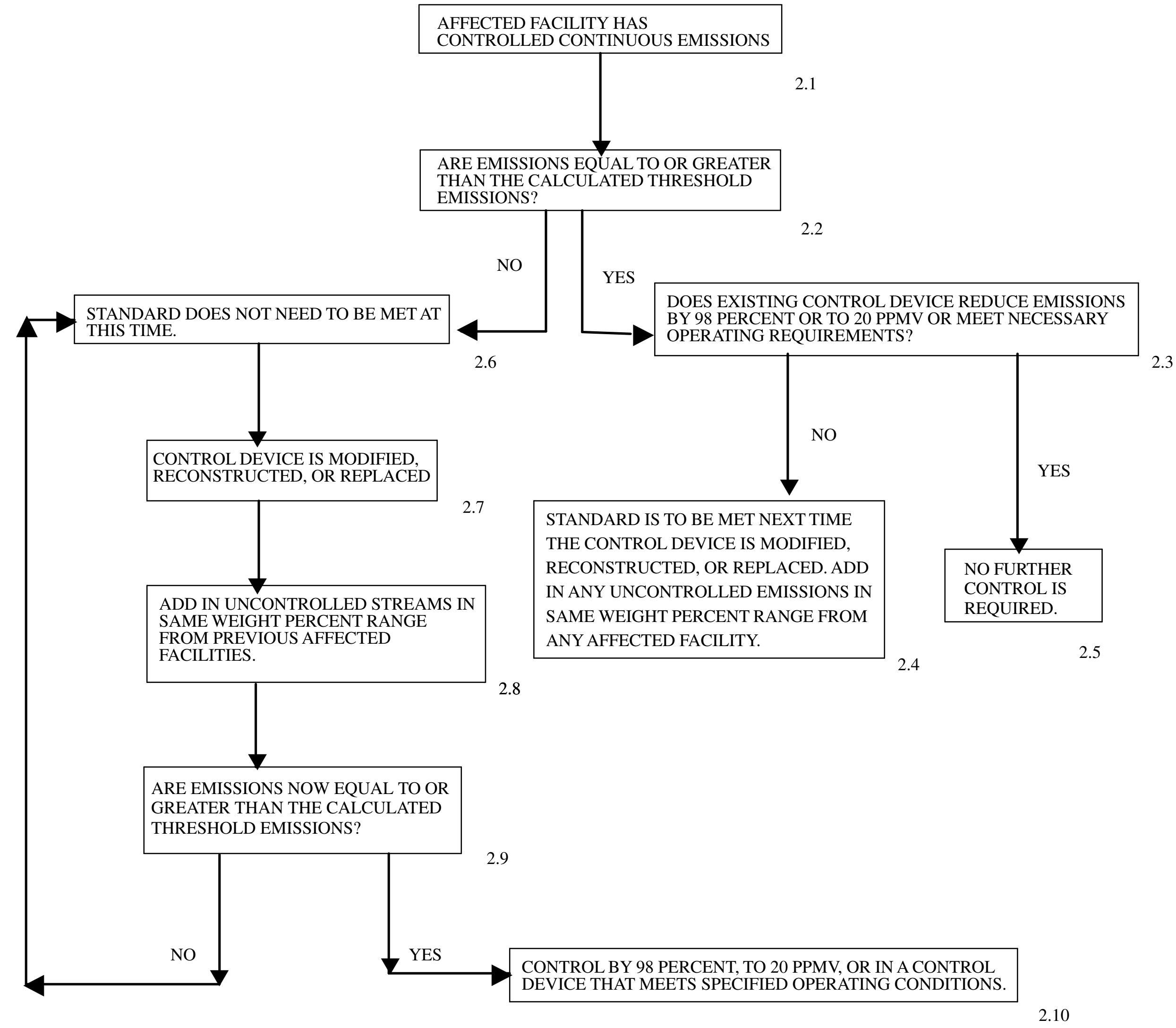


Figure 1.
Decision Making Process for Uncontrolled Continuous Emissions from Polypropylene and Polyethylene Affected Facilities

c. Controlled continuous emissions. For each vent stream that emits continuous emissions from an affected facility as defined in sub. (1) (a) 1. and that is controlled in an existing control device, each owner or operator shall determine whether the emissions entering the control device are greater than or equal to the calculated threshold emissions (CTE) level, which is to be calculated using the TOC concentration of the inlet vent stream and the equations in footnote b of Table 3. If the inlet stream's TOC concentration is equal to or greater than 20 weight percent, the calculated threshold emissions level is 18.2 Mg/yr. If multiple emission streams are vented to the control device, the individual streams are not to be separated into individual weight percent ranges for calculation purposes as would be done for uncontrolled emission streams. Emissions vented to an existing control device are required to be controlled as described in subd. 1. c. 1) and 2). Figure 2 illustrates the control determination procedure for controlled continuous emissions.



NOTE: There are no individual stream exemptions from emissions already controlled by existing control devices.

Figure 2.
Decision Making Process for Continuous Emissions Already Controlled at Polypropylene and Polyethylene Affected Facilities.

1) If the annual emissions of the stream entering the control device are equal to or greater than the CTE levels, then compliance with one of the requirements identified in subd. 1. a. 1), 2) or 3) is required when the control device is reconstructed or replaced or has its operating conditions modified as a result of state or local regulations, including changes in the operating permit, including those instances where the control device is reconstructed, replaced or modified in its operation at the same time the existing process section is modified or reconstructed and becomes an affected facility. If the existing control device already complies with one of the requirements identified in subd. 1. a. 1), 2) or 3) no further control is required.

2) If the annual emissions of the stream entering the control device are less than the CTE level, then the requirements of subd. 1. a. 1), 2) or 3) are not applicable at that time. However, if the control device is replaced, reconstructed or modified at a later date, each owner or operator shall reevaluate the applicability of these standards. This is done by combining with the vent stream entering the control device any uncontrolled vent streams in the same weight percent range as the controlled vent stream and determining whether the annual emissions of the stream entering the control device plus the applicable uncontrolled vent streams are greater than or equal to the CTE level, which is based on the weighted TOC concentration of the controlled vent stream and the uncontrolled vent streams. If the annual emissions entering the control device, including the applicable uncontrolled vent streams, are greater than or equal to the CTE level, then compliance with one of the requirements identified in subd. 1. a. 1), 2) or 3) is required at that time for both the controlled and uncontrolled vent streams. If the annual emissions are less than the CTE level, compliance with these standards is again not required at such time. However, if the control device is again replaced, reconstructed or modified, each owner or operator shall repeat this determination procedure.

2. Intermittent emissions. The owner or operator shall control each vent stream that emits intermittent emissions from an

affected facility as defined in sub. (1) (a) 1. by meeting one of the control requirements specified in subd. 2. a. and b. If a vent stream that emits intermittent emissions is controlled in an existing flare, incinerator, boiler or process heater, the requirements of this paragraph are waived until such time the control device is reconstructed or replaced or is modified in its operating conditions as a result of state or local regulation, including changes in the operating permit. This paragraph does not apply to emergency vent streams exempted by sub. (1) (h) and as defined in sub. (2).

a. Combust the emissions in a flare that is:

1) Designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours,

2) Operated with a flame present at all times, and

3) Designed to maintain a stable flame.

b. Combust the emissions in an incinerator, boiler or process heater. The emissions shall be introduced into the flame zone of a boiler or process heater.

(b) Each owner or operator of a polystyrene process line containing process sections subject to the provisions of this section shall comply with the provisions in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first. Each owner or operator of a polystyrene process line using a continuous process shall:

1. Limit the continuous TOC emissions from the material recovery section by complying with one of the following:

a. Not allow continuous TOC emissions to be greater than 0.0036 kg TOC/Mg product; or

b. Not allow the outlet gas stream temperature from each final condenser in the material recovery section to exceed −25°C (−13°F). For purposes of this standard, temperature excursions above this limit will not be considered a violation when the excursions occur during periods of startup, shutdown or malfunction; or

c. Comply with par. (a) 1. a. 1), 2) or 3)

2. If continuous TOC emissions from the material recovery section are routed through an existing emergency vapor recovery system, then compliance with these standards is required when the emergency vapor recovery system undergoes modification, reconstruction or replacement. In such instances, compliance with these standards shall be achieved no later than 180 days after completion of the modification, reconstruction or replacement.

(c) Each owner or operator of a poly(ethylene terephthalate) process line containing process sections subject to the provisions of this section shall comply with the provisions in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first.

1. Each owner or operator of a PET process line using a dimethyl terephthalate process shall:

a. Limit the continuous TOC emissions from the material recovery section, that is, methanol recovery, by complying with one of the following:

1) Not allow the continuous TOC emissions to be greater than 0.018 kg TOC/Mg product; or

2) Not allow the outlet gas stream temperature from each final condenser in the material recovery section, that is, methanol recovery, to exceed + 3°C (+ 37°F). For purposes of this standard, temperature excursions above this limit will not be considered a violation when the excursions occur during periods of startup, shutdown or malfunction.

b. Limit the continuous TOC emissions and, if steam−jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the following appropriate standard. The ethylene glycol concentration limits specified in subd. 1. b. 2) and 3) shall be determined by the procedures specified in sub. (6) (j).

1) Not allow continuous TOC emissions from the polymerization reaction section, including emissions from any equipment used to further recover the ethylene glycol, but excluding those emissions from the cooling tower, to be greater than 0.02 kg TOC/Mg product; and

2) If steam−jet ejectors are used as vacuum producers and a low viscosity product is being produced using single or multiple end finishers or a high viscosity product is being produced using a single end finisher, maintain the concentration of ethylene glycol in the liquid effluent exiting the vacuum system servicing the polymerization reaction section at or below 0.35% by weight, averaged on a daily basis over a rolling 14−day period of operating days; or

3) If steam−jet ejectors are used as vacuum producers and a high viscosity product is being produced using multiple end finishers, maintain an ethylene glycol concentration in the cooling tower at or below 6.0% by weight averaged on a daily basis over a rolling 14−day period of operating days.

2. Each owner or operator of a PET process line using a terephthalic acid process shall:

a. Not allow the continuous TOC emissions from the esterification vessels in the raw materials preparation section to be greater than 0.04 kg TOC/Mg product.

b. Limit the continuous TOC emissions and, if steam−jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the following appropriate standard. The ethylene glycol concentration limits specified in subd. 2. b. 2) and 3) shall be determined by the procedures specified in sub. (6) (j).

1) Not allow continuous TOC emissions from the polymerization reaction section, including emissions from any equipment used to further recover the ethylene glycol, but excluding those emissions from the cooling tower, to be greater than 0.02 kg TOC/Mg product; and

2) If steam−jet ejectors are used as vacuum producers and a low viscosity product is being produced using single or multiple end finishers or a high viscosity product is being produced using a single end finisher, maintain the concentration of ethylene glycol in the liquid effluent exiting the vacuum system servicing the polymerization reaction section at or below 0.35% by weight, averaged on a daily basis over a rolling 14−day period of operating days; or

3) If steam−jet ejectors are used as vacuum producers and a high viscosity product is being produced using multiple end finishers, maintain an ethylene glycol concentration in the cooling tower at or below 6.0% by weight averaged on a daily basis over a rolling 14−day period of operating days.

(d) Closed vent systems and control devices used to comply with this section shall be operated at all times when emissions may be vented to them.

(e) Vent systems that contain valves that could divert a vent stream from a control device shall have car−sealed opened all valves in the vent system from the emission source to the control device and car−sealed closed all valves in vent system that would lead the vent stream to the atmosphere, either directly or indirectly, bypassing the control device.

(4) STANDARDS: EQUIPMENT LEAKS OF VOC. (a) Each owner or operator of an affected facility subject to the provisions of this section shall comply with the requirements specified in s. NR 440.62 (3) as soon as practicable, but no later than 180 days after initial startup, except that indications of liquids dripping from bleed ports in existing pumps in light liquid service are not considered to be a leak as defined in s. NR 440.62 (3) (b) 2. b. For purposes of this standard, a "bleed port" is a technologically–required feature of the pump whereby polymer fluid used to provide lubrication, cooling, or both, of the pump shaft exits the pump, thereby resulting in a visible leak of fluid. This exemption expires when the existing pump is replaced or reconstructed.

(b) An owner or operator may elect to comply with the requirements specified in s. NR 440.62 (4) (a) and (b).

(c) An owner or operator may apply to the administrator for a determination of equivalency for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in this section. In doing so, the owner or operator shall comply with requirements specified in 40 CFR 60.484, as in effect on July 1, 1994.

(d) Each owner or operator subject to the provisions of this section shall comply with the provisions specified in s. NR 440.62 (6) except an owner or operator may use the following provision in addition to s. NR 440.62 (6) (e). Equipment is in light liquid service if the percent evaporated is greater than 10% at 150°C as determined by ASTM Method D86–78, incorporated by reference in s. NR 440.17.

(e) Each owner or operator subject to the provisions of this section shall comply with s. NR 440.62 (7) and (8).

(5) MONITORING REQUIREMENTS. (a) Whenever a particular item of monitoring equipment specified in this subsection is to be installed, the owner or operator shall install, calibrate, maintain and operate according to manufacturer's specifications that item as follows:

1. A temperature monitoring device to measure and record continuously the operating temperature to within 1% (relative to degrees Celsius) or ±0.5°C (±0.9°F), whichever is greater.

2. A flame monitoring device, such as a thermocouple, an ultra–violet sensor, an infrared beam sensor or similar device to indicate and record continuously whether a flare or pilot light flame is present, as specified.

3. A flow monitoring indicator to indicate and record whether or not flow exists at least once every 15 minutes.

4. An organic monitoring device, based on a detection principle such as infrared, photoionization or thermal conductivity, to indicate and record continuously the concentration level of organic compounds.

5. A specific gravity monitoring device to measure and record continuously to within 0.02 specific gravity unit.

(b) The owner or operator shall install, as applicable, the monitoring equipment for the control means used to comply with sub. (3) except sub. (3) (a) 1. a. 4) as follows:

1. If the control equipment is an incinerator:

a. For a noncatalytic incinerator, a temperature monitoring device shall be installed in the firebox.

b. For a catalytic incinerator, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalytic bed.

2. If a flare is used:

a. A flame monitoring device shall be installed to indicate the presence of a flare flame or a flame for each pilot light, if the flare is used to comply with sub. (3) (a) 1. including those flares controlling both continuous and intermittent emissions.

b. A thermocouple or equivalent monitoring device to indicate the presence of a flame at each pilot light, if used to comply with sub. (3) (a) 2.

3. If a boiler or process heater is used:

a. If the boiler or process heater has a heat input design capacity of less than 150 million Btu/hr, a temperature monitoring device shall be installed between the radiant section and the convection zone for watertube boilers and between the furnace, combustion zone, and the firetubes for firetube boilers.

b. If the boiler or process heater has a heat input design capacity of 150 million Btu/hr or greater, records to indicate the periods of operation of the boiler or process heater shall be maintained. The records shall be readily available for inspection.

4. If an absorber is the final unit in a system:

a. A temperature monitoring device and a specific gravity monitoring device for the scrubber liquid shall be installed; or

b. An organic monitoring device shall be installed at the outlet of the absorber.

5. If a condenser is the final unit in a system:

a. A temperature monitoring device shall be installed at the condenser exit (product side); or

b. An organic monitoring device shall be installed at the outlet of the condenser.

6. If a carbon adsorber is the final unit in a system, an organic monitoring device shall be installed at the outlet of the carbon bed.

(c) Owners or operators of control devices used to comply with the provisions of this section, except sub. (3) (a) 1. a. 4) shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.

(d) Owners or operators using a vent system that contains valves that could divert a vent stream from a control device used to comply with the provisions of this section shall do one or a combination of the following:

1. Install a flow indicator immediately downstream of each valve that if opened would allow a vent stream to bypass the control device and be emitted, either directly or indirectly, to the atmosphere. The flow indicator shall be capable of recording flow at least once every 15 minutes.

2. Monitor the valves once a month, checking the position of the valves and the condition of the car seal and identify all times when the car seals have been broken and the valve position has been changed, that is, from opened to closed for valves in the vent piping to the control device and from closed to open for valves that allow the stream to be vented directly or indirectly to the atmosphere.

(e) An owner or operator complying with the standards specified under sub. (3) except sub. (3) (a) 1. a. 4) with control devices other than an incinerator, boiler, process heater, flare, absorber, condenser or carbon adsorber or by any other means shall provide to the department information describing the operation of the control device and the process parameters which would indicate proper operation and maintenance of the device. The department may request further information and will specify appropriate monitoring procedures or requirements.

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures specified in this subsection, except as provided under s. NR 440.08 (2). Owners or operators complying with sub. (3) (a) 1. a. 4) need not perform a performance test on the control device, provided the control device is not used to comply with any other requirement of sub. (3) (a).

1. Whenever changes are made in production capacity, feedstock type or catalyst type or whenever there is replacement, removal or addition of a control device, each owner or operator shall conduct a performance test according to the procedures in this subsection as appropriate, in order to determine compliance with sub. (3).

2. Where a boiler or process heater with a design heat input capacity of 150 million Btu/hr or greater is used, the requirement for an initial performance test is waived, in accordance with s. NR 440.08 (2). However, the department reserves the option to require testing at such other times as may be required, as provided for in ch. NR 439.

3. The owner or operator shall determine the average organic concentration for each performance test run using the equipment described in sub. (5) (a) 4. The average organic concentration shall be determined from measurements taken at least every 15 minutes during each performance test run. The average of the 3 runs shall be the base value for the monitoring program.

4. When an absorber is the final unit in the system, the owner or operator shall determine the average specific gravity for each performance test run using specific gravity monitoring equipment described in sub. (5) (a) 5. An average specific gravity shall be determined from measurements taken at least every 15 minutes during each performance test run. The average of the 3 runs shall be the base value for the monitoring program.

5. When a condenser is the final unit in the system, the owner or operator shall determine the average outlet temperature for each performance test run using the temperature monitoring equipment described in sub. (5) (a) 1. An average temperature shall be determined from measurements taken at least every 15 minutes during each performance test run while the vent stream is normally routed and constituted. The average of the 3 runs shall be the base value for the monitoring program.

(b) Except as provided for in par. (c), the owner or operator shall determine compliance with the emission concentration standard in sub. (3) (a) 1. a. 1) or (b) 1. c. if applicable.

1. The TOC concentration is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^{n} C_j$$

where:

C_{TOC} is the concentration of TOC (minus methane and ethane), dry basis, ppmv

C_j is the concentration of sample component j, ppm

n is the number of components in the sample

a. Method 18 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used to determine the concentration of each individual organic component (C_j) in the gas stream. Method 1 or 1A of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, as appropriate, shall be used to determine the sampling site at the outlet of the control device. Method 4 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used to determine the moisture content, if necessary.

b. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15 minute intervals.

2. If supplemental combustion air is used, the TOC concentration shall be corrected to 3% oxygen and shall be computed using the following equation:

$$C_{CORR} = C_{MEAS} \times \frac{17.9}{20.9 - \%0_{2d}}$$

where:

C_{CORR} is the concentration of TOC corrected to 3% oxygen, dry basis, ppm by volume

C_{MEAS} is the concentration of TOC (minus methane and ethane), dry basis, ppm by volume, as calculated in subd. 1.

$\%O_{2d}$ is the concentration of O_2, dry basis, percent by volume

a. The emission rate correction factor, integrated sampling and analysis procedure of Method 3 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used to determine the oxygen concentration ($\%O_{2d}$). The sampling site shall be the same as that of the TOC sample and the samples shall be taken during the same time that the TOC samples are taken.

(c) If par. (b) is not applicable, then the owner or operator shall determine compliance with the percent emission reduction standard in sub. (3) (a) 1. a. 1) or (b) 1. c. as follows:

1. The emission reduction of TOC (minus methane and ethane) shall be determined using the following equation:

$$P = \frac{E_{inlet} - E_{outlet}}{E_{inlet}} \times 100$$

where:

P is the percent emission reduction, by weight

E_{inlet} is the mass rate of TOC entering the control device, kg TOC/hr

E_{outlet} is the mass rate of TOC, discharged to the atmosphere, kg TOC/hr

2. The mass rates of TOC (E_i, E_o) shall be computed using the following equations:

$$E_i = K_1 \left(\sum_{j=1}^{n} C_{ij} M_{ij} \right) Q_i$$

$$E_o = K_1 \left(\sum_{j=1}^{n} C_{oj} M_{oj} \right) Q_o$$

where:

C_{ij} and C_{oj} are the concentration of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, dry basis, ppmv

M_{ij} and M_{oj} are the molecular weight of sample component "j" of the gas stream at the inlet and outlet of the control device respectively, g/g–mole (lb/lb–mole)

Q_i and Q_o are the flow rate of the gas stream at the inlet and outlet of the control device, respectively, dscm/hr (dscf/hr)

$K_1 = 4.157 \times 10^{-8}$ [(kg) / (g–mole)]/[(g) (ppm) (dscm)] {5.711×10^{-15} [(lb)/(lb–mole)] / [(lb) (ppm) (dscf)]}

a. Method 18 shall be used to determine the concentration of each individual organic component (C_{ij}, C_{oj}) in the gas stream. Method 1 or 1A, as appropriate, shall be used to determine the inlet and outlet sampling sites. The inlet site shall be before the inlet of the control device and after all product recovery units.

b. Method 2, 2A, 2C or 2D of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, as appropriate, shall be used to determine the volumetric flow rates (Q_i, Q_o). If necessary, Method 4 shall be used to determine the moisture content. Both determinations shall be compatible with the Method 18 determinations.

c. Inlet and outlet samples shall be taken simultaneously. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15 minute intervals.

(d) An owner or operator shall determine compliance with the individual stream exemptions in sub. (1) (g) and the procedures specified in Table 3 for compliance with sub. (3) (a) 1. as identified in subd. 1. and 2. An owner or operator using the procedures specified in sub. (3) (a) 1. for determining which continuous process emissions are to be controlled may use calculations demonstrated to be sufficiently accurate as to preclude the necessity of actual testing for purposes of calculating the uncontrolled annual emissions and weight percent of TOC. Owners or operators seeking to exempt streams under sub. (1) (g) shall use the appropriate test procedures specified in this subsection.

1. The uncontrolled annual emissions of the individual vent stream shall be determined using the following equation:

$$E_{unc} = K_1\left(\sum_{j=1}^{n} C_j M_j\right) Q \times 8,600 \times \frac{1 Mg}{1,000\ kg}$$

where:

E_{unc} is the uncontrolled annual emissions, Mg/yr

C_j is the concentration of sample component "j" of the gas stream, dry basis, ppmv

M_j is the molecular weight of sample component "j" of the gas stream, g/g–mole (lb/lb–mole)

Q is the flow rate of the gas stream, dscm/hr (dscf/hr)

$K_l = 4.157 \times 10^{-8}$ [(kg)/(g–mole)] / [(g) (ppm) (dscm)] {5.711×10^{-15} [(lb)/(lb–mole)] / [(lb) (ppm) (dscf)]}

8,600 is the number of operating hours per year

a. Method 18 shall be used to determine the concentration of each individual organic component (C_j) in the gas stream. Method 1 or 1A, as appropriate, shall be used to determine the sampling site. If the gas stream is controlled in an existing control device, the sampling site shall be before the inlet of the control device and after all product recovery units.

b. Method 2, 2A, 2C or 2D, as appropriate, shall be used to determine the volumetric flow rate (Q). If necessary, Method 4 shall be used to determine the moisture content. Both determinations shall be compatible with the Method 18 determinations.

c. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15 minute intervals.

2. The weight percent VOC of the uncontrolled individual vent stream shall be determined using the following equation:

$$\text{weight \% TOC} = \frac{\sum_{j=1}^{n} C_j M_j}{MW_{gas} \times 10^6} \times 100$$

where:

C_j is the concentration of sample TOC component "j" of the gas stream, dry basis, ppmv

M_j is the molecular weight of sample TOC component "j" of the gas stream, g/g–mole (lb/lb–mole)

MW_{gas} is the average molecular weight of the entire gas stream, g/g–mole (lb/lb–mole)

a. Method 18 shall be used to determine the concentration of each individual organic component (C_j) in the gas stream. Method 1 or 1A, as appropriate, shall be used to determine the sampling site. If the gas stream is controlled in an existing control device, the sampling site shall be before the inlet of the control device and after all product recovery units. If necessary, Method 4 shall be used to determine the moisture content. This determination shall be compatible with the Method 18 determinations.

b. The average molecular weight of the gas stream shall be determined using methods approved by the department. If the carrier component of the gas stream is nitrogen, then an average molecular weight of 28 g/g–mole (lb/lb– mole) may be used in lieu of testing. If the carrier component of the gas stream is air, then an average molecular weight of 29 g/g–mole (lb/lb–mole) may be used in lieu of testing.

c. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15 minute intervals.

(e) The owner or operator shall determine compliance of flares with the visible emission and flare provisions in sub. (3) as follows:

1. Method 22 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used to determine visible emission. The observation period for each run shall be 2 hours.

2. The monitoring device of sub. (5) (b) 2. shall be used to determine whether a flame is present.

(f) The owner or operator shall determine compliance with the net heating value provisions in s. NR 440.18 as referenced by sub. (3) (a) 1. a. 3). The net heating value of the process vent stream being combusted in a flare shall be computed as follows:

$$H_T = K_2\left(\sum_{j=1}^{n} C_j H_j\right)$$

where:

H_T is the net heating value of the sample based on the net enthalpy per mole of offgas combusted at 25°C and 760 mmHg, but the standard temperature for determining the volume corresponding to one mole is 20°C, MJ/scm

K_2 is a conversion constant,

$$1.740 \times 10^{-7} \frac{(1)}{(ppm)} \frac{(g\text{–}mole)}{(scm)} \frac{(MJ)}{(kcal)}$$

where standard temperature for (g–mole)/scm is 20°C;

C_j is the concentration of sample component j in ppm on a wet basis

H_j is the net heat of combustion of sample component j, at 25°C and 760 mm Hg, kcal/g–mole

1. Method 18 shall be used to determine the concentration of each individual organic component (C_j) in the gas stream. Method 1 or 1A, as appropriate, shall be used to determine the sampling site to the inlet of the flare. Using this same sample, ASTM D1946–77, incorporated by reference in s. NR 440.17, shall be used to determine the hydrogen and carbon monoxide content.

2. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15 minute intervals.

3. Published or calculated values shall be used for the net heats of combustion of the sample components. If values are not published or cannot be calculated, ASTM D2382–76, incorporated by reference in s. NR 440.17 may be used to determine the net heat of combustion of component "j" .

(g) The owner or operator shall determine compliance with the exit velocity provisions in s. NR 440.18 as referenced by sub. (3) (a) 1. a. 3) as follows:

1. If applicable, the net heating value (H_T) of the process vent shall be determined according to the procedures in par. (f) to determine the applicable velocity requirements.

2. If applicable, the maximum permitted velocity (V_{max}) for steam–assisted and nonassisted flares shall be computed using the following equation:

$$\mathrm{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

where:

V_{max} is the maximum permitted velocity, m/sec

28.8 is a constant

31.7 is a constant

H_T is the net heating value as determined in par. (f)

3. The maximum permitted velocity, V_{max}, for air–assisted flares shall be determined by the following equation:

$$V_{max} = 8.706 + 0.7084(H_T)$$

where:

V_{max} is the maximum permitted velocity, m/sec

8.706 is a constant

0.7084 is a constant

H_T is the net heating value as determined in par. (f)

4. The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Method 2, 2A, 2C or 2D as appropriate, by the unobstructed (free) cross sectional area of the flare tip.

(h) The owner or operator shall determine compliance with the mass emission per mass product standards in sub. (1) (d) and (e) and in sub. (3) (b) 1. a., (c) 1. a. 1), b. 1), 2. a. and b. 1). The emission rate of TOC shall be computed using the following equation:

$$ER_{TOC} = \frac{E_{TOC}}{P_p \times \frac{1\text{Mg}}{1{,}000\text{ kg}}}$$

where:

ER_{TOC} is the emission rate of total organic compounds (minus methane and ethane), kg TOC/Mg product

E_{TOC} is the emission rate of total organic compounds (minus methane and ethane) in the sample, kg/hr

P_p is the rate of polymer produced, kg/hr

1. The mass rate of TOC, E_{TOC}, shall be determined according to the procedures, as appropriate, in par. (c) 2. The sampling site for determining compliance with sub. (1) (d) and (e) shall be before any add–on control devices and after all product recovery devices. Otherwise, the sampling site shall be at the outlet of the control device.

2. The rate of polymer produced, P_p (kg/hr), shall be determined by dividing the weight of polymer pulled in kilograms (kg) from the process line during the performance test by the number of hours (hr) taken to perform the performance test. The polymer pulled, in kilograms, shall be determined by direct measurement or, subject to prior approval by the department computed from materials balance by good engineering practice.

(i) The owner or operator shall determine continuous compliance with the temperature requirements in sub. (3) (b) 1. b. and 1. a. 2) by using the temperature monitoring equipment described in sub. (5) (a) 1. An average temperature shall be determined from measurements taken at least every 15 minutes every 3 hours while the vent stream is normally routed and constituted. Each 3–hour period constitutes a performance test.

(j) For purposes of determining compliance with sub. (3) (c) 1. b. 2), 3), 2. b. 2) or 3), the ethylene glycol concentration in either the cooling tower or the liquid effluent from steam–jet ejectors used to produce a vacuum in the polymerization reactors, whichever is applicable, shall be determined:

1. Using procedures that conform to the methods described in ASTM D2908–74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous–Injection Gas Chromatography, incorporated by reference in s. NR 440.17 except as provided in par. (j) 2.:

a. At least one sample per operating day shall be collected using the grab sampling procedures of ASTM D3370–76, Standard Practices for Sampling Water, incorporated by reference in s. NR 440.17. An average ethylene glycol concentration by weight shall be calculated on a daily basis over a rolling 14–day period of operating days, except as provided in par. (j) 1. b. and c. Each daily average ethylene glycol concentration so calculated constitutes a performance test. Exceedance of the standard during the reduced testing program specified in par. (j) 1. b. and c. is a violation of these standards.

b. For those determining compliance with sub. (3) (c) 1. b. 2) or 2. b. 2), the owner or operator may elect to reduce the sampling program to any 14 consecutive day period once every 2 calendar months, if at least 17 consecutive 14–day rolling average concentrations immediately preceding the reduced sampling program are each less than 0.10 weight percent ethylene glycol. If the average concentration obtained over the 14 day sampling during the reduced testing period exceeds the upper 95% confidence interval calculated from the most recent test results in which no one 14–day average exceeded 0.10 weight percent ethylene glycol, then the owner or operator shall reinstitute a daily sampling program. A reduced sampling program can be reinstituted if the requirements specified in this paragraph are met.

c. For those determining compliance with sub. (3) (c) 1. b. 3) or 2. b. 3) the owner or operator may elect to reduce the sampling program to any 14 consecutive day period once every 2 calendar months, if at least 17 consecutive 14–day rolling average concentrations immediately preceding the reduced sampling program are each less than 1.8 weight percent ethylene glycol. If the average concentration obtained over the 14 day sampling during the reduced test period exceeds the upper 95% confidence interval calculated from the most recent test results in which no one 14–day average exceeded 1.8 weight percent ethylene glycol, then the owner or operator shall reinstitute a daily sampling program. A reduced program can be reinstituted if the requirements specified in this paragraph are met.

d. The upper 95% confidence interval shall be calculated using the equation:

$$CI_{95} = \frac{\sum_{i=1}^{n} X_i}{n} + 2\left[\frac{n\sum X_i^2 - \left(\sum X_i\right)^2}{n(n-1)}\right]^{0.5}$$

where:

X_i is the daily ethylene glycol concentration for each day used to calculate each 14–day rolling average used in test results to justify implementing the reduced testing program

n is the number of ethylene glycol concentrations

2. Measuring an alternative parameter, such as carbon oxygen demand or biological oxygen demand, that is demonstrated to be directly proportional to the ethylene glycol concentration. Such parameter shall be measured during the initial 14–day performance test during which the facility is shown to be in compliance with the ethylene glycol concentration standard whereby the ethylene glycol concentration is determined using the procedures described in par. (j) 1. The alternative parameter shall be measured on a daily basis and the average value of the alternative parameter shall be calculated on a daily basis over a rolling

14–day period of operating days. Each daily average value of the alternative parameter constitutes a performance test.

(7) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall keep an up–to–date, readily–accessible record of the following information measured during each performance test and shall include the following information in the report of the initial performance test in addition to the written results of such performance tests as required under s. NR 440.08. Where a control device is used to comply with sub. (3) (a) 1. a. 4) only, a report containing performance test data need not be submitted, but a report containing the information in subd. 11. is required. Where a boiler or process heater with a design heat input capacity of 150 million Btu/hr or greater is used to comply with sub. (3) (a) a report containing performance test data need not be submitted, but a report containing the information in subd. 2. a. is required. The same information specified in this subsection shall be submitted in the reports of all subsequently required performance tests where either the emission control efficiency of a combustion device or the outlet concentration of TOC, minus methane and ethane, is determined.

1. When an incinerator is used to demonstrate compliance with sub. (3) except sub. (3) (a) 2.:

a. The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed), measured at least every 15 minutes and averaged over the performance test period, and

b. The percent reduction of TOC (minus methane and ethane) achieved by the incinerator, the concentration of TOC (minus methane and ethane) (ppmv, by compound) at the outlet of the control device on a dry basis or the emission rate in terms of kilograms TOC (minus methane and ethane) per megagram of product at the outlet of the control device, whichever is appropriate. If supplemental combustion air is used, the TOC concentration corrected to 3% oxygen shall be recorded and reported.

2. When a boiler or process heater is used to demonstrate compliance with sub. (3) except sub. (3) (a) 2.:

a. A description of the location at which the vent stream is introduced into the boiler or process heater, and

b. For boilers or process heaters with a design heat input capacity of less than 150 million Btu/hr, all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance was determined.

3. When a flare is used to demonstrate compliance with sub. (3) except sub. (3) (a) 2.:

a. All visible emission readings, heat content determinations, flow rate measurements and exit velocity determinations made during the performance test,

b. Continuous records of the pilot flame heat–sensing monitoring, and

c. Records of all periods of operations during which the pilot flame is absent.

4. When an incinerator, boiler or process heater is used to demonstrate compliance with sub. (3) (a) 2., a description of the location at which the vent stream is introduced into the incinerator, boiler or process heater.

5. When a flare is used to demonstrate compliance with sub. (3) (a) 2.:

a. All visible emission readings made during the performance test,

b. Continuous records of the pilot flame heat–sensing monitoring, and

c. Records of all periods of operation during which the pilot flame is absent.

6. When an absorber is the final unit in a system to demonstrate compliance with sub. (3) except sub. (3) (a) 2., the specific gravity, or alternative parameter that is a measure of the degree of absorbing liquid saturation, if approved by the department, and average temperature, measured at least every 15 minutes and averaged over the performance test period, of the absorbing liquid, both measured while the vent stream is normally routed and constituted.

7. When a condenser is the final unit in a system to demonstrate compliance with sub. (3) except sub. (3) (a) 2. the average exit (product side) temperature, measured at least every 15 minutes and averaged over the performance test period while the vent stream is normally routed and constituted.

8. Daily measurement and daily average 14–day rolling average of the ethylene glycol concentration in the liquid effluent exiting the vacuum system servicing the polymerization reaction section, if an owner or operator is subject to sub. (3) (c) 1. b. 2) or 2. b. 2) or of the ethylene glycol concentration in the cooling water in the cooling tower, if subject to sub. (3) (c) 2. b. 3) or c. 3).

9. When a carbon adsorber is the final unit in a system to demonstrate compliance with sub. (3) except sub. (3) (a) 2., the concentration level or reading indicated by the organics monitoring device at the outlet of the adsorber, measured at least every 15 minutes and averaged over the performance test period while the vent stream is normally routed and constituted.

10. When an owner or operator seeks to comply with the requirements of this section by complying with the uncontrolled threshold emission rate cutoff provision in sub. (1) (d) and (e) or with the individual stream exemptions in sub. (1) (g), each process operation variable, for example, pressure, temperature, type of catalyst, that may result in an increase in the uncontrolled emission rate, if sub. (1) (d) or (e) is applicable or in an increase in the uncontrolled annual emissions or the VOC weight percent, as appropriate, if sub. (1) (g) is applicable, should such operating variable be changed.

11. When an owner or operator uses a control device to comply with sub. (3) (a) 1. a. 4) alone: all periods when the control device is not operating.

(b) 1. Each owner or operator subject to the provisions of this section shall submit with the initial performance test or, if complying with sub. (3) (a) 1. a. 4) as a separate report, an engineering report describing in detail the vent system used to vent each affected vent stream to a control device. This report shall include all valves and vent pipes that could vent the stream to the atmosphere, thereby bypassing the control device and identify which valves are car–sealed opened and which valves are car–sealed closed.

2. If a vent system containing valves that could divert the emission stream away from the control device is used, each owner or operator subject to the provisions of this section shall keep for at least 2 years up–to–date, readily accessible continuous records of:

a. All periods when flow is indicated if flow indicators are installed under sub. (5) (d) 1.

b. All times when maintenance is performed on car–sealed valves, when the car seal is broken and when the valve position is changed, that is, from open to closed for valves in the vent piping to the control device and from closed to open for valves that vent the stream directly or indirectly to the atmosphere bypassing the control device.

(c) Where an incinerator is used to comply with sub. (3), except sub. (3) (a) 1. a. 4) and 2., each owner or operator subject to the provisions of this section shall keep for at least 2 years up–to–date, readily accessible continuous records of:

1. The temperature measurements specified under sub. (5) (b) 1.

2. Records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded are defined as follows:

a. For noncatalytic incinerators, all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance was demonstrated.

b. For catalytic incinerators, all 3–hour periods of operation during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the vent stream during the most recent performance test at which compliance was demonstrated. The owner or operator also shall record all 3–hour periods of operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which compliance was demonstrated.

(d) Where a boiler or process heater is used to comply with sub. (3) except sub. (3) (a) 1. a. 4) and (a) 2., each owner or operator subject to the provisions of this section shall keep for at least 2 years up–to–date, readily accessible continuous records of:

1. Where a boiler or process heater with a heat input design capacity of 150 million Btu/hr or greater is used, all periods of operation of the boiler or process heater,

Note: Examples of such records could include records of steam use, fuel use or monitoring data collected pursuant to other state or federal regulatory requirements.

2. Where a boiler or process heater with a heat input design capacity of less than 150 million Btu/hr is used, all periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded are defined as all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance was demonstrated.

(e) Where a flare is used to comply with sub. (3) except sub. (3) (a) 1. a. 4), each owner or operator subject to the provisions of this section shall keep for at least 2 years up–to–date, readily accessible continuous records of:

1. The flare or pilot light flame heat sensing monitoring specified under sub. (5) (b) 2., and

2. All periods of operation in which the flare or pilot flame, as appropriate, is absent.

(f) Where an adsorber, condenser, absorber or a control device other than a flare, incinerator, boiler or process heater is used to comply with sub. (3) except sub. (3) (a) 1. a. 4), each owner or operator subject to the provisions of this section shall keep for at least 2 years up–to–date, readily–accessible continuous records of the periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. Where an owner or operator seeks to comply with sub. (3), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. Where an absorber is the final unit in a system:

a. All 3–hour periods of operation during which the average absorbing liquid temperature was more than 11°C (20°F) above the average absorbing liquid temperature during the most recent performance test at which compliance was demonstrated are exceeded, and

b. All 3–hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above or more than 0.1 unit below, the average absorbing liquid specific gravity during the most recent performance test at which compliance was demonstrated, unless monitoring of an alternative parameter that is a measure of the degree of absorbing liquid saturation is approved by the department, in which case appropriate parameter boundaries and periods of operation during which they are exceeded will be defined.

2. Where a condenser is the final unit in a system, all 3–hour periods of operation during which the average condenser operating temperature was more than 6°C (10°F) above the average operating temperature during the most recent performance test at which compliance was demonstrated.

3. Where a carbon adsorber is the final unit in a system, all 3–hour periods of operation during which the average organic concentration level in the carbon adsorber gases is more than 20% greater than the exhaust gas concentration level or reading measured by the organics monitoring system during the most recent performance test at which compliance was demonstrated.

(g) Each owner or operator of an affected facility subject to the provisions of this section and seeking to demonstrate compliance with sub. (3) shall keep up–to–date, readily accessible records of:

1. Any changes in production capacity, feedstock type or catalyst type or of any replacement, removal or addition of product recovery equipment; and

2. The results of any performance test performed pursuant to the procedures specified by sub. (6).

(h) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the uncontrolled threshold emission rate cutoff provision in sub. (1) (d) and (e) or with the individual stream exemptions in sub. (1) (g) shall keep for at least 2 years up–to–date, readily accessible records of any change in process operation that increases the uncontrolled emission rate of the process line in which the affected facility is located, if sub. (1) (d) or (e) is applicable or that increase the uncontrolled annual emissions or the VOC weight percent of the individual stream, if sub. (1) (g) is applicable.

(i) Each owner and operator subject to the provisions of this section is exempt from s. NR 440.07 (3).

(j) The department will specify appropriate reporting and recordkeeping requirements where the owner or operator of an affected facility complies with the standards specified under sub. (3) other than as provided under par. (a) to (e).

(k) Each owner or operator that seeks to comply with the requirements of this section by complying with the uncontrolled threshold emission rate cutoff provision of sub. (1) (d) and (e), the individual stream exemptions of sub. (1) (g) or the requirements of sub. (3) shall submit to the department semiannual reports of the following recorded information, as applicable. The initial report shall be submitted within 6 months after the initial startup date.

1. Exceedances of monitored parameters recorded under pars. (c), (d) 2. and (f).

2. All periods recorded under par. (b) when the vent stream has been diverted from the control device.

3. All periods recorded under par. (d) when the boiler or process heater was not operating.

4. All periods recorded under par. (e) in which the flare or pilot flame was absent.

5. All periods recorded under par. (a) 8. when the 14–day rolling average exceeded the standard specified in sub. (3) (c) 1. b. 2), 3), 2. b. 2) or 3) as applicable.

6. Any change in process operations that increases the uncontrolled emission rate of the process line in which the affected facility is located, as recorded in par. (h).

7. Any change in process operations that increases the uncontrolled annual emissions or the VOC weight percent of the individual stream, as recorded in par. (h).

(L) Each owner or operator subject to the provisions of this section shall notify the department of the specific provisions of sub. (1) (d) or (e), (3) or (4), as applicable, with which the owner or operator has elected to comply. Notification shall be submitted with the notification of initial startup required by sub. (1) (c). If an owner or operator elects at a later date to use an alternative provision of sub. (3) or (4) with which he or she will comply or becomes subject to sub. (3) or (4) for the first time, that is, the owner or operator can no longer meet the requirements of this section by complying with the uncontrolled threshold emission rate cutoff provision in sub. (1) (d) or (e), then the owner or operator shall notify the department 90 days before implementing a change and, upon implementing a change, a performance test shall be performed as specified in sub. (6).

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (c), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.65 Flexible vinyl and urethane coating and printing. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each rotogravure printing line used to print or coat flexible vinyl or urethane products.

(b) This section applies to any affected facility which begins construction, modification, or reconstruction after January 18, 1983.

(c) For facilities controlled by a solvent recovery emission control device, the provisions of sub. (5) (a) requiring monitoring of operations will not apply until performance specifications are promulgated under 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, for the continuous monitoring system. After the promulgation of performance specifications these provisions will apply to each affected facility under par. (b). Facilities controlled by a solvent recovery emission control device that become subject to the standard prior to promulgation of performance specifications must conduct performance tests in accordance with s. NR 440.13 (2) after performance specifications are promulgated.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Emission control device" means any solvent recovery or solvent destruction device used to control volatile organic compounds (VOC) emissions from flexible vinyl and urethane rotogravure printing lines.

2. "Emission control system" means the combination of an emission control device and a vapor capture system for the purpose of reducing VOC emissions from flexible vinyl and urethane rotogravure printing lines.

3. "Flexible vinyl and urethane products" means those products, except for resilient floor coverings (1977 Standard Industry Code 3996) and flexible packaging, that are more than 50 micrometers (0.002 inches) thick and that consist of or contain a vinyl or urethane sheet or a vinyl or urethane coated web.

4. "Gravure cylinder" means a plated cylinder with a printing image consisting of minute cells or indentations specifically engraved or etched into the cylinder's surface to hold ink when continuously resolved through a fountain of ink.

5. "Ink" means any mixture of ink, coating solids, organic solvents including dilution solvent and water that is applied to the web of flexible vinyl or urethane on a rotogravure printing line.

6. "Ink solids" means the solids content of an ink as determined by Reference Method 24, ink manufacturer's formulation data, or plant blending records.

7. "Inventory system" means a method of physically accounting for the quantity of ink, solvent and solids used at one or more affected facilities during a time period. The system is based on plant purchase or inventory records.

8. "Plant blending records" means those records which document the weight fraction of organic solvents and solids used in the formulation or preparation of inks at the vinyl or urethane printing plant where they are used.

9. "Rotogravure print station" means any device designed to print or coat inks on one side of a continuous web or substrate using the intaglio printing process with a gravure cylinder.

10. "Rotogravure printing line" means any number of rotogravure print stations and associated dryers capable of printing or coating simultaneously on the same continuous vinyl or urethane web or substrate which is fed from a continuous roll.

11. "Vapor capture system" means any device or combination of devices designed to contain, collect and route organic solvent vapors emitted from the flexible vinyl or urethane rotogravure printing line.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. "a" means the gas stream vents exiting the emission control device.

2. "b" means the gas stream vents entering the emission control device.

3. "f" means the gas stream vents which are not directed to an emission control device.

4. "C_{aj}" means the concentration of VOC in each gas stream (j) for the time period exiting the emission control device, in parts per million by volume.

5. "C_{bi}" means the concentration of VOC in each gas stream (i) for the time period entering the emission control device, in parts per million by volume.

6. "C_{fk}" means the concentration of VOC in each gas stream (k) for the time period which is not directed to an emission control device, in parts per million by volume.

7. "G" means the weighted average mass of VOC per mass of ink solids applied, in kilograms per kilogram.

8. "M_{ci}" means the total mass of each dilution solvent (j) added at the print line in the time period determined from plant records, in kilograms.

10. "Q_{aj}" means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in standard cubic meters per hour.

11. "Q_{bi}" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in standard cubic meters per hour.

12. "Q_{fk}" means the volumetric flow rate of each effluent gas stream (k) not directed to an emission control device, in standard cubic meters per hour.

13. "E" means the VOC emission reduction efficiency (as a fraction) of the emission control device during performance testing.

14. "F" means the VOC emission capture efficiency (as a fraction) of the vapor capture system during performance testing.

15. "W_{oi}" means the weight fraction of VOC in each ink (i) used in the time period as determined by Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

16. "W_{xi}" means the weight fraction of solids in each ink (i) used in the time period as determined from Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

17. "W_{oj}" means the weight fraction of VOC in each dilution solvent (j) added at the print line in the time period determined from Reference Method 24 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the performance test required by s. NR 440.08 has been completed each owner or operator subject to this section shall either:

1. Use inks with a weighted average VOC content less than 1.0 kilogram VOC per kilogram ink solids at each affected facility, or

2. Reduce VOC emissions to the atmosphere by 85% from each affected facility.

(4) TEST METHODS AND PROCEDURES. (a) Reference Methods in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with sub. (3), as follows:

1. Method 24 for analysis of inks. If nonphotochemically reactive solvents are used in the inks standard gas chromatographic techniques may be used to identify and quantify these solvents. The results of Reference method 24 may be adjusted to subtract these solvents from the measured VOC content.

2. Method 24A for VOC concentration (the calibration gas shall be propane);

3. Method 1 for sample and velocity traverses;

4. Method 2 for velocity and volumetric flow rates;

5. Method 3 for gas analysis;

6. Method 4 for stack gas moisture.

(b) To demonstrate compliance with sub. (3) (a) 1. the owner or operator of an affected facility shall determine the weighted average VOC content of the ink according to the following procedures:

1. Determine and record the VOC content and amount of each ink used at the print head, including the VOC content and amount of diluent solvent, for any time periods when VOC emission control equipment is not used.

2. Compute the weighted average VOC content by the following equation:

$$G = \frac{\sum_{i=1}^{n}(W_{oi}M_{ci}) + \sum_{j=1}^{m}(W_{oj}M_{dj})}{\sum_{i=1}^{n}(M_{ci}W_{si})}$$

3. The weighted average VOC content of the inks shall be calculated over a period that does not exceed one calendar month or 4 consecutive weeks. A facility that uses an accounting system based on quarters consisting of two 28 calendar day periods and one 35 calendar day period may use an averaging period of 35 calendar days 4 times per year, provided the use of such an accounting system is documented in the initial performance test.

4. Each determination of the weighted average VOC content shall constitute a performance test for any period when VOC emission control equipment is not used. Results of the initial performance test must be reported to the department. Reference Method 24 or ink manufacturers' formulation data along with plant blending records (if plant blending is done) may be used to determine VOC content. The department may require the use of Reference Method 24 if there is a question concerning the accuracy of the ink manufacturer's data or plant blending records.

5. If, during the time period when emission control equipment is not used, all inks used contain less than 1.0 kilogram VOC per kilogram ink solids the owner or operator is not required to calculate the weighted average VOC content but must verify and record the VOC content of each ink (including any added dilution solvent) used as determined by Reference Method 24, ink manufacturers' formulation data or plant blending records.

(c) To determine compliance with sub. (3) (a) 1. the owner or operator may determine the weighted average VOC content using an inventory system.

1. The inventory system shall accurately account to the nearest kilogram for the VOC content of all inks and dilution solvent used, recycled and discarded for each affected facility during the averaging period. Separate records must be kept for each affected facility.

2. To determine VOC content of inks and dilution solvent used or recycled Reference Method 24 or ink manufacturers' formulation data must be used in combination with plant blending records (if plant blending is done) or inventory records or purchase records for new inks or dilution solvent.

3. For inks to be discarded only Reference Method 24 shall be used to determine the VOC content. Inks to be discarded may be combined prior to measurement of volume or weight and tested by Reference Method 24.

4. The department may require the use of Reference Method 24 if there is a question concerning the accuracy of the ink manufacturer's data or plant records.

5. The department shall approve the inventory system of accounting for VOC content prior to the initial performance test.

(d) To demonstrate compliance with sub. (3) (a) 2. the owner or operator of an affected facility controlled by a solvent recovery emission control device or an incineration control device shall conduct a performance test to determine overall VOC emission control efficiency according to the following procedures:

1. The performance test shall consist of 3 runs. Each test run must last a minimum of 30 minutes and shall continue until the printing operation is interrupted or until 180 minutes of continuous operation occurs. During each test run the print line shall be printing continuously and operating normally. The VOC emission reduction efficiency achieved from each test run is averaged over the entire test run period.

2. VOC concentration values at each site shall be measured simultaneously.

3. The volumetric flow rate shall be determined from one Method 2 measurement for each test run conducted immediately prior to, during, or after that test run. Volumetric flow rates at each site do not need to be measured simultaneously.

4. In order to determine capture efficiency from an affected facility all fugitive VOC emissions from the affected facility

shall be captured and vented through stacks suitable for measurement. During a performance test the owner or operator of an affected facility located in an area with other sources of VOC shall isolate the affected facility from other sources of VOC. These requirements shall be accomplished using one of the following methods:

a. Build a permanent enclosure around the affected facility;

b. Build a temporary enclosure around the affected facility and duplicate, to an extent that is reasonably feasible, the ventilation conditions that are in effect when the affected facility is not enclosed (one way to do this is to divide the room exhaust rate by the volume of the room and then duplicate that quotient or 20 air changes per hour, whichever is smaller, in the temporary enclosure); or

c. Shut down all other sources of VOC and continue to exhaust fugitive emissions from the affected facility through any building ventilation system and other room exhausts such as print line ovens and embossers.

5. For each affected facility compliance with sub. (3) (a) 2. has been demonstrated if the average value of the overall control efficiency (EF) for the 3 runs is equal to or greater than 85%. An overall control efficiency is calculated for each run as follows:

a. For efficiency of the emission control device.

$$E = \frac{\sum_{i=1}^{n}(Q_{bi}C_{bi}) - \sum_{j=1}^{m}(Q_{aj}C_{aj})}{\sum_{i=1}^{n}(Q_{bi}C_{bi})}$$

b. For efficiency of the vapor capture system.

$$F = \frac{\sum_{i=1}^{n}(Q_{bi}C_{bi})}{\sum_{i=1}^{n}(Q_{bi}C_{bi}) + \sum_{k=1}^{p}(Q_{fk}C_{fk})}$$

(5) MONITORING OF OPERATIONS AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of an affected facility controlled by a solvent recovery emission control device shall install, calibrate, operate and maintain a monitoring system which continuously measures and records the VOC concentration of the exhaust vent stream from the control device and shall comply with the following requirements:

1. The continuous monitoring system shall be installed in a location that is representative of the VOC concentration in the exhaust vent at least two equivalent stack diameters from the exhaust point and protected from interferences due to wind, weather, or other processes.

2. During the performance test the owner or operator shall determine and record the average exhaust vent VOC concentration in parts per million by volume. After the performance test the owner or operator shall determine and, in addition to the record made by the continuous monitoring device, record the average exhaust vent VOC concentration for each 3–hour clock period of printing operation when the average concentration is greater than 50 ppm and more than 20% greater than the average concentration value demonstrated during the most recent performance test.

(b) The owner or operator of an affected facility controlled by a thermal incineration emission control device shall install, calibrate, operate and maintain a monitoring device that continuously measures and records the temperature of the control device exhaust gases and shall comply with the following requirements:

1. The continuous monitoring device shall be calibrated annually and have an accuracy of ± 0.75% of the temperature being measured or ± 2.5°C, whichever is greater.

2. During the performance test the owner or operator shall determine and record the average temperature of the control device exhaust gases. After the performance test the owner or operator shall determine and record, in addition to the record made by the continuous monitoring device, the average temperature for each 3–hour clock period of printing operation when the average temperature of the exhaust gases is more than 28°C below the average temperature demonstrated during the most recent performance test.

(c) The owner or operator of an affected facility controlled by a catalytic incineration emission control device shall install, calibrate, operate and maintain monitoring devices that continuously measure and record the gas temperatures both upstream and downstream of the catalyst bed and shall comply with the following requirements:

1. Each continuous monitoring device shall be calibrated annually and have an accuracy of ± 0.75% of the temperature being measured or ± 2.5°C, whichever is greater.

2. During the performance test the owner or operator shall determine and record the average gas temperature both upstream and downstream of the catalyst bed. After the performance test the owner or operator shall determine and record, in addition to the record made by the continuous monitoring device, the average temperatures for each 3–hour clock period of printing operation when the average temperature of the gas stream before the catalyst bed is more than 28°C below the average temperature demonstrated during the most recent performance test or the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test.

(d) The owner or operator of an affected facility shall record time periods of operation when an emission control device is not in use.

(6) REPORTING REQUIREMENTS. (a) For all affected facilities subject to compliance with sub. (3) the performance test data and results from the performance test shall be submitted to the department as specified in s. NR 440.08 (1).

(b) The owner or operator of each affected facility shall submit semiannual reports to the department of occurrences of the following:

1. Exceedances of the weighted average VOC content specified in sub. (3) (a) 1.;

2. Exceedances of the average value of the exhaust vent VOC concentration as defined under sub. (5) (a) 2.;

3. Drops in the incinerator temperature as defined under sub. (5) (b) 2.; and

4. Drops in the average temperature of the gas stream immediately before the catalyst bed or drops in the average temperature across the catalyst bed as defined under sub. (5) (c) 2.

(c) The reports required under par (b) shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; (2) (a) (intro.) and (b) (intro.), r. (6) (d), Register, September, 1990, No. 417, eff. 10–1–90.

NR 440.66 Equivalent leaks of VOC in petroleum refineries.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 1. The provisions of this section apply to affected facilities in petroleum refineries.

2. A compressor is an affected facility.

3. The group of all the equipment (defined in sub. (2)) within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction or modification after January 4, 1983, is subject to the requirements of this section.

(c) Addition or replacement of equipment (defined in sub. (2)) for the purpose of process improvement which is accomplished without a capital expenditure may not by itself be considered a modification under this section.

(d) Facilities subject to s. NR 440.62 or 440.68 are excluded from this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02 or 440.62.

(a) "Alaskan north slope" means the approximately 69,000 square mile area extending from the Brooks Range to the Arctic Ocean.

(b) "Equipment" means each valve, pump, pressure relief device, sampling connection system, open–ended valve or line and flange or other connector in VOC service. Compressors are considered equipment only for the purposes of recordkeeping and reporting.

(c) "In hydrogen service" means that a compressor contains a process fluid that meets the conditions in sub. (4) (b).

(d) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in sub. (4) (c).

(e) "Petroleum refinery" means that facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through the distillation of petroleum or through the redistillation, cracking, or reforming of unfinished petroleum derivatives.

(f) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(g) "Process unit" means components assembled to produce intermediate or final products from petroleum, unfinished petroleum derivatives, or other intermediates; a process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

(3) STANDARDS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of s. NR 440.62 (3) (a) to (j) as soon as practicable, but no later than 180 days after initial startup.

(b) An owner or operator may elect to comply with the requirements of s. NR 440.62 (4) (a) and (b).

(c) An owner or operator may apply to the administrator for a determination of equivalency for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in this section. In doing so the owner or operator shall comply with requirements 40 CFR 60.484, as in effect on July 1, 1994, and provide notice to the department of any determination of equivalency approved by the administrator.

(d) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (6) except as provided in sub. (4).

(e) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (7) and (8).

(4) EXCEPTIONS. (a) Each owner or operator subject to the provisions of this section may comply with the following exceptions to the provisions of s. NR 440.62.

(b) 1. Compressors in hydrogen service are exempt from the requirements of sub. (3) if an owner or operator demonstrates that a compressor is in hydrogen service.

2. Each compressor is presumed not to be in hydrogen service unless an owner or operator demonstrates that the piece of equipment is in hydrogen service. For a piece of equipment to be considered in hydrogen service it must be determined that the percent hydrogen content can be reasonably expected always to exceed 50% by volume. For purposes of determining the percent hydrogen content in the process fluid that is contained in or contacts a compressor procedures that conform to the general method described in ASTM E260–73, E168–67 or E169–63, incorporated by reference in s. NR 440.17, shall be used.

3. a. An owner or operator may use engineering judgment rather than procedures in subd. 2. to demonstrate that the percent content exceeds 50% by volume. When an owner or operator and the department do not agree on whether a piece of equipment is in hydrogen service however, the procedure in subd. 2. shall be used to resolve the disagreement.

b. If an owner or operator determines that a piece of equipment is in hydrogen service the determination can be revised only after following the procedures in subd. 2.

(c) Any existing reciprocating compressor that becomes an affected facility under provisions of s. NR 440.14 or 440.15 is exempt from s. NR 440.62 (3) (c) 1., 2., 3., 4., 5. and 8., provided the owner or operator demonstrates that recasting the distance piece or replacing the compressor are the only options available to bring the compressor into compliance with the provisions of s. NR 440.62 (3) (c) 1., 2., 3., 4., 5. and 8.

(d) An owner or operator may use the following provision in addition to s. NR 440.62 (6) (e): Equipment is in light liquid service if the percent evaporated is greater than 10% at 150°C as determined by ASTM Method D86–78, incorporated by reference in s. NR 440.17.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (1) (c) (2) (intro.), (3) (c), (4) (b) 2. and (a), Register, September, 1990, No. 417, eff. 10–1–90; am. (3) (c), Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.67 Synthetic fiber production facilities.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b) the affected facility to which the provisions of this section apply is each solvent–spun synthetic fiber process that produces more than 500 megagrams of fiber per year.

(b) The provisions of this section do not apply to any facility that uses the reaction spinning process to produce spandex fiber or the viscose process to produce rayon fiber.

(c) The provisions of this section apply to each facility as identified in par. (a) that commences construction or reconstruction after November 23, 1982. The provisions of this section do not apply to facilities that commence modification but not reconstruction after November 23, 1982.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Acrylic fiber" means a manufactured synthetic fiber in which the fiber–forming substance is any long–chain synthetic polymer composed of at least 85% by weight of acrylonitrile units.

(b) "Makeup solvent" means the solvent introduced into the affected facility that compensates for solvent lost from the affected facility during the manufacturing process.

(c) "Nongaseous losses" means the solvent that is not volatilized during fiber production and escapes the process and is unavailable for recovery or is in a form or concentration unsuitable for economical recovery.

(d) "Polymer" means any of the natural or synthetic compounds as usually high molecular weight that consist of many repeated links each link being a relatively light and simple molecule.

(e) "Precipitation bath" means the water, solvent, or other chemical bath into which the polymer or prepolymer (partially reacted material) solution is extruded and causes physical or chemical changes to occur in the extruded solution to result in a semihardened polymeric fiber.

(f) "Rayon fiber" means a manufactured fiber composed of regenerated cellulose as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 5 percent of the hydrogens of the hydroxyl groups.

(g) "Reaction spinning process" means the fiber–forming process where a prepolymer is extruded into a fluid medium and solidification takes place by chemical reaction to form the final polymeric material.

(h) "Recovered solvent" means the solvent captured from liquid and gaseous process streams that is concentrated in a control device and that may be purified for reuse.

(i) "Solvent feed" means that the solvent introduced into the spinning solution preparation system or precipitation bath. This feed stream includes the combination of recovered solvent and makeup solvent.

(j) "Solvent inventory variation" means the normal changes in the total amount of solvent contained in the affected facility.

(k) "Solvent recovery system" means the equipment associated with capture, transportation, collection, concentration and purification of organic solvents. It may include enclosures, hoods, ducting, piping, scrubbers, condensers, carbon adsorbers, distillation equipment and associated storage vessels.

(L) "Solvent–spun synthetic fiber" means any synthetic fiber produced by a process that uses an organic solvent in the spinning solution, the precipitation bath, or processing of the spun fiber.

(m) "Solvent–spun synthetic fiber process" means the total of all equipment having a common spinning solution preparation system or a common solvent recovery system and is used in the manufacture of solvent–spun synthetic fiber. It includes spinning solution preparation, spinning, fiber processing and solvent recovery but does not include the polymer production equipment.

(n) "Spandex fiber" means a manufactured fiber in which the fiber–forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented polyurethane.

(o) "Spinning solution" means the mixture of polymer, prepolymer, or copolymer and additives dissolved in solvent. The solution is prepared at a viscosity and solvent–to–polymer ratio that is suitable for extrusion into fibers.

(p) "Spinning solution preparation system" means the equipment used to prepare spinning solutions; the system includes equipment for mixing, filtering, blending and storage of the spinning solutions.

(q) "Synthetic fiber" means any fiber composed partially or entirely of materials made by chemical synthesis or made partially or entirely from chemically–modified naturally–occurring materials.

(r) "Viscose process" means the fiber forming process where cellulose and concentrated caustic soda are reacted to form soda or alkali cellulose. This reacts with carbon disulfide to form sodium cellulose xanthate which is then dissolved in a solution of caustic soda. The solution is spun into an acid coagulating bath after ripening. This precipitates the cellulose in the form of a regenerated cellulose filament.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the initial performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause the discharge into the atmosphere from any affected facility that produces acrylic fibers VOC emissions that exceed 10 kilograms (kg) VOC per megagram (Mg) solvent feed to the spinning solution preparation system or precipitation bath. VOC emissions from affected facilities that produce both acrylic and nonacrylic fiber types may not exceed 10 kg VOC per Mg solvent feed. VOC emissions from affected facilities that produce only nonacrylic fiber types may not exceed 17 kg VOC per Mg solvent feed. Compliance with the emission limitations is determined on a 6–month rolling average basis as described in sub. (4).

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (6) does not apply to the performance test procedures required by this section.

(b) Each owner or operator of an affected facility shall determine compliance with the applicable standard in sub. (3) (a) by determining and recording monthly the VOC emissions per Mg solvent feed from each affected facility for the current and preceding 5 consecutive calendar months and using these values to calculate the 6–month average emissions. Each calculation is considered a performance test. The owner or operator of an affected facility shall use the following procedure to determine VOC emissions for each calendar month;

1. Install, calibrate, maintain, and operate monitoring devices that continuously measure and permanently record for each calendar month the amount of makeup solvent and solvent feed. These values shall be used in calculating VOC emissions according to subd. 2. All monitoring devices, meters and peripheral equipment shall be calibrated and any error recorded. Total compounded error of the flow measuring and recording devices may not exceed 1% accuracy over the operating range. As an alternative to measuring solvent feed the owner or operator may:

a. Measure the amount of recovered solvent returned to the solvent feed storage tanks and use the following equation to determine the amount of solvent feed:

Solvent Feed = Makeup Solvent + Recovered Solvent + Change in the Amount of Solvent Contained in the Solvent Feed Holding Tank.

b. Measure and record the amount of polymer introduced into the affected facility and the solvent–to–polymer ratio of the spinning solutions and use the following equation to determine the amount of solvent feed:

$$\text{Solvent Feed} = \sum_{i=1}^{n} (\text{Polymer Used})_i \times (\text{Solvent–to–Polymer Ratio})_i$$

where subscript "i" denotes each particular spinning solution used during the test period; values of "i" vary from one to the total number of spinning solutions, "n," used during the calendar month.

2. VOC emissions shall be determined each calendar month by use of the following equations:

$$E = \frac{M_W}{S_W} - N - I \text{ where } M_W = M_V S_P D,$$

$$S_W = \frac{S_V S_P D}{1000} \text{ and } I = \frac{I_E - I_S}{S_W}$$

where all values are for the calendar month only and where:

E is the emissions in kg per Mg solvent feed

S_V is the measured or calculated volume of solvent feed in liters

S_W is the weight of solvent feed in Mg

M_V is the measured volume of makeup solvent in liters

M_W is the weight of makeup in kg

N is the allowance for nongaseous losses per Mg solvent feed; 13 kg per Mg solvent feed to the spinning solution preparation system and precipitation bath. This value shall be used in all cases unless an owner or operator demonstrates to the satisfaction of the department that greater nongaseous losses occur at the affected facility. In this case, the greater value may be substituted in the equation.

S_P is the fraction of measured volume that is actual solvent (excludes water)

D is the density of the solvent in kg/liter

I is the allowance for solvent inventory variation or changes in the amount of solvent contained in the affected facility per Mg solvent feed (may be positive or negative)

I_S is the amount in kg of solvent contained in the affected facility at the beginning of test period, as determined by owner or operator

I_E is the amount in kg of solvent contained in the affected facility at the close of test period, as determined by owner or operator.

(5) REPORTING REQUIREMENTS. (a) The owner or operator of an affected facility shall submit a written report to the department of the following:

1. The results of the initial performance test; and

2. The results of subsequent performance tests that indicate that VOC emissions exceed the standards in sub. (3). These reports shall be submitted quarterly at 3–month intervals after the initial performance test. If no exceedances occur during a particular quarter, a report stating this shall be submitted to the department semiannually.

(b) Solvent–spun synthetic fiber producing facilities exempted from these standards in sub. (1) (a) (those producing less than 500 megagrams annually) shall report to the department within 30 days whenever extruded fiber for the preceding 12 calendar months exceeds 500 megagrams.

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; renum. (2) (a) (intro.) and 1. to 18. to be (2) (intro.) and (a) to (r) and am. (2) (intro.), am. (3) (a), r. (5) (c), Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b) 2. and (5) (a) 2., Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.675 Volatile organic compound (VOC) emissions from the synthetic organic chemical manufacturing industry (SOCMI) air oxidation unit processes. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each affected facility designated in par. (b) that produces any of the chemicals listed in sub. (8) as a product, co–product, by–product or intermediate, except as provided in par. (c).

(b) The affected facility is any of the following for which construction, modification or reconstruction commenced after October 21, 1983:

1. Each air oxidation reactor not discharging its vent stream into a recovery system.

2. Each combination of an air oxidation reactor and the recovery system into which its vent stream is discharged.

3. Each combination of 2 or more air oxidation reactors and the common recovery system into which their vent streams are discharged.

(c) Each affected facility that has a total resource effectiveness (TRE) index value greater than 4.0 is exempt from all provisions of this section except for subs. (3), (5) (f), (6) (h) and (L).

Note: The intent of these standards is to minimize the emissions of VOC through the application of best demonstrated technology (BDT). The numerical emission limits in these standards are expressed in terms of total organic compounds (TOC), measured as TOC minus methane and ethane. This emission limit reflects the performance of BDT.

(2) DEFINITIONS. As used in this section, all terms not defined here shall have the meanings given them in s. NR 440.02 and the following terms shall have the specific meanings given them.

(a) "Air oxidation reactor" means any device or process vessel in which one or more organic reactants are combined with air or a combination of air and oxygen, to produce one or more organic compounds. Ammoxidation and oxychlorination reactions are included in this definition.

(b) "Air oxidation reactor recovery train" means an individual recovery system receiving the vent stream from at least one air oxidation reactor, along with all air oxidation reactors feeding vent streams into this system.

(c) "Air oxidation unit process" means a unit process, including ammoxidation and oxychlorination unit process, that uses air or a combination of air and oxygen, as an oxygen source in combination with one or more organic reactants to produce one or more organic compounds.

(d) "Boilers" means any enclosed combustion device that extracts useful energy in the form of steam.

(e) "By compound" means by individual stream components, not carbon equivalents.

(f) "Continuous recorder" means a data recording device recording an instantaneous data value at least once every 15 minutes.

(g) "Flame zone" means the portion of the combustion chamber in a boiler occupied by the flame envelope.

(h) "Flow indicator" means a device which indicates whether gas flow is present in a vent stream.

(i) "Halogenated vent stream" means any vent stream determined to have a total concentration, by volume, of compounds containing halogens of 20 ppmv by compound or greater.

(j) "Incinerator" means any enclosed combustion device that is used for destroying organic compounds and does not extract energy in the form of steam or process heat.

(k) "Process heater" means a device that transfers heat liberated by burning fuel to fluids contained in tubes, including all fluids except water that is heated to produce steam.

(L) "Process unit" means equipment assembled and connected by pipes or ducts to produce, as intermediate or final products, one or more of the chemicals in sub. (8). A process unit can operate independently if supplied with sufficient fuel or raw materials and sufficient product storage facilities.

(m) "Product" means any compound or chemical listed in sub. (8) that is produced for sale as a final product as that chemical or is produced for use in a process that needs that chemical for the production of other chemicals in another facility. By–products, co–products and intermediates are considered to be products.

(n) "Recovery device" means an individual unit of equipment, such as an absorber, condenser and carbon adsorber, capable of and used to recover chemicals for use, reuse or sale.

(o) "Recovery system" means an individual recovery device or series of such devices applied to the same process stream.

(p) "Total organic compounds" or "TOC" means those compounds measured according to the procedures in sub. (5) (b) 4. For the purposes of measuring molar composition as required in sub. (5) (d) 3. a., hourly emissions rate as required in sub. (5) (d) 6. and (e), and TOC concentration as required in sub. (6) (b) 4. and (g) 4., those compounds which the department has determined do not contribute appreciably to the formation of ozone are to be excluded. The compounds to be excluded are identified in s. NR 400.02 (162).

(q) "Total resource effectiveness (TRE) index value" means a measure of the supplemental total resource requirement per unit reduction of TOC associated with an individual air oxidation vent stream, based on vent stream flow rate, emission rate of TOC, net heating value and corrosion properties, whether or not the vent stream is halogenated, as quantified by the equation given under sub. (5) (e).

(r) "Vent stream" means any gas stream, containing nitrogen which was introduced as air to the air oxidation reactor, released to the atmosphere directly from any air oxidation reactor recovery train or indirectly, after diversion through other process equipment. The vent stream excludes equipment leaks and relief valve discharges including, but not limited to, pumps, compressors and valves.

(3) STANDARDS. Each owner or operator of any affected facility shall comply with par. (a), (b) or (c) for each vent stream on and after the date on which the initial performance test required by s. NR 440.08 and sub. (5) is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after the initial startup, whichever date comes first. Each owner or operator shall either:

(a) Reduce emissions of TOC (minus methane and ethane) by 98 weight– percent or to a TOC (minus methane and ethane) concentration of 20 ppmv on a dry basis corrected to 3% oxygen, whichever is less stringent. If a boiler or process heater is used to comply with this paragraph, then the vent stream shall be introduced into the flame zone of the boiler or process heater; or

(b) Combust the emissions in a flare that meets the requirements of s. NR 440.18; or

(c) Maintain a TRE index value greater than 1.0 without use of VOC emission control devices.

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility that uses an incinerator to seek to comply with the TOC emission limit specified under sub. (3) (a) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater.

a. Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

b. Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

2. A flow indicator that provides a record of vent stream flow to the incinerator at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each affected facility at a point closest to the inlet of each incinerator and before being joined with any other vent stream.

(b) The owner or operator of an affected facility that uses a flare to seek to comply with sub. (3) (b) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A heat sensing device, such as an ultra–violet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.

2. A flow indicator that provides a record of vent stream flow to the flare at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each affected facility at a point closest to the flare and before being joined with any other vent stream.

(c) The owner or operator of an affected facility that uses a boiler or process heater to seek to comply with sub. (3) (a) shall install, calibrate, maintain and operate according to the manufacturer's specifications the following equipment:

1. A flow indicator that provides a record of vent stream flow to the boiler or process heater at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each air oxidation reactor within an affected facility at a point closest to the inlet of each boiler or process heater and before being joined with any other vent stream.

2. A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being measured expressed in degrees Celsius or ± 0.5°C, whichever is greater, for boilers or process heaters of less than 44 MW (150 million Btu/hr) heat input design capacity.

3. Monitor and record the periods of operation of the boiler or process heater if the design input capacity of the boiler is 44 MW (150 million Btu/hr) or greater. The records shall be readily available for inspection.

(d) The owner or operator of an affected facility that seeks to demonstrate compliance with the TRE index value limit specified under sub. (3) (c) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment, unless alternative monitoring procedures or requirements are approved for that facility by the department:

1. Where an absorber is the final recovery device in a recovery system:

a. A scrubbing liquid temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, and a specific gravity monitoring device having an accuracy of ± 0.02 specific gravity units, each equipped with a continuous recorder;

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infra–red, photoionization or thermal conductivity, each equipped with a continuous recorder.

2. Where a condenser is the final recovery device in a recovery system:

a. A condenser exit or product side temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitoring expressed in degrees Celsius or ±0.5°C, whichever is greater;

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infra–red, photoionization or thermal conductivity, each equipped with a continuous recorder.

3. Where a carbon adsorber is the final recovery device in a recovery system:

a. An integrating steam flow monitoring device having an accuracy of ± 10% and a carbon bed temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, both equipped with a continuous recorder;

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infra–red, photoionization or thermal conductivity, each equipped with a continuous recorder.

(e) An owner or operator of an affected facility seeking to demonstrate compliance with the standards specified under sub. (3) with control devices other than an incinerator, boiler, process heater or flare; or recovery devices other than an absorber, condenser or carbon adsorber shall provide to the administrator information describing the operation of the control device or recovery device and the process parameters which would indicate proper operation and maintenance of the device. The administrator may request further information and will specify appropriate monitoring procedures or requirements.

(5) TEST METHODS AND PROCEDURES. (a) For the purpose of demonstrating compliance with sub. (3), all affected facilities shall be run at full operating conditions and flow rates during any performance test.

(b) The following methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2) (b), shall be used as reference methods to determine compliance with the emission limit or percent reduction efficiency specific under sub. (3) (a):

1. Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or TOC (less methane and ethane) reduction efficiency shall be prior to the inlet of the control device and after the recovery system.

2. Method 2, 2A, 2C or 2D, as appropriate, for determination of the volumetric flow rates.

3. The emission rate correction factor, integrated sampling and analysis procedure of Method 3 shall be used to determine the oxygen concentration ($\%O_{2d}$) for the purposes of determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the TOC samples and the samples shall be taken during the same time that the TOC samples are taken.

The TOC concentration corrected to 3% O_2 (C_c) shall be computed using the following equations:

$$C_c = C_{TOC}\frac{17.9}{20.9 - \%0_{2d}}$$

where:

C_c is the concentration of TOC corrected to 3% O_2, dry basis, ppm by volume

C_{TOC} is the concentration of TOC (minus methane and ethane), dry basis, ppm by volume

$\%O_{2d}$ is the concentration of O_2, dry basis, percent by volume

4. Method 18 to determine concentration of TOC in the control device outlet and the concentration of TOC in the inlet when the reduction efficiency of the control device is to be determined.

a. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used then the samples shall be taken at 15–minute intervals.

b. The emission reduction (R) of TOC (minus methane and ethane) shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100$$

where:

R is the emission reduction, percent by weight

E_i is the mass rate of TOC entering the control device, kg TOC/hr

E_o is the mass rate of TOC discharged to the atmosphere, kg TOC/hr

c. The mass rates of TOC (E_i , E_o) shall be computed using the following equations:

$$E_i = K_2\left(\sum_{j=1}^{n} C_{ij}M_{ij}\right)Q_i$$

$$E_o = K_2\left(\sum_{j=1}^{n} C_{oj}M_{oj}\right)Q_o$$

where:

C_{ij} and C_{oj} are the concentration of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively

M_{ij} and M_{oj} are the molecular weight of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, g/g–mole (lb/lb–mole)

Q_i and Q_o are the flow rate of gas stream at the inlet and outlet of the control device, respectively, dscm/min (dscf/hr)

K_2 is a constant, 2.494×10^{-6} (1/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for (g–mole/scm) is 20°C

d. The TOC concentration (C_{TOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^{n} C_j$$

where:

C_{TOC} is the concentration of TOC (minus methane and ethane), dry basis, ppm by volume

C_j is the concentration of sample components in the sample

n is the number of components in the sample

5. When a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used to seek to comply with sub. (3) (a), the requirement for an initial performance test is waived, in accordance with s. NR 440.08 (2). However, the department reserves the option to require testing at such other times as may be required.

(c) When a flare is used to seek to comply with sub. (3) (b), the flare shall comply with the requirements of s. NR 440.18.

(d) The following test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used for determining the net heating value of the gas combusted to determine compliance under sub. (3) (b) and for determining the process vent stream TRE index value to determine compliance under sub. (3) (c).

1. Method 1 or 1A, as appropriate, for selection of the sampling site. The sampling site for the vent stream flow rate and molar composition determination prescribed in subds. 3. and 4. shall be, except for the situations outlined in subd. 2., prior to the inlet of any control device, prior to any post–reactor dilution of the stream with air and prior to any post–reactor introduction of halogenated compounds into the vent stream. No transverse site selection method is needed for vents smaller than 4 inches in diameter.

2. If any gas stream other than the air oxidation vent stream from the affected facility is normally conducted through the final recovery device:

a. The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which the nonair oxidation stream is introduced.

b. The efficiency of the final recovery device is determined by measuring the TOC concentration using Method 18 at the inlet to the final recovery device after the introduction of any nonair oxidation vent stream and at the outlet of the final recovery device.

c. This efficiency is applied to the TOC concentration measured prior to the final recovery device and prior to the introduction of the nonair oxidation stream to determine the concentration of TOC in the air oxidation stream from the final recovery device. This concentration of TOC is then used to perform the calculations outlined in subds. 5. and 6.

3. The molar composition of the process vent stream shall be determined as follows:

a. Method 18 to measure the concentration of TOC including those containing halogens.

b. ASTM D1946–77, incorporated by reference in s. NR 440.17, to measure the concentration of carbon monoxide and hydrogen.

c. Method 4 to measure the content of water vapor.

4. The volumetric flow rate shall be determined using Method 2, 2A, 2C or 2D, as appropriate.

5. The net heating value of the vent stream shall be calculated using the following equation:

$$H_T = K_1\left(\sum_{j=1}^{n} C_j H_j\right)$$

where:

H_T is the net heating value of the sample, MJ/scm, where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s (offgas flow rate)

K_1 is a constant, 1.740×10^{-7}

$$\frac{(1)}{(\text{ppm})}\,\frac{(\text{g–mole})}{(\text{scm})}\,\frac{(\text{MJ})}{(\text{kcal})}$$

where standard temperature for

$$\frac{(\text{g–mole})}{(\text{scm})} \text{ is } 20°\text{C}$$

C_j is the concentration of compound j in ppm, as measured for organics by Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77, incorporated by reference in s. NR 440.17, as indicated in subd 3.

H_j is the net heat of combustion j, kcal/g–mole, based on combustion at 25°C and 760 mm Hg. The heats of combustion of vent stream components would be required to be determined using ASTM D2382–76, incorporated by reference as specified in s. NR 440.17, if published values are not available or cannot be calculated

6. The emission rate of TOC in the process vent stream shall be calculated using the following equation:

$$E_{TOC} = K_2\left(\sum_{j=1}^{n} C_j M_j\right)Q_s$$

where:

E_{TOC} is the emission rate of TOC in the sample, kg/hr

K_2 is the constant, 2.494×10^{-6} (1/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for (g–mole/scm) is 20°C

C_j is the concentration on a basis of compound j in ppm as measured by Method 18 as indicated in subd. 3.

M_j is the molecular weight of sample j, g/g–mole

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

7. The total process vent stream concentration (by volume) of compounds containing halogens (ppmv, by compound) shall be summed from the individual concentrations of compounds containing halogens which were measured by Method 18.

(e) For purposes of complying with sub. (3) (c), the owner or operator of a facility affected by this section shall calculate the TRE index value of the vent stream using the equation for incineration in subd. 1. for halogenated vent streams. The owner or operator of an affected facility with a nonhalogenated vent stream shall determine the TRE index value by calculating values using both the incinerator equation in subd. 1. and the flare equation in subd. 2. and selecting the lower of the 2 values.

1. The TRE index value of the vent stream controlled by an incinerator shall be calculated using the following equation:

$$\text{TRE} = \frac{1}{E_{TOC}}\left[a + b(Q_s)^{0.88} + c(Q_s) + d(Q_s)(H_T) + e(Q_s)^{0.88}(H_T)^{0.88} + f(Y_s)^{0.5}\right]$$

a. Where for a vent stream flow rate (scm/min) at a standard temperature of 20°C that is greater than or equal to 14.2 scm/min:

TRE is the TRE index value

Q_s is the vent stream flow rate (scm/min), at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm), where the net enthalpy of combustion per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s

Y_s is the Q_s for all vent stream categories listed in Table 1 except for Category E vent streams where $Y_s = (Q_s)(H_T)/3.6$

E_{TOC} is the hourly emissions of TOC reported in kg/hr a, b, c, d, e and f are coefficients

The set of coefficients which apply to a vent stream shall be obtained from Table 1.

Table 1. Air Oxidation NSPS TRE Coefficients For Vent Streams Controlled By an Incinerator

Design Category A1. For Halogenated Process Vent Streams, If 0 ≤ Net Heating Value (MJ/scm) ≤ 3.5:

Q_s = Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$14.2 \le Q_s \le 18.8$	19.18370	0.27580	0.75762	−0.13064	0	0.01025
$18.8 < Q_s \le 699$	20.00563	0.27580	0.30387	−0.13064	0	0.01025
$699 < Q_s \le 1400$	39.87022	0.29973	0.30387	−0.13064	0	0.01449
$1400 < Q_s \le 2100$	59.73481	0.31467	0.30387	−0.13064	0	0.01775
$2100 < Q_s \le 2800$	79.59941	0.32572	0.30387	−0.13064	0	0.02049
$2800 < Q_s \le 3500$	99.46400	0.33456	0.30387	−0.13064	0	0.02291

Table 1. Air Oxidation NSPS TRE Coefficients For Vent Streams Controlled By an Incinerator (continued)

Design Category A2. For Halogenated Process Vent Streams, If Net Heating Value > 3.5:

Q_s = Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 18.8$	18.84466	0.26742	−0.20044	0	0	0.01025
$18.8 < Q_s \leq 699$	19.66658	0.26742	−0.25332	0	0	0.01025
$699 < Q_s \leq 1400$	39.19213	0.29062	−0.25332	0	0	0.01449
$1400 < Q_s \leq 2100$	58.71768	0.30511	−0.25332	0	0	0.01775
$2100 < Q_s \leq 2800$	78.24323	0.31582	−0.25332	0	0	0.02049
$2800 < Q_s \leq 3500$	97.76879	0.32439	−0.25332	0	0	0.02291

Design Category B. For Nonhalogenated Process Vent Streams, If $0 \leq$ Net Heating Value (MJ/scm) ≤ 0.48:

Q_s = Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1340$	8.54245	0.10555	0.09030	−0.17109	0	0.01025
$1340 < Q_s \leq 2690$	16.94386	0.11470	0.09030	−0.17109	0	0.01449
$2690 < Q_s \leq 4040$	25.34528	0.12042	0.09030	−0.17109	0	0.01775

Design Category C. For Nonhalogenated Process Vent Streams, If $0.48 <$ Net Heating Value (MJ/scm) ≤ 1.9:

Q_s = Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1340$	9.25233	0.06105	0.31937	−0.16181	0	0.01025
$1340 < Q_s \leq 2690$	18.36363	0.06635	0.31937	−0.16181	0	0.01449
$2690 < Q_s \leq 4040$	27.47492	0.06965	0.31937	−0.16181	0	0.01775

Design Category D. For Nonhalogenated Process Vent Streams, If $1.9 <$ Net Heating Value (MJ/scm) ≤ 3.6:

Q_s = Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1180$	6.67868	0.06943	0.02582	0	0	0.01025
$1180 < Q_s \leq 2370$	13.21633	0.07546	0.02582	0	0	0.01449
$2370 < Q_s \leq 3550$	19.75398	0.07922	0.02582	0	0	0.01775

Design Category E. For Nonhalogenated Process Vent Streams, If Net Heating Value $\leq$ 3.6 MJ/scm:

Y_s = Dilution Flow Rate (scm/min) = $(Q_s)(H_T)/3.6$	a	b	c	d	e	f
$14.2 \leq Y_s \leq 1180$	6.67868	0	0	−0.00707	0.02220	0.01025
$1180 < Y_s \leq 2370$	13.21633	0	0	−0.00707	0.02412	0.01449
$2370 < Y_s \leq 3550$	19.75398	0	0	−0.00707	0.02533	0.01775

b. Where for a vent stream flow rate (scm/min) at a standard temperature of 20°C that is less than 14.2 scm/min:

TRE is the TRE index value

Q_s = 14.2 scm/min

H_T is the (FLOW) (HVAL)/14.2

where the following inputs are used:

FLOW is the vent stream flow rate (scm/min), at a standard temperature of 20°C

HVAL is the vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to 1 mole is 20°C as in the definition of Q_s

Y_s = 14.2 scm/min for all vent stream categories listed in Table 1 except for Category E vent streams, where $Y_s = (14.2)(H_T)/3.6$

E_{TOC} is the hourly emissions of TOC reported in kg/hr

a,b,c,d,e and f are coefficients

The set of coefficients that apply to a vent stream shall be obtained from Table 1.

2. The equation for calculating the TRE index value of a vent stream controlled by a flare is as follows:

$$TRE = \frac{1}{E_{TOC}}[a(Q_s) + b(Q_s)^{0.8} + c(Q_s)(H_T) + d(E_{TOC}) + e]$$

TRE is the TRE index value

E_{TOC} is the hourly emission rate of TOC reported in kg/hr

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm) where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to 1 mole is 20°C as in the definition of Q_s

a,b,c,d and e are coefficients

The set of coefficients that apply to a vent stream shall be obtained from Table 2.

Table 2. Air Oxidation Processes NSPS TRE Coefficients For Vent Streams Controlled By a Flare

	a	b	c	d	e
$H_T < 11.2$ MJ/scm	2.25	0.288	−0.193	−0.0051	2.08
$H_T \geq 11.2$ MJ/scm	0.309	0.0619	−0.0043	−0.0034	2.08

(f) Each owner or operator of an affected facility seeking to comply with sub. (1) (c) or (3) (c) shall recalculate the TRE index value for that affected facility whenever process changes are made. Some examples of process changes are changes in production capacity, feedstock type or catalyst type or whenever there is replacement, removal or addition of recovery equipment. The TRE index value shall be recalculated based on test data or on best engineering estimates of the effects of the change to the recovery system.

1. Where the recalculated TRE index value is less than or equal to 1.0, the owner or operator shall notify the department within 1 week of the recalculation and shall conduct a performance test according to the methods and procedures required by sub. (5) to determine compliance with sub. (3) (a). Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

2. Where the initial TRE index value is greater than 4.0 and the recalculated TRE index value is less than or equal to 4.0, but greater than 1.0, the owner or operator shall conduct a performance test in accordance with s. NR 440.08 and this subsection, and shall comply with subs. (4) and (6) and this subsection. Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to sub. (3) shall notify the department of the specific provisions of sub. (3) with which the owner or operator has elected to comply. Notification shall be submitted with the notification of initial startup required by s. NR 440.07 (1) (c). If an owner or operator elects at a later date to use an alternative provision of sub. (3) with which he or she will comply, then the department shall be notified by the owner or operator 90 days before implementing a change and, upon implementing the change, a performance test shall be performed as specified by sub. (5) within 180 days.

(b) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible records of the following data measured during each performance test and also include the following data in the report of the initial performance test required under s. NR 440.08. Where a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used to comply with sub. (3) (a), a report containing performance test data need not be submitted, but a report containing the information of subd. 2. a. is required. The same data specified in this subsection shall be submitted in the reports of all subsequently required performance tests where either the emission control efficiency of a control device, outlet concentration of TOC or the TRE index value of a vent stream from a recovery system is determined.

1. Where an owner or operator subject to this section seeks to demonstrate compliance with sub. (3) (a) through use of either a thermal or catalytic incinerator:

a. The average firebox temperature of the incinerator, or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator, measured at least every 15 minutes and averaged over the same time period of the performance testing, and

b. The percent reduction of TOC determined as specified in sub. (5) (b) achieved by the incinerator or the concentration of TOC (ppmv, by compound) determined as specified in sub. (5) (b) at the outlet of the control device on a dry basis corrected to 3% oxygen.

2. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (a) through use of a boiler or process heater:

a. A description of the location at which the vent stream is introduced into the boiler or process heater, and

b. The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 MW (150 million Btu/hr) measured at least every 15 minutes and averaged over the same time period of the performance testing.

3. Where an owner or operator subject to the provisions of this section seeks to comply with sub. (3) (b) through the use of a smokeless flare, flare design, that is, steam–assisted, air–assisted or nonassisted, all visible emission readings, heat content determinations, flow rate measurements and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring and records of all periods of operations during which the pilot flame is absent.

4. Where an owner or operator seeks to demonstrate compliance with sub. (3) (c).

a. Where an absorber is the final recovery device in a recovery system, the exit specific gravity, or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved by the department, and average exit temperature of the absorbing liquid, measured at least every 15 minutes and averaged over the same time period of the performance testing, both measured while the vent stream is normally routed and constituted; or

b. Where a condenser is the final recovery device in a recovery system, the average exit, that is, product side, temperature, measured at least every 15 minutes and average over the same time period of the performance testing while the vent stream is normally routed and constituted.

c. Where a carbon adsorber is the final recovery device in a recovery system, the total steam mass flow measured at least every 15 minutes and averaged over the same time period of the performance test, that is, full carbon bed cycle, temperature of the carbon bed after regeneration, and within 15 minutes of completion of any cooling cycle, and duration of the carbon bed steaming cycle, all measured while the vent stream is normally routed and constituted; or

d. As an alternative to subd. 4. a., b. or c., the concentration level or reading indicated by the organic monitoring device at the outlet of the absorber, condenser or carbon adsorber measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is normally routed and constituted.

e. All measurements and calculations performed to determine the TRE index value of the vent stream.

(c) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (a) and (c) as well as up–to–date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where a combustion device is used by an owner or operator seeking to demonstrate compliance with sub. (3) (a) or (c), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. For thermal incinerators, all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average temperature of the vent stream during the most recent performance test at which compliance with sub. (3) (a) was determined.

2. For catalytic incinerators, all 3–hour periods of operation during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the vent stream during the most recent performance test at which compliance with sub. (3) (a) was determined. The owner or operator also shall record all 3–hour periods of operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference of the device during the most recent per-

formance test at which compliance with sub. (3) (a) was determined.

3. All 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined for boilers or process heaters with a design heat input capacity of less than 44 MW (150 million Btu/hr).

4. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under sub. (3) (a).

(d) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the flow indication specified under sub. (4) (a) 2., (b) 2. and (c) 1. as well as up–to–date, readily accessible records of all periods when the vent stream is diverted from the control device or has no flow rate.

(e) Each owner or operator subject to the provisions of this section who uses a boiler or process heater with a design heat input capacity of 44 MW or greater to comply with sub. (3) (a) shall keep an up–to–date, readily accessible record of all periods of operation of the boiler or process heater.

Note: Examples of such records could include records of steam use, fuel use or monitoring data collected pursuant to other state or federal regulatory requirements.

(f) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the flare pilot flame monitoring specified in sub. (4) (b), as well as up–to–date, readily accessible records of all periods of operations in which the pilot flame is absent.

(g) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (c) as well as up–to–date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where the owner or operator seeks to demonstrate compliance with sub. (3) (c), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. Where an absorber is the final recovery device in a recovery system and where an organic monitoring device is not used:

a. All 3–hour periods of operation during which the average absorbing liquid temperature was more than 11°C (20°F) above the average absorbing liquid temperature during the most recent performance test or

b. All 3–hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above or more than 0.1 unit below, the average absorbing liquid specific gravity during the most recent performance test, unless monitoring of an alternative parameter, which is a measure of the degree of absorbing liquid saturation, is approved by the department, in which case the department will define appropriate parameter boundaries and periods of operation during which they are exceeded.

2. When a condenser is the final recovery device in a recovery system and where an organic monitoring device is not used, all 3–hour periods of operation during which the average exit or product side condenser operating temperature was more than 6°C (11°F) above the average exit (product side) operating temperature during the most recent performance test.

3. Where a carbon adsorber is the final recovery device in a recovery system and where an organic monitoring device is not used:

a. All carbon bed regeneration cycles during which the total mass steam flow was more than 10% below the total mass steam flow during the most recent performance test; or

b. All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration, and after completion of any cooling cycle, was more than 10% greater than the carbon bed temperature, in degrees Celsius, during the most recent performance test.

4. Where an absorber, condenser or carbon adsorber is the final recovery device in the recovery system and an organic monitoring device approved by the department is used, all 3–hour periods of operation during which the average concentration level or reading of organic compounds in the exhaust gases is more than 20% greater than the exhaust gas organic compound concentration level or reading measured by the monitoring device during the most recent performance test.

(h) Each owner or operator subject to the provisions of this section and seeking to demonstrate compliance with sub. (3) (c) shall keep up–to–date, readily accessible records of:

1. Any changes in production capacity, feedstock type or of any replacement, removal or addition of recovery equipment or air oxidation reactors;

2. Any recalculation of the TRE index value performed pursuant to sub. (5) (f);

3. The results of any performance test performed pursuant to the methods and procedures required by sub. (5) (d).

(i) Each owner and operator subject to the provisions of this section is exempt from the quarterly reporting requirements contained in s. NR 440.07 (3).

(j) Each owner or operator that seeks to comply with the requirements of this section by complying with the requirements of sub. (3) shall submit to the department semiannual reports of the following information. The initial report shall be submitted within 6 months after the initial startup date.

1. Exceedances of monitored parameters recorded under pars. (c) and (g).

2. All periods recorded under par. (d) when the vent stream is diverted from the control device or has no flow rate.

3. All periods recorded under par. (e) when the boiler or process heater was not operating.

4. All periods recorded under par. (f) in which the pilot flame of the flare was absent.

5. Any recalculation of the TRE index value, as recorded under par. (h).

Note: The requirements of par. (j) remain in force until and unless EPA, in delegating enforcement authority to a state under section 111 (c) of the act, approves reporting requirements or an alternative means of compliance surveillance adopted by such state. In that event, affected sources within the state will be relieved of the obligation to comply with par. (j), provided that they comply with the requirements established by the state.

(L) The department will specify appropriate reporting and recordkeeping requirements where the owner or operator of an affected facility seeks to demonstrate compliance with the standards specified under sub. (3) other than as provided under sub. (4) (a) to (d).

(7) RECONSTRUCTION. (a) For purposes of this section "fixed capital cost of the new components", as used in s. NR 440.15, includes the fixed capital cost of all depreciable components which are or will be replaced pursuant to all continuous programs of components which are commenced within any 2–year period following October 21, 1983. For purposes of this paragraph,"commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(8) CHEMICALS AFFECTED BY THIS SECTION.

Chemical Name	CAS No.*
Acetaldehyde	75–07–0
Acetic acid	64–19–7
Acetone	67–64–1
Acetonitrile	75–05–8
Acetophenone	98–86–2
Acrolein	107–02–8
Acrylic acid	79–10–7
Acrylonitrile	107–13–1
Anthraquinone	84–65–1
Benzaldehyde	100–52–7
Benzoic acid, tech	65–85–0
1,3–Butadiene	106–99–0
p–t–Butyl benzoic acid	98–73–7
N–Butyric acid	107–92–6
Crotonic acid	3724–65–0
Cumene hydroperoxide	80–15–9
Cyclohexanol	108–93–0
Cyclohexanone	108–94–1
Dimethyl terephthalate	120–61–6
Ethylene dichloride	107–06–2
Ethylene oxide	75–21–8
Formaldehyde	50–00–0
Formic acid	64–18–6
Glyoxal	107–22–2
Hydrogen cyanide	74–90–8
Isobutyric acid	79–31–2–5
Isophthalic acid	121–91
Maleic anhydride	108–31–6
Methyl ethyl ketone	78–93–3
α–Methyl styrene	98–83–9
Phenol	108–95–2
Phthalic anhydride	85–44–9
Propionic acid	79–09–4
Propylene oxide	75–56–9
Styrene	100–42–5
Terephthalic acid	100–21–0

*CAS numbers refer to the Chemical Abstracts Service Registry numbers assigned to specific isomers or mixtures of chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed, whether CAS numbers have been assigned or not.

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (a) 1. (intro.), (d) 1. a., 3. a., (5) (e) 1. a., Register, December, 1995, No. 480, eff. 1–1–96; **renum. (2) (a) (intro.) and 1. to 18. to be (2) (intro.) and (a) to (r), am. (2) (p), Register, November, 1999, No. 527, eff. eff. 12–1–99.**

NR 440.68 Petroleum dry cleaners. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities located at a petroleum dry cleaning plant with a total manufacturer's rated dryer capacity equal to or greater than 38 kilograms (84 pounds): Petroleum solvent dry cleaning dryers, washers, filters, stills and settling tanks.

1. When the affected facility is installed in an existing plant that is not expanding the manufacturer's rated capacity of its petroleum solvent dryer(s) the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated capacity for each existing petroleum solvent dryer.

2. When the affected facility is installed in a plant that is expanding the manufacturer's rated capacity of its petroleum solvent dryers the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated dryer capacity for each existing and proposed new petroleum solvent dryer.

3. When the affected facility is installed in a new plant the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated dryer capacity for each proposed new petroleum solvent dryer.

4. The petroleum solvent dryers considered in the determination of the total manufacturer's rated dryer capacity are those new and existing dryers in the plant that will be in service at any time after the proposed new source or modification commences operation.

(b) Any facility under par. (a) that commences construction or modification after December 14, 1982, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Cartridge filter" means a discrete filter unit containing both filter paper and activated carbon that traps and removes contaminants from petroleum solvent together with the piping and ductwork used in the installation of this device.

(b) "Dryer" means a machine used to remove petroleum solvent from articles of clothing or other textile or leather goods, after washing and removing of excess petroleum solvent, together with the piping and ductwork used in the installation of this device.

(c) "Manufacturer's rated dryer capacity" means the dryer's rated capacity of articles, in pounds or kilograms of clothing articles per load, dry basis, that is typically found on each dryer on the manufacturer's name–plate or in the manufacturer's equipment specifications.

(d) "Perceptible leaks" means any petroleum solvent vapor or liquid leaks that are conspicuous from visual observation or that bubble after application of a soap solution such as pools or droplets of liquid, open containers or solvent, or solvent laden waste standing open to the atmosphere.

(e) "Petroleum dry cleaner" means a dry cleaning facility that uses petroleum solvent in a combination of washers, dryers, filters, stills and settling tanks.

(f) "Settling tank" means a container that gravimetrically separates oils, grease and dirt from petroleum solvent together with the piping and ductwork used in the installation of this device.

(g) "Solvent filter" means a discrete solvent filter unit containing a porous medium that traps and removes contaminants from petroleum solvent together with the piping and ductwork used in the installation of this device.

(h) "Solvent recovery dryer" means a class of dry cleaning dryers that employs a condenser to condense and recover solvent vapors evaporated in a closed–loop stream of heated air together with the piping and ductwork used in the installation of this device.

(i) "Still" means a device used to volatilize, separate and recover petroleum solvent from contaminated solvent together with the piping and ductwork used in the installation of this device.

(j) "Washer" means a machine which agitates fabric articles in a petroleum solvent bath and spins the articles to remove the solvent together with the piping and ductwork used in the installation of this device.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each affected petroleum solvent dry cleaning dryer that is installed at a petroleum dry cleaning plant shall be a solvent recovery dryer. The solvent recovery dryers shall be properly installed, operated and maintained.

(b) Each affected petroleum solvent filter that is installed at a petroleum dry cleaning plant shall be a cartridge filter. Cartridge filters shall be drained in their sealed housings for at least 8 hours prior to their removal.

(c) Each manufacturer of an affected petroleum solvent dryer shall include leak inspection and leak repair cycle information in the operating manual and on a clearly visible label posted on each affected facility. Such information should state:

To protect against fire hazards, loss of valuable solvents and emissions of solvent to the atmosphere, periodic inspection of this equipment for evidence of leaks and prompt repair of any leaks is recommended. The Wisconsin Department of Natural Resources recommends that the equipment be inspected every 15 days and all vapor or liquid leaks be repaired within the subsequent 15 day period.

Note: The administrator may approve the use of equipment of procedures that have been demonstrated to be equivalent, in terms of reducing VOC emissions, to those prescribed for compliance in this section, under 40 CFR 60.623.

(5) TEST METHODS AND PROCEDURES. Each owner or operator of an affected facility subject to the provisions of sub. (3) (a) shall perform an initial test to verify that the flow rate of recovered solvent from the solvent recovery dryer at the termination of the recovery cycle is no greater than 0.05 liters per minute. This test shall be conducted for a duration of no less than 2 weeks during which no less than 50% of the dryer loads shall be monitored for their final recovered solvent flow rate. The suggested point for measuring the flow rate of recovered solvent is from the outlet of the solvent–water separator. Near the end of the recovery cycle the entire flow of recovered solvent should be diverted to a graduated cylinder. As the recovered solvent collects in the graduated cylinder the elapsed time is monitored and recorded in periods of greater than or equal to 1 minute. At the same time the volume of solvent in the graduated cylinder is monitored and recorded to determine the volume of recovered solvent that is collected during each time period. The recovered solvent flow rate is calculated by dividing the volume of solvent collected per period by the length of time elapsed during the period and converting the result with appropriate factors into units of liters per minute. The recovery cycle and the monitoring procedure should continue until the flow rate of solvent is less than or equal to 0.05 liter per minute. The type of articles cleaned and the total length of the cycle should then be recorded.

(6) RECORDKEEPING REQUIREMENTS. Each owner or operator of an affected facility subject to the provisions of this section shall maintain a record of the performance test required under sub. (5).

History: Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (2) Intro.), r. (4), Register, September, 1990, No. 417, eff. 10–1–90.

NR 440.682 Equipment leaks of VOC from onshore natural gas processing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY: (a) 1. The provisions of this section apply to affected facilities in onshore natural gas processing plants.

2. A compressor in VOC service or in wet gas service is an affected facility.

3. The group of all equipment except compressors, as defined in sub. (2), within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction, reconstruction or modification after January 20, 1984 is subject to the requirements of this section.

(c) Addition or replacement of equipment, as defined in sub. (2), for the purpose of process improvement that is accomplished without a capital expenditure may not by itself be considered a modification under this section.

(d) Facilities covered by s. NR 440.62 or 440.66 are excluded from this section.

(e) A compressor station, dehydration unit, sweetening unit, underground storage tank, field gas gathering system, or liquified natural gas unit is covered by this section if it is located at an onshore natural gas processing plant. If the unit is not located at the plant site, then it is exempt from the provisions of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02 or 440.62.

(a) "Alaskan north slope" means the approximately 69,000 square–mile area extending from the Brooks Range to the Arctic Ocean.

(b) "Equipment" means each pump, pressure relief device, open–ended valve or line, valve, compressor, and flange or other connector that is in VOC service or in wet gas service and any device or system required by this section.

(c) "Field gas" means feedstock gas entering the natural gas processing plant.

(d) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in s. NR 440.62 (6) (e) or sub. (4) (h) 2.

(e) "In wet gas service" means that a piece of equipment contains or contacts the field gas before the extraction step in the process.

(f) "Natural gas liquids" means the hydrocarbons, such as ethane, propane, butane and pentane, that are extracted from field gas.

(g) "Natural gas processing plant" or "gas plant" means any processing site engaged in the extraction of natural gas liquids from field gas fractionation of mixed natural gas liquids to natural gas products, or both.

(h) "Nonfractionating plant" means any gas plant that does not fractionate mixed natural gas liquids into natural gas products.

(i) "Onshore" means all facilities except those that are located in the territorial seas or on the outer continental shelf.

(j) "Process unit" means equipment assembled for the extraction of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the products.

(k) "Reciprocating compressor" means a piece of equipment that increases the pressure of a process gas by positive displacement employing linear movement of the driveshaft.

(3) STANDARDS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of s. NR 440.62 (3) (a) 1., 2. and 4., and (b) to (j), except as provided in sub. (4), as soon as practicable, but no later than 180 days after initial startup.

(b) An owner or operator may elect to comply with the requirements of s. NR 440.62 (4) (a) and (b).

(c) An owner or operator may apply to the department for permission to use an alternative means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to that achieved by the controls required in this section. In doing so, the owner or operator shall comply with requirements of sub. (5).

(d) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (6) except as provided in sub. (4) (f).

(e) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (7) and (8) except as provided in subs. (4), (6) and (7).

(f) An owner or operator shall use the following provisions instead of s. NR 440.62 (6) (d) 1. Each piece of equipment is presumed to be in VOC service or in wet gas service unless an owner or operator demonstrates that the piece of equipment is not in VOC service or in wet gas service. For a piece of equipment to be considered not in VOC service, it shall be determined that the percent VOC content can be reasonably expected never to exceed 10.0% by weight. For a piece of equipment to be considered in wet gas service, it shall be determined that it contains or contacts the field gas before the extraction step in the process. For purposes of determining the percent VOC content of the process fluid that is contained in or contacts a piece of equipment, procedures that conform to the methods described in ASTM Methods E169−63, E168−67, or E260−73, incorporated by reference in s. NR 440.17, shall be used.

(4) EXCEPTIONS. (a) Each owner or operator subject to the provisions of this section may comply with the exceptions to the provisions of s. NR 440.62.

(b) 1. Each pressure relief device in gas/vapor service may be monitored quarterly and within 5 days after each pressure release to detect leaks by the methods specified in s. NR 440.62 (6) (b) except as provided in sub. (3) (c), subd. 4., and s. NR 440.62 (3) (d).

2. If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

3. a. When a leak is detected, it shall be repaired as soon as practicable, but no later than 15 calendar days after it is detected except as provided in s. NR 440.62 (3) (i).

b. A first attempt at repair shall be made no later then 5 calendar days after each leak is detected.

4. a. Any pressure relief device that is located in a nonfractionating plant that is monitored only by nonplant personnel may be monitored after a pressure release the next time the monitoring personnel are on site, instead of within 5 days as specified in subd. 1. and s. NR 440.62 (3) (d) 2. a.

b. No pressure relief device described in subd. 4. a. may be allowed to operate for more than 30 days after a pressure release without monitoring.

(c) Sampling connection systems are exempt from the requirements of s. NR 440.62 (3) (e).

(d) Pumps in light liquid service, valves in gas/vapor and light liquid service and pressure relief devices in gas vapor service that are located at a nonfractionating plant that does not have the design capacity to process 283,000 standard cubic meters per day (scmd) (10 million scf/day) or more of field gas are exempt from the routine monitoring requirements of s. NR 440.62 (3) (b) 1. a. and (g) 1. and par. (b) 1.

(e) Pumps in light liquid service, valves in gas/vapor and light liquid service, and pressure relief devices in gas/vapor service within a process unit that is located in the Alaskan North Slope are exempt from the routine monitoring requirements of ss. NR 440.62 (3) (b) 1. a., and (3) (g) 1. and par. (b) 1.

(f) Reciprocating compressors in wet gas service are exempt from the compressor control requirements of s. NR 440.62 (3) (c).

(g) Flares used to comply with this section shall comply with requirements of s. NR 440.18.

(h) An owner or operator may use the following provisions instead of s. NR 440.62 (6) (e).

1. Equipment is in heavy liquid service if the weight percent evaporated is 10% or less at 150°C as determined by ASTM Method D86−78, incorporated by reference in s. NR 440.17.

2. Equipment is in light liquid service if the weight percent evaporated is greater than 10% at 150°C as determined by ASTM Method D86−78, incorporated by reference in s. NR 440.17.

(5) ALTERNATIVE MEANS OF EMISSION LIMITATION. (a) If, in the administrator's judgement, an alternative means of emission limitation will achieve a reduction in VOC emissions at least equivalent to the reduction in VOC emissions achieved under any design, equipment, work practice or operational standard, the administrator will publish, in the federal register, a notice permitting the use of that alternative means for the purpose of compliance with that standard. The notice may condition permission on requirements related to the operation and maintenance of the alternative means.

(b) Any notice under par. (a) shall be published only after notice and an opportunity for a public hearing.

(c) The administrator will consider applications under this subsection from either owners or operators of affected facilities, or manufacturers of control equipment.

(d) The administrator will treat applications under this subsection according to the following criteria, except in cases where he or she concludes that other criteria are appropriate:

1. The applicant shall collect, verify and submit test data, covering a period of at least 12 months, necessary to support the finding in par. (a).

2. If the applicant is an owner or operator of an affected facility, he or she shall commit in writing to operate and maintain the alternative means so as to achieve a reduction in VOC emissions at least equivalent to the reduction in VOC emissions achieved under the design, equipment, work practice or operational standard.

(6) RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of pars. (b) and (c) in addition to the requirements of s. NR 440.62 (7).

(b) The following recordkeeping requirements shall apply to pressure relief devices subject to the requirements of sub. (4) (b) 1.:

1. When each leak is detected as specified in sub. (4) (b) 2., a weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment. The identification on the pressure relief device may be removed after it has been repaired.

2. When each leak is detected as specified in sub. (4) (b) 2., the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

a. The instrument and operator identification numbers and the equipment identification number.

b. The date the leak was detected and the dates of each attempt to repair the leak.

c. Repair methods applied in each attempt to repair the leak.

d. "Above 10,000 ppm" if the maximum instrument reading measured by the methods specified in after each repair attempt is 10,000 ppm or greater.

e. "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

f. The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

g. The expected date of successful repair of the leak if a leak is not repaired within 15 days.

h. Dates of process unit shutdowns that occur while the equipment is unrepaired.

i. The date of successful repair of the leak.

j. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of s. NR 440.62 (3) (d) 1. The designation of equipment subject to the provisions of s. NR 440.62 (3) (d) 1. signed by the owner or operator.

(c) An owner or operator shall comply with the following requirement in addition to the requirement of s. NR 440.62 (10): Information and data used to demonstrate that a reciprocating compressor is in wet gas service to apply for the exemption in sub. (4) (f) shall be recorded in a log that is kept in a readily accessible location.

(7) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of pars. (b) and (c) in addition to the requirements of s. NR 440.62 (8).

(b) An owner or operator shall include the following information in the initial semiannual report in addition to the information required in s. NR 440.62 (8) (b) 1. to 4.: number of pressure relief devices subject to the requirements of sub. (4) (b) except for those pressure relief devices designated for no detectable emission under the provision of s. NR 440.62 (3) (d) 1. and those pressure relief devices complying with s. NR 440.62 (3) (d) 3.

(c) An owner or operator shall include the following information in all semiannual reports in addition to the information required in s. NR 440.62 (8) (c) 2. a. to f.:

1. Number of pressure relief devices for which leaks were detected as required in sub. (4) (b) 2. and

2. Number of pressure relief devices for which leaks were not repaired as required in sub. (4) (b) 3.

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (4) (b) 3. a., Register, July, 1993, No. 451, eff. 8–1–93**; correction in (4) (b) and (d) made under s. 13.93 (2m) (b) 7., Register, November, 1999, No. 527.**

NR 440.684 Onshore natural gas processing: SO_2 emissions. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section are applicable to the following affected facilities that process natural gas: each sweetening unit, and each sweetening unit followed by a sulfur recovery unit.

(b) Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H_2S) in the acid gas (expressed as sulfur) are required to comply with sub. (8) (c) but are not required to comply with subs. (3) to (7).

(c) The provisions of this section are applicable to facilities located on land and include facilities located onshore which process natural gas produced from either onshore or offshore wells.

(d) The provisions of this section apply to each affected facility identified in par. (a) which commences construction or modification after January 20, 1984.

(e) The provisions of this section do not apply to sweetening facilities producing acid gas that is completely reinjected into oil–or–gas–bearing geologic strata or that is otherwise not released to the atmosphere.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

1. "Acid gas" means a gas stream of hydrogen sulfide (H_2S) and carbon dioxide (CO_2) that has been separated from sour natural gas by a sweetening unit.

2. "Natural gas" means a naturally occurring mixture of a hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface. The principal hydrocarbon constituent is methane.

3. "Onshore" means all facilities except those that are located in the territorial seas or on the outercontinental shelf.

4. "Reduced sulfur compounds" means hydrogen sulfide (H_2S), carbonyl sulfide (COS), and carbon disulfide (CS_2).

5. "Sulfur production rate" means the rate of liquid sulfur accumulation from the sulfur recovery unit.

6. "Sulfur recovery unit" means a process device that recovers element sulfur from acid gas.

7. "Sweetening unit" means a process device that separates the H_2S and CO_2 contents from the sour natural gas stream.

8. "Total SO_2 equivalents" means the sum of volumetric or mass concentrations of the sulfur compounds obtained by adding the quantity existing as SO_2 to the quantity of SO_2 that would be obtained if all reduced sulfur compounds were converted to SO_2 (ppmv or kg/DSCM).

(b) As used in this section, all symbols not defined in this subsection have the meanings given them in s. NR 440.03.

1. "E" = the sulfur emission rate expressed as elemental sulfur, kilograms per hour (kg/hr) rounded to one decimal place.

2. "P" = the sulfur emission reduction efficiency achieved in percent carried to one decimal place.

3. "S" = the sulfur production rate in kilograms per hour (kg/hr) rounded to one decimal place.

4. "TRS" = the total concentration of reduced sulfur compounds as determined by Method 15 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, if the source is a reduction–type device or the concentration of total reduced sulfur compounds as determined by Method 16A of Appendix A of 40 CFR part 60 if the source is an oxidation–type device.

5. "X" = the sulfur feed rate, i.e., the H_2S in the acid gas (expressed as sulfur) from the sweetening unit, expressed in long tons per day (LT/D) of sulfur rounded to one decimal place.

6. "Y" = the sulfur content of the acid gas from the sweetening unit, expressed as mole percent H_2S (dry basis) rounded to one decimal place.

7. "Z" = the minimum required sulfur dioxide (SO_2) emission reduction efficiency, expressed as percent carried to one decimal place. Z_i refers to the reduction efficiency required at the initial performance test. Z_c refers to the reduction efficiency required on a continual basis after compliance with Z_i has been demonstrated.

(3) STANDARDS FOR SULFUR DIOXIDE. (a) During the initial performance test required by s. NR 440.08 (2), each owner or operator shall achieve, at a minimum, an SO_2 emission reduction efficiency (Z_i) to be determined from Table 1 based on the sulfur feed rate (X) and the sulfur content of the acid gas (Y) of the affected facility.

(b) After demonstrating compliance with the provisions of par. (a), the owner or operator shall achieve, at a minimum, an SO_2 emission reduction efficiency (Z_c) to be determined from Table 2 based on the sulfur feed rate (X) and the sulfur content of the acid gas (Y) of the affected facility.

(4) COMPLIANCE PROVISIONS. (a) 1. To determine compliance with the standards for sulfur dioxide specified in sub. (3) (a), during the initial performance test as required by s. NR 440.08, the minimum required sulfur dioxide emissions reduction efficiency (Z) is compared to the emission reduction efficiency (R) achieved by the sulfur recovery technology.

a. If R is greater than or equal to Z_i, the affected facility is in compliance.

b. If R is less than Z_i, the affected facility is not in compliance.

2. Following the initial determination of compliance as required by s. NR 440.08, any subsequent compliance determinations that may be required by the department shall compare R to Z_c.

(b) The emission reduction efficiency (R) achieved by the sulfur recovery technology shall be determined using the procedures in sub. (5) (c) 1.

Table 1. Required Minimum Initial SO_2 Emission Reduction Efficiency (Z_i)

H_2S content of acid gas (Y), %	Sulfur feed rate (X), LT/D			
	$2.0 \le X \le 5.0$	$5.0 < X \le 15.0$	$15.0 < X \le 300.0$	$X > 300.0$
$Y \ge 50$	79.0	.... $88.51X^{0.0101}Y^{0.0125}$ or 99.8, whichever is smaller		
$20 \le Y < 50$	79.0	.... $88.51X^{0.0101}Y^{0.0125}$ or 97.9, whichever is smaller		97.9
$10 \le Y < 20$	79.0	$88.51X^{0.0101}Y^{0.0125}$ or 93.5, whichever is smaller	93.5	93.5
$Y < 10$	79.0	79.0	79.0	79.0

Table 2. Required Minimum SO_2 Emission Reduction Efficiency (Z_c)

H_2S content of acid gas (Y), %	Sulfur feed rate (X), LT/D			
	$2.0 \le X \le 5.0$	$5.0 < X \le 15.0$	$15.0 < X \le 300.0$	$X > 300.0$
$Y \ge 50$	74.0	.... $85.35X^{0.0144}Y^{0.0128}$ or 99.8, whichever is smaller		
$20 \le Y < 50$	74.0	..... $85.35X^{0.0144}Y^{0.0128}$ or 97.5, whichever is smaller		97.5
$10 \le Y < 20$	74.0	$85.35X^{0.0144}Y^{0.0128}$ or 90.8, whichever is smaller	90.8	90.8
$Y < 10$	74.0	74.0	74.0	74.0

(5) Test methods and procedures. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) During a performance test required by s. NR 440.08, the owner or operator shall determine the minimum required reduction efficiencies (Z) of SO_2 emissions as required in sub. (3) (a) and (b) as follows:

1. The average sulfur feed rate (X) shall be computed as follows:

$$X = K\,Q_a\,Y$$

where:

X is the average sulfur feed rate, long ton/day

Q_a is the average volumetric flow rate of acid gas from sweetening unit, dscf/day

Y is the average H_2S concentration in acid gas feed from sweetening unit, percent by volume

K = (32 lb S/lb–mole)/[(100%) (385.36 dscf/lb–mole) (2240 lb/long ton)] = 3.707×10^{-7}

2. The continuous readings from the process flowmeter shall be used to determine the average volumetric flow rate (Q_a) in dscf/day of the acid gas from the sweetening unit for each run.

3. The Tutwiler procedure in sub. (9) or a chromatographic procedure following ASTM E260–73, incorporated by reference in s. NR 440.17, shall be used to determine the H_2S concentration in the acid gas feed from the sweetening unit. At least one sample per hour, at equally spaced intervals, shall be taken during each 4–hour run. The arithmetic mean of all samples shall be the average H_2S concentration (Y) on a dry basis for the run. By multiplying the result from the Tutwiler procedure by 1.62×10^{-3}, the units gr/100 scf are converted to volume percent.

4. Using the information from par. (b) 1. and 3., Tables 1 and 2 shall be used to determine the required initial (Z_i) and continuous (Z_c) reduction efficiencies of SO_2 emissions.

(c) The owner or operator shall determine compliance with the SO_2 standards in sub. (3) (a) or (b) as follows:

1. The emission reduction efficiency (R) achieved by the sulfur recovery technology shall be computed for each run using the following equation:

$$R = (100\,S)/(S + E)$$

2. The level indicators or manual soundings shall be used to measure the liquid sulfur accumulation rate in the product storage tanks. Readings taken at the beginning and end of each run, the tank geometry, sulfur density at the storage temperature and sample duration shall be used to determine the sulfur production rate (S) in kg/hr for each run.

3. The emission rate (E) of sulfur shall be computed for each run as follows:

$$E = C_e\,Q_{sd}/K$$

where:

C_e is the concentration of sulfur equivalent (SO_2 + TRS), g/dscm

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr

K is the conversion factor, 1000 g/kg

4. The concentration (C_e) of sulfur equivalent shall be the sum of the SO_2 and TRS concentrations, after being converted to sulfur equivalents. For each run and each of the test methods specified in par. (c), the sampling time shall be at least 4 hours. Method 1 shall be used to select the sampling site. The sampling point in the duct shall be at the centroid of the cross– section if the area is less than 5 m^2 (54 ft^2) or at a point no closer to the walls than 1 m (39 in.) if the cross–sectional area is 5 m^2 or more and the centroid is more than 1 m (39 in.) from the wall.

a. Method 6 shall be used to determine the SO_2 concentration. Eight samples of 20 minutes each shall be taken at 30–minute intervals. The arithmetic average in mg/dscm shall be the concentration for the run. The concentration in mg/dscm shall be multiplied by 0.5×10^{-3} to convert the results to sulfur equivalent.

b. Method 15 shall be used to determine the TRS concentration from reduction–type devices or where the oxygen content of the effluent gas is less than 1.0% by volume. The sampling rate shall be at least 3 liters/min (0.1 ft^3/min) to insure minimum residence time in the sample line. Sixteen samples shall be taken at 15–minute intervals. The arithmetic average of all the samples shall be the concentration for the run. The concentration in ppm TRS as SO_2 shall be multiplied by 1.352×10^{-3} to convert the results to sulfur equivalent.

c. Method 16A shall be used to determine the TRS concentration from oxidation–type devices or where the oxygen content of the effluent gas is greater than 1.0% by volume. Eight samples of 20 minutes each shall be taken at 30–minute intervals. The arithmetic average shall be the concentration for the run. The concentration in ppm TRS as H_2S shall be multiplied by 1.352×10^{-3} to convert the results to sulfur equivalent.

d. Method 2 shall be used to determine the volumetric flow rate of the effluent gas. A velocity traverse shall be conducted at the beginning and end of each run. The arithmetic average of the 2 measurements shall be used to calculate the volumetric flow rate (Q_{sd}) for the run. For the determination of the effluent gas molecular weight, a single integrated sample over the 4–hour period may be taken and analyzed or grab samples at 1–hour intervals may be taken, analyzed and averaged. For the moisture content, 2 samples of at least 0.10 dscm (0.35 dscf) and 10 minutes shall be taken at the beginning of the 4–hour run and near the end of the time period. The arithmetic average of the 2 runs shall be the moisture content for the run.

(d) To comply with sub. (7) (d), the owner or operator shall obtain the information required by using the monitoring devices in par. (b) or (c).

(7) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator subject to the provisions of sub. (3) (a) or (b) shall install, calibrate, maintain and operate monitoring devices or perform measurements to determine the following operations information on a daily basis:

1. The accumulation of sulfur product over each 24–hour period: The monitoring method may incorporate the use of an instrument to measure and record the liquid sulfur production rate, or may be a procedure for measuring and recording the sulfur liquid levels in the storage tanks with a level indicator or by manual soundings with subsequent calculation of the sulfur production rate based on the tank geometry, stored sulfur density, and elapsed time between readings. The method shall be designed to be accurate with ± 2% of the 24–hour sulfur accumulation.

2. The H_2S concentration in the acid gas from the sweetening unit for each 24–hour period: At least one sample per 24–hour period shall be collected and analyzed using the method specified in sub. (5) (b) 3. The department may require the owner or operator to demonstrate that the H_2S concentration obtained from one or more samples over a 24–hour period is within ± 20% of the average of 12 samples collected at equally spaced intervals during the 24–hour period. In instances where the H_2S concentration of a single sample is not within ± 20% of the average of the 12 equally spaced samples, the department may require a more frequent sampling schedule.

3. The average acid gas flow rate from the sweetening unit: The owner or operator shall install and operate a monitoring device to continuously measure the flow rate of acid gas. The monitoring device reading shall be recorded at least once per hour during each 24–hour period. The average acid gas flow rate shall be computed from the individual readings.

4. The sulfur feed rate (X): For each 24–hour period, X shall be computed using the equation in sub. (5) (b) 1.

5. The required sulfur dioxide emission reduction efficiency for the 24–hour period. The sulfur feed rate and the H_2S concentration in the acid gas for the 24–hour period as applicable, shall be used to determine the required efficiency in accordance with the provisions of sub. (3) (b).

(b) Where compliance is achieved through the use of an oxidation control system or a reduction control system followed by a continually operated incineration device, the owner or operator shall install, calibrate, maintain, and operate monitoring devices and continuous emission monitors as follows:

1. A continuous monitoring system to measure the total sulfur emission rate (E) of SO_2 in the gases discharged to the atmosphere. The SO_2 emission rate shall be expressed in terms of equivalent sulfur mass flow rates (kg/hr). The span of this monitoring system shall be set so that the equivalent emission limit of sub. (3) (b) will be between 30% and 70% of the measurement range of the instrument system.

2. Except as provided in subd. 3.: A monitoring device to measure the temperature of the gas leaving the combustion zone of the incinerator, if compliance with sub. (3) (a) is achieved through the use of an oxidation control system or a reduction control system followed by a continually operated incineration device. The monitoring device shall be certified by the manufacturer to be accurate to within ± 1% of the temperature being measured. When performance tests are conducted under the provision of s. NR 440.08 to demonstrate compliance with the standards under sub. (3), the temperature of the gas leaving the incinerator combustion zone shall be determined using the monitoring device. If the volumetric ratio of sulfur dioxide to sulfur dioxide plus total reduced sulfur (expressed as SO_2) in the gas leaving the incinerator is ≥ 0.98, then temperature monitoring may be used to demonstrate that sulfur dioxide emission monitoring is sufficient to determine total sulfur emissions. At all times during the operation of the facility, the owner or operator shall maintain the average temperature of the gas leaving the combustion zone of the incinerator at or above the appropriate level determined during the most recent performance test to ensure the sulfur compound oxidation criteria are met. Operation at lower average temperatures may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that the minimum incinerator temperature be reestablished by conducting new performance tests under s. NR 440.08.

3. The owner or operator may, as an alternative to subd. 2., install, calibrate, maintain, and operate a continuous emission monitoring system for total reduced sulfur compounds as required in par. (d) in addition to a sulfur dioxide emission monitoring system. The sum of the equivalent sulfur mass emission rates from the 2 monitoring systems shall be used to compute the total sulfur emission rate (E).

(c) Where compliance is achieved through the use of a reduction control system not followed by a continually operated incineration device, the owner or operator shall install, calibrate, maintain, and operate a continuous monitoring system to measure the emission rate of reduced sulfur compounds as SO_2 equivalent in the gases discharged to the atmosphere. The SO_2 equivalent compound emission rate shall be expressed in terms of equivalent sulfur mass flow rates (kg/hr). The span of this monitoring system shall be set so that the equivalent emission limit of sub. (3) (b) will be between 30 and 70% of the measurement range of the system.

(d) For those sources required to comply with pars. (b) and (c), the average sulfur emission reduction efficiency achieved (R) shall be calculated for each 24–hour clock interval. The 24–hour interval may begin and end at any selected clock time but shall be consistent. The 24–hour average reduction efficiency (R) shall be computed based on the 24–hour average sulfur production rate (S) and sulfur emission rate (E) using the equation in sub. (5) (c) 1.

1. Data obtained from the sulfur production rate monitoring device specified in par. (a) shall be used to determine S.

2. Data obtained from the sulfur emission rate monitoring systems specified in par. (b) or (c) shall be used to calculate a 24–hour average for the sulfur emission rate (E). The monitoring system shall provide at least one data point in each successive 15–minute interval. At least 2 data points shall be used to calculate each 1–hour average. A minimum of 18 1–hour averages shall be used to compute each 24–hour average. NR 440.684

(e) In lieu of complying with par. (b) or (c), those sources with a design capacity of less than 150 LT/D of H_2S expressed as sulfur may calculate the sulfur emission reduction efficiency achieved for each 24–hour period by:

$$R = \frac{0.0236\ S}{X}(100\%)$$

where:

R is the sulfur dioxide removal efficiency achieved during the 24–hour period, percent

S is the sulfur production rate during the 24–hour period, kg/hr

X is the sulfur feed rate in the acid gas LT/D

0.0236 is the conversion factor, LT/D per kg/hr

(f) The monitoring devices required in sub. (7) (b) 1., (b) 3., and (c) shall be calibrated at least annually according to the manufacturer's specifications as required by s. NR 440.13 (2).

(g) The continuous emission monitoring systems required in sub. (7) (b) 1., (b) 3., and (c) shall be subject to the emission monitoring requirements of s. NR 440.13. For conducting the continuous emission monitoring system performance evaluation required by s. NR 440.13 (3), Performance Specification 2 of 40 CFR part 60, Appendix B, incorporated by reference in s. NR 440.17, shall apply, and Method 6 of 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used for systems required by par. (b).

(8) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Records of the calculations and measurements required in subs. (3) (a) and (b) and (7) (a) to (g) shall be retained for at least 2 years following the date of the measurements by owners and operators subject to this section. This requirement is included under s. NR 440.07 (5).

(b) Each owner or operator shall submit a written report of excess emissions to the department semiannually. For the purpose of these reports, excess emissions are defined as:

1. Any 24–hour period (at consistent intervals) during which the average sulfur emission reduction efficiency (R) is less than the minimum required efficiency (Z).

2. For any affected facility electing to comply with the provisions of sub. (7) (b) 2., any 24–hour period during which the average temperature of the gases leaving the combustion zone of an incinerator is less than the appropriate operating temperatures determined during the most recent performance test in accordance with the provisions of sub. (7) (b) 2. Each 24–hour period shall consist of at least 96 temperature measurements equally spaced over the 24 hours.

(c) To certify that a facility is exempt from the control requirements of these standards, each owner or operator of a facility with a design capacity less than 2 LT/D of H_2S in the acid gas (expressed as sulfur) shall keep, for the life of the facility, an analysis demonstrating that the facility's design capacity is less than 2 LT/D of H_2S expressed as sulfur.

(d) Each owner or operator who elects to comply with sub. (7) (e) shall keep, for the life of the facility, a record demonstrating that the facility's design capacity is less than 150 LT/D of H_2S expressed as sulfur.

(9) OPTIONAL PROCEDURE FOR MEASURING HYDROGEN SULFIDE IN ACID GAS–TUTWILER PROCEDURE. (a) *General.* The Tutwiler procedure may be used to measure hydrogen sulfide in acid gas in accordance with the Gas Engineer's Handbook, first edition, second printing, Fuel Gas Engineering Practices, page 6/25, incorporated by reference in s. NR 440.17. When an instantaneous sample is desired and H_2S concentration is 10 grains per 1000 cubic foot or more, a 100 ml Tutwiler burette is used. For concentrations less than 10 grains, a 500 ml Tutwiler burette and more dilute solutions are used. In principle this method consists of titrating hydrogen sulfide in a gas sample directly with a standard solution of iodine.

(b) *Apparatus.* (See Figure 1.) A 100 or 500 ml capacity Tutwiler burette with 2–way glass stopcock at the bottom and 3–way stopcock at the top is connected either with inlet tubulature or a glass–stoppered cylinder, 10 ml capacity, graduated in 0.1 ml subdivisions, with rubber tubing connecting the burette with a leveling bottle.

(c) *Reagents.* 1. Iodine stock solution, 0.1N. Weigh out 12.7 g of iodine and 20 to 25 g cp potassium iodide for each liter of solution. Dissolve the KI in as little water as necessary and then dissolve the iodine in the concentrated KI solution, make up to proper volume, and store in a glass–stoppered brown glass bottle.

2. Standard iodine solution, 1 ml ± 0.001771 g I. Transfer 33.7 ml of the 0.1N stock solution into a 250 ml volumetric flask, add water to the mark and mix well. Then, for a 100 ml sample of gas, 1 ml of standard iodine solution is equivalent to 100 grains of H_2S per cubic foot of gas.

Starch solution. Rub into a thin paste about one teaspoonful of wheat starch with a little water, pour it into about a pint of boiling water and stir. After it has cooled, decant off the clear solution. Make fresh solution every few days.

(d) *Procedure.* Fill the leveling bulb with starch solution. Raise (L), open cock (G), open (F) to (A), and close (F) when the solution starts to run out of the gas inlet. Close (G). Purge the gas sampling line and connect it with (A). Lower (L) and open (F) and (G). When the liquid level is several ml past the 100 ml mark, close (G) and (F), and disconnect the sampling tube. Open (G) and bring the starch solution to the 100 ml mark by raising (L), then close (G). Open (F) momentarily, to bring the gas in the burette to atmospheric pressure, and close (F). Open (G) and bring the liquid level down to the 10 ml mark by lowering (L). Close (G), clamp the rubber tubing near (E) and disconnect it from the burette. Rinse the graduated cylinder with a standard iodine solution (0.00171 g I per ml), fill the cylinder and record the reading. Introduce successive small amounts of iodine thru (F), shaking well after each addition, and continue until a faint permanent blue color is obtained. Record the reading, subtract it from the previous reading and call the difference D.

(e) *Reagent test.* With every fresh stock of starch solution, perform a blank test as follows: introduce fresh starch solution into the burette up to the 100 ml mark. Close (F) and (G). Lower (L) and open (G). When the liquid level reaches the 10 ml mark, close (G). With air in the burette titrate as during a test and up to the same end point. Call the ml of iodine used C. Then,

$$\text{Grains } H_2S \text{ per 100 cubic foot of gas} = 100\,(D - C)$$

(f) *Sensitivity enhancement.* Greater sensitivity can be attained if a 500 ml capacity Tutwiler burette is used with a more dilute (0.001N) iodine solution. Concentrations less than 1.0 grains per 100 cubic foot can be determined in this way. Usually the starch–iodine end point is much less distinct and a blank determination of end point, with H_2S–free gas or air, is required.

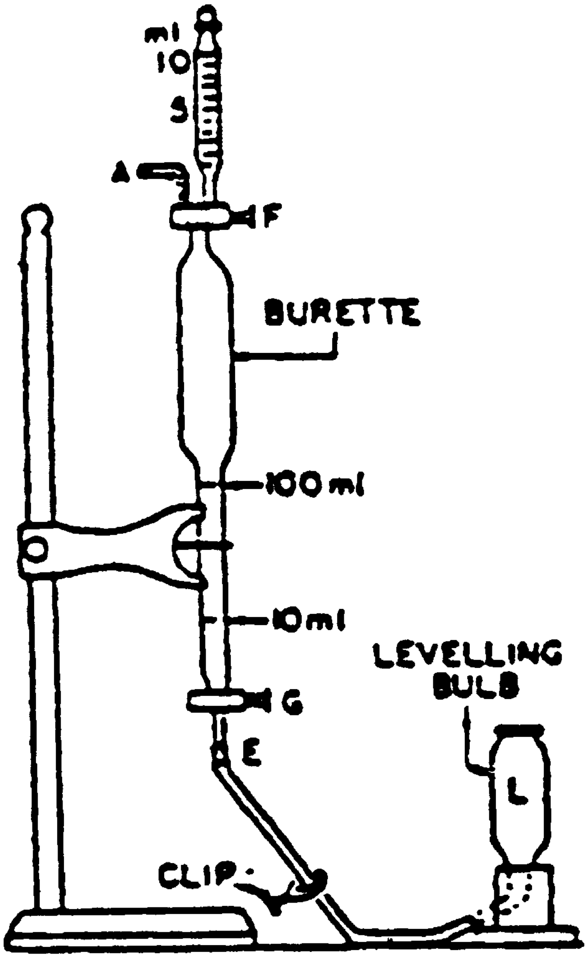


Figure 1. Tutwiler burette (lettered items mentioned in text).

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (a) 4., (4) (b), (7) (a) 2. and 4., (b) 3., (c), (d) (intro.), (e) and (8) (a), renum. (2) (b) 4. to 6. to be (2) (b) 5. to 7., cr. (2) (b) 4., r. and recr. (5), r. (6), Register, July, 1993, No. 451, eff. 8–1–93; am. (5) (c) 3., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.686 Volatile organic compound (VOC) emissions from synthetic organic chemical manufacturing industry (SOCMI) distillation operations. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each affected facility designated in par. (b) that is part of a process unit that produces any of the chemicals listed in sub. (8) as a product, co–product, by–product or intermediate, except as provided in par. (c).

(b) The affected facility is any of the following for which construction, modification or reconstruction commenced after December 30, 1983:

1. Each distillation unit not discharging its vent stream into a recovery system.

2. Each combination of a distillation unit and the common recovery system into which its vent stream is discharged.

3. Each combination of 2 or more distillation units and the common recovery system into which their vent streams are discharged.

(c) Exemptions from the provisions of par. (a) are as follows:

1. Any distillation unit operating a part of a process unit which produces coal tar or beverage alcohols or which uses, contains and produces no VOC is not an affected facility.

2. Any distillation unit that is subject to the provisions of s. NR 440.647 is not an affected facility.

3. Any distillation unit that is designed and operates as a batch operation is not an affected facility.

4. Each affected facility that has a total resource effectiveness (TRE) index value greater than 8.0 is exempt from all provisions of this section except for subs. (3), (5) (d), (e) and (f) and (6) (h) and (L).

5. Each affected facility in a process unit with a total design capacity for all chemicals produced within that unit of less than one gigagram per year is exempt from all provisions of this section except for the recordkeeping and reporting requirements in sub. (6) (j), (L) 6. and (n).

6. Each affected facility operated with a vent stream flow rate less than 0.008 scm/min is exempt from all provisions of this section except for the test method and procedure and the recordkeeping and reporting requirements in subs. (5) (g) and (6) (i), (L) 5. and (o).

Note: The intent of these standards is to minimize the emissions of VOC through the application of best demonstrated technology (BDT). The numerical emission limits in these standards are expressed in terms of total organic compounds (TOC), measured as TOC less methane and ethane. This emission limit reflects the performance of BDT.

(2) DEFINITIONS. As used in this section, all terms not defined here shall have the meaning given them in s. NR 440.02 and the following terms shall have the specific meanings given them:

(a) "Batch distillation operation" means a noncontinuous distillation operation in which a discrete quantity or batch of liquid feed is charged into a distillation unit and distilled at one time. After the initial charging of the liquid feed, no additional liquid is added during the distillation operation.

(b) "Boiler" means any enclosed combustion device that extracts useful energy in the form of steam.

(c) "By compound" means by individual steam components, not carbon equivalents.

(d) "Continuous recorder" means a data recording device recording an instantaneous data value at least once every 15 minutes.

(e) "Distillation operation" means an operation separating one or more feed streams into 2 or more exit streams, each exit stream having component concentrations different from those in the feed streams. The separation is achieved by the redistribution of the components between the liquid and vapor– phase as they approach equilibrium within the distillation unit.

(f) "Distillation unit" means a device or vessel in which distillation operations occur, including all associated internals, such as trays or packing, and accessories, such as reboiler, condenser, vacuum pump, steam jet or other similar device, plus any associated recovery system.

(g) "Flame zone" means the portion of the combustion chamber in a boiler occupied by the flame envelope.

(h) "Flow indicator" means a device which indicates whether gas flow is present in a vent stream.

(i) "Halogenated vent stream" means any vent stream determined to have a total concentration (by volume) of compounds containing halogens of 20 ppmv (by compound) or greater.

(j) "Incinerator" means any enclosed combustion device that is used for destroying organic compounds and does not extract energy in the form of steam or process heat.

(k) "Process heater" means a device that transfers heat liberated by burning fuel to fluids contained in tubes, including all fluids except water that is heated to produce steam.

(L) "Process unit" means equipment assembled and connected by pipes or ducts to produce, as intermediates or final products, one or more of the chemicals in sub. (8). A process unit can operate independently if supplied with sufficient fuel or raw materials and sufficient product storage facilities.

(m) "Product" means any compound or chemical listed in sub. (8) that is produced for sale as a final product as that chemical or for use in the production of other chemicals or compounds. By−products, co−products and intermediates are considered to be products.

(n) "Recovery device" means an individual unit of equipment, such as an absorber, carbon adsorber or condenser, capable of and used for the purpose of recovering chemicals for use, reuse or sale.

(o) "Recovery system" means an individual recovery device or series of such devices applied to the same vent stream.

(p) "Total organic compounds" or "TOC" means those compounds measured according to the procedures in sub. (5) (b) 4. For the purposes of measuring molar composition as required in sub. (5) (d) 2. a., hourly emissions rate as required in sub. (5) (d) 5. and (e), and TOC concentration as required in sub. (6) (b) 4. and (g) 4., those compounds which the department has determined do not contribute appreciably to the formation of ozone are to be excluded. The compounds to be excluded are identified in s. NR 400.02 (162).

(q) "TRE index value" means a measure of supplemental total resource requirement per unit reduction of TOC associated with an individual distillation vent stream, based on vent stream flow rate, emission rate of TOC net heating, value and corrosion properties, whether or not the vent stream is halogenated, as quantified by the equation given under sub. (5) (e).

(r) "Vent stream" means any gas stream discharged directly from a distillation facility to the atmosphere or indirectly to the atmosphere after diversion through other process equipment. The vent stream excludes relief valve discharges and equipment leaks including, but not limited to, pumps, compressors and valves.

(3) STANDARDS. Each owner or operator of any affected facility shall comply with par. (a), (b) or (c) for each vent stream on and after the date on which the initial performance test required by s. NR 440.08 and sub. (5) is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after the initial startup, whichever date comes first. Each owner or operator shall either:

(a) Reduce emission of TOC, less methane and ethane, by 98 weight−percent or to a TOC, less methane and ethane, concentration of 20 ppmv, on a dry basis corrected to 3% oxygen, whichever is less stringent. If a boiler or process heater is used to comply with this paragraph, then the vent stream shall be introduced into the flame zone of the boiler or process heater; or

(b) Combust the emissions in a flare that meets the requirements of s. NR 440.18; or

(c) Maintain a TRE index value greater than 1.0 without use of VOC emission control devices.

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility that uses an incinerator to seek to comply with the TOC emission limit specified under sub. (3) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater.

a. Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

b. Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

2. A flow indicator that provides a record of vent stream flow to the incinerator at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each affected facility at a point closest to the inlet of each incinerator and before being joined with any other vent stream.

(b) The owner or operator of an affected facility that uses a flare to seek to comply with sub. (3) (b) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A heat sensing device, such as a ultra−violet beam sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.

2. A flow indicator that provides a record of vent stream flow to the flare at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each affected facility at a point closest to the flare and before being joined with any other vent stream.

(c) The owner or operator of an affected facility that uses a boiler or process heater to seek to comply with sub. (3) (a) shall install, calibrate, maintain and operate according to the manufacturer's specifications in the following equipment:

1. A flow indicator that provides a record of vent stream flow to the boiler or process heater at least once every hour for each affected facility. The flow indicator shall be installed in the vent stream from each distillation unit within an affected facility at a point closest to the inlet of each boiler or process heater and before being joined with any other vent stream.

2. A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being measured, expressed in degrees Celsius or ± 0.5°C, whichever is greater, for boilers or process heaters of less than 44 MW (150 million Btu/hr) heat input design capacity.

3. Monitor and record the periods of operation of the boiler or process heater if the design heat input capacity of the boiler or process heater is 44 MW (150 million Btu/hr) or greater. The records shall be readily available for inspection.

(d) The owner or operator of an affected facility that seeks to comply with the TRE index value limit specified under sub. (3) (c) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment, unless alternative monitoring procedures or requirements are approved for that facility by the department:

1. Where an absorber is the final recovery device in the recovery system:

a. A scrubbing liquid temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, and a specific gravity monitoring device having an accuracy of ± 0.02 specific gravity units, each equipped with a continuous recorder; or

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization or thermal conductivity, each quipped with a continuous recorder.

2. Where a condenser is the final recovery device in the recovery system:

a. The condenser exit (product side) temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater; or

b. An organic monitoring device used to monitor organic compounds exiting the recovery device based on a detection principle such as infra–red, photoionization or thermal conductivity, each equipped with a continuous recorder.

3. Where a carbon adsorber is the final recovery device unit in the recovery system:

a. An integrating steam flow monitoring device having an accuracy of ± 10% and a carbon bed temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, both equipped with a continuous recorder; or

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infra–red, photoionization or thermal conductivity, each equipped with a continuous recorder.

(e) An owner or operator or an affected facility seeking to demonstrate compliance with the standards specified under sub. (3) with control devices other than incinerator, boiler, process heater or flare; or recovery device other than an absorber, condenser or carbon adsorber shall provide to the administrator information describing the operation of the control device or recovery device and the process parameters which would indicate proper operation and maintenance of the device. The administrator may request further information and will specify appropriate monitoring procedures or requirements.

(5) TEST METHODS AND PROCEDURES. (a) For the purpose of demonstrating compliance with sub. (3), all affected facilities shall be run at full operating conditions and flow rates during any performance test.

(b) The following methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used as reference methods to determine compliance with the emission limit or percent reduction efficiency specified under sub. (3) (a).

1. Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or TOC, less methane and ethane, reduction efficiency shall be prior to the inlet of the control device and after the recovery system.

2. Method 2, 2A, 2C or 2D, as appropriate, for determination of the gas volumetric flow rates.

3. The emission rate correction factor, integrated sampling and analysis procedure of Method 3 shall be used to determine the oxygen concentration ($\%O_{2d}$) for the purposes of determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the TOC samples and the samples shall be taken during the same time that the TOC samples are taken. The TOC concentration corrected to 3% O_2 (C_c) shall be completed using the following equation:

$$C_c = C_{TOC}\frac{17.9}{20.9 - \%0_{2d}}$$

where:

C_c is the concentration of TOC corrected to 3% O_2, dry basis, ppm by volume

C_{TOC} is the concentration of TOC (minus methane and ethane), dry basis, ppm by volume

$\%O_{2d}$ is the concentration of O_2, dry basis, percent by volume

4. Method 18 to determine the concentration of TOC in the control device outlet and the concentration of TOC in the inlet when the reduction efficiency of the control device is to be determined.

a. The sampling time for each run shall be 1 hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used then the samples shall be taken at 15–minute intervals.

b. The emission reduction (R) of TOC (minus methane and ethane) shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100$$

where:

R is the emission reduction, percent by weight

E_i is the mass rate of TOC entering the control device, kg TOC/hr

E_o is the mass rate of TOC discharged to the atmosphere, kg TOC/hr

c. The mass rates of TOC (E_i, E_o) shall be computed using the following equations

$$E_i = K_2\left(\sum_{j=1}^{n} C_{ij}M_{ij}\right)Q_i$$

$$E_o = K_2\left(\sum_{j=1}^{n} C_{oj}M_{oj}\right)Q_o$$

where:

C_{ij} and C_{oj} are the concentration of sample component “j” of the gas stream at the inlet and outlet of the control device, respectively, dry basis, ppm by volume

M_{ij} and M_{oj} are the molecular weight of sample component “j” of the gas stream at the inlet and outlet of the control device, respectively, g/g–mole (lb/lb–mole)

Q_i and Q_o are the flow rate of gas stream at the inlet and outlet of the control device, respectively, dscm/min (dcsf/hr)

K_2 is a constant, 2.494×10^{-6} (1/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for (g–mole/scm) is 20°C

d. The TOC concentration (C_{TOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^{n} C_j$$

where:

C_{TOC} is the concentration of TOC (minus methane and ethane), dry basis, ppm by volume

C_j is the concentration of sample components “j”, dry basis, ppm by volume

n is the number of components in the sample

5. When a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used to seek to comply with sub. (3) (a), the requirement for an initial performance test is waived, in accordance with s. NR 440.08 (2). However, the department reserves the option to require testing at such other times as may be required.

(c) When a flare is used to seek to comply with sub. (3) (b), the flare shall comply with the requirements of s. NR 440.18.

(d) The following test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used for determining the net heating value of the gas combusted to determine compliance under sub. (3) (b) and for determining the process vent stream TRE index value to determine compliance under sub. (3) (c).

1. Method 1 or 1A, as appropriate, for selection of the sampling site. The sampling site for the vent stream flow rate and molar composition determination prescribed in subds. 2. and 3.

shall be, except for the situations outlined in subd. 1. a., prior to the inlet of any control device, prior to any post–distillation dilution of the stream with air and prior to any post– distillation introduction of halogenated compounds into the process vent stream. No transverse site selection method is needed for vents smaller than 4 inches in diameter.

a. If any gas stream other than the distillation vent stream from the affected facility is normally conducted through the final recovery device.

b. The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which the nondistillation stream is introduced.

c. The efficiency of the final recovery device is determined by measuring the TOC concentration using Method 18 at the inlet to the final recovery device after the introduction of any nondistillation vent stream at the outlet of the final recovery device.

d. This efficiency is applied to the TOC concentration measured prior to the final recovery device and prior to the introduction of the nondistillation stream to determine the concentration of TOC in the distillation vent stream from the final recovery device. This concentration of TOC is then used to perform the calculations outlined in subds. 4. and 5.

2. The molar composition of the process vent stream shall be determined as follows:

a. Method 18 to measure the concentration of TOC including those containing halogens.

b. ASTM D1946–77, incorporated by reference in s. NR 440.17, to measure the concentration of carbon monoxide and hydrogen.

c. Method 4 to measure the content of water vapor.

3. The volumetric flow rate shall be determined using Method 2, 2A, 2C or 2D, as appropriate.

4. The net heating value of the vent stream shall be calculated using the following equation:

$$H_T = K_1\left(\sum_{j=1}^{n} C_j H_j\right)$$

where:

H_T is the net heating value of the sample, MJ/scm, where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s (vent stream flow rate)

K_1 is the constant, 1.740×10^{-7}

$$\frac{(1)}{(\text{ppm})}\ \frac{(\text{g–mole})}{(\text{scm})}\ \frac{(\text{MJ})}{(\text{kcal})}$$

where standard temperature for

$$\frac{(\text{g–mole})}{(\text{scm})}$$

is 20°C

C_j is the concentration on a wet basis of compound j in ppm, as measured for organics by Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77, incorporated by references in s. NR 440.17, as indicated in par. (d) 2.

H_j is the net heat of combustion of compound j, kcal/g–mole, based on combustion at 25°C and 760 mm Hg

The heats of combustion of vent stream components would be required to be determined using ASTM D2382–76, incorporated by reference as specified in s. NR 440.17, if published values are not available or cannot be calculated.

5. The emission rate of TOC in the vent stream shall be calculated using the following equation:

$$E_{TOC} = K_2\left(\sum_{j=1}^{n} C_j M_j\right)Q_s$$

where:

E_{TOC} is the emission rate of TOC in the sample, kg/hr

K_2 is the constant, 2.494×10^{-6} (1/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for (g–mole/scm) is 20°C

C_j is the concentration on a basis of compound j in ppm as measured by Method 18 as indicated in subd. 2.

M_j is the molecular weight of sample j, g/g–mole

Q_s is the vent stream flow rate (scm/min) at a temperature of 20°C

6. The total process vent stream concentration (by volume) of compounds containing halogens (ppmv, by compound) shall be summed from the individual concentrations of compounds containing halogens which were measured by Method 18.

(e) For purpose of complying with sub. (3) (c), the owner or operator of a facility affected by this section shall calculate the TRE index value of the vent stream using the equation for incineration in subd. 1. for halogenated vent streams. The owner or operator of an affected facility with a nonhalogenated vent stream shall determine the TRE index value by calculating values using both the incinerator equation in subd. 1. and the flare equation in subd. 2. and selecting the lower of the 2 values.

1. The equation for calculating the TRE index value of a vent stream controlled by an incinerator is as follows:

$$\text{TRE} = \frac{1}{E_{TOC}}\left[a + b(Q_s)^{0.88} + c(Q_s) + d(Q_s)(H_T) + e(Q_s)^{0.88}(H_T)^{0.88} + f(Y_s)^{0.5}\right]$$

a. Where for a vent stream flow rate (scm/min) at a standard temperature of 20°C that is greater than or equal to 14.2 scm/min:

TRE is the TRE index value

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s

$Y_s = Q_s$ for all vent stream categories listed in Table 1 except for Category E vent streams where $Y_s = (Q_s)(H_T)/3.6$

E_{TOC} is the hourly emissions of TOC reported in kg/hr

a,b,c,d,e and f are coefficients

The set of coefficients that apply to a vent stream shall be obtained from Table 1.

Table 1.
Distillation NSPS TRE Coefficients for Vent Streams Controlled By An Incinerator

Design Category A1. For Halogenated Process Vent Streams,
If $0 \le$ Net Heating Value (MJ/scm) $\le$ 3.5:

Q_s = Vent Stream Flow Rate (scm/min)	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Q_s \le 18.8$	19.18370	0.27580	0.75762	−0.13064	0	0.01025
$18.8 < Q_s \le 699$	20.00563	0.27580	0.30387	−0.13064	0	0.01025
$699 < Q_s \le 1400$	39.87022	0.29973	0.30387	−0.13064	0	0.01449
$1400 < Q_s \le 2100$	59.73481	0.31467	0.30387	−0.13064	0	0.01775
$2100 < Q_s \le 2800$	79.59941	0.32572	0.30387	−0.13064	0	0.02049
$2800 < Q_s \le 3500$	99.46400	0.33456	0.30387	−0.13064	0	0.02291

Design Category A2. For Halogenated Process Vent Streams,
If Net Heating Value > 3.5 MJ/scm:

Q_s = Vent Stream Flow Rate (scm/min)	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Q_s \le 18.8$	18.84466	0.26742	−0.20044	0	0	0.01025
$18.8 < Q_s \le 699$	19.66658	0.26742	−0.25332	0	0	0.01025
$699 < Q_s \le 1400$	39.19213	0.29062	−0.25332	0	0	0.01449
$1400 < Q_s \le 2100$	58.71768	0.30511	−0.25332	0	0	0.01775
$2100 < Q_s \le 2800$	78.24323	0.31582	−0.25332	0	0	0.02049
$2800 < Q_s \le 3500$	97.76879	0.32439	−0.25332	0	0	0.02291

Design Category B. For Nonhalogenated Process Vent Streams,
If $0 \le$ Net Heating Value (MJ/scm) $\le$ 0.48:

Q_s = Vent Stream Flow Rate (scm/min)	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Q_s \le 1340$	8.54245	0.10555	0.09030	−0.17109	0	0.01025
$1340 < Q_s \le 2690$	16.94386	0.11470	0.09030	−0.17109	0	0.01449
$2690 < Q_s \le 4040$	25.34528	0.12042	0.09030	−0.17109	0	0.01775

Design Category C. For Nonhalogenated Process Vent Streams,
If 0.48 < Net Heating Value (MJ/scm) $\le$ 1.9:

Q_s = Vent Stream Flow Rate (scm/min)	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Q_s \le 1340$	9.25233	0.06105	0.31937	−0.16181	0	0.01025
1340 < Qs $\le$ 2690	18.36363	0.06635	0.31937	−0.16181	0	0.01449
$2690 < Q_s \le 4040$	27.47492	0.06965	0.31937	−0.16181	0	0.01775

Design Category D. For Nonhalogenated Process Vent Streams,
If 1.9 < Net Heating Value (MJ/scm) $\le$ 3.6:

Q_s = Vent Stream Flow Rate (scm/min)	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Q_s \le 1180$	6.67868	0.06943	0.02582	0	0	0.01025
$1180 < Q_s \le 2370$	13.21633	0.07546	0.02582	0	0	0.01449
$2370 < Q_s \le 3550$	19.75398	0.07922	0.02582	0	0	0.01775

Design Category E. For Nonhalogenated Process Vent Streams,
If Net Heating Value > 3.6 MJ/scm:

Y_s = Dilution Flow Rate (scm/min) = (Q_s) (H_T)/3.6	**a**	**b**	**c**	**d**	**e**	**f**
$14.2 \le Y_s \le 1180$	6.67868	0	0	−0.00707	0.02220	0.01025
$1180 < Y_s \le 2370$	13.21633	0	0	−0.00707	0.02412	0.01449
$2370 < Y_s \le 3550$	19.75398	0	0	−0.00707	0.02533	0.01775

b. Where for a vent stream flow rate (scm/min) at a standard temperature of 20°C that is less than 14.2 scm/min:

TRE is the TRE index value

Q_s = 14.2 scm/min

H_T = (FLOW) (HVAL)/14.2

where the following inputs are used:

FLOW is the vent stream flow rate (scm/min), at a standard temperature of 20°C

HVAL is the vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C as in definition of Q_s

Y_s is 14.2 scm/min for all vent stream categories listed in Table 1 except for Category E vent streams, where Y_s is (14.2) (H_T)/3.6

E_{TOC} is the hourly emissions of TOC reported in kg/hr

a,b,c,d,e and f are coefficients

The set of coefficients that apply to a vent stream shall be obtained from Table 1.

2. The equation for calculating the TRE index value of a vent stream controlled by a flare is as follows:

$$TRE = \frac{1}{E_{TOC}}[a(Q_s) + b(Q_s)^{0.8} + c(Q_s)(H_T) + d(E_{TOC}) + e]$$

where:

TRE is the TRE index value

E_{TOC} is the hourly emission rate of TOC reported in kg/hr

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm) where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s

a,b,c,d and e are coefficients

The set of coefficients that apply to a vent stream shall be obtained from Table 2.

Table 2. Distillation NSPS TRE Coefficients for Vent Streams Controlled by a Flare

	a	b	c	d	e
$H_T < 11.2$ MJ/scm	2.25	0.288	–0.193	–0.0051	2.08
$H_T \geq 11.2$ MJ/scm	0.309	0.0619	–0.0043	–0.0034	2.08

(f) Each owner or operator of an affected facility seeking to comply with sub. (1) (c) 4. or (3) (c) shall recalculate the TRE index value for that affected facility whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type or catalyst type or whenever there is replacement, removal or addition of recovery equipment. The TRE index value shall be recalculated based on test data or on best engineering estimates of the effects of the change to the recovery system.

1. Where the recalculated TRE index value is less than or equal to 1.0, the owner or operator shall notify the department within one week of the recalculation and shall conduct a performance test according to the methods and procedures required by this subsection in order to determine compliance with sub. (3) (a). Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

2. Where the initial TRE index value is greater than 8.0 and the recalculated TRE index value is less than or equal to 8.0 but greater than 1.0, the owner or operator shall conduct a performance test in accordance with s. NR 440.08 and this subsection and shall comply with subs. (4) and (6) and this subsection. Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

(g) Any owner or operator subject to the provisions of this section seeking to demonstrate compliance with sub. (1) (c) 6. shall use Method 2, 2A, 2C or 2D as appropriate, for determination of volumetric flow rate.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to sub. (3) shall notify the department of the specific provisions of sub. (3) with which the owner or operator has elected to comply. Notification shall be submitted with the notification of initial startup required by s. NR 440.07 (1) (c). If an owner or operator elects at a later date to use an alternative provision of sub. (3) with which he or she will comply, then the department shall be notified by the owner or operator within 90 days before implementing a change and, upon implementing the change, a performance test shall be performed as specified by sub. (5) within 180 days.

(b) Each owner or operator subject to the provisions of this section shall keep an up–to–date, readily accessible record of the following data measured during each performance test and also include the following data in the report of the initial performance test required under s. NR 440.08. Where a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used to comply with sub. (3) (a), a report containing performance test data need not be submitted but a report containing the information in subd. 2. a. is required. The same data specified in this subsection shall be submitted in the reports of all subsequently required performance tests where either the emission control efficiency of a control device, outlet concentration of TOC or the TRE index value of a vent stream from a recovery system is determined.

1. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (a) through use of either a thermal or catalytic incinerator:

a. The average firebox temperature of the incinerator, or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator, measured at least every 15 minutes and averaged over the same time period of the performance testing and

b. The percent reduction of TOC determined as specified in sub. (5) (b) achieved by the incinerator or the concentration of TOC (ppmv, by compound) determined as specified in sub. (5) (b) at the outlet of the control device on a dry basis corrected to 3% oxygen.

2. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (a) through use of a boiler or process heater:

a. A description of the location at which the vent stream is introduced into the boiler or process heater, and

b. The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 MW (150 million Btu/hr) measured at least every 15 minutes and averaged over the same time period of the performance testing.

3. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (b) through use of a smokeless flare, flare design, that is, steam–assisted, air–assisted or nonassisted, all visible emission readings, heat content determinations, flow rate measurements and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring and records of all periods of operations during which the pilot flame is absent.

4. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (c):

a. Where an absorber is the final recovery device in the recovery system, the exit specific gravity, or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved by the department, and average exit temperature, of the adsorbing liquid measured at least every 15 minutes and averaged over the same time period of the performance testing, both measured while the vent stream is normally routed and constituted; or

b. Where a condenser is the final recovery device in the recovery system, the average exit (product side) temperature measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is routed and constituted normally; or

c. Where a carbon adsorber is the final recovery device in the recovery system, the total steam mass flow measured at least every 15 minutes and averaged over the same time period of the performance test (full carbon bed cycle), temperature of the carbon bed after regeneration, and within 15 minutes of completion of any cooling cycle, and duration of the carbon bed steaming cycle, all measured while the vent stream is routed and constituted normally; or

d. As an alternative to subd. 4. a., b. or c., the concentration level or reading indicated by the organics monitoring device at the outlet of the absorber, condenser or carbon adsorber, measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is normally routed and constituted, or

e. All measurements and calculations performed to determine the TRE index value of the vent stream.

(c) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (a) and (c) as well as up–to–date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where a combustion device is used to comply with sub. (3) (a), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. For thermal incinerators, all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined.

2. For catalytic incinerators, all 3–hour periods of operation during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined. The owner or operator also shall record all 3–hour periods of operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference of the device during the most recent performance test at which compliance with sub. (3) (a) was determined.

3. All 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined for boilers or process heaters with a design heat input capacity of less than 44 MW (150 million Btu/hr).

4. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under sub. (3) (a).

(d) Each owner or operator subject to the provisions of this section shall keep up to date, readily accessible continuous records of the flow indication specified under sub. (4) (a) 2., (b) 2. and (c) 1., as well as up–to– date, readily accessible records of all periods when the vent stream is diverted from the control device or has no flow rate.

(e) Each owner or operator subject to the provisions of this section who uses a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hr) or greater to comply with sub. (3) (a) shall keep up–to– date, readily accessible records of all periods of operation of the boiler or process heater.

Note: Examples of such records could include records of steam use, fuel use or monitoring data collected pursuant to other state or federal regulatory requirements.

(f) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible records of the flare pilot flame monitoring specified under sub. (4) (b), as well as up–to–date, readily accessible records of all periods of operations in which the pilot flame is absent.

(g) Each owner or operator subject to the provisions of this section shall keep up–to–date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (d), as well as up–to–date, readily accessible records of all periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where an owner or operator seeks to comply with sub. (3) (c), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. Where an absorber is the final recovery device in a recovery system and where an organic compound monitoring device is not used:

a. All 3–hour periods of operating during which the average absorbing liquid temperature was more than 11°C (20°F) above the average absorbing liquid temperature during the most recent performance test; or

b. All 3–hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above or more than 0.1 unit below, the average absorbing liquid specific gravity during the most recent performance test, unless monitoring of an alternative parameter, which is a measure of the degree of absorbing liquid saturation, is approved by the department, in which case the owner or operator will define appropriate parameter boundaries and periods of operation during which they are exceeded.

2. Where a condenser is the final recovery device in a system and where an organic compound monitoring device is not used, all 3–hour periods of operation during which the average exit (product side) condenser operating temperature was more than 6°C (11°F) above the average exit (product side) operating temperature during the most recent performance test.

3. Where a carbon adsorber is the final recovery device in a system and where an organic compound monitoring device is not used:

a. All carbon bed regeneration cycles during which the total mass stream flow was more than 10% below the total mass stream flow during the most recent performance test; or

b. All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration, and after completion of any cooling cycle, was more than 10% greater than the carbon bed temperature (in degrees Celsius) during the most recent performance.

4. Where an absorber, condenser or carbon adsorber is the final recovery device in the recovery system and where an organic compound monitoring device is used, all 3–hour periods of operation during which the average organic compound concentration level or reading of organic compounds in the exhaust gases is more than 20% greater than the exhaust gas organic compound concentration level or reading measured by the monitoring device during the most recent performance test.

(h) Each owner or operator of an affected facility subject to the provisions of this section and seeking to demonstrate compliance with sub. (3) (c) shall keep up–to–date, readily accessible records of:

1. Any changes in production capacity, feedstock type or catalyst type or any replacement, removal or addition of recovery equipment or a distillation unit;

2. Any recalculation of the TRE index value performed pursuant to sub. (5) (f); and

3. The results of any performance test performed pursuant to the methods and procedures required by sub. (5) (d).

(i) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the flow rate cutoff in sub. (1) (c) 6. shall keep up–to–date, readily accessible records to indicate that the vent stream flow rate is less than 0.008 m^3/min and of any change in equipment or process operation that increases the operating vent stream flow rate, including a measurement of the new vent stream flow rate.

(j) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the design production capacity provision in sub. (1) (c) 5. shall keep up–to–date, readily accessible records of any change in equipment or process operation that increases the design production capacity of the process unit in which the affected facility is located.

(k) Each owner and operator subject to the provisions of this section is exempt from the quarterly reporting requirements contained in s. NR 440.07 (3).

(L) Each owner or operator that seeks to comply with the requirements of this section by complying with the requirements of sub. (1) (c) 4., 5. or 6. or (3) shall submit to the department semiannual reports of the following recorded information. The initial report shall be submitted within 6 months after the initial startup date.

1. Exceedances of monitored parameters recorded under pars. (c) and (g).

2. All periods recorded under par. (d) when the vent stream is diverted from the control device or has no flow rate.

3. All periods recorded under par. (e) when the boiler or process heater was not operating.

4. All periods recorded under par. (f) in which the pilot flame of the flare was absent.

5. Any change in equipment or process operation that increases the operating vent stream flow rate above the low flow exemption level in sub. (1) (c) 6., including a measurement of the new vent stream flow rate, as recorded under par. (i). These shall be reported as soon as possible after the change and no later than 180 days after the change. A performance test shall be completed with the same time period to verify the recalculated flow value and to obtain the vent stream characteristics of heating value and E_{TOC}. The performance test is subject to the requirements of s. NR 440.08. Unless the facility qualifies for an exemption under the low capacity exemption status in sub. (1) (c) 5., the facility shall begin compliance with the requirements set forth in sub. (3).

6. Any change in equipment or process operation, as recorded under par. (j), that increases the design production capacity above the low capacity exemption level in sub. (1) (c) 5. and the new capacity resulting from the change for the distillation process unit containing the affected facility. These shall be reported as soon as possible after the change and no later than 180 days after the change. A performance test shall be completed within the same time period to obtain the vent stream flow rate, heating value, E_{TOC}. The performance test is subject to the requirements of s. NR 440.08. Unless the facility qualifies for an exemption under the low flow exemption in sub. (1) (c) 6., the facility shall begin compliance with the requirements in sub. (3).

7. Any recalculation of the TRE index value, as recorded under par. (h).

(n) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 5. shall submit to the department an initial report detailing the design production capacity of the process unit.

(o) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 6. shall submit to the department an initial report including a flow rate measurement using the test methods specified in sub. (5).

(p) The department will specify appropriate reporting and recordkeeping requirements where the owner or operator of an affected facility complies with the standards specified under sub. (3) other than as provided under sub. (4) (a) to (d).

(7) RECONSTRUCTION. (a) For purposes of this section, "fixed capital cost of the new components", as used in s. NR 440.15, includes the fixed capital cost of all depreciable components which are or will be replaced pursuant to all continuous programs of component replacement which are commended with any 2–year period following December 30, 1983. For purposes of this paragraph, "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(8) CHEMICALS AFFECTED BY THIS SECTION.

Chemical Name	CAS No.*
Acetaldehyde	75–07–0
Acetaldol	107–89–1
Acetic acid	64–19–7
Acetic anhydride	108–24–7
Acetone	67–64–1
Acetone cyanohydrin	75–86–5
Acetylene	74–86–2
Acrylic acid	79–10–7
Acrylonitrile	107–13–1
Adipic acid	124–04–9
Adiponitrile	111–69–3
Alcohols, C–11 or lower, mixtures	—
Alcohols, C–12 or higher, mixtures	—
Allyl chloride	107–05–1
Amylene	513–35–9
Amylenes, mixed	—
Aniline	62–53–3
Benzene	71–43–2
Benzenesulfonic acid	98–11–3
Benzenesulfonic acid $C_{10–16}$–alkyl derivatives, sodium salts	68081–81–2
Benzoic acid, tech	65–85–0
Benzyl chloride	100–44–7
Biphenyl	92–52–4
Bisphenol A	80–05–7
Brometone	76–08–4
1,3–Butadiene	106–99–0
Butadiene and butene fractions	—
n–Butane	106–97–8
1,4–Butanediol	110–63–4
Butanes, mixed	—
1–Butene	106–98–9
2–Butene	25167–67–3
Butenes, mixed	—
n–Butyl acetate	123–86–4
Butyl acrylate	141–32–2
n–Butyl alcohol	71–36–3
sec–Butyl alcohol	78–92–2
tert–Butyl alcohol	75–65–0
Butylbenzyl phthalate	85–68–7
Butylene glycol	107–88–0
tert–Butyl hydroperoxide	75–91–2
2–Butyne–1,4–diol	110–65–6
Butyraldehyde	123–72–8
Butyric anhydride	106–31–0
Caprolactam	105–60–2
Carbon disulfide	75–15–0
Carbon tetrabromide	558–13–4
Carbon tetrachloride	56–23–5
Chlorobenzene	108–90–7

2–Chloro–4–(ethylamino)–6–(isopropylamino)–s–triazine	1912–24–9
Chloroform	67–66–3
p–Chloronitrobenzene	100–00–5
Chloroprene	126–99–8
Citric acid	77–92–9
Crotonaldehyde	4170–30–0
Crotonic acid	3724–65–0
Cumene	98–82–8
Cumene hydroperoxide	80–15–9
Cyanuric chloride	108–77–0
Cyclohexane	110–82–7
Cyclohexane, oxidized	68512–15–2
Cyclohexanol	108–93–0
Cyclohexanone	108–94–1
Cyclohexanone oxime	100–64–1
Cyclohexene	110–83–8
1,3–Cyclopentadiene	542–92–7
Cyclopropane	75–19–4
Diacetone alcohol	123–42–2
Dibutanized aromatic concentrate	—
1,4–Dichlorobutene	110–57–8
3,4–Dichlor–1–butene	64037–54–3
Dichlorodifluoromethane	75–71–8
Dichlorodimethylsilane	75–78–5
Dichlorofluoromethane	75–43–4
1,3–Dichlorohydrin	96–23–1
Diethanolamine	111–42–2
Diethylbenzene	25340–17–4
Diethylene glycol	111–46–6
Di–n–heptyl–n–nonyl undecyl phthalate	85–68–7
Di–isodecyl phthalate	26761–40–0
Diisononyl phthalate	28553–12–0
Dimethylamine	124–40–3
Dimethyl terephthalate	120–61–6
2,4–Dinitrotoluene	121–14–2
2,6–Dinitrotoluene	606–20–2
Dioctyl phthalate	117–81–7
Dodecene	25378–22–7
Dodecylbenzene, non linear	—
Dodecylbenzenesulfonic acid	27176–87–0
Dodecylbenzenesulfonic acid, sodium salt	25155–30–0
Epichlorohydrin	106–89–8
Ethanol	64–17–5
Ethanolamine	141–43–5
Ethyl acetate	141–78–6
Ethyl acrylate	140–88–5
Ethylbenzene	100–41–4
Ethyl chloride	75–00–3
Ethyl cyanide	107–12–0
Ethylene	74–85–1
Ethylene dibromide	106–93–4
Ethylene dichloride	107–06–2
Ethylene glycol	107–21–1
Ethylene glycol monobutyl	111–76–2
Ethylene glycol monoethyl ether	110–80–5
Ethylene glycol monoethyl ether acetate	111–15–9
Ethylene glycol monomethyl ether	109–86–4
Ethylene oxide	75–21–8
2–Ethylhexanal	26266–68–2
2–Ethylhexyl alcohol	104–76–7
Chemical Name	**CAS No.***
(2–Ethylhexyl) amine	104–75–6
Ethylmethylbenzene	25550–14–5
6–Ethyl–1,2,3,4–tetrahydro–9,10–anthracenedione	15547–17–8
Formaldehyde	50–00–0
Glycerol	56–81–5
n–Heptane	142–82–5
Heptenes, mixed	—
Hexadecyl chloride	—
Hexamethylene diamine	124–09–4
Hexamethylene diamine adipate	3323–53–3
Hexamethylenetetramine	100–97–0
Hexane	110–54–3
2–Hexenedinitrile	13042–02–9
3–Hexenedinitrile	1119–85–3
Hydrogen cyanide	74–90–8
Isobutane	75–28–5
Isobutanol	78–83–1
Isobutylene	115–11–7
Isobytyraldehyde	78–84–2
Isodecyl alcohol	25339–17–7
Isooctyl alcohol	26952–21–6
Isopentane	78–78–4
Isophthalic acid	121–91–5
Isoprene	78–79–5
Isopropanol	67–63–0
Ketene	463–51–4
Linear alcohols, ethoxylated, mixed	—
Linear alcohols, ethoxylated and sulfated, sodium salt, mixed	—
Linear alcohols, sulfated, sodium salt, mixed	—
Linear alkylbenzene	123–01–3
Magnesium acetate	142–72–3
Maleic anhydride	108–31–6
Melamine	108–78–1
Mesityl oxide	141–79–7
Methacrylonitrile	126–98–7
Methanol	67–56–1
Methylamine	74–89–5
ar–Methylbenzenediamine	25376–45–8
Methyl chloride	74–87–3
Methylene chloride	75–09–2
Methyl ethyl ketone	78–93–3
Methyl iodide	74–88–4
Methyl isobutyl ketone	108–10–1
Methyl methacrylate	80–62–6
2–Methylpentane	107–83–5
1–Methyl–2–pyrrolidone	872–50–4
Methyl tert–butyl ether	—
Naphthalen	91–20–3
Nitrobenzene	98–95–3
1–Nonene	27215–95–8
Nonyl alcohol	143–08–08
Nonylphenol	25154–52–3
Nonylphenol, ethoxylated	9016–45–9
Octene	25377–83–7
Oil–soluble petroleum sulfonate, calcium salt	—
Oil–soluble petroleum sulfonate, sodium salt	—
Pentaerythritol	115–77–5
n–Pentane	109–66–0
3–Pentenenitrile	4635–87–4
Pentenes, mixed	109–67–1
Perchloroethylene	127–18–4
Phenol	108–95–2
1–Phenylethyl hydroperoxide	3071–32–7
Chemical Name	**CAS No.***
Phenylpropane	103–65–1
Phosgene	75–44–5
Phthalic anhydride	85–44–9
Propane	74–98–6
Propionaldehyde	123–38–6
Propionic acid	79–09–4
Propyl alcohol	71–23–8

Propylene	115–07–1
Propylene chlorohydrin	78–89–7
Propylene glycol	57–55–6
Propylene oxide	75–56–9
Propyl alcohol	71–23–8
Propylene	115–07–1
Sodium cyanide	143–33–9
Sorbitol	50–70–4
Styrene	100–42–5
Terephthalic acid	100–21–0
1,1,2,2–Tetrachloroethane	79–34–5
Tetraethyl lead	78–00–2
Tetrahydrofuran	109–99–9
Tetra (methyl–ethyl) lead	—
Tetramethyl lead	75–74–1
Toluene	108–88–3
Toluene–2,4–diamine	95–80–7
Toluene–2,4 (and 2,6)–diisocyanate (80/20 mixture)	26471–62–5
Tribromomethane	75–25–2
1,1,1–Trichloroethane	71–55–6
1,1,2–Trichloroethane	79–00–5
Trichloroethylene	79–01–6
Trichlorofluoromethane	75–89–4
1,1,2–Trichloro–1,2,2–trifluoroethane	76–13–1
Triethanolamine	102–71–6
Triethylene glycol	112–27–67
Vinyl acetate	108–05–4
Vinyl chloride	75–01–4
Vinylidene chloride	75–35–4
m–Xylene	108–38–3
o–Xylene	95–47–6
p–Xylene	106–42–3
Xylenes, mixed	1330–20–7
m–Xylenol	576–26–1

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*CAS numbers refer to the Chemical Abstracts Service Registry numbers assigned to specific chemicals, isomers or mixtures of chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed, whether CAS numbers have been assigned or not.

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (5) (e) 1. a., b., (8), Register, December, 1995, No. 480, eff. 1–1–96**; renum. (2) (a) (intro.) and 1. to 18. to be (2) (intro.) and (a) to (r), am. (2) (p), Register, November, 1999, No. 527, eff. 12–1–99.**

NR 440.688 Nonmetallic mineral processing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in pars. (b) to (d), the provisions of this section are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants; each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station.

(b) An affected facility that is subject to the provisions of s. NR 440.22 or 440.25 or that follows in the plant process any facility subject to the provisions of s. NR 440.22 or 440.25 is not subject to the provisions of this section.

(c) Facilities at the following plants are not subject to the provision of this section.

1. Fixed sand and gravel plants and crushed stone plants with capacities, as defined in sub. (2), of 23 megagrams per hour (25 tons per hour) or less;

2. Portable sand and gravel plants and crushed stone plants with capacities, as defined in sub. (2), of 136 megagrams per hour (150 tons per hour) or less; and

3. Common clay plants and pumice plants with capacities, as defined in sub. (2), of 9 megagrams per hour (10 tons per hour) or less.

(d) 1. When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in sub. (2) having the same function as the existing facility, the new facility is exempt from the provisions of subs. (3), (5) and (6) except as provided for in subd. 3.

2. An owner or operator seeking to comply with this paragraph shall comply with the reporting requirements of sub. (7) (a) and (b).

3. An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in subd. 1. and shall comply with the provisions of subs. (3), (5) and (6).

(e) An affected facility under par. (a) that commences construction, reconstruction, or modification after August 31, 1983 is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Bagging operation" means the mechanical process by which bags are filled with nonmetallic minerals.

(b) "Belt conveyor" means a conveying device that transports material from one location to another by means of an endless belt that is carried on a series of idlers and routed around a pulley at each end.

(c) "Bucket elevator" means a conveying device of nonmetallic minerals consisting of a head and foot assembly which supports and drives an endless single or double strand chain or belt to which buckets are attached.

(d) "Building" means any frame structure with a roof.

(e) "Capacity" means the cumulative rated capacity of all initial crushers that are part of the plant.

(f) "Capture system" means the equipment (including enclosures, hoods, ducts, fans, dampers, etc.) used to capture and transport particulate matter generated by one or more process operations to a control device.

(g) "Control device" means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more process operations at a nonmetallic mineral processing plant.

(h) "Conveying system" means a device for transporting materials from one piece of equipment or location to another location within a plant. Conveying systems include but are not limited to the following: Feeders, belt conveyors, bucket elevators and pneumatic systems.

(i) "Crusher" means a machine used to crush any nonmetallic minerals, and includes, but is not limited to the following types: jaw, gyratory, cone, roll, rod mill, hammermill and impactor.

(j) "Enclosed truck or railcar loading station" means that portion of a nonmetallic mineral processing plant were nonmetallic minerals are loaded by an enclosed conveying system into enclosed trucks or railcars.

(k) "Fixed plant" means any nonmetallic mineral processing plant at which the processing equipment specified in sub. (1) (a) is attached by a cable, chain, turnbuckle, bolt or other means (except electrical connections) to any anchor, slab, or structure including bedrock.

(L) "Fugitive emission" means particulate matter that is not collected by a capture system and is released to the atmosphere at the point of generation.

(m) "Grinding mill" means a machine used for the wet or dry fine crushing of any nonmetallic mineral. Grinding mills include, but are not limited to, the following types: hammer, roller, rod, pebble and ball, and fluid energy. The grinding mill includes the air conveying system, air separator, or air classifier, where such systems are used.

(n) "Initial crusher" means any crusher into which nonmetallic minerals can be fed without prior crushing in the plant.

(o) "Nonmetallic mineral" means any of the following minerals or any mixture of which the majority is any of the following minerals:

1. Crushed and broken stone, including limestone, dolomite, granite, traprock, sandstone, quartz, quartzite, marl, marble, slate, shale, oil shale, and shell.

2. Sand and gravel.

3. Clay including kaolin, fireclay, bentonite, Fuller's earth, Ball clay, and common clay.

4. Rock salt.

5. Gypsum.

6. Sodium compounds, including sodium carbonate, sodium chloride, and sodium sulfate.

7. Pumice.

8. Gilsonite.

9. Talc and pyrophyllite.

10. Boron, including borax, kernite, and colemanite.

11. Barite.

12. Fluorospar.

13. Feldspar.

14. Diatomite.

15. Perlite.

16. Vermiculite.

17. Mica.

18. Kyanite, including andalusite, sillimanite, topaz, and dumortierite.

(p) "Nonmetallic mineral processing plant" means any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located including lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in sub. (1) (b) and (c).

(q) "Portable plant" means any nonmetallic mineral processing plant that is mounted on any chassis or skids and may be moved by the application of a lifting or pulling force. In addition, there may be no cable, chain, turnbuckle, bolt or other means (except electrical connections) by which any piece of equipment is attached or clamped to any anchor, slab, or structure, including bedrock, that must be removed prior to the application of a lifting or pulling force for the purpose of transporting the unit.

(r) "Production line" means all affected facilities (crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck and railcar loading stations) which are directly connected or are connected together by a conveying system.

(s) "Screening operation" means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series, and retaining oversize material on the mesh surfaces (screens).

(t) "Size" means the rated capacity in tons per hour of a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station; the total surface area of the top screen of a screening operation; the width of a conveyor belt; and the rated capacity in tons of a storage bin.

(u) "Stack emissions" means the particulate matter that is released to the atmosphere from a capture system.

(v) "Storage bin" means a facility for storage, including surge bins, for nonmetallic minerals prior to further processing or loading.

(w) "Transfer point" means a point in a conveying operation where the nonmetallic mineral is transferred to or from a belt conveyor except where the nonmetallic mineral is being transferred to a stockpile.

(x) "Truck dumping" means the unloading of nonmetallic minerals from movable vehicles designed to transport nonmetallic minerals from one location to another. Movable vehicles include but are not limited to: trucks, front end loaders, skip hoists, and railcars.

(y) "Vent" means an opening through which there is mechanically induced air flow for the purpose of exhausting from a building air carrying particulate matter emissions from one or more affected facilities.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any stack emissions which:

1. Contain particulate matter in excess of 0.05 g/dscm, or

2. Exhibit greater than 7% opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. Facilities using a wet scrubber shall comply with the reporting provisions of sub. (7) (c) to (e).

(b) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any fugitive emissions which exhibit greater than 10% opacity except as provided in pars. (c) to (e).

(c) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup, no owner or operator may cause to be discharged into the atmosphere from any crusher, at which a capture system is not used, fugitive emissions which exhibit greater than 15% opacity.

(d) Truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from the requirements of this subsection.

(e) If any transfer point on a conveyor belt or any other affected facility is enclosed in a building, then each enclosed affected facility shall comply with the emission limits in pars. (a), (b) and (c), or the building enclosing the affected facility or facilities shall comply with the following emission limits:

1. No owner or operator may cause to be discharged into the atmosphere from any building enclosing any transfer point on a conveyor belt or any other affected facility any visible fugitive emissions except emissions from a vent as defined in sub. (2).

2. No owner or operator may cause to be discharged into the atmosphere from any vent of any building enclosing any transfer point on a conveyor belt or any other affected facility emissions which exceed the stack emissions limits in par. (a).

(4) RECONSTRUCTION. (a) The cost of replacement of ore–contact surfaces on processing equipment may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital cost that would be required to construct a comparable new facility" under s. NR 440.15. Ore–

contact surfaces are crushing surfaces; screen meshes, bars, and plates; conveyor belts; and elevator buckets.

(b) Under s. NR 440.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a)) which are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2–year period following August 31, 1983.

(5) MONITORING OF OPERATIONS. The owner or operator of any affected facility subject to the provisions of this section which uses a wet scrubber to control emissions shall install, calibrate, maintain and operate the following monitoring devices:

(a) A device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device shall be certified by the manufacturer to be accurate within ± 250 pascals (± 1 inch water) gauge pressure and shall be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device shall be certified by the manufacturer to be accurate within ± 5% of design scrubbing liquid flow rate and shall be calibrated on an annual basis in accordance with manufacturer's instructions.

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2). Acceptable alternative methods and procedures are given in par. (e).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) (a) as follows:

1. Method 5 or Method 17 shall be used to determine the particulate matter concentration. The sample volume shall be at least 1.70 dscm (60 dscf). For Method 5, if the gas stream being sampled is at ambient temperature, the sampling probe and filter may be operated without heaters. If the gas stream is above ambient temperature, the sampling probe and filter may be operated at a temperature high enough, but no higher than 121°C (250°F), to prevent water condensation on the filter.

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity.

(c) In determining compliance with the particulate matter standards in sub. (3) (b) and (c), the owner or operator shall use Method 9 and the procedures in s. NR 440.11, with the following additions:

1. The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

2. The observer shall, when possible, select a position that minimizes interference from other fugitive emission sources, for example, road dust. The required observer position relative to the sun (Method 9, Section 2.1) shall be followed.

3. For affected facilities using wet dust suppression for particulate matter control, a visible mist is sometimes generated by the spray. The water mist may not be confused with particulate matter emissions and is not to be considered a visible emission. When a water mist of this nature is present, the observation of emission is to be made at a point in the plume where the mist is no longer visible.

(d) In determining compliance with sub. (3) (e), the owner or operator shall use Method 22 to determine fugitive emissions. The performance test shall be conducted while all affected facilities inside the building are operating. The performance test for each building shall be at least 75 minutes in duration, with each side of the building and the roof being observed for at least 15 minutes.

(e) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this subsection:

1. For the method and procedure of par. (c), if emissions from 2 or more facilities continuously interfere so that the opacity of fugitive emissions from an individual affected facility cannot be read, either of the following procedures may be used:

a. Use for the combined emission stream the highest fugitive opacity standard applicable to any of the individual affected facilities contributing to the emission stream.

b. Separate the emissions so that the opacity of emissions from each affected facility can be read.

(f) To comply with sub. (7) (d), the owner or operator shall record the measurements as required in sub. (7) (c) using the monitoring devices in sub. (5) (a) and (b) during each particulate matter run and shall determine the averages.

(7) REPORTING AND RECORDKEEPING. (a) Each owner or operator seeking to comply with sub. (1) (d) shall submit to the department the following information about the existing facility being replaced and the replacement price of equipment.

1. For a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station:

a. The rated capacity in tons per hour of the existing facility being replaced, and

b. The rated capacity in tons per hour of the replacement equipment.

2. For a screening operation:

a. The total surface area of the top screen of the existing screening operation being replaced, and

b. The total surface area of the top screen of the replacement screening operation.

3. For a conveyor belt:

a. The width of the existing belt being replaced and

b. The width of the replacement conveyor belt.

4. For a storage bin:

a. The rated capacity in tons of the existing storage bin being replaced, and

b. The rated capacity in tons of replacement storage bins.

(b) Each owner or operator seeking to comply with sub. (1) (d) shall submit the following data to the Director of the Emission Standards and Engineering Division, (MD–13), U.S. Environmental Protection Agency, Research Triangle Park NC 27711:

1. The information described in par. (a).

2. A description of the control device used to reduce particulate matter emissions from the existing facility and a list of all other pieces of equipment controlled by the same control device; and

3. The estimated age of the existing facility.

(c) During the initial performance test of a wet scrubber, and daily thereafter, the owner or operator shall record the measurement of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(d) After the initial performance test of a wet scrubber, the owner or operator shall submit semiannual reports to the department of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± 30% for the average determined during the most recent performance test.

(e) The reports required under par. (d) shall be postmarked within 30 days following end of the second and fourth calendar quarters.

(f) The owner or operator of any affected facility shall submit written reports of the results of all performance test conducted to demonstrate compliance with the standards set forth in sub. (3) including reports of opacity observations made using Method 9, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, to demonstrate compliance with sub. (3) (b) and (c) and reports of observations using Method 22, 40 CFR part 60, Appendix A, incorporated by reference in s. NR 440.17, to demonstrate compliance with sub. (3) (e).

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (3) (d), (e) (intro.) and (7) (d), r. and recr. (6), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.69 Wool fiberglass insulation manufacturing plants. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each rotary spin wool fiberglass insulation manufacturing line.

(b) The owner or operator of any facility under par. (a) that commences construction, modification, or reconstruction after February 7, 1984, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Glass pull rate" means the mass of molten glass utilized in the manufacture of wool fiberglass insulation at a single manufacturing line in a specified time period.

(b) "Manufacturing line" means the manufacturing equipment comprising the forming section, where molten glass is fiberized and a fiberglass mat is formed; the curing section, where the binder resin in the mat is thermally "set" ; and the cooling section, where the mat is cooled.

(c) "Rotary spin" means a process used to produce a wool fiberglass insulation by forcing molten glass through numerous small orifices in the side wall of a spinner to form continuous glass fibers that are then broken into discrete lengths by high velocity air flow.

(d) "Wool fiberglass insulation" means a thermal insulation material composed of glass fibers and made from glass produced or melted at the same facility where the manufacturing line is located.

(3) STANDARD FOR PARTICULATE MATTER. On and after the date on which the performance test required to be conducted by s. NR 440.18 is completed no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of 5.5 kg per Mg (11.0 lb/ton) of glass pulled.

(4) MONITORING OPERATIONS. (a) Any owner or operator subject to the provisions of this section who uses a wet scrubbing control device to comply with the mass emission standard shall install, calibrate, maintain and operate monitoring devices that measure the gas pressure drop across each scrubber and the scrubbing liquid flow rate to each scrubber. The pressure drop monitor is to be certified by its manufacturer to be accurate within plus or minus 250 pascals (± 1 inch water gauge) over its operating range and the flow rate monitor is to be certified by its manufacturer to be accurate within ±5% over its operating range.

(b) An owner or operator subject to the provisions of this section who uses a wet electrostatic precipitator control device to comply with the mass emission standard shall install, calibrate, maintain and operate monitoring devices that measure the primary and secondary current (amperes) and voltage in each electrical field and the inlet water flow rate. In addition the owner or operator shall determine the total residue (total solids) content of the water entering the control device once per day using Method 2450 B, "Total Solids Dried at 103–105°C," in Standard Methods for the Examination of Water and Wastewater, 17th edition, 1989, incorporated by reference in s. NR 440.17. Total solids shall be reported as percent by weight. All monitoring devices required under this paragraph are to be certified by their manufacturers to be accurate within ± 5% over their operating range.

(c) All monitoring devices required under this subsection are to be recalibrated quarterly in accordance with procedures under s. NR 440.13 (2).

(5) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) At 30–minute intervals during each 2–hour test run of each performance test of a wet scrubber control device, and at least once every 4 hours thereafter, the owner or operator shall record the measurements required by sub. (4) (a).

(b) At 30–minute intervals during each 2–hour test run of each performance test of a wet electrostatic precipitator control device, and at least once every 4 hours thereafter, the owner or operator shall record the measurements required by sub. (4) (b), except that the concentration of total residue in the water shall be recorded once during each performance test and once per day thereafter.

(c) Records of the measurements required in pars. (a) and (b) must be retained for at least 2 years.

(d) Each owner or operator shall submit written semiannual reports of exceedances of control device operating parameters required to be monitored by pars. (a) and (b) and written documentation of, and a report of corrective maintenance required as a result of, quarterly calibrations of the monitoring devices required in sub. (4) (c). For the purpose of these reports exceedances are defined as any monitoring data that are less than 70% of the lowest values or greater than 130% of the highest value of each operating parameter recorded during the most recent performance test.

(6) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use as reference methods and procedures the test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08 (2).

(b) The owner or operator shall conduct performance tests while the product with the highest loss on ignition (LOI) expected to be produced by the affected facility is being manufactured.

(c) The owner or operator shall determine compliance with the particulate matter standard in sub. (3) as follows:

1. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (C_t Q_{sd})/(P_{avg} K)$$

where:

E is the emission rate of particulate matter, kg/Mg (lb/ton)

C_t is the concentration of particulate matter, g/dscm (g/dscf)

Q_{sd} is the volumetric flow rate of effluent gas, dscm/hr (dscf/hr)

P_{avg} is the average glass pull rate, Mg/hr (ton/hr)

K is the conversion factor, 1000 g/kg (453.6 g/lb)

2. Method 5E shall be used to determine the particulate matter concentration (C_t) and the volumetric flow rate (Q_{sd}) of the effluent gas. The sampling time and sample volume shall be at least 120 minutes and 2.55 dscm (90 dscf).

3. The average glass pull rate (P_{avg}) for the manufacturing line shall be the arithmetic average of 3 glass pull rate (P_i) determinations taken at intervals of at least 30 minutes during each run.

The individual glass pull rates (P_i) shall be computed using the following equation:

$$P_i = K'L_sW_m[1.0 - (LOI/100)]$$

where:

P_i is the glass pull rate at interval "i", Mg/hr (ton/hr)

L_s is the line speed, m/min (Ft/min)

W_m is the trimmed mat width, m (ft)

M is the mat gram weight, g/m^2 (lb/ft^2)

LOI is the loss on ignition, weight percent

K' is the conversion factor, 6×10^{-5} (min–Mg)/(hr–g) [3×10^{-2} (min–ton)/(hr–lb)]

a. ASTM Standard Test Method D2584–68 (reapproved 1979), incorporated by reference in s. NR 440.17, shall be used to determine the LOI for each run.

b. Line speed (L_s) trimmed mat width (W_m) and mat gram weight (M) shall be determined for each run from the process information or from direct measurements.

(d) To comply with sub. (5) (d), the owner or operator shall record measurements as required in sub. (5) (a) and (b) using the monitoring devices in sub. (4) (a) and (b) during the particulate matter runs.

History: Cr. Register, January, 1984, No. 337, eff. 2–1–84; cr. (5) (d) and (6) (e), Cr. Register, September, 1986, No. 369, eff. 10–1–86; am. (4) (b), r. and recr. (6), Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.70 VOC emissions from petroleum refinery wastewater systems. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 1. The provisions of this section apply to affected facilities located in petroleum refineries for which construction, modification or reconstruction is commenced after May 4, 1987.

2. An individual drain system is a separate affected facility.

3. An oil–water separator is a separate affected facility.

4. An aggregate facility is a separate affected facility.

(b) Notwithstanding the provisions of s. NR 440.14 (5) (b), the construction or installation of a new individual drain system shall constitute a modification to an affected facility described in par. (a) 4. For purposes of this paragraph, a new individual drain system shall be limited to all process drains and the first common junction box.

(2) DEFINITIONS. As used in this section, all terms not defined herein shall have the meaning given them in s. NR 440.02 and the following terms shall have the specific meanings given them.

(a) "Active service" means that a drain is receiving refinery wastewater from a process unit that will continuously maintain a water seal.

(b) "Aggregate facility" means an individual drain system together with ancillary downstream sewer lines and oil–water separators, down to and including the secondary oil–water separator, as applicable.

(c) "Catch basin" means an open basin which serves as a single collection point for stormwater runoff received directly from refinery surfaces and for refinery wastewater from process drains.

(d) "Closed vent system" means a system that is not open to the atmosphere and is composed of piping, connections and, if necessary, flow inducing devices that transport gas or vapor from an emission source to a control device.

(e) "Completely closed drain system" means an individual drain system that is not open to the atmosphere and is equipped and operated with a closed vent system and control device complying with the requirements of sub. (7).

(f) "Control device" means an enclosed combustion device, vapor recovery system or flare.

(g) "Fixed roof" means a cover that is mounted to a tank or chamber in a stationary manner and which does not move with fluctuations in wastewater levels.

(h) "Floating roof" means a pontoon–type or double–deck type cover that rests on the liquid surface.

(i) "Gas–tight" means operated with no detectable emissions.

(j) "Individual drain system" means all process drains connected to the first common downstream junction box. The term includes all such drains and common junction box, together with their associated sewer lines and other junction boxes, down to the receiving oil–water separator.

(k) "Junction box" means a manhole or access point to a wastewater sewer system line.

(L) "No detectable emissions" means less than 500 ppm above background levels, as measured by a detection instrument in accordance with Method 21 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(m) "Non–contact cooling water system" means a once–through drain, collection and treatment system designed and operated for collecting cooling water which does not come into contact with hydrocarbons or oily wastewaters and which is not recirculated through a cooling tower.

(n) "Oil–water separator" means wastewater treatment equipment used to separate oil from water consisting of a separation tank, which also includes the forebay and other separator basins, skimmers, weirs, grit chambers and sludge hoppers. Slop oil facilities, including tanks, are included in this term along with storage vessels and auxiliary equipment located between individual drain systems and the oil–water separator. This term does not include storage vessels or auxiliary equipment which do not come in contact with or store oily wastewater.

(o) "Oily wastewater" means wastewater generated during the refinery process which contains oil, emulsified oil or other hydrocarbons. Oily wastewater originates from a variety of refinery processes including cooling water, condensed stripping steam, tank draw–off and contact process water.

(p) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(q) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through the distillation of petroleum or through the redistillation of petroleum, cracking or reforming unfinished petroleum derivatives.

(r) "Sewer line" means a lateral, trunk line, branch line, ditch, channel or other conduit used to convey refinery wastewater to downstream components of a refinery wastewater treatment system. This term does not include buried, below–grade sewer lines.

(s) "Slop oil" means the floating oil and solids that accumulate on the surface of an oil–water separator.

(t) "Storage vessel" means any tank, reservoir or container used for the storage of petroleum liquids, including oil wastewater.

(u) "Stormwater sewer system" means a drain and collection system designed and operated for the sole purpose of collecting stormwater and which is segregated from the process wastewater collection system.

(v) "Wastewater system" means any component, piece of equipment or installation that receives, treats or processes oily wastewater from petroleum refinery process units.

(w) "Water seal controls" means a seal pot, p–leg, trap or other type of trap filled with water that has a design capability to create a water barrier between the sewer and atmosphere.

(3) STANDARDS: GENERAL. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of this subsection, with subs. (4) to (7), (10) and (11), except during periods of startup, shutdown or malfunction.

(b) Compliance with this subsection, subs. (4) to (7), (10) and (11) shall be determined by review of records and reports, review of performance test results and inspection using the methods and procedures specified in sub. (14).

(c) Permission to use alternative means of emission limitation to meet the requirements of subs. (4) to (6) may be granted if the administrator's approval is obtained under 40 CFR 60.694.

Note: See Note in sub. (11).

(d) Stormwater sewer systems are not subject to the requirements of this section.

(e) Ancillary equipment, which is physically separate from the wastewater system and does not come in contact with or store oily wastewater, is not subject to the requirements of this section.

(f) Non–contact cooling water systems are not subject to the requirements of this section.

(g) An owner or operator shall demonstrate compliance with the exclusions in pars. (d) to (f), as provided in sub. (15) (L), (m) and (n).

(4) STANDARDS: INDIVIDUAL DRAIN SYSTEMS. (a) Each drain shall be equipped with water seal controls.

(b) Each drain in active service shall be checked by visual or physical inspection initially and monthly thereafter for indications of low water levels or other conditions that would reduce the effectiveness of the water seal controls.

(c) Except as provided in par. (d), each drain out of active service shall be checked by visual or physical inspection initially and weekly thereafter for indications of low water levels or other problems that could result in VOC emissions.

(d) As an alternative to the requirements in par. (c), if an owner or operator elects to install a tightly sealed cap or plug over a drain that is out of service, inspections shall be conducted initially and semiannually to ensure caps or plugs are in place and properly installed.

(e) Whenever low water levels or missing or improperly installed caps or plugs are identified, water shall be added or first efforts at repair shall be made as soon as practicable, but not later than 24 hours after detection, except as provided in sub. (8).

(f) Junction boxes shall be equipped with a cover and may have an open vent pipe. The vent pipe shall be at least 90 cm (3 ft.) in length and may not exceed 10.2 cm (4 in.) in diameter.

(g) Junction box covers shall have a tight seal around the edge and shall be kept in place at all times, except during inspection and maintenance.

(h) Junction boxes shall be visually inspected initially and semiannually thereafter to ensure that the cover is in place and to ensure that the cover has a tight seal around the edge.

(i) If a broken seal or gap is identified, the first effort at repair shall be made as soon as practicable, but not later than 15 calendar days after the broken seal or gap is identified, except as provided in sub. (8).

(j) Sewer lines may not be open to the atmosphere and shall be covered or enclosed in a manner so as to have no visual gaps or cracks in joints, seals or other emission interfaces.

(k) The portion of each unburied sewer line shall be visually inspected initially and semiannually thereafter for indication of cracks, gaps or other problems that could result in VOC emissions.

(L) Whenever cracks, gaps or other problems are detected, repairs shall be made as soon as practicable, but not later than 15 calendar days after identification, except as provided in sub. (8).

(m) Except as provided in par. (n), each modified or reconstructed individual drain system that has a catch basin in the existing configuration prior to May 4, 1987 shall be exempt from the provisions of this subsection.

(n) Refinery wastewater routed through new process drains and a new first common downstream junction box, either as part of a new individual drain system or an existing individual drain system, may not be routed through a downstream catch basin.

(5) STANDARDS: OIL–WATER SEPARATORS. (a) Each oil–water separator tank, slop oil tank, storage vessel or other auxiliary equipment subject to the requirements of this section shall be equipped and operated with a fixed roof, which meets the following specifications, except as provided in par. (d) or in sub. (11).

1. The fixed roof shall be installed to completely cover the separator tank, slop oil tank, storage vessel or other auxiliary equipment with no separation between the roof and the wall.

2. The vapor space under a fixed roof may not be purged unless the vapor is directed to a control device.

3. If the roof has access doors or openings, such doors or openings shall be gasketed, latched and kept closed at all times during operation of the separator system, except during inspection and maintenance.

4. Roof seals, access doors and other openings shall be checked by visual inspection initially and semiannually thereafter to ensure that no cracks or gaps occur between the roof and wall and that access doors and other openings are closed and gasketed properly.

5. When a broken seal or gasket or other problem is identified, first efforts at repair shall be made as soon as practicable, but not later than 15 calendar days after it is identified, except as provided in sub. (8).

(b) Each oil–water separator tank or auxiliary equipment with a design capacity to treat more than 16 liters per second (250 gpm) of refinery wastewater shall, in addition to the requirements in par. (a), be equipped and operated with a closed vent system and control device, which meet the requirements of sub. (7), except as provided in par. (c) or in sub. (11).

(c) Each modified or reconstructed oil–water separator tank with a maximum design capacity to treat less than 38 liters per second (600 gpm) of refinery wastewater which was equipped and operated with a fixed roof covering the entire separator tank or a portion of the separator tank prior to May 4, 1987 shall be exempt from the requirements of par. (b), but shall meet the requirements of par. (a) or may elect to comply with par. (c) 1.

1. The owner or operator may elect to comply with the requirements of par. (a) for the existing fixed roof covering a portion of the separator tank and comply with the requirements for floating roofs in sub. (11) for the remainder of the separator tank.

(d) Storage vessels, including slop oil tanks and other auxiliary tanks that are subject to the requirements of s. NR 440.27, 440.28 or 440.285, are not subject to the requirements of this subsection.

(e) Slop oil from an oil–water separator tank and oil wastewaters from slop oil handling equipment shall be collected, stored, transported, recycled, reused or disposed of in an enclosed system. Once slop oil is returned to the process unit or is disposed of, it is no longer within the scope of this section. Equipment used in handling slop oil shall be equipped with a fixed roof meeting the requirements of par. (a).

(f) Each oil–water separator tank, slop oil tank, storage vessel or other auxiliary equipment that is required to comply with par. (a) and not par. (b), may be equipped with a pressure control valve as necessary for proper system operation. The pressure control valve shall be set at the maximum pressure necessary for proper system operation, but such that the valve will not vent continuously.

(6) STANDARDS: AGGREGATE FACILITY. Anew, modified or reconstructed aggregate facility shall comply with the requirements of subs. (4) and (5).

(7) STANDARDS: CLOSED VENT SYSTEM AND CONTROL DEVICES. (a) Enclosed combustion devices shall be designed and operated to reduce the VOC emissions vented to them with an efficiency of 95% or greater or to provide a minimum residence time of 0.75 seconds at a minimum temperature of 816°C (1,500°F).

(b) Vapor recovery systems, for example, condensers and absorbers, shall be designed and operated to recover the VOC emissions vented to them with an efficiency of 95% or greater.

(c) Flares used to comply with this section shall comply with the requirements of s. NR 440.18.

(d) Closed vent systems and control devices used to comply with provisions of this section shall be operated at all times when emissions may be vented to them.

(e) Closed vent system shall be designed and operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as determined during the initial and semiannual inspections by the methods specified in sub. (14).

(f) Closed vent systems shall be purged to direct vapor to the control device.

(g) A flow indicator shall be installed on a vent stream to control a control device to ensure that the vapors are being routed to the device.

(h) All gauging and sampling devices shall be gas–tight except when gauging or sampling is taking place.

(i) When emissions from a closed system are detected, first efforts at repair to eliminate the emissions shall be made as soon as practicable, but not later than 30 calendar days from the date the emissions are detected, except as provided in sub. (8).

(8) STANDARDS: DELAY OF REPAIR. (a) Delay of repair of facilities that are subject to the provisions of this section will be allowed if the repair is technically impossible without a complete or partial refinery or process unit shutdown.

(b) Repair of such equipment shall occur before the end of the next refinery or process unit shutdown.

(9) STANDARDS: DELAY OF COMPLIANCE. (a) Delay of compliance of modified individual drain systems with ancillary downstream treatment components will be allowed if compliance with the provisions of this section cannot be achieved without a refinery or process unit shutdown.

(b) Installation of equipment necessary to comply with the provisions of this section shall occur no later than the next scheduled refinery or process unit shutdown.

(10) ALTERNATIVE STANDARDS FOR INDIVIDUAL DRAIN SYSTEMS. (a) An owner or operator may elect to construct and operate a completely closed drain system.

(b) Each completely closed drain system shall be equipped and operated with a closed vent system and control device complying with the requirements of sub. (7).

(c) An owner or operator shall notify the department in the report required in s. NR 440.07 that the owner or operator has elected to construct and operate a completely closed drain system.

(d) If the owner or operator elects to comply with the provisions of this subsection, then the owner or operator does not need to comply with the provisions of sub. (4) or (11) (j) note.

(e) Sewer lines may not be open to the atmosphere and shall be covered or enclosed in a manner so as to have no visual gaps or cracks in joints, seals or other emission interfaces.

(f) The portion of each unburied sewer line shall be visually inspected initially and semiannually thereafter for indication of cracks, gaps or other problems that could result in VOC emissions.

(g) Whenever cracks, gaps or other problems are detected, repairs shall be made as soon as practicable, but not later than 15 calendar days after identification, except as provided in sub. (8).

(11) ALTERNATIVE STANDARDS FOR OIL–WATER SEPARATORS. (a) An owner or operator may elect to construct and operate a floating roof on an oil–water separator tank, slop oil tank, storage vessel or other auxiliary equipment subject to the requirements of this section which meets the following specifications.

1. Each floating roof shall be equipped with a closure device between the wall of the separator and the roof edge. The closure device is to consist of a primary seal and a secondary seal.

2. The primary seal shall be a liquid–mounted seal.

3. A liquid–mounted seal means a foam or liquid–filled seal mounted in contact with the liquid between the wall of the separator and the floating roof.

4. The gap width between the primary seal and the separator wall may not exceed 3.8 cm (1.5 in.) at any point.

5. The total gap area between the primary seal and the separator wall may not exceed 67 cm^2/m (3.2 in^2/ft) of separator wall perimeter.

6. The secondary seal shall be above the primarily seal and cover the annular space between the floating roof and the wall of the separator.

7. The gap width between the secondary seal and the separator wall may not exceed 1.3 cm (0.5 in.) at any point.

8. The total gap area between the secondary seal and the separator wall may not exceed 6.7 cm^2/m (0.32 in^2/ft) of separator wall perimeter.

(b) The maximum gap width and total gap area shall be determined by the methods and procedures specified in sub. (14) (d).

1. Measurement of primary seal gaps shall be performed within 60 calendar days after initial installation of the floating roof and introduction of refinery wastewater and once every 5 years thereafter.

2. Measurement of secondary seal gaps shall be performed within 60 calendar days of initial introduction of refinery wastewater and once every year thereafter.

(c) The owner or operator shall make necessary repairs within 30 calendar days of identification of seals not meeting the requirements listed in par. (a) 2. and 6.

(d) Except as provided in par. (f), each opening in the roof shall be equipped with a gasketed cover, seal or lid, which shall be maintained in a closed position at all times, except during inspection and maintenance.

(e) The roof shall be floating on the liquid, that is, off the roof supports, at all times except during abnormal conditions, that is, low flow rate.

(f) The floating roof may be equipped with one or more emergency roof drains for removal of stormwater. Each emergency roof drain shall be fitted with a slotted membrane fabric cover that covers at least 90% of the drain opening area or a flexible fabric sleeve seal.

(g) Access doors and other openings shall be visually inspected initially and semiannually thereafter to ensure that there is a tight fit around the edges and to identify other problems that could result in VOC emissions.

1. When a broken seal or gasket on an access door or other opening is identified, it shall be repaired as soon as practicable, but not later than 30 calendar days after it is identified, except as provided in sub. (8).

(h) An owner or operator shall notify the department in the report required by s. NR 440.07 that the owner or operator has elected to construct and operate a floating roof under pars. (a) to (g).

(i) For portions of the oil–water separator tank where it is infeasible to construct and operate a floating roof, such as the skimmer mechanism and weirs, a fixed roof meeting the requirements of sub. (5) (a) shall be installed.

(j) Except as provided in par. (i), if an owner or operator elects to comply with the provisions of this subsection, then the owner or operator does not need to comply with the provisions of sub. (5) or 40 CFR 60.694 applicable to the same facilities.

Note: Under 40 CFR 60.694, if, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in VOC emissions at least equivalent to the reduction in VOC emissions achieved by the applicable requirement in subs. (3) to (9), the administrator will publish in the Federal Register a notice permitting the use of the alterative means for purposes of compliance with that requirement. The notice may condition the permission on requirements related to the operation and maintenance of the alternative means. Any such notice shall be published only after notice and an opportunity for a hearing. Any person seeking permission under 40 CFR 60.694 shall collect, verify and submit to the administrator information showing that the alterative means achieves equivalent emission reductions.

(13) MONITORING OF OPERATIONS. (a) Each owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment, unless alternative monitoring procedures or requirements are approved for that facility by the department.

1. Where a thermal incinerator is used for VOC emission reduction, a temperature monitoring device equipped with a continuous recorder shall be used to measure the temperature of the gas stream in the combustion zone of the incinerator. The temperature monitoring device shall have an accuracy of 1% of the measured in °C or ± 0.5°C (± 1.0°F), whichever is greater.

2. Where a catalytic incinerator is used for VOC emission reduction, temperature monitoring devices, each equipped with a continuous recorder, shall be used to measure the temperature in the gas stream immediately before and after the catalyst bed of the incinerator. The temperature monitoring devices shall have an accuracy of 1% of the temperature being measured in °C or ± 0.5°C (± 1.0°F), whichever is greater.

3. Where a carbon absorber is used for VOC emissions reduction, a monitoring device that continuously indicates and records the VOC concentration level or reading of organics in the exhaust gases of the control device outlet gas stream or inlet and outlet gas stream shall be used.

4. Where a flare is used for VOC emission reduction, the owner or operator shall comply with the monitoring requirements of s. NR 440.18 (6) (b).

(b) Where a VOC recovery device other than a carbon absorber is used to meet the requirements specified in sub. (7) (a), the owner or operator shall provide to the department information describing the operation of the control device and the process parameters that would indicate proper operation and maintenance of the device. The department may request further information and will specify appropriate monitoring procedures or requirements.

(c) An alternative operational or process parameter may be monitored if it can be demonstrated that another parameter will ensure that the control device is operated in conformance with these standards and the control device's design specifications.

(14) PERFORMANCE TEST METHODS AND PROCEDURES AND COMPLIANCE PROVISIONS. (a) Before using any equipment installed in compliance with the requirements of sub. (4), (5), (6), (7), (10) or (11), the owner or operator shall inspect the equipment for indications of potential emissions, defects or other problems that may cause the requirements of this section not to be met. Points of inspection shall include, but are not limited to, seals, flanges, joints, gaskets, hatches, caps and plugs.

(b) The owner or operator of each source that is equipped with a closed vent system and control device as required in sub. (7), other than a flare, is exempt from s. NR 440.08 and shall use Method 21 of 40 CFR part 60 Appendix A, incorporated by reference in s. NR 440.17, to measure the emission concentrations, using 500 ppm as the no detectable emission limit. The instrument shall be calibrated each day before using. The calibration gases shall be:

1. Zero air (less than 10 ppm of hydrocarbon in air) and

2. A mixture of either methane or n–hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n–hexane.

(c) The owner or operator shall conduct a performance test initially and at other times as requested by the department, using the test methods and procedures in s. NR 440.18 (6) to determine compliance of flares.

(d) After installing the control equipment required to meet sub. (11) (a) to (g) or whenever sources that have ceased to treat refinery wastewater for a period of 1 year or more are placed back into service, the owner or operator shall determine compliance with the standards in sub. (11) (a) to (g) as follows:

1. The maximum gap widths and maximum gap areas between the primary seal and the separator wall and between the secondary seal and the separator wall shall be determined individually within 60 calendar days of the initial installation of the floating roof and introduction of refinery wastewater or 60 calendar days after the equipment is placed back into service using the following procedure when the separator is filled to the design operating level and when the roof is floating off the roof supports.

a. Measure seal gaps around the entire perimeter of the separator in each place where a 0.32 cm (0.125 in) diameter uniform probe passes freely, without forcing or binding against seal, between the seal and the wall of the separator and measure the gap width and perimetrical distance of each such location.

b. That total surface area of each gap described in subd. 1. a. shall be determined by using probes of various widths to measure accurately the actual distance from the wall to the seal and multiplying each such width by its respective perimetrical distance.

c. Add the gap surface area of each gap location for the primary seal and the secondary seal individually, divide the sum for each seal by the nominal perimeter of the separator basin and compare each to the maximum gap area as specified in sub. (11).

2. The gap widths and total gap area shall be determined using the procedure in subd. 1. according to the following frequency:

a. For primary seals, once every 5 years.

b. For secondary seals, once every year.

(15) RECORDKEEPING REQUIREMENTS. (a) Each owner or operator of a facility subject to the provisions of this section shall comply with the recordkeeping requirements of this subsection. All records shall be retained for a period of 2 years after being recorded unless otherwise noted.

(b) For individual drain systems subject to sub. (4), the location, date and corrective action shall be recorded for each drain when the water seal is dry or otherwise breached, when a drain cap or plug is missing or improperly installed or other problem is identified that could result in VOC emissions, as determined during the initial and periodic visual or physical inspection.

(c) For junction boxes subject to sub. (4), the location, date and corrective action shall be recorded for inspections required by sub. (4) (f) to (i) when a broken seal, gap or other problem is identified that could result in VOC emissions.

(d) For sewer lines subject to subs. (4) and (5) (e), the location, date and corrective action shall be recorded for inspections required by sub. (4) (j) to (n) and (10) (e) to (g) when a problem is identified that could result in VOC emissions.

(e) For oil−water separators subject to sub. (5), the location, date and corrective action shall be recorded for inspections required by sub. (5) (a) when a problem is identified that could result in VOC emissions.

(f) For closed vent systems subject to sub. (7) and completely closed drain systems subject to sub. (10), the location, date and corrective action shall be recorded for inspections required by sub. (7) (e) to (i) during which detectable emissions are measured or a problem is identified that could result in VOC emissions.

(g) If an emission point cannot be repaired or corrected without a process unit shutdown, the expected date of a successful repair shall be recorded.

1. The reason for the delay as specified in sub. (8) shall be recorded if an emission point or equipment problem is not repaired or corrected in the specified amount of time.

2. The signature of the owner or operator, or designee, whose decision it was that repair could not be effected without refinery or process shutdown shall be recorded.

3. The date of successful repair or corrective action shall be recorded.

(h) A copy of the design specifications for all equipment used to comply with the provisions of this section shall be kept for the life of the source in a readily accessible location.

(i) The following information pertaining to the design specifications shall be kept:

1. Detailed schematics and piping and instrumentation diagrams.

2. The dates and descriptions of any changes in the design specifications.

(j) The following information pertaining to the operation and maintenance of closed drain systems and closed vent systems shall be kept in a readily accessible location:

1. Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions shall be kept for the life of the facility. This documentation is to include a general description of the gas streams that enter the control device, including flow and VOC content under varying liquid level conditions, dynamic and static, and manufacturer's design specifications for the control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816°C (1,500°F) is used to meet the 95% requirement, documentation that those conditions exist is sufficient to meet the requirements of this paragraph.

2. A description of the operating parameters to be monitored to ensure that the control device will be operated in conformance with these standards and the control device's design specifications and an explanation of the criteria used for selection of those parameters shall be kept for the life of the facility.

3. Periods when the closed vent systems and control devices required in subs. (3) to (9) are not operated as designed, including periods when a flare pilot does not have a flame shall be recorded and kept for 2 years after the information is recorded.

4. Dates of startup and shutdown of the closed vent system and control devices required in subs. (3) to (9) shall be recorded and kept for 2 years after the information is recorded.

5. The dates of each measurement of detectable emissions required in subs. (3) to (11), shall be recorded and kept for 2 years after the information is recorded.

6. The background level measured during each detectable emissions measurements shall be recorded and kept for 2 years after the information is recorded.

7. The maximum instrument reading measured during each detectable emission measurement shall be recorded and kept for 2 years after the information is recorded.

8. Each owner or operator of an affected facility that uses a thermal incinerator shall maintain continuous records of the temperature of the gas stream in the combustion zone of the incinerator and records of all 3−hour periods of operation during which the average temperature of the gas stream in the combustion zone is more than 28°C (50°F) below the design combustion zone temperature and shall keep such records for 2 years after the information is recorded.

9. Each owner or operator of an affected facility that uses a catalytic incinerator shall maintain continuous records of the temperature of the gas stream both upstream and downstream of the catalyst bed of the incinerator, records of all 3−hour periods of operation during which the average temperature measured before the catalyst bed is more than 28°C (50°F) below the design gas stream temperature and records of all 3−hour periods during which the average temperature difference across the catalyst bed is less than 80% of the design temperature difference and shall keep such records for 2 years after the information is recorded.

10. Each owner or operator of an affected facility that uses a carbon absorber shall maintain continuous records of the VOC concentration level or reading of organics of the control device outlet gas stream or inlet and outlet gas stream and records of all 3−hour periods of operation during which the average VOC concentration level or reading of organics in the exhaust gases or inlet and outlet gas stream, is more than 20% greater than the design exhaust gas concentration level and shall keep such records for 2 years after the information is recorded.

(k) If an owner or operator elects to install a tightly sealed cap or plug over a drain that is out of active service, the owner or operator shall keep for the life of a facility in a readily accessible location, plans or specifications which indicate the location of such drains.

(L) For stormwater sewer systems subject to the exclusion in sub. (3) (d), an owner or operator shall keep for the life of the facility in a readily accessible location, plans or specifications which demonstrate that no wastewater from any process units or equipment is directly discharged to the stormwater sewer system.

(m) For ancillary equipment subject to the exclusion in sub. (3) (e), an owner or operator shall keep for the life of a facility in a readily accessible location, plans or specifications which demonstrate that the ancillary equipment does not come in contact with or store oily wastewater.

(n) For non−contact cooling water system subject to the exclusion in sub. (3) (f) an owner or operator shall keep for the life of the facility in a readily accessible location, plans or specifications which demonstrate that the cooling water does not contact hydrocarbons or oily wastewater and is not recirculated through a cooling tower.

(16) REPORTING REQUIREMENTS. (a) An owner or operator electing to comply with the provisions of subs. (10) and (11) shall notify the department of the alternative standard selected in the report required in s. NR 440.07.

(b) Each owner or operator of a facility subject to this section shall submit to the department within 60 days after initial startup a certification that the equipment necessary to comply with these standards has been installed and that the required initial inspections or tests of process drains, sewer lines, junction boxes, oil–water separators and closed vent systems and control devices have been carried out in accordance with these standards. Thereafter, the owner or operator shall submit to the department semiannually a certification that all of the required inspections have been carried out in accordance with these standards.

(c) Each owner or operator of an affected facility that uses a flare shall submit to the department within 60 days after initial startup, as required under s. NR 440.08 (1), a report of the results of the performance test required in sub. (14) (c).

(d) A report that summarizes all inspections when a water seal was dry or otherwise breached, when a drain cap or plug was missing or improperly installed or when cracks, gaps or other problems were identified that could result in VOC emissions, including information about the repairs or corrective action taken, shall be submitted initially and semiannually thereafter to the department.

(e) As applicable, a report shall be submitted semiannually to the department that indicates:

1. Each 3–hour period of operation during which the average temperature of the gas stream in the combustion zone of a thermal incinerator, as measured by the temperature monitoring device, is more than 28°C (50°F) below the design combustion zone temperatures.

2. Each 3–hour period of operation during which the average temperature of the gas stream immediately before the catalyst bed of a catalytic incinerator, as measured by the temperature monitoring device, is more than 28°C (50°F) below the design gas stream temperature and any 3–hour period during which the average temperature difference across the catalyst bed (that is, the difference between the temperatures of the gas stream immediately before and after the catalyst bed), as measured by the temperature monitoring device, is less than 80% of the design temperature difference; or

3. Each 3–hour period of operation during which the average VOC concentration level or reading of organics in the exhaust gases from a carbon absorber is more than 20% greater than the design exhaust gas concentration level or reading.

(f) If compliance with the provisions of this section is delayed pursuant to sub. (9), the notification required under s. NR 440.07 (1) (d) shall include the estimated date of the next scheduled refinery or process unit shutdown after the date of notification and the reason why compliance with the standards is technically impossible without a refinery or process unit shutdown.

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (1) (b), (15), (j) 1., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.705 Volatile organic compound emissions from synthetic organic chemical manufacturing industry (SOCMI) reactor processes. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) This section applies to each affected facility designated in par. (b) that is part of a process unit that produces any of the chemicals listed in sub. (8) as a product, co–product, by–product or intermediate except as provided in par. (c).

(b) The affected facility is any of the following for which construction, modification or reconstruction commenced after June 29, 1990:

1. Each reactor process not discharging its vent stream into a recovery system.

2. Each combination of a reactor process and the recovery system into which its vent stream is discharged.

3. Each combination of 2 or more reactor processes and the common recovery system into which their vent streams are discharged.

(c) Exemptions from the provisions of par. (a) are as follows:

1. Any reactor process that is designed and operated as a batch operation is not an affected facility.

2. Each affected facility that has a total resource effectiveness (TRE) index value greater than 8.0 is exempt from all provisions of this section except for subs. (3) (c), (5) (d), (e) and (f) and (6) (g), (L) and (t).

3. Each affected facility in a process unit with a total design capacity for all chemicals produced within that unit of less than one gigagram per year (1,100 tons per year) is exempt from all provisions of this section except for the recordkeeping and reporting requirements in sub. (6) (i), (L) 6. and (n).

4. Each affected facility operated with a vent stream flow rate less than 0.011 scm/min is exempt from all provisions of this section except for the test method and procedure and the recordkeeping and reporting requirements in subs. (5) (g) and (6) (h), (L) 5. and (o).

5. If the vent stream from an affected facility is routed to a distillation unit subject to s. NR 440.686 and has no other releases to the air except for a pressure relief valve, the facility is exempt from all provisions of this section except for sub. (6) (r).

6. Any reactor process operating as part of a process unit which produces beverage alcohols or which uses, contains and produces no VOC is not an affected facility.

7. Any reactor process that is subject to the provisions of s. NR 440.647 is not an affected facility.

8. Each affected facility operated with a concentration of total organic compounds (TOC), less methane and ethane, in the vent stream less than 300 ppmv, as measured by Method 18 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or a concentration of TOC in the vent stream less than 150 ppmv, as measured by Method 25A in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, is exempt from all provisions of this section except for the test method and procedure and the reporting and recordkeeping requirements in subs. (5) (h) and (6) (j), (L) 8. and (p).

Note: The intent of these standards is to minimize emissions of VOC through the application of best demonstrated technology (BDT). The numerical emission limits in these standards are expressed in terms of TOC, measured as TOC less methane and ethane. This emission limit reflects the performance of BDT.

(2) DEFINITIONS. All terms not defined in this section have the meanings given in s. NR 440.02. In this section:

(a) "Batch operation" means any noncontinuous reactor process that is not characterized by steady state conditions and in which reactants are not added and products are not removed simultaneously.

(b) "Boiler" means any enclosed combustion device that extracts useful energy in the form of steam and is not an incinerator.

(c) "By compound" means by individual stream components, not carbon equivalents.

(d) "Car–seal" means a seal that is placed on a device that is used to change the position of a valve, for example, from opened to closed, in such a way that the position of the valve cannot be changed without breaking the seal.

(e) "Combustion device" means an individual unit of equipment, such as an incinerator, flare, boiler or process heater, used for combustion of a vent stream discharged from the process vent.

(f) "Continuous recorder" means a data recording device recording an instantaneous data value at least once every 15 minutes.

(g) "Flame zone" means the portion of the combustion chamber in a boiler occupied by the flame envelope.

(h) "Flow indicator" means a device which indicates whether gas flow is present in a line.

(i) "Halogenated vent stream" means any vent stream determined to have a total concentration by volume of compounds containing halogens of 20 ppmv, by compound, or greater.

(j) "Incinerator" means an enclosed combustion device that is used for destroying organic compounds. If there is energy recovery, the energy recovery section and the combustion chambers are not of integral design. That is, the energy recovery section and the combustion section are not physically formed into one manufactured or assembled unit but are joined by ducts or connections carrying flue gas.

(k) "Primary fuel" means the fuel fired through a burner or a number of similar burners. The primary fuel provides the principal heat input to the device and the amount of fuel is sufficient to sustain operation without the addition of other fuels.

(L) "Process heater" means a device that transfers heat liberated by burning fuel directly to process streams or to heat transfer liquids other than water.

(m) "Process unit" means equipment assembled and connected by pipes or ducts to produce as intermediates or final products one or more of the chemicals in sub. (8). A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient product storage facilities.

(n) "Product" means any compound or chemical listed in sub. (8) which is produced for sale as a final product as that chemical or for use in the production of other chemicals or compounds. By–products, co–products and intermediates are considered to be products.

(o) "Reactor processes" means unit operations in which one or more chemicals or reactants, other than air, are combined or decomposed in such a way that their molecular structures are altered and one or more new organic compounds are formed.

(p) "Recovery device" means an individual unit of equipment, such as an absorber, carbon adsorber or condenser, capable of and used for the purpose of recovering chemicals for use, reuse or sale.

(q) "Recovery system" means an individual recovery device or series of recovery devices applied to the same vent stream.

(r) "Relief valve" means a valve used only to release an unplanned, nonroutine discharge. A relief valve discharge results from an operator error, a malfunction such as a power failure or equipment failure or other unexpected cause that requires immediate venting of gas from process equipment in order to avoid safety hazards or equipment damage.

(s) "Secondary fuel" means a fuel fired through a burner other than a primary fuel burner. The secondary fuel may provide supplementary heat in addition to the heat provided by the primary fuel.

(t) "Total organic compounds" or "TOC" means those compounds measured according to the procedures in sub. (5) (b) 4. For the purposes of measuring molar composition as required in sub. (5) (d) 2. a. and b., hourly emission rate as required in sub. (5) (d) 5. and (e) and TOC concentration as required in sub. (6) (b) 4. and (f) 4., those compounds which the department has determined do not contribute appreciably to the formation of ozone are to be excluded.

(u) "Total resource effectiveness" or "TRE index value" means a measure of the supplemental total resource requirement per unit reduction of TOC associated with a vent stream from an affected reactor process facility based on vent stream flow rate, emission rate of TOC, net heating value and corrosion properties, whether or not the vent stream contains halogenated compounds as quantified by the equation given under sub. (5) (e).

(v) "Vent stream" means any gas stream discharged directly from a reactor process to the atmosphere or indirectly to the atmosphere after diversion through other process equipment. The vent stream excludes relief valve discharges and equipment leaks.

(3) STANDARDS. Each owner or operator of any affected facility shall comply with par. (a), (b) or (c) for each vent stream on and after the date on which the initial performance test required by s. NR 440.08 and sub. (5) is completed but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after the initial startup, whichever date comes first. Each owner or operator shall either:

(a) Reduce emissions of TOC, less methane and ethane, by 98 weight percent or to a TOC, less methane and ethane, concentration of 20 ppmv on a dry basis corrected to 3% oxygen, whichever is less stringent. If a boiler or process heater is used to comply with this paragraph, then the vent stream shall be introduced into the flame zone of the boiler or process heater; or

(b) Combust the emissions in a flare that meets the requirements of s. NR 440.18; or

(c) Maintain a TRE index value greater than 1.0 without use of a VOC emission control device.

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility that uses an incinerator to seek to comply with the TOC emission limit specified under sub. (3) (a) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater.

a. Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox or in the ductwork immediately downstream of the firebox in a position before any substantial heat exchange is encountered.

b. Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

2. A flow indicator that provides a record of vent stream flow diverted from being routed to the incinerator at least once every 15 minutes for each affected facility, except as provided in subd. 2. b.

a. The flow indicator shall be installed at the entrance to any bypass line that could divert the vent stream from being routed to the incinerator, resulting in its emission to the atmosphere.

b. Where the bypass line valve is secured in the closed position with a car–seal or a lock–and–key type configuration, a flow indicator is not required. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and the vent stream is not diverted through the bypass line.

(b) The owner or operator of an affected facility that uses a flare to seek to comply with sub. (3) (b) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment:

1. A heat sensing device, such as an ultraviolet beam sensor or thermocouple at the pilot light to indicate the continuous presence of a flame.

2. A flow indicator that provides a record of vent stream flow diverted from being routed to the flare at least once every 15 minutes for each affected facility, except as provided in subd. 2. b.

a. The flow indicator shall be installed at the entrance to any bypass line that could divert the vent stream from being routed to the flare, resulting in its emission to the atmosphere.

b. Where the bypass line valve is secured in the closed position with a car–seal or a lock–and–key type configuration, a flow indicator is not required. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and the vent stream is not diverted through the bypass line.

(c) The owner or operator of an affected facility that uses a boiler or process heater to seek to comply with sub. (3) (a) shall install, calibrate, maintain and operate according to the manufacturer's specifications the following equipment:

1. A flow indicator that provides a record of vent stream flow diverted from being routed to the boiler or process heater at least once every 15 minutes for each affected facility, except as provided in subd. 1. b.

a. The flow indicator shall be installed at the entrance to any bypass line that could divert the vent stream from being routed to the boiler or process heater, resulting in its emission to the atmosphere.

b. Where the bypass line valve is secured in the closed position with a car–seal or a lock–and–key type configuration, a flow indicator is not required. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and the vent stream is not diverted through the bypass line.

2. A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, for boilers or process heaters of less than 44 MW (150 million Btu/hr) design heat input capacity. Any vent stream introduced with primary fuel into a boiler or process heater is exempt from this requirement.

(d) The owner or operator of an affected facility that seeks to demonstrate compliance with the TRE index value limit specified under sub. (3) (c) shall install, calibrate, maintain and operate according to manufacturer's specifications the following equipment unless alternative monitoring procedures or requirements are approved for that facility by the department:

1. Where an absorber is the final recovery device in the recovery system:

a. A scrubbing liquid temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater, and a specific gravity monitoring device having an accuracy of ± 0.02 specific gravity units, each equipped with a continuous recorder; or

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization or thermal conductivity, each equipped with a continuous recorder.

2. Where a condenser is the final recovery device in the recovery system:

a. A product side condenser exit temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is greater; or

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization or thermal conductivity, each equipped with a continuous recorder.

3. Where a carbon adsorber is the final recovery device unit in the recovery system:

a. An integrating steam flow monitoring device having an accuracy of ± 10% and a carbon bed temperature monitoring device having an accuracy of ± 1% of the temperature being monitored expressed in degrees Celsius or ±0.5°C, whichever is greater, both equipped with a continuous recorder; or

b. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization or thermal conductivity, each equipped with a continuous recorder.

(e) An owner or operator of an affected facility seeking to demonstrate compliance with the standards specified under sub. (3) with a control device other than an incinerator, boiler, process heater or flare, or a recovery device other than an absorber, condenser or carbon adsorber, shall provide to the administrator information describing the operation of the control device or recovery device and the process parameters which would indicate proper operation and maintenance of the device. The administrator may request further information and will specify appropriate monitoring procedures or requirements.

(5) TEST METHODS AND PROCEDURES. (a) For the purpose of demonstrating compliance with sub. (3), all affected facilities shall be run at full operating conditions and flow rates during any performance test.

(b) The following methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used as reference methods to determine compliance with the emission limit or percent reduction efficiency specified under sub. (3) (a):

1. Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or TOC, less methane and ethane, reduction efficiency shall be prior to the inlet of the control device and after the recovery system.

2. Method 2, 2A, 2C or 2D, as appropriate, for determination of the gas volumetric flow rates.

3. The emission rate correction factor, integrated sampling and analysis procedure of Method 3B shall be used to determine the oxygen concentration ($\%O_{2d}$) for the purposes of determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the TOC samples, and the samples shall be taken during the same time that the TOC samples are taken. The TOC concentration corrected to 3% O_2 (C_c) shall be computed using the following equation:

$$C_c = C_{TOC}\frac{17.9}{20.9 - \%0_{2d}}$$

where:

C_c is the concentration of TOC corrected to 3% O_2, dry basis ppm by volume

C_{TOC} is the concentration of TOC minus methane and ethane, dry basis ppm by volume

$\%O_{2d}$ is the concentration of O_2, dry basis percent by volume

4. Method 18 to determine the concentration of TOC in the control device outlet and the concentration of TOC in the inlet

when the reduction efficiency of the control device is to be determined.

a. The minimum sampling time for each run shall be one hour in which either an integrated sample or 4 grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately 15–minute intervals.

b. The emission reduction (R) of TOC, minus methane and ethane, shall be determined using the following equation: where:

$$R = \frac{E_i - E_o}{E_i} \times 100$$

R is the emission reduction, percent by weight

E_i is the mass rate of TOC entering the control device, kg TOC/hr

E_o is the mass rate of TOC discharged to the atmosphere, kg TOC/hr

c. The mass rates of TOC (E_i, E_o) shall be computed using the following equations:

$$E_i = K_2 \sum_{j=1}^{n} C_{ij} M_{ij} Q_i$$

$$E_o = K_2 \sum_{j=1}^{n} C_{oj} M_{oj} Q_o$$

where:

C_{ij}, C_{oj} is the concentration of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, dry basis ppm by volume

M_{ij}, M_{oj} is the molecular weight of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, g/g–mole (lb/lb–mole)

Q_i, Q_o is the flow rate of gas stream at the inlet and outlet of the control device respectively, dscm/min (dscf/hr)

K_2 is a constant, 2.494×10^{-6} (l/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for g–mole/scm is 20°C

d. The TOC concentration (C_{TOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^{n} C_j$$

where:

C_{TOC} is the concentration of TOC, minus methane and ethane, dry basis ppm by volume

C_j is the concentration of sample components "j", dry basis ppm by volume

n is the number of components in the sample

5. The requirement for an initial performance test is waived in accordance with s. NR 440.08(2) for the following:

a. When a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used to seek compliance with sub. (3) (a).

b. When a vent stream is introduced into a boiler or process heater with the primary fuel.

c. The department reserves the option to require testing at such other times as may be required.

6. For purposes of complying with the 98 weight percent reduction in sub. (3) (a), if the vent stream entering a boiler or process heater with a design capacity less than 44 MW (150 million Btu/hour) is introduced with the combustion air or as secondary fuel, the weight percent reduction of TOC, minus methane and ethane, across the combustion device shall be determined by comparing the TOC, minus methane and ethane, in all combusted vent streams, primary fuels and secondary fuels with the TOC, minus methane and ethane, exiting the combustion device.

(c) When a flare is used to seek to comply with sub. (3) (b), the flare shall comply with the requirements of s. NR 440.18.

(d) The following test methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used for determining the net heating value of the gas combusted to determine compliance under sub. (3) (b) and for determining the process vent stream TRE index value to determine compliance under subs. (1) (c) 2. and (3) (c).

1. a. Method 1 or 1A, as appropriate, for selection of the sampling site. The sampling site for the vent stream flow rate and molar composition determination prescribed in subds. 2. and 3. shall be, except for the situations outlined in subd. 1. b., prior to the inlet of any control device, prior to any postreactor dilution of the stream with air and prior to any postreactor introduction of halogenated compounds into the process vent stream. No traverse site selection method is needed for vents smaller than 4 inches in diameter.

b. If any gas stream other than the reactor vent stream is normally conducted through the final recovery device:

1) The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which any nonreactor stream or stream from a nonaffected reactor process is introduced.

2) The efficiency of the final recovery device is determined by measuring the TOC concentration using Method 18 at the inlet to the final recovery device after the introduction of any vent stream and at the outlet of the final recovery device.

3) This efficiency of the final recovery device shall be applied to the TOC concentration measured prior to the final recovery device and prior to the introduction of any nonreactor stream or stream from a nonaffected reactor process to determine the concentration of TOC in the reactor process vent stream from the final recovery device. This concentration of TOC is then used to perform the calculations outlined in subds. 4. and 5.

2. The molar composition of the process vent stream shall be determined as follows:

a. Method 18 to measure the concentration of TOC including those containing halogens.

b. ASTM D1946–77, incorporated by reference in s. NR 440.17, to measure the concentration of carbon monoxide and hydrogen.

c. Method 4 to measure the content of water vapor.

3. The volumetric flow rate shall be determined using Method 2, 2A, 2C or 2D as appropriate.

4. The net heating value of the vent stream shall be calculated using the following equation:

$$H_T = K_1 \sum_{j=1}^{n} C_j H_j (1 - B_{ws})$$

where:

H_T is the net heating value of the sample, MJ/scm, where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s (vent stream flow rate)

K_1 is a constant, 1.740×10^{-7} (l/ppm) (g–mole/scm) (MJ/kcal), where standard temperature for (g–mole/scm) is 20°C

C_j is the concentration on a dry basis of compound "j" in ppm as measured for organics by Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77, incorporated by reference in s. NR 440.17, as indicated in subd. 2.

H_j is the net heat of combustion of compound "j", kcal/g–mole, based on combustion at 25°C and 760 mm Hg. The heats of combustion of vent stream components would be required to be determined using ASTM D2382–76, incorporated by reference in s. NR 440.17, if published values are not available or cannot be calculated

B_{ws} is the water vapor content of the vent stream, proportion by volume

5. The emission rate of TOC in the vent stream shall be calculated using the following equation:

$$E_{TOC} = K_2 \sum_{j=1}^{n} C_j M_j Q_s$$

where:

E_{TOC} is the emission rate of TOC in the sample, kg/hr

K_2 is a constant, 2.494×10^{-6} (l/ppm) (g–mole/scm) (kg/g) (min/hr), where standard temperature for (g–mole/scm) is 20°C

C_j is the concentration on a dry basis of compound "j" in ppm as measured by Method 18 as indicated in subd. 2.

M_j is the molecular weight of sample "j", g/g–mole

Q_s is the vent stream flow rate (dscm/min) at a temperature of 20°C

6. The total vent stream concentration, by volume, of compounds containing halogens (ppmv, by compound) shall be summed from the individual concentrations of compounds containing halogens which were measured by Method 18.

(e) For purposes of complying with subs. (1) (c) 2. and (3) (c), the owner or operator of a facility affected by this section shall calculate the TRE index value of the vent stream using the equation for incineration in subd. 1. for halogenated vent streams. The owner or operator of an affected facility with a nonhalogenated vent stream shall determine the TRE index value by calculating values using both the incinerator equation in subd. 1. and the flare equation in subd. 2. and selecting the lower of the 2 values.

1. The equation for calculating the TRE index value of a vent stream controlled by an incinerator is as follows:

$$TRE = \frac{1}{E_{TOC}}\left[a + b(Q_s)^{0.88} + c(Q_s) + d(Q_s)(H_T) + e(Q_s)^{0.88}(H_T)^{0.88} + f(Y_s)^{0.5}\right]$$

a. Where for a vent stream flow rate (scm/min) at a standard temperature of 20°C that is greater than or equal to 14.2 scm/min:

TRE is the TRE index value

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s

Y_s is Q_s for all vent stream categories listed in Table 1 except for Category E vent streams where $Y_s = (Q_s)(H_T)/3.6$

E_{TOC} is the hourly emissions of TOC reported in kg/hr

a, b, c, d, e and f are coefficients. The set of coefficients that apply to a vent stream can be obtained from Table 1.

Table 1. Total Resource Effectiveness Coefficients for Vent Streams Controlled by an Incinerator Subject to the New Source Performance Standards for Reactor Processes

	a	b	c	d	e	f
Design Category A1. For Halogenated Process Vent Streams, If 0 ≤ Net Heating Value (MJ/scm) ≤ 3.5: Q_s=Vent Stream Flow Rate (scm/min)						
$14.2 \le Q_s \le 18.8$	19.18370	0.27580	0.75762	−0.13064	0	0.01025
$18.8 < Q_s \le 699$	20.00563	0.27580	0.30387	−0.13064	0	0.01025
$699 < Q_s \le 1,400$	39.87022	0.29973	0.30387	−0.13064	0	0.01449
$1,400 < Q_s \le 2,100$	59.73481	0.31467	0.30387	−0.13064	0	0.01775
$2,100 < Q_s \le 2,800$	79.59941	0.32572	0.30387	−0.13064	0	0.02049
$2,800 < Q_s \le 3,500$	99.46400	0.33456	0.30387	−0.13064	0	0.02291
Design Category A2. For Halogenated Process Vent Streams, If Net Heating Value (MJ/scm)>3.5: Q_s=Vent Stream Flow Rate (scm/min)						
$14.2 \le Q_s \le 18.8$	18.84466	0.26742	−0.20044	0	0	0.01025
$18.8 < Q_s \le 699$	19.66658	0.26742	−0.25332	0	0	0.01025
$699 < Q_s \le 1,400$	39.19213	0.29062	−0.25332	0	0	0.01449
$1,400 < Q_s \le 2,100$	58.71768	0.30511	−0.25332	0	0	0.01775
$2,100 < Q_s \le 2,800$	78.24323	0.31582	−0.25332	0	0	0.02049
$2,800 < Q_s \le 3,500$	97.76879	0.32439	−0.25332	0	0	0.02291

Table 1. Total Resource Effectiveness Coefficients for Vent Streams Controlled by an Incinerator Subject to the New Source Performance Standards for Reactor Processes (continued)

Design Category B. For Nonhalogenated Process Vent Streams, If 0 ≤ Net Heating Value (MJ/scm) ≤ 0.48: Q_s=Vent Stream Flow Rate (scm/min)						
$14.2 \le Q_s \le 1{,}340$	8.54245	0.10555	0.09030	−0.17109	0	0.01025
$1{,}340 < Q_s \le 2{,}690$	16.94386	0.11470	0.09030	−0.17109	0	0.01449
$2{,}690 < Q_s \le 4{,}040$	25.34528	0.12042	0.09030	−0.17109	0	0.01775
Design Category C. For Nonhalogenated Process Vent Streams, If 0.48 < Net Heating Value (MJ/scm) ≤ 1.9: Q_s=Vent Stream Flow Rate (scm/min)						
$14.2 \le Q_s \le 1{,}340$	9.25233	0.06105	0.31937	−0.16181	0	0.01025
$1{,}340 < Q_s \le 2{,}690$	18.36363	0.06635	0.31937	−0.16181	0	0.01449
$2{,}690 < Q_s \le 4{,}040$	27.47492	0.06965	0.31937	−0.16181	0	0.01775
Design Category D. For Nonhalogenated Process Vent Streams, If 1.9 < Net Heating Value (MJ/scm) ≤ 3.6: Q_s=Vent Stream Flow Rate (scm/min)						
$14.2 \le Q_s \le 1{,}180$	6.67868	0.06943	0.02582	0	0	0.01025
$1{,}180 < Q_s \le 2{,}370$	13.21633	0.07546	0.02582	0	0	0.01449
$2{,}370 < Q_s \le 3{,}550$	19.75398	0.07922	0.02582	0	0	0.01755
Design Category E. For Nonhalogenated Process Vent Streams, If Net Heating Value (MJ/scm)>3.6: Y_s=Dilution Flow Rate (scm/min)=$(Q_s)(H_T)/3.6$						
$14.2 \le Y_s \le 1{,}180$	6.67868	0	0	−0.00707	0.02220	0.01025
$1{,}180 < Y_s \le 2{,}370$	13.21633	0	0	−0.00707	0.02412	0.01449
$2{,}370 < Y_s \le 3{,}550$	19.75398	0	0	−0.00707	0.02533	0.01755

b. For a vent stream flow rate (scm/min) at a standard temperature of 20°C that is less than 14.2 scm/min:

TRE is the TRE index value

Q_s is 14.2 scm/min

H_T = (FLOW) (HVAL)/14.2

where the following inputs are used:

FLOW is the vent stream flow rate (scm/min) at a standard temperature of 20°C

HVAL is the vent stream net heating value (MJ/scm) where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s

Y_s is 14.2 scm/min for all vent streams except for Category E vent streams where $Y_s = (14.2)\ (H_T)/3.6$

E_{TOC} is the hourly emissions of TOC reported in kg/hr

a, b, c, d, e and f are coefficients. The set of coefficients that apply to a vent stream can be obtained from Table 1.

2. The equation for calculating the TRE index value of a vent stream controlled by a flare is as follows:

$$TRE = \frac{1}{E_{TOC}}\left[a(Q_s) + b(Q_s)^{0.8} + c(Q_s)(H_T) + d(E_{TOC}) + e\right]$$

where:

TRE is the TRE index value

E_{TOC} is the hourly emission rate of TOC reported in kg/hr

Q_s is the vent stream flow rate (scm/min) at a standard temperature of 20°C

H_T is the vent stream net heating value (MJ/scm) where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s

a, b, c, d and e are coefficients. The set of coefficients that apply to a vent stream can be obtained from Table 2.

Table 2. Total Resource Effectiveness Coefficients for Vent Streams Controlled by a Flare Subject to the New Source Performance Standards for Reactor Processes

	a	b	c	d	e
$H_T < 11.2$ MJ/scm	2.25	0.288	−0.193	−0.0051	2.08
$H_T \ge 11.2$ MJ/scm	0.309	0.0619	−0.0043	−0.0034	2.08

(f) Each owner or operator of an affected facility seeking to comply with sub. (1) (c) 2. or (3) (c) shall recalculate the TRE index value for that affected facility whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type or catalyst type or whenever there is replacement, removal or addition of recovery equipment. The TRE index value shall be recalculated based on test data or on best engineering estimates of the effects of the change on the recovery system.

1. Where the recalculated TRE index value is less than or equal to 1.0, the owner or operator shall notify the department within one week of the recalculation and shall conduct a performance test according to the methods and procedures required by this subsection in order to determine compliance with sub. (3) (a). Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

2. Where the recalculated TRE index value is less than or equal to 8.0 but greater than 1.0, the owner or operator shall conduct a performance test in accordance with s. NR 440.08 and this subsection and shall comply with subs. (4) and (6) and this subsection. Performance tests shall be conducted as soon as possible after the process change but no later than 180 days from the time of the process change.

(g) Any owner or operator subject to the provisions of this section seeking to demonstrate compliance with sub. (1) (c) 4. shall use Method 2, 2A, 2C or 2D of Appendix A to 40 CFR part 60, incorporated by reference in s. NR 440.17, for determination of volumetric flow rate.

(h) Each owner or operator seeking to demonstrate that a reactor process vent stream has a TOC concentration for compliance with the low concentration exemption in sub. (1) (c) 8. shall conduct an initial test to measure TOC concentration.

1. The sampling site shall be selected as specified in par. (d) 1.a.

2. Method 18 or Method 25A of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, shall be used to measure concentration.

3. Where Method 18 is used to qualify for the low concentration exclusion in sub. (1) (c) 8., the procedures in par. (b) 4. a. and d. shall be used to measure TOC concentration and the procedures of par. (b) 3. shall be used to correct the TOC concentration to 3% oxygen. To qualify for the exclusion, the results shall demonstrate that the concentration of TOC corrected to 3% oxygen is below 300 ppm by volume.

4. Where Method 25A is used, the following procedures shall be used to calculate ppm by volume TOC concentration corrected to 3% oxygen:

a. Method 25A shall be used only if a single organic compound is greater than 50% of total TOC, by volume, in the reactor process vent stream. This compound shall be the principal organic compound.

b. The principal organic compound may be determined by either process knowledge or test data collected using an appropriate reference method. Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry or previous test results provided the results are still relevant to the current reactor process vent stream conditions.

c. The principal organic compound shall be used as the calibration gas for Method 25A.

d. The span value for Method 25A shall be 300 ppmv.

e. Use of Method 25A is acceptable if the response from the high level calibration gas is at least 20 times the standard deviation of the response from the zero calibration gas when the instrument is zeroed on the most sensitive scale.

f. The owner or operator shall demonstrate that the concentration of TOC, including methane and ethane, measured by Method 25A, corrected to 3% oxygen, is below 150 ppm by volume to qualify for the low concentration exclusion in sub. (1) (c) 8.

g. The concentration of TOC shall be corrected to 3% oxygen using the procedures and equation in par. (b) 3.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to sub. (3) shall notify the department of the specific provisions of sub. (3) (a), (b) or (c) with which the owner or operator has elected to comply. Notification shall be submitted with the notification of initial startup required by s. NR 440.07(1) (c). If an owner or operator elects at a later date to use an alternative provision of sub. (3) with which he or she will comply, then the department shall be notified by the owner or operator 90 days before implementing a change and, upon implementing the change, a performance test shall be performed as specified by sub. (5) no later than 180 days from initial startup.

(b) Each owner or operator subject to the provisions of this section shall keep an up to date, readily accessible record of the following data measured during each performance test, and also include the following data in the report of the initial performance test required under s. NR 440.08. Where a boiler or process heater with a design heat input capacity of 44 MW (150 million Btu/hour) or greater is used or where the reactor process vent stream is introduced as the primary fuel to any size boiler or process heater to comply with sub. (3) (a), a report containing performance test data need not be submitted, but a report containing the information in par. (b) 2. a. is required. The same data specified in this subsection shall be submitted in the reports of all subsequently required performance tests where either the emission control efficiency of a combustion device, outlet concentration of TOC or the TRE index value of a vent stream from a recovery system is determined.

1. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (a) through use of either a thermal or catalytic incinerator:

a. The average firebox temperature of the incinerator, or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator, measured at least every 15 minutes and averaged over the same time period of the performance testing, and

b. The percent reduction of TOC determined as specified in sub. (5) (b) achieved by the incinerator or the concentration of TOC (ppmv, by compound) determined as specified in sub. (5) (b) at the outlet of the control device on a dry basis corrected to 3% oxygen.

2. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (a) through use of a boiler or process heater:

a. A description of the location at which the vent stream is introduced into the boiler or process heater, and

b. The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 MW (150 million Btu/hr) measured at least every 15 minutes and averaged over the same time period of the performance testing.

3. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (b) through use of a smokeless flare, flare design, for example, steam–assisted, air–assisted or nonassisted, all visible emission readings, heat content determinations, flow rate measurements and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring, and records of all periods of operations during which the pilot flame is absent.

4. Where an owner or operator subject to the provisions of this section seeks to demonstrate compliance with sub. (3) (c):

a. Where an absorber is the final recovery device in the recovery system, the exit specific gravity, or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved by the department, and average exit temperature of the absorbing liquid measured at least every 15 minutes and averaged over the same time period of the performance testing, with both measured while the vent stream is normally routed and constituted; or

b. Where a condenser is the final recovery device in the recovery system, the average product side exit temperature measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is routed and constituted normally; or

c. Where a carbon adsorber is the final recovery device in the recovery system, the total steam mass flow measured at least every 15 minutes and averaged over the same time period of the performance test or full carbon bed cycle, temperature of the carbon bed after regeneration and within 15 minutes of completion of any cooling cycle and duration of the carbon bed steaming cycle with all measured while the vent stream is routed and constituted normally; or

d. As an alternative to subd. 4. a., b. or c., the concentration level or reading indicated by the organics monitoring device at the outlet of the absorber, condenser or carbon adsorber measured at least every 15 minutes and averaged over the same time period of the performance testing while the vent stream is normally routed and constituted.

e. All measurements and calculations performed to determine the TRE index value of the vent stream.

(c) Each owner or operator subject to the provisions of this section shall keep up to date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (a) and (c) as well as up to date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where a combustion device is used to comply with sub. (3) (a), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. For thermal incinerators, all 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined.

2. For catalytic incinerators, all 3–hour periods of operation during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C (50°F) below the average temperature of the vent stream during the most recent performance test at which compliance with sub. (3) (a) was determined. The owner or operator also shall record all 3–hour periods of operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference of the bed during the most recent performance test at which compliance with sub. (3) (a) was determined.

3. All 3–hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test at which compliance with sub. (3) (a) was determined for boilers or process heaters with a design heat input capacity of less than 44 MW (150 million Btu/hr) where the vent stream is introduced with the combustion air or as a secondary fuel.

4. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under sub. (3) (a).

(d) Each owner or operator subject to the provisions of this section shall keep records of the following:

1. Up to date, readily accessible continuous records of the flow indication specified under sub. (4) (a) 2. a., (b) 2. a. and (c) 1. a. as well as up to date, readily accessible records of all periods and the duration when the vent stream is diverted from the control device.

2. Where a seal mechanism is used to comply with sub. (4) (a) 2. b., (b) 2. b., and (c) 1. b., a record of continuous flow is not required. In such cases the owner or operator shall keep up to date, readily accessible records of all monthly visual inspections of the seals as well as readily accessible records of all periods and the duration when the seal mechanism is broken, the bypass line valve position has changed, the serial number of the broken car–seal has changed or when the key for a lock–and–key type configuration has been checked out.

(e) Each owner or operator subject to the provisions of this section shall keep up to date, readily accessible continuous records of the flare pilot flame monitoring specified under sub. (4) (b) as well as up to date, readily accessible records of all periods of operations in which the pilot flame is absent.

(f) Each owner or operator subject to the provisions of this section shall keep up to date, readily accessible continuous records of the equipment operating parameters specified to be monitored under sub. (4) (d) as well as up to date, readily accessible records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The department may at any time require a report of these data. Where an owner or operator seeks to comply with sub. (3) (c), periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded are defined as follows:

1. Where an absorber is the final recovery device in a recovery system, and where an organic compound monitoring device is not used:

a. All 3–hour periods of operation during which the average absorbing liquid temperature was more than 11°C (20°F) above the average absorbing liquid temperature during the most recent performance test; or

b. All 3–hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above or more than 0.1 unit below the average absorbing liquid specific gravity during the most recent performance test unless monitoring of an alternative parameter, which is a measure of the degree of absorbing liquid saturation, is approved by the department in which case the department will define appropriate parameter boundaries and periods of operation during which they are exceeded.

2. Where a condenser is the final recovery device in a system and where an organic compound monitoring device is not used, all 3–hour periods of operation during which the average product side exit condenser operating temperature was more than 6°C (11°F) above the average product side exit operating temperature during the most recent performance test.

3. Where a carbon adsorber is the final recovery device in a system and where an organic compound monitoring device is not used:

a. All carbon bed regeneration cycles during which the total mass steam flow was more than 10% below the total mass steam flow during the most recent performance test; or

b. All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration and after completion of any cooling cycle was more than 10% or 5°C greater, whichever is less stringent, than the carbon bed temperature in degrees Celsius during the most recent performance test.

4. Where an absorber, condenser or carbon adsorber is the final recovery device in the recovery system and where an organic compound monitoring device is used, all 3–hour periods of operation during which the average organic compound concentration level or reading of organic compounds in the exhaust gases is more than 20% greater than the exhaust gas organic compound concentration level or reading measured by the monitoring device during the most recent performance test.

(g) Each owner or operator of an affected facility subject to the provisions of this section and seeking to demonstrate compliance with sub. (3) (c) shall keep up to date, readily accessible records of:

1. Any changes in production capacity, feedstock type or catalyst type or of any replacement, removal or addition of recovery equipment or reactors;

2. Any recalculation of the TRE index value performed pursuant to sub. (5) (f); and

3. The results of any performance test performed pursuant to the methods and procedures required by sub. (5) (d).

(h) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the flow rate cutoff in sub. (1) (c) 4. shall keep up to date, readily accessible records to indicate that the vent stream flow rate is less than 0.011 scm/min and of any change in equipment or process operation that increases the operating vent stream flow rate, including a measurement of the new vent stream flow rate.

(i) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the design production capacity provision in sub. (1) (c) 3. shall keep up to date, readily accessible records of any change in equipment or process operation that increases the design production capacity of the process unit in which the affected facility is located.

(j) Each owner or operator of an affected facility that seeks to comply with the requirements of this section by complying with the low concentration exemption in sub. (1) (c) 8. shall keep up to date, readily accessible records of any change in equipment or process operation that increases the concentration of the vent stream of the affected facility.

(k) Each owner or operator subject to the provisions of this section is exempt from the quarterly reporting requirements contained in s. NR 440.07(3).

(L) Each owner or operator that seeks to comply with the requirements of this section by complying with the requirements of sub. (1) (c) 2., 3. or 4. or (3) shall submit to the department semiannual reports of the following recorded information. The initial report shall be submitted within 6 months after the initial startup date.

1. Exceedances of monitored parameters recorded under pars. (c) and (f).

2. All periods and duration recorded under par. (d) when the vent stream is diverted from the control device to the atmosphere.

3. All periods recorded under par. (e) in which the pilot flame of the flare was absent.

4. Any change in equipment or process operation that increases the operating vent stream flow rate above the low flow exemption level in sub. (1) (c) 4., including a measurement of the new vent stream flow rate, as recorded under par. (h). These shall be reported as soon as possible after the change and no later than 180 days after the change. A performance test shall be completed within the same time period to verify the recalculated flow value and to obtain the vent stream characteristics of heating value and E_{TOC}. The performance test is subject to the requirements of s. NR 440.08. Unless the facility qualifies for an exemption under any of the exemption provisions listed in sub. (1) (c), except for the total resource effectiveness index greater than 8.0 exemption in sub. (1) (c) 2., the facility shall begin compliance with the requirements in sub. (3).

5. Any change in equipment or process operation as recorded under par. (i) that increases the design production capacity above the low capacity exemption level in sub. (1) (c) 3. and the new capacity resulting from the change for the reactor process unit containing the affected facility. These shall be reported as soon as possible after the change and no later than 180 days after the change. A performance test shall be completed within the same time period to obtain the vent stream flow rate, heating value and E_{TOC}. The performance test is subject to the requirements of s. NR 440.08. Unless the facility qualifies for an exemption under any of the exemption provisions listed in sub. (1) (c), the facility shall begin compliance with the requirements in sub. (3).

6. Any recalculation of the TRE index value as recorded under par. (g).

7. All periods recorded under par. (d) in which the seal mechanism is broken or the by–pass line valve position has changed. A record of the serial number of the car–seal or a record to show that the key to unlock the bypass line valve was checked out shall be maintained to demonstrate the period, the duration and frequency in which the bypass line was operated.

8. Any change in equipment or process operation that increases the vent stream concentration above the low concentration exemption level in sub. (1) (c) 8., including a measurement of the new vent stream concentration as recorded under par. (j). These shall be reported as soon as possible after the change and no later than 180 days after the change. If the vent stream concentration is above 300 ppmv as measured using Method 18 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or above 150 ppmv as measured using Method 25A of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, a performance test shall be completed within the same time period to obtain the vent stream flow rate, heating value and E. The performance test is subject to the requirements of s. NR 440.08. Unless the facility qualifies for an exemption under any of the exemption provisions listed in sub. (1) (c), except for the TRE index greater than 8.0 exemption in sub. (1) (c) 2., the facility shall begin compliance with the requirements in sub. (3).

(n) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 3. shall submit to the department an initial report detailing the design production capacity of the process unit.

(o) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 4. shall submit to the department an initial report including a flow rate measurement using the test methods specified in sub. (5).

(p) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 8. shall submit to the department an initial report including a concentration measurement using the test method specified in sub. (5).

(q) The department shall specify appropriate reporting and recordkeeping requirements where the owner or operator of an affected facility complies with the standards specified under sub. (3) other than as provided under sub. (4) (a), (b), (c) and (d).

(r) Each owner or operator whose reactor process vent stream is routed to a distillation unit subject to s. NR 440.686 and who seeks to demonstrate compliance with sub. (1) (c) 5. shall submit to the department a process design description as part of the initial report. This process design description shall be retained for the life of the process. No other records or reports are required unless process changes are made.

(s) Each owner or operator who seeks to demonstrate compliance with sub. (3) (a) or (b) using a control device shall maintain on file a schematic diagram of the affected vent streams, collection system, fuel systems, control devices and bypass systems as part of the initial report. This schematic diagram shall be retained for the life of the system.

(t) Each owner or operator that seeks to demonstrate compliance with sub. (1) (c) 2. shall maintain a record of the initial test for determining the total resource effectiveness index and the results of the initial total resource effectiveness index calculation.

(7) RECONSTRUCTION. (a) For purposes of this section "fixed capital cost of the new components," as used in s. NR 440.15, includes the fixed capital cost of all depreciable components which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2 year period following June 29, 1990. For purposes of this paragraph,"commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(8) CHEMICALS AFFECTED BY THIS SECTION.

Chemical Name	CAS No.[1]
Acetaldehyde	75–07–0
Acetic	64–19–7
Acetic	108–24–7
Acetone	67–64–1
Acetone	75–86–5
Acetylene	74–86–2
Acrylic	79–10–7
Acrylonitrile	107–13–1
Adipic	124–04–9
Adiponitrile	111–69–3
Alcohols, C–11 or lower, mixtures	
Alcohols, C–12 or higher, mixtures	
Alcohols, C–12 or higher, unmixed	
Allyl chloride	107–05–1
Amylene	513–35–9
Amylenes, mixed	
Aniline	62–53–3
Benzene	71–43–2
Benzenesulfonic acid	98–11–3
Benzenesulfonic acid C–alkyl derivatives, sodium salts	68081–81–2
Benzyl chloride	100–44–7
Bisphenol A	80–05–7
Brometone	76–08–4
1,3–Butadiene	106–99–0
Butadiene and butene fractions	
n–Butane	106–97–8
1,4–Butanediol	110–63–4
Butanes, mixed	
1–Butene	106–98–9
2–Butene	25167–67–3
Butenes, mixed	
n–Butyl acetate	123–86–4
Butyl acrylate	141–32–2
n–Butyl alcohol	71–36–3
sec–Butyl alcohol	78–92–2
tert–Butyl alcohol	75–65–0
Butylbenzyl phthalate	85–86–7
tert–Butyl hydroperoxide	75–91–2
2–Butyne–1,4–diol	110–65–6
Butyraldehyde	123–72–8
Butyric anhydride	106–31–0
Caprolactam	105–60–2
Carbon disulfide	75–15–0
Carbon tetrachloride	56–23–5
Chloroacetic acid	79–11–8
Chlorobenzene	108–90–7
Chlorodifluoromethane	75–45–6
Chloroform	67–66–3
p–Chloronitrobenzene	100–00–5
Citric acid	77–92–9
Cumene	98–82–8
Cumene hydroperoxide	80–15–9
Cyanuric chloride	108–77–0
Cyclohexane	110–82–7
Cyclohexane, oxidized	68512–15–2
Cyclohexanol	108–93–0
Cyclohexanone	108–94–1
Cyclohexanone oxime	100–64–1
Cyclohexene	110–83–8
Cyclopropane	75–19–4
Diacetone alcohol	123–42–2
1,4–Dichlorobutene	110–57–6
3,4–Dichloro–1–butene	64037–54–3
Dichlorodifluoromethane	75–71–8
Dichlorodimethylsilane	75–78–5
Dichlorofluoromethane	75–43–4
Diethanolamine	111–42–2
Diethylbenzene	25340–17–4
Diethylene glycol	111–46–6
Di–isodecyl phthalate	26761–40–0
Dimethyl terephthalate	120–61–6
2,4–(and 2,6)–Dinitrotoluene	121–14–2 606–20–2
Dioctyl phthalate	117–81–7
Dodecene	25378–22–7
Dodecylbenzene, nonlinear	
Dodecylbenzenesulfonic acid	27176–87–0
Dodecylbenzenesulfonic acid, sodium salt	25155–30–0
Epichlorohydrin	106–89–8
Ethanol	64–17–5
Ethanolamine	141–43–5
Ethyl acetate	141–78–6
Ethyl acrylate	140–88–5
Ethylbenzene	100–41–4
Ethyl chloride	75–00–3
Ethylene dibromide	106–93–4
Ethylene dichloride	107–06–2
Ethylene glycol	107–21–1
Ethylene glycol monobutyl ether	111–76–2
Ethylene glycol monoethyl ether acetate	111–15–9
Ethylene glycol monomethyl ether	109–86–4
Ethylene oxide	75–21–8
2–Ethylhexyl alcohol	104–76–7
(2–Ethylhexyl) amine	104–75–6
6–Ethyl–1,2,3,4–tetrahydro 9,10–antracenedione	15547–17–8
Formaldehyde	50–00–0
Glycerol	56–81–5
n–Heptane	142–82–5
Heptenes (mixed)	
Hexamethylene diamine	124–09–4
Hexamethylene diamine adipate	3323–53–3

Chemical Name	CAS No.[1]
Hexamethylenetetramine	100–97–0
Hexane	110–54–3
Isobutane	75–28–5
Isobutanol	78–83–1
Isobutylene	115–11–7
Isobytyraldehyde	78–84–2
Isopentane	78–78–4
Isoprene	78–79–5
Isopropanol	67–63–0
Ketene	463–51–4
Linear alcohols, ethoxylated, mixed	
Linear alcohols, ethoxylated, and sulfated, sodium salt, mixed	
Linear alcohols, sulfated, sodium salt, mixed	
Linear alkylbenzene	123–01–3
Maleic anhydride	108–31–6
Mesityl oxide	141–79–7
Methanol	67–56–1
Methylamine	74–39–5
ar–Methylbenzenediamine	25376–45–8
Methyl chloride	74–87–3
Methylene chloride	75–09–2
Methyl ethyl ketone	78–93–3
Methyl isobutyl ketone	108–10–1
Methyl methacrylate	80–62–6
1–Methyl–2–pyrrolidone	872–50–4
Methyl tert–butyl ether	
Naphthalene	91–20–3
Nitrobenzene	98–95–3
1–Nonene	27215–95–8
Nonyl alcohol	143–08–08
Nonylphenol	25154–52–3
Nonylphenol, ethoxylated	9016–45–9
Octene	25377–83–7
Oil–soluble petroleum sulfonate, calcium salt	
Pentaerythritol	115–77–5
3–Pentenenitrile	4635–87–4
Pentenes, mixed	109–67–1
Perchloroethylene	127–18–4
Phenol	108–95–2
1–Phenylethyl hydroperoxide	3071–32–7
Phenylpropane	103–65–1
Phosgene	75–44–5
Phthalic anhydride	85–44–9
Propane	74–98–6
Propionaldehyde	123–38–6
Propyl alcohol	71–23–8
Propylene	115–07–1
Propylene glycol	57–55–6
Propylene oxide	75–56–9
Sorbitol	50–70–4
Styrene	100–42–5
Terephthalic acid	100–21–0
Tetraethyl lead	78–00–2
Tetrahydrofuran	109–99–9
Tetra (methyl–ethyl) lead	
Tetramethyl lead	75–74–1
Toluene	108–88–3
Toluene–2,4–diamine	95–80–7
Toluene–2,4–(and, 2,6)–diisocyanate (80/20 mixture)	26471–62–5
1,1,1–Trichloroethane	71–55–6
1,1,2–Trichloroethane	79–00–5
Trichloroethylene	79–01–6
Trichlorofluoromethane	75–69–4
1,1,2–Trichloro–1,2,2–trifluoroethane	76–13–1
Triethanolamine	102–71–6
Triethylene glycol	112–27–6
Vinyl acetate	108–05–4
Vinyl chloride	75–01–4
Vinylidene chloride	75–35–4
m–Xylene	108–38–3
o–Xylene	95–47–6
p–Xylene	106–42–3
Xylenes (mixed)	1330–20–7

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[1] CAS numbers refer to the Chemical Abstracts Registry numbers assigned to specific chemicals, isomers or mixtures of chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed whether CAS numbers have been assigned or not.

History: Cr., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.71 Magnetic tape coating facilities. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facilities to which the provisions of this section apply are:

1. Each coating operation; and

2. Each piece of coating mix preparation equipment.

(b) Any new coating operation that utilizes less than 38 m^3 of solvent or any modified or reconstructed coating operation that utilizes less than 370 m^3 of solvent for the manufacture of magnetic tape per calendar year is subject only to the requirements of subs. (5) (a) and (8) (b) and (c). If the amount of solvent utilized for the manufacture of magnetic tape equals or exceeds these amounts in any calendar year, the facility is subject to sub. (3) and all other paragraphs of this section. Once a facility has become subject to sub. (3) and all other paragraphs of this section, it shall remain subject to those requirements regardless of changes in annual solvent utilization.

(c) This section applies to any affected facility for which construction, modification or reconstruction begins after January 22, 1986.

(2) DEFINITIONS, SYMBOLS AND CROSS REFERENCE TABLES. (a) All terms used in this section that are not defined as follows have the meaning given to them in s. NR 440.02.

1. "Base film" means the substrate that is coated to produce magnetic tape.

2. "Capture system" means any device or combination of devices that contains or collects an airborne pollutant and directs it into a duct.

3. "Coating applicator" means any apparatus used to apply a coating to a continuous base film.

4. "Coating mix preparation equipment" means all mills, mixers, holding tanks, polishing tanks and other equipment used in the preparation of the magnetic coating formulation but does not include those mills that do not emit VOC because they are closed, sealed and operated under pressure.

5. "Coating operation" means any coating applicator, flashoff area and drying oven located between a base film unwind station and a base film rewind station that coat a continuous base film to produce magnetic tape.

6. "Common emission control device" means a control device controlling emissions from the coating operation as well as from another emission source within the plant.

7. "Concurrent" means construction of a control device is commenced or completed within the period beginning 6 months prior to the date construction of affected coating mix preparation equipment commences and ending 2 years after the date construction of affected coating mix preparation equipment is completed.

8. "Control device" means any apparatus that reduces the quantity of a pollutant emitted to the air.

9. "Cover" means, with respect to coating mix preparation equipment, a device that lies over the equipment opening to prevent VOC from escaping and that meets the requirements found in sub. (3) (e) 1. to 5.

10. "Drying oven" means a chamber in which heat is used to bake, cure, polymerize or dry a surface coating.

11. "Equivalent diameter" means 4 times the area of an opening divided by its perimeter.

12. "Flashoff area" means the portion of a coating operation between the coating applicator and the drying oven where solvent begins to evaporate from the coated base film.

13. "Magnetic tape" means any flexible substrate that is covered on one or both sides with a coating containing magnetic particles and that is used for audio or video recording or information storage.

14. "Natural draft opening" means any opening in a room, building or total enclosure that remains open during operation of the facility and that is not connected to a duct in which a fan is installed. The rate and direction of the natural draft across such an opening is a consequence of the difference in pressures on either side of the wall containing the opening.

15. "Nominal 1–month period" means a calendar month or, if established prior to the performance test in a statement submitted with notification of anticipated startup pursuant to s. NR 440.07 (1) (b), a similar monthly time period, for example, 30–day month or accounting month.

16. "Temporary enclosure" means a total enclosure that is constructed for the sole purpose of measuring the fugitive emissions from an affected facility. A temporary enclosure shall be constructed and ventilated, through stacks suitable for testing, so that it has minimal impact on the performance of the permanent capture system. A temporary enclosure will be assumed to achieve total capture of fugitive VOC emissions if it conforms to the requirements found in sub. (4) (b) 5. a. and if all natural draft openings are at least 4 duct or hood equivalent diameters away from each exhaust duct or hood. Alternatively, the owner or operator may apply to the administrator for approval of a temporary enclosure on a case–by–case basis.

17. "Total enclosure" means a structure that is constructed around a source of emissions so that all VOC emissions are collected and exhausted through a stack or duct. With a total enclosure, there will be no fugitive emissions, only stack emissions. The only openings in a total enclosure are forced makeup air and exhaust ducts and any natural draft openings such as those that allow raw materials to enter and exit the enclosure for processing. All access doors or windows are closed during routine operation of the enclosed source. Brief, occasional openings of such doors or windows to accommodate process equipment adjustments are acceptable, but, if such openings are routine or if an access door remains open during the entire operation, the access door shall be considered a natural draft opening. The average inward face velocity across the natural draft openings of the enclosure shall be calculated including the area of such access doors. The drying oven itself may be part of the total enclosure. A permanent enclosure that meets the requirements found in sub. (4) (b) 5. a. is assumed to be a total enclosure. The owner or operator of a permanent enclosure that does not meet the requirements may apply to the department for approval of the enclosure as a total enclosure on a case–by–case basis. Such approval shall be granted upon a demonstration to the satisfaction of the department that all VOC emissions are contained and vented to the control device.

18. "Utilize" refers to the use of solvent that is delivered to coating mix preparation equipment for the purpose of formulating coatings to be applied on an affected coating operation and any other solvent, for example, dilution solvent, that is added at any point in the manufacturing process.

20. "Volatile organic compounds" or 'VOC' means any organic compounds that participate in atmospheric photochemical reactions or that are measured by Method 18, 24, 25 or 25A or an equivalent or an alternative method as defined in s. NR 440.02 (5).

(b) The nomenclature used in this section has the following meaning:

1. "A_k" means the area of each natural draft opening (k) in a total enclosure, in square meters.

2. "C_{aj}" means the concentration of VOC in each gas stream (j) exiting the emission control device, in parts per million by volume.

3. "C_{bi}" means the concentration of VOC in each gas stream (i) entering the emission control device, in parts per million by volume.

4. "C_{di}" means the concentration of VOC in each gas stream (i) entering the emission control device from the affected coating operation, in parts per million by volume.

5. "C_{fk}" means the concentration of VOC in each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in parts per million by volume.

6. "C_{gv}" means the concentration of VOC in the gas stream entering each individual carbon adsorber vessel (v), in parts per million by volume. For the purposes of calculating the efficiency of the individual adsorber vessel, C_{gv} may be measured in the carbon adsorption system's common inlet duct prior to the branching of individual inlet ducts.

7. "C_{hv}" means the concentration of VOC in the gas stream exiting each individual carbon adsorber vessel (v), in parts per million by volume.

8. "E" means the control device efficiency achieved for the duration of the emission test, expressed as a fraction.

9. "F" means the VOC emission capture efficiency of the VOC capture system achieved for the duration of the emission test, expressed as a fraction.

10. "FV" means the average inward face velocity across all natural draft openings in a total enclosure, in meters per hour.

11. "G" means the calculated weighted average mass of VOC per volume of coating solids, in kilograms per liter, applied each nominal 1–month period.

12. "H_v" means the individual carbon adsorber vessel (v) efficiency achieved for the duration of the emission test, expressed as a fraction.

13. "H_{sys}" means the carbon adsorption system efficiency calculated when each adsorber vessel has an individual exhaust stack.

14. "L_{si}" means the volume fraction of solids in each coating (i) applied during a nominal 1–month period as determined from the facility's formulation records.

15. "M_{ci}" means the total mass in kilograms of each coating (i) applied at an affected coating operation during a nominal 1–month period as determined from facility records. This quantity shall be determined at a time and location in the process after all ingredients, including any dilution solvent, have been added to the coating or appropriate adjustments shall be made to account for any ingredients added after the mass of the coating has been determined.

16. "M_r" means the total mass in kilograms of VOC recovered for a nominal 1–month period.

17. "Q_{aj}" means the volumetric flow rate of each gas stream (j) exiting the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

18. "Q_{bi}" means the volumetric flow rate of each gas stream (i) entering the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

19. "Q_{di}" means the volumetric flow rate of each gas stream (i) entering the emission control device from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

20. "Q_{fk}" means the volumetric flow rate of each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

21. "Q_{gv}" means the volumetric flow rate of the gas stream entering each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration. For purposes of calculating the efficiency of the individual adsorber vessel, the value of Q_{gv} can be assumed to equal the value of Q_{hv} measured for that adsorber vessel.

22. "Q_{hv}" means the volumetric flow rate of the gas stream exiting each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

23. "$Q_{in\ i}$" means the volumetric flow rate of each gas stream (i) entering the total enclosure through a forced makeup air duct, in standard cubic meters per hour (wet basis).

24. "$Q_{out\ j}$" means the volumetric flow rate of each gas stream (j) exiting the total enclosure through an exhaust duct or hood, in standard cubic meters per hour (wet basis).

25. "R" means the overall VOC emission reduction achieved for the duration of the emission test, expressed as a percentage.

26. "RS_i" means the total mass (kg) of VOC retained in the coated base film after oven drying for a given magnetic tape product.

27. "V_{ci}" means the total volume in liters of each coating (i) applied during a nominal 1–month period as determined from facility records.

28. "W_{oi}" means the weight fraction of VOC in each coating (i) applied at an affected coating operation during a nominal 1–month period as determined by Method 24. This value shall be determined at a time and location in the process after all ingredients, including any dilution solvent, have been added to the coating or appropriate adjustments shall be made to account for any ingredients added after the weight fraction of VOC in the coating has been determined.

(c) Tables 1A and 1B present a cross reference of the affected facility status and the relevant subsections of the regulation.

Table 1A — Cross Reference[a,b]

Status	Standard[c]	Compliance provisions[d] sub. (4)
A. Coating operation alone: New	Sub. (3) (b): Recover or destroy at least 93% of the VOC applied	(b) 1., (b) 2., (b) 3., (b) 4., (b) 5., (c), (d)
Modified or reconstructed:		
1. If at least 90% of the VOC applied is recovered or destroyed prior to modification/reconstruction	Sub. (3) (c) 1. to 3.: a. Maintain demonstrated level of VOC control or 93%, whichever is lower. b. If the VOC control device is subsequently replaced the new control device shall be at least 95% efficient, a demonstration shall be made that the overall level of VOC control is at least as high as required with the old control device (90 to 93%) and, if the demonstration level is higher than the old level, maintain the higher level of control (up to 93%).	(a) 1., (a) 3., (b) 1., (b) 2., (b) 3., (b) 4., (c), (d)
2. If existing coating operation has a total enclosure vented to a control device that is at least 92% efficient.	Sub. (3) (c) 4.: a. Continue to vent all VOC emissions to the control device and maintain control efficiency at or above the demonstrated level or 95%, whichever is lower. b. If the VOC control device is subsequently replaced, the new control device shall be at least 95% efficient and all VOC emissions shall be vented from the total enclosure to the new control device.	(a) 2., (b) 5., (c), (d)
3. If existing coating operation is not in the previous 2 categories.	Sub. (3) (d): Recover or destroy at least 93% of the VOC applied	(b) 1., (b) 2., (b) 3., (b) 4., (b) 5., (c), (d)
B. Coating mix preparation equipment alone:		
New:		
1. With concurrent construction of new VOC control device (other than a condenser) on the coating operation.	Sub. (3) (e): Install and use covers and vent to a control device that is at least 95% efficient.[e]	(b) 6.
2. Without concurrent construction of new VOC control device on the coating operation or with concurrent construction of a condenser.	Sub.(3) (f) 1. or 2.: Install and use covers and vent to a control device or install and use covers.[e]	(b) 7., (b) 8.
Modified or reconstructed	Sub. (3) (f) 1. or 2.: Install and use covers and vent to a control device or install and use covers.[e]	(h), (i)
C. Both coating operation and coating mix preparation equipment: New and modified or reconstructed.	Sub. (3) (g): In lieu of standards in sub.(3) (a)–(f), use coatings containing a maximum of 0.20 kg VOC per liter of coating solids.	(b) 9.

[a] This table is presented for the convenience of the user and is not intended to supersede the language of the regulation. For the details of the requirements, refer to the text of the regulation.

[b] Refer to Part B to determine which paragraphs of subs. (5), (6) and (8) correspond to each compliance provision (sub. (4)).

[c] As per sub. (1) (b), any new coating operation with solvent utilization <38 m^3/yr or any modified or reconstructed coating operation with solvent utilization <370 m^3/yr is exempt from the VOC standards (sub. (3)). Such coating operations are subject only to subs. (5) (a) and (8) (b) and (c). However, should a coating operation once exceed the applicable annual solvent utilization cutoff, that coating operation shall be subject to the VOC standards (sub. (3)) and all other applicable subsections. Once this has occurred, the coating operation shall remain subject to those requirements regardless of changes in annual solvent utilization.

[d] As applicable

[e] 40 CFR 60.716 permits the use of an alternative means of VOC emission limitation that achieves an equivalent or greater VOC emission reduction.

Table 1B – Cross Reference

	Compliance provisions[a] sub. (4)	Test methods– sub. (6)	Category/ equipment[b]	Installation of monitoring devices and recordkeeping sub. (5)	Reporting and monitoring requirements[c] sub. (8)
A.	Coating operation alone: (b) 1. – When emissions from only the affected coating operation are controlled by a solvent recovery device, perform a liquid–liquid VOC material balance.	(a)		(b), (i), (k)	(a), (d) 1., (e), (h), (i)
	(b) 2. – When emissions from only the affected coating operation are controlled by an incinerator or when a common emission control device (other than a carbon adsorption system with individual exhaust stacks for each adsorber vessel) is used to control emissions from an affected coating operation as well as from other sources of VOC, perform a gaseous emission test.	(b)–(g)	General	(i), (k)	(a), (e), (h), (i)
			CA	(c)	(d) 3., (d) 4.
			CO	(d)	(d) 5.
			TI	(e)	(d) 6.
			CI	(f)	(d) 7.
			PE,TE	(g)	(d) 8.
	(b) 3. – When emissions from both the affected coating operation and from other sources of VOC are controlled by a carbon absorption system with individual exhaust stacks for each adsorber vessel, perform a gaseous emission test.	(b)–(g)	General	(i), (k)	(a), (e), (h), (i)
			CA	(c)	(d) 3., (d) 4.
			PE, TE	(g)	(d) 8.
	(b) 4. – When emissions from more than one affected coating operation are vented through the same duct to a control device also controlling emissions from nonaffected sources that are vented separately from the affected coating operations, consider the combined affected coating operations as a single emission source and conduct a compliance test described in sub. (4) (b) 2. or 3.	(b)–(g)	General	(i), (k)	(a), (e), (h), (i)
			CA	(c)	(d) 3., (d) 4.
			CO	(d)	(d) 5.
			TI	(e)	(d) 6.
			CI	(f)	(d) 7.
			PE,TE	(g)	(d) 8.
	(b) 5. – Alternative to sub. (4) (b) 1. to 4.: Demonstrate that a total enclosure is installed around the coating operation and that all VOC emissions are vented to a control device with the specified efficiency.	(b)–(g)	General	(i), (k)	(a), (e), (h), (i)
			CA	(c)	(d) 3., (d) 4.
			CO	(d)	(d) 5.
			TI	(e)	(d) 6.
			CI	(f)	(d) 7.
			TE	(h)	(d) 8.
B.	Coating mix preparation equipment alone:				
	(b) 6. – Demonstrate that covers meeting the requirements of sub.(3) (e) 1. to 5. are installed and used properly; procedures detailing the proper use of covers are posted; the mix equipment is vented to a control device; and the control device efficiency is greater than or equal to 95%.	(b)–(g)	General	(k)	(a), (e), (h), (i)
			CA	(c)	(d) 3., (d) 4.
			TI	(e)	(d) 6.
			CI	(f)	(d) 7.
	(b) 7. – Demonstrate that covers meeting the requirements of sub.(3) (e) 1. to 5. are installed and used properly; procedures detailing the proper use of covers are posted; and the mix equipment is vented to a control device.				
	(b) 8. – Demonstrate that covers meeting the requirement of sub.(3) (e) 1. to 5. are installed and used properly and that procedures detailing the proper use of the covers are posted.				
C.	Both coating operation and coating mix preparation equipment: (b) 9. Determine that weighted average mass of VOC in the coating per volume of coating solids applied for each month.	(a)		(i), (j), (k)	(d) 2., (e), (g), (h), (i)

[a] Sub. (4) (a) specifies the procedures to be used prior to modification/reconstruction to establish the applicability of the VOC standards in sub. (3) (c) for modified/reconstructed coating operations. Subsection (4) (a) 1. requires the use of the procedures of sub. (4) (b) 1., 2., 3. or 4., to demonstrate prior to modification/reconstruction that 90% of the applied VOC is recovered or destroyed. Sub. (4) (a) 2. requires the use of procedures of sub. (4) (b) 5. to demonstrate prior to modification/reconstruction that the coating operation has a total enclosure vented to a control device that is at least 92% efficient. Sub. (4) (k) and (L) do not have corresponding test methods, monitoring, reporting or recordkeeping requirements.

[b] TI = thermal incinerator, CI = catalytic incinerator; CA = carbon adsorber; CO = condenser; PE = partial enclosure; TE = total enclosure.

[c] See sub. (8) (f) for additional reporting requirements when coating mix preparation equipment is constructed at a time when no coating operation is being constructed. See sub. (8) (g) for addition reporting requirements when coating mix preparation equipment is constructed at the same time as an affected coating operation.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each owner or operator of any affected facility that is subject to the requirements of this section shall comply with the emission limitations in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after initial startup, whichever date comes first.

(b) Each owner or operator shall control emissions from a new coating operation by recovering or destroying at least 93% of the VOC content of the coating applied at the coating applicator.

(c) Each owner or operator of a modified or reconstructed coating operation shall meet the appropriate standard in subds. 1. to 3., 4. or par. (d).

1. For coating operations demonstrated prior to modification or reconstruction pursuant to sub. (4) (a) 1. to have emissions controlled by the recovery or destruction of at least 90% of the VOC content of the coating applied at the coating applicator.

2. Subject to the provisions of subd. 3., each owner or operator shall continue to control emissions from the coating operation to at least the demonstrated level or 93%, whichever is lower.

3. If the VOC control device in use during the emission reduction demonstration made pursuant to sub. (4) (a) 1. is subsequently replaced, each owner or operator shall:

a. Install a control device that is at least 95% efficient; and

b. Control emissions from the coating operation to at least the level determined pursuant to sub. (4) (a) 3. b.

4. For coating operations demonstrated prior to modification or reconstruction pursuant to sub. (4) (a) 2. to have a total enclosure installed around the coating operation and all VOC emissions ventilated to a control device that is at least 92% efficient.

a. Subject to the provisions of subd. 4. b., each owner or operator shall continue to ventilate all VOC emissions from the total enclosure to the control device and maintain control device efficiency at or above the demonstrated level or 95%, whichever is lower.

b. If the VOC control device in use during the control device efficiency demonstration made pursuant to sub. (4) (a) 2. is subsequently replaced, each owner or operator shall install a VOC control device that is at least 95% efficient and ventilate all VOC emissions from the total enclosure to the control device.

(d) For coating operations not subject to par. (c) 1. to 4., each owner or operator shall control emissions from the coating operation by recovering or destroying at least 93% of the VOC content of the coating applied at the coating applicator.

(e) Each owner or operator constructing new coating mix preparation equipment with concurrent construction of a new VOC control device, other than a condenser, on a magnetic tape coating operation shall control emissions from the coating mix preparation equipment by installing and using a cover on each piece of equipment and venting the equipment to a 95% efficient control device. Each cover shall meet the following specifications:

1. Cover shall be closed at all times except when adding ingredients, withdrawing samples, transferring the contents or making visual inspection when such activities cannot be carried out with cover in place. Such activities shall be carried out through ports of the minimum practical size.

2. Cover shall extend at least 2 cm beyond the outer rim of the opening or shall be attached to the rim;

3. Cover shall be of such design and construction that contact is maintained between cover and rim along the entire perimeter;

4. Any breach in the cover, such as an opening for insertion of a mixer shaft or port for addition of ingredients, shall be covered consistent with par. (c) 2. and 3., when not actively in use. An opening sufficient to allow safe clearance for a mixer shaft is acceptable during those periods when the shaft is in place; and

5. A polyethylene or nonpermanent cover may be used provided it meets the requirements of par. (c) 2. to 4. A cover may not be reused after once being removed.

(f) Each owner or operator of affected coating mix preparation equipment not subject to par. (e) shall control emissions from the coating mix preparation equipment by either:

1. Installing and using a cover that meets the specifications in par. (c) 1. to 5. and venting VOC emissions from the equipment to a VOC control device; or

2. Installing and using a cover that meets the specifications in par. (c) 1. to 5.

(g) In lieu of complying with pars. (b) to (f), each owner or operator may use coatings that contain a maximum of 0.20 kg of VOC per liter of coating solids as calculated on a weighted average basis for each nominal 1–month period.

(4) COMPLIANCE PROVISIONS. (a) The determination of the applicability of sub. (3) (c), standards for modified or reconstructed coating operations, and determination of control level required in sub. (3) (c) 3. b. is as follows:

1. To establish applicability of sub. (3) (c) 1. to 3., each owner or operator shall demonstrate, prior to modification or reconstruction, that at least 90% of the VOC content of the coating applied at the coating applicator is recovered or destroyed. The demonstration shall be made using the procedures of par. (b) 1., 2., 3. or 4., as appropriate.

2. To establish applicability of sub. (3) (c) 4., each owner or operator shall demonstrate, prior to modification or reconstruction, that a total enclosure is installed around the existing coating operation and that all VOC emissions are ventilated to a control device that is at least 92% efficient. The demonstration shall be made using the procedures of par. (b) 5.

3. To determine the level of control required in sub. (3) (c) 3. b., the owner or operator shall demonstrate:

a. That the VOC control device subsequently installed is at least 95% efficient. Such demonstration shall be made using Equation (2) specified in par. (b) 2. d. or Equations (4) and (5) specified in par. (b) 3. d. and e., as applicable and the test methods and procedures specified in sub. (6) (b) to (g); and

b. That the overall level of control after the VOC control device is installed is at least as high as the level demonstrated prior to modification or reconstruction pursuant to par. (a) 1. Demonstrations shall be made using the procedures of par. (b) 1., 2., 3. or 4., as appropriate. The required overall level of control subsequent to this demonstration shall be the level so demonstrated or 93%, whichever is lower.

(b) The compliance demonstrations for sub. (3) (b), (c) 1. to 3., 4., (d), (e), (f) and (g) are made as follows:

1. To demonstrate compliance with sub. (3) (b), (c) 1. to 3. or (d), standards for coating operations, when emissions from only the affected coating operations are controlled by a dedicated solvent recovery device, each owner or operator of the affected coating operation shall perform a liquid– liquid VOC material balance over each and every nominal 1–month period. When demonstrating compliance by this procedure, s. NR 440.08 (6) does not apply. The amount of liquid VOC applied and recovered shall be determined as discussed in subd. 1. c. The overall VOC emission reduction (R) is calculated using the following equation:

$$R = \frac{M_r}{\sum_{i=1}^{n}\left(W_{oi}M_{ci} - RS_i\right)} \times 100 \qquad \text{(Equation 1)}$$

a. The value of RS_i is zero unless the owner or operator submits the following information to the administrator for approval of a measured value of RS_i, that is greater than zero:

1) Measurement techniques; and

2) Documentation that the measured value of RS_i exceeds zero.

b. The measurement techniques of subd. 1. a. 1) shall be submitted to the administrator for approval with the notification of anticipated startup required under s. NR 440.07 (1) (b).

c. Each owner or operator demonstrating compliance by the test method described in subd. 1. shall:

1) Measure the amount of coating applied at the coating applicator;

2) Determine the VOC content of all coatings applied using the test method specified in sub. (6) (a);

3) Install, calibrate, maintain and operate, according to the manufacturer's specifications, a device that indicates the cumulative amount of VOC recovered by the solvent recovery device over each nominal 1–month period. The device shall be certified by the manufacturer to be accurate to within ± 2.0%;

4) Measure the amount of VOC recovered; and

5) Calculate the overall VOC emission reduction (R) for each and every nominal 1–month period using Equation 1.

d. For facilities subject to sub. (3) (b) or (d), compliance is demonstrated if the value of R is equal to or greater than 93%.

e. Subject to the provisions of subd. 1. f., for facilities subject to sub. (3) (c) 1. to 3., compliance is demonstrated if the value of R is equal to or greater than the percent reduction demonstrated pursuant to par. (a) 1. prior to modification or reconstruction or 93%, whichever is lower.

f. For facilities subject to sub. (3) (c) 3., compliance is demonstrated if the value of E (control device efficiency) is greater than or equal to 0.95 and if the value of R is equal to or greater than the percent reduction demonstrated pursuant to par. (a) 3. or 93%, whichever is lower.

2. To demonstrate compliance with sub. (3) (b), (c) 1. to 3. or (d), standards for coating operations, when the emissions

from only an affected coating operation are controlled by a dedicated incinerator or when a common emission control device, other than a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel, is used to control emissions from an affected coating operation as well as from other sources of VOC, each owner or operator of an affected coating operation shall perform a gaseous emission test using the following procedures:

a. Construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (6) (b) to (g);

b. Determine capture efficiency from the coating operation by capturing, venting and measuring all VOC emissions from the operation. During a performance test, the owner or operator of an affected coating operation located in an area with other sources of VOC shall isolate the coating operation emissions from all other sources of VOC by one of the following methods:

1) Build a temporary enclosure around the affected coating operation; or

Note: See sub. (2) (a) 16.

2) Shut down all other sources of VOC and continue to exhaust fugitive emissions from the affected coating operation through any building ventilation system and other room exhausts such as drying ovens. All ventilation air shall be vented through stacks suitable for testing;

c. Operate the emission control device with all emission sources connected and operating;

d. Determine the efficiency (E) of the control device using the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{p} Q_{aj}C_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi}} \qquad \text{(Equation 2)}$$

e. Determine the efficiency (F) of the VOC capture system using the following equation:

$$F = \frac{\sum_{i=1}^{n} Q_{di}C_{di}}{\sum_{i=1}^{n} Q_{di}C_{di} + \sum_{k=1}^{p} Q_{fk}c_{fk}} \qquad \text{(Equation 3)}$$

f. For each affected coating operation subject to sub. (3) (b) or (d), compliance is demonstrated if the product of (E) × (F) is equal to or greater than 0.93.

g. For each affected coating operation subject to sub. (3) (c) 2., compliance is demonstrated if the product of (E) × (F) is equal to or greater than the fractional reduction demonstrated pursuant to par. (a) 1. prior to modification or reconstruction or 0.93, whichever is lower.

h. For each affected coating operation subject to sub. (3) (c) 3., compliance is demonstrated if the value of E is greater than or equal to 0.95 and if the product of (E) × (F) is equal to or greater than the fractional reduction demonstrated pursuant to par. (a) 3. or 0.93, whichever is lower.

3. To demonstrate compliance with sub. (3) (b), (c) 1. to 3. or (d), standards for coating operations, when a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel is used to control emissions from an affected coating operation as well as from other sources of VOC, each owner or operator of an affected coating operation shall perform a gaseous emission test using the following procedures:

a. Construct the overall VOC emission reduction system so that each volumetric flow rate and the total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (6) (b) to (g);

b. Assure that all VOC emissions from the coating operation are segregated from other VOC sources and that the emissions can be captured for measurement, as described in subd. 2. b. 1) and 2);

c. Operate the emission control device with all emission sources connected and operating;

d. Determine the efficiency (H_v) of each individual adsorber vessel (v) using the following equation:

$$H_v = \frac{Q_{gv}C_{gv} - Q_{hv}C_{hv}}{Q_{gv}C_{gv}} \qquad \text{(Equation 4)}$$

e. Determine the efficiency of the carbon adsorption system (H_{sys}) by computing the average efficiency of the adsorber vessels as weighted by the volumetric flow rate (Q_{hv}) of each individual adsorber vessel (v) using the following equation:

$$H_{sys} = \frac{\sum_{V=1}^{q} H_vQ_{hv}}{\sum_{V=1}^{q} Q_{hv}} \qquad \text{(Equation 5)}$$

f. Determine the efficiency (F) of the VOC capture system using Equation (3).

g. For the affected coating operation subject to sub. (3) (b) or (d), compliance is demonstrated if the product of (H_{sys}) × (F) is equal to or greater than 0.93.

h. For the affected coating operation subject to sub. (3) (c) 2., compliance is demonstrated if the product of (H_{sys}) × (F) is equal to or greater than the fractional reduction demonstrated pursuant to par. (a) 1. prior to modification or reconstruction or 0.93, whichever is lower.

i. For each affected coating operation subject to sub. (3) (c) 3., compliance is demonstrated if the value of H_{sys} is greater than or equal to 0.95 and if the product of (H_{sys}) × (F) is equal to or greater than the fractional reduction demonstrated pursuant to par. (a) 3. or 0.93, whichever is lower.

4. To demonstrate compliance with sub. (3) (b), (c) 1. to 3. or (d), standards for coating operations, when the VOC emissions from more than one affected coating operation are collected by a common capture system and are vented through a common duct to a control device that is also controlling emissions from nonaffected sources and the emissions from the nonaffected sources are vented separately from the affected coating operations, the owner or operator may:

a. Consider the combined affected coating operations as single emission source; and

b. Conduct a compliance test on this single source by the methods described in subd. 2. or 3., as applicable.

5. An alternative method of demonstrating compliance with sub. (3) (b) or (d), standards for coating operations, and the sole method of demonstrating compliance with sub. (3) (c) 4., standards for modified or reconstructed coating operations, is the installation of a total enclosure around the coating operation and the ventilation of all VOC emissions from the total enclosure to a control device with the efficiency specified in par. (b) 5. c. 1) or 2), as applicable. If this method is selected, the compliance test methods described in par. (b) 1. to 4. are not required. Instead, each owner or operator of an affected coating operation shall:

a. Demonstrate that a total enclosure is installed. An enclosure that meets the requirements in subd. 5. a. 1) to 4) shall be assumed to be a total enclosure. The owner or operator of an enclosed coating operation that does not meet the requirements may apply to the administrator for approval of the enclosure as a total enclosure on a case–by–case basis. The enclosure shall be considered a total enclosure if it is demonstrated to the satisfaction of the administrator that all VOC emissions from the affected coating operation are contained and vented to the control device. The requirements for automatic approval are as follows:

1) Total area of all natural draft openings may not exceed 5% of the total surface area of the total enclosure's walls, floor and ceiling;

2) All sources of emissions within the enclosure shall be a minimum of 4 equivalent diameters away from each natural draft opening;

3) Average inward face velocity across all natural draft openings (FV) shall be a minimum of 3,600 meters per hour as determined by the following procedures:

a) Construct all forced makeup air ducts and all exhaust ducts so that the volumetric flow rate in each can be accurately determined by the test methods and procedures specified in sub. (6) (c) and (d). Volumetric flow rates shall be calculated without the adjustment normally made for moisture content; and

b) Determine FV by the following equation:

$$FV = \frac{\sum_{j=1}^{n} Q_{\text{out } j} - \sum_{i=1}^{p} Q_{\text{in } i}}{\sum_{k=1}^{q} A_k} \qquad \text{(Equation 6)}$$

4) The air passing through all natural draft openings shall flow into the enclosure continuously. If FV is less than or equal to 9,000 meters per hour, the continuous inward flow of air shall be verified by continuous observation using smoke tubes, streamers, tracer gases or other means approved by the administrator over the period that the volumetric flow tests required to determine FV are carried out. If FV is greater than 9,000 meters per hour, the direction of airflow through the natural draft openings shall be presumed to be inward at all times without verification.

b. Determine the control device efficiency using Equation (2) or Equations (4) and (5), as applicable and the test methods and procedures specified in sub. (6) (b) to (g).

c. Compliance is demonstrated if the installation of a total enclosure is demonstrated and the value of E determined from Equation (2), or the value of H_{sys} determined from Equations (4) and (5), as applicable, is equal to or greater than the required efficiency as follows:

1) For coating operations subject to the standards of sub. (3) (b), (c) 4. b. and (d), 0.95 (95%); or

2) For coating operations subject to the standards of sub. (3) (c) 4. a., the value of E determined from Equation (2), or the value of H_{sys} determined from Equations (4) and (5), as applicable, pursuant to par. (a) 2. prior to modification or reconstruction or 0.95 (95%), whichever is lower.

6. To demonstrate compliance with sub. (3) (e) (standard for new mix equipment with concurrent construction of a control device), each owner or operator of affected coating mix preparation equipment shall demonstrate upon inspection that:

a. Covers satisfying the requirements of sub. (3) (e) 1. to 5. have been installed and are being used properly;

b. Procedures detailing the proper use of covers, as specified in sub. (3) (c) 1., have been posted in all areas where affected coating mix preparation equipment is used;

c. The coating mix preparation equipment is vented to a control device; and

d. The control device efficiency (E or H_{sys}, as applicable) determined using Equation (2) or Equations (4) and (5), respectively and the test methods and procedures specified in sub. (6) (b) to (g) is equal to or greater than 0.95.

7. To demonstrate compliance with sub. (3) (f) 1., standard for mix equipment, each owner or operator of affected coating mix preparation equipment shall demonstrate upon inspection that:

a. Covers satisfying the requirements of sub. (3) (e) 1. to 5. have been installed and are being used properly;

b. Procedures detailing the proper use of covers, as specified in sub. (3) (c) 1., have been posted in all areas where affected coating mix preparation equipment is used; and

c. The coating mix preparation equipment is vented to a control device.

8. To demonstrate compliance with sub. (3) (f) 2., standard for mix equipment, each owner or operator of affected coating mix preparation equipment shall demonstrate upon inspection that both:

a. Covers satisfying the requirements of sub. (3) (e) 1. to 5. have been installed and are being used properly; and

b. Procedures detailing the proper use of covers, as specified in sub. (3) (c) 1., have been posted in all areas where affected coating mix preparation equipment is used.

9. To determine compliance with sub. (3) (g), high–solids coatings alternative standard, each owner or operator of an affected facility shall determine the weighted average mass of VOC contained in the coating per volume of coating solids applied for each and every nominal 1–month period according to the following procedures:

a. Determine the weight fraction of VOC in each coating applied using Method 24 as specified in sub. (6) (a);

b. Determine the volume of coating solids in each coating applied from the facility records; and

c. Compute the weighted average by the following equation:

$$G = \frac{\sum_{i=1}^{n} W_{oi} M_{ci}}{\sum_{i=1}^{n} L_{si} V_{ci}} \qquad \text{(Equation 7)}$$

d. For each affected facility where the value of G is less than or equal to 0.20 kilogram of VOC per liter of coating solids applied, the facility is in compliance.

(c) Startups and shutdowns are normal operation for this source category. Emissions from these operations are to be included when determining if the standards for coating operations specified in sub. (3) (b) to (d) are being attained.

(d) If a control device other than a carbon adsorber, condenser or incinerator is used to control emissions from an affected facility, the necessary operating specifications for that device shall be obtained from the administrator. An example of such a device is a flare.

(5) INSTALLATION OF MONITORING DEVICES AND RECORDKEEPING. All monitoring devices required under the provisions of this subsection shall be installed and calibrated, according to the manufacturer's specifications, prior to the initial performance tests in locations such that representative values of the monitored parameters will be obtained. The parameters to be monitored shall be continuously measured and recorded during all performance tests.

(a) Each owner or operator of an affected coating operation that utilizes less solvent annually than the applicable cutoff provided in sub. (1) (b) and that is not subject to sub. (3), standards for coating operations, shall both:

1. Make semiannual estimates of the projected annual amount of solvent to be utilized for the manufacture of magnetic tape at the affected facility in that calendar year and maintain records of these estimates; and

2. Maintain records of actual solvent use.

(b) Each owner or operator of an affected coating operation demonstrating compliance by the test method described in sub. (4) (b) 1., liquid material balance, shall maintain records of all the following for each and every nominal 1–month period:

1. Amount of coating applied at the applicator;

2. Results of the reference test method specified in sub. (6) (a) for determining the VOC content of all coatings applied;

3. Amount VOC recovered; and

4. Calculation of the percent VOC recovered.

(c) Each owner or operator of an affected coating operation or affected coating mix preparation equipment controlled by a carbon adsorption system and demonstrating compliance by the procedures described in sub. (4) (b) 2., 3., 4., 5. or 6., which include control device efficiency determinations, shall carry out the monitoring and recordkeeping provisions of subd. 1. or 2., as appropriate.

1. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in either the control device outlet gas stream or in both the control device inlet and outlet gas streams. The outlet gas stream would be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in sub. (8) (d) 3. The inlet and outlet gas streams would be monitored if the percent control device efficiency is used as the basis for reporting, as described in sub. (8) (d) 4.

2. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in the outlet gas stream for a minimum of one complete adsorption cycle per day for each adsorber vessel. The owner or operator may also monitor and record the concentration level of organic compounds in the common carbon adsorption system inlet gas stream or in each individual carbon adsorber vessel inlet stream. The outlet gas streams alone would be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in sub. (8) (d) 3. In this case, the owner or operator shall compute daily a 3–day rolling average concentration level of organics in the outlet gas stream from each individual adsorber vessel. The inlet and outlet gas streams would be monitored if the percent control device efficiency is used as the basis for reporting, as described in sub. (8) (d) 4. In this case, the owner or operator shall compute daily a 3–day rolling average efficiency for each individual adsorber vessel.

(d) Each owner or operator of an affected coating operation controlled by condensation system and demonstrating compliance by the procedures described in sub. (4) (b) 2., 4. or 5., which include control device efficiency determinations, shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the temperature of the condenser exhaust stream.

(e) Each owner or operator of an affected coating operation or affected coating mix preparation equipment controlled by a thermal incinerator and demonstrating compliance by the procedures described in sub. (4) (b) 2., 4., 5. or 6., which include control device efficiency determinations, shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the combustion temperature of the incinerator. The monitoring device shall have an accuracy within ± 1% of the temperature being measured in Celsius degrees.

(f) Each owner or operator of an affected coating operation or affected coating mix preparation equipment controlled by a catalytic incinerator and demonstrating compliance by the procedures described in sub. (4) (b) 2., 4., 5. or 6., which include control device efficiency determinations, shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed. The monitoring device shall have an accuracy with ± 1% of the temperature being measured in Celsius degrees.

(g) Each owner or operator of an affected coating operation demonstrating compliance pursuant to sub. (4) (b) 2., 3. or 4., which include VOC capture system efficiency determinations, shall submit a monitoring plan for the VOC capture system to the department for approval along with notification of anticipated startup required under s. NR 440.07 (1) (b). This plan shall identify the parameter to be monitored as an indicator of VOC capture system performance, for example the amperage to the exhaust fans or duct flow rates, and the method for monitoring the chosen parameter. The owner or operator shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the value of the chosen parameter.

(h) Each owner or operator of an affected coating operation who uses the equipment alternative described in sub. (4) (b) 5. to demonstrate compliance shall follow the procedures described in par. (g) to establish a monitoring plan for the total enclosure.

(i) Each owner or operator of an affected coating operation shall record time periods of coating operations when an emission control device is not in use.

(j) Each owner or operator of an affected coating operation or affected coating mix preparation equipment complying with sub. (3) (g) shall maintain records of the monthly weighted average mass of VOC contained in the coating per volume of coating solids applied for each coating as described in sub. (4) (b) 9. a. to d.

(k) Records of the measurements and calculations required in sub. (4) and this subsection shall be retained for at least 2 years following the date of the measurements and calculations.

(6) TEST METHODS AND PROCEDURES. Methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance as follows:

(a) Method 24 is used to determine the VOC content in coatings. If it is demonstrated to the satisfaction of the administrator that plant coating formulation data are equivalent to Method 24 results, formulation data may be used. In the event of any inconsistency between a Method 24 test and a facility's formulation data, the Method 24 test will govern. For Method 24, the coating sample shall be a 1–liter sample taken into a 1–liter container at a location and time such that the sample will be representative of the coating applied to the base film, that is, the sample shall include any dilution solvent or other VOC added during the manufacturing process. The container shall be tightly sealed immediately after the sample is taken. Any solvent or other VOC added after the sample is taken shall be measured and accounted for in the calculations that use Method 24 results.

(b) Method 18, 25 or 25A, as appropriate to the conditions at the site, is used to determine VOC concentration. The owner or operator shall submit notice of the intended test method to the administrator for approval along with the notification of the performance test required under s. NR 440.08(2). Method selection shall be based on consideration of the diversity of organic species present and their total concentration and on consideration of the potential presence of interfering gases. Except as indicated in par. (b) 1. and 2., the test shall consist of 3 separate runs, each lasting a minimum of 30 minutes.

1. When the method is to be used in the determination of the efficiency of a fixed–bed carbon adsorption system with a common exhaust stack for all the individual adsorber vessels pursuant to sub. (4) (b) 2., 4., 5. or 6., the test vessel shall consist of 3 separate runs, each coinciding with one or more complete sequences through the adsorption cycles of all the individual adsorber vessels.

2. When the method is to be used in the determination of the efficiency of a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel pursuant to sub. (4) (b) 3., 4., 5. or 6., each adsorber vessel shall be tested individually. The test for each adsorber vessel shall consist of 3 separate runs. Each run shall coincide with one or more complete adsorption cycles.

(c) Method 1 or 1A is used for sample and velocity traverses.

(d) Method 2, 2A, 2C or 2D is used for velocity and volumetric flow rates.

(e) Method 3 is used for gas analysis.

(f) Method 4 is used for stack gas moisture.

(g) Methods 2, 2A, 2C, 2D, 3 and 4 shall be performed, as applicable, at least twice during each test period.

Note: Under 40 CFR 60.716, if, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions of VOC from any emission point subject to sub. (3) (e) or (f) (standards for mix equipment) at least equivalent to that required by sub. (3) (e) or (f), respectively, the administrator will publish in the Federal Register a notice permitting the use of the alternative means. The notice may condition permission on requirements related to the operation and maintenance of the alternative means. Any such notice shall be published only after public notice and an opportunity for a public hearing. Any person seeking permission under 40 CFR 60.716 shall submit either results from an emission test that documents the collection and measurement of all VOC emissions from a given control device or an engineering evaluation that documents the determination of such emissions.

(8) REPORTING AND MONITORING REQUIREMENTS. (a) For all affected coating operations subject to sub. (3) (b), (c) 1. to 3., 4. or (d) and all affected coating mix preparation equipment subject to sub. (3) (e), the performance test data and results shall be submitted to the department as specified in s. NR 440.08 (1). In addition, the average values of the monitored parameters measured at least every 15 minutes and averaged over the period of the performance test shall be submitted with the results of all performance tests.

(b) Each owner or operator of an affected coating operation claiming to utilize less than the applicable volume of solvent specified in sub. (1) (b) in the first calendar year of operation shall submit to the department, with the notification of projected startup, a material flow chart indicating projected solvent use. The owner or operator shall also submit actual solvent use records at the end of the initial calendar year.

(c) Each owner or operator of an affected coating operation initially utilizing less than the applicable volume of solvent specified in sub. (1) (b) per calendar year shall:

1. Report the first calendar year in which actual annual solvent use exceeds the applicable volume; and

2. Report the first semiannual estimate in which annual solvent use would exceed the applicable volume.

(d) Each owner or operator of an affected coating operation or affected coating mix preparation equipment subject to sub. (3) (e), shall submit quarterly reports to the department documenting the following:

1. The 1–month amount of VOC contained in the coating, the VOC recovered and the percent emission reduction for months of noncompliance for any affected coating operation demonstrating compliance by the performance test method described in sub. (3) (g), liquid material balance;

2. The VOC contained in the coatings for the manufacture of magnetic tape for any 1–month period during which the weighted average solvent content (G) of the coatings exceeded 0.20 kilogram per liter of coating solids for those affected facilities complying with sub. (3) (g), high–solids coatings alternative standard;

3. For those affected facilities monitoring only the carbon adsorption system outlet concentration levels of organic compounds, the periods, during actual coating operations specified in subd. 3. a. or b., as applicable.

a. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of 3 consecutive adsorption cycles of all the individual adsorber vessels during which the average value of the concentration level of organic compounds in the common outlet gas stream is more than 20% greater than the average value measured during the most recent performance test that demonstrated compliance.

b. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3–day rolling averages for each adsorber vessel when the concentration level of organic compounds in the individual outlet gas stream is more than 20% greater than the average value for that adsorber vessel measured during the most recent performance test that demonstrated compliance.

4. For those affected facilities monitoring both the carbon adsorption system inlet and outlet concentration levels of organic compounds, the periods, during actual coating operations, specified in par. (d) 4. a. or b., as applicable.

a. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of 3 consecutive adsorption cycles of all the individual adsorber vessels during which the average carbon adsorption system efficiency falls below the applicable level as follows:

1) For those affected facilities demonstrating compliance by the performance test method described in sub. (4) (b) 2. or 4., the value of E determined using Equation (2) during the most recent performance test that demonstrated compliance.

2) For those affected facilities demonstrating compliance pursuant to sub. (4) (b) 5. c. 1) or 6., 0.95 (95%).

3) For those affected facilities demonstrating compliance pursuant to sub. (4) (b) 5. c. 2), the required value of E determined using Equation (2) pursuant to sub. (4) (a) 2. prior to modification or reconstruction or 0.95 (95%), whichever is lower.

b. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3–day rolling averages for each adsorber vessel when the efficiency falls below the applicable level as follows:

1) For those affected facilities demonstrating compliance by the performance test method described in sub. (4) (b) 3. or 4., the value of H_v determined using Equation (4) during the most recent performance test that demonstrated compliance.

2) For those affected facilities demonstrating compliance pursuant to sub. (4) (b) 5. c. 1) or 6., 0.95 (95%).

3) For those affected facilities demonstrating compliance pursuant to sub. (4) (b) 5. c. 2), the value of H_v determined using Equation (4) pursuant to sub. (4) (a) 2. prior to modification or reconstruction.

5. All 3–hour periods, during actual coating operations, during which the average exhaust temperature is 5 or more Celsius degrees above the average temperature measured during the most recent performance test that demonstrated compliance for those affected facilities monitoring condenser exhaust gas temperature;

6. All 3–hour periods, during actual coating operations, during which the average combustion temperature is more than 28 Celsius degrees below the average combustion temperature during the most recent performance test that demonstrated compliance for those affected facilities monitoring thermal incinerator combustion gas temperature;

7. All 3–hour periods, during actual coating operations, during which the average gas temperature immediately before the catalyst bed is more than 28 Celsius degrees below the average gas temperature during the most recent performance test that demonstrated compliance and all 3–hour periods, during actual coating operations, during which the average gas temperature difference across the catalyst bed is less than 80% of the average gas temperature difference during the most recent performance test that demonstrated compliance for those affected facilities monitoring catalytic incinerator catalyst bed temperature; and

8. All 3–hour periods, during actual coating operations, during which the average total enclosure or VOC capture system monitoring device readings vary by 5% or more from the average value measured during the most recent performance test that demonstrated compliance for those affected facilities monitoring a total enclosure pursuant to sub. (5) (h) for VOC capture system pursuant to sub. (5) (g).

(e) Each owner or operator of an affected coating operation or affected coating mix preparation equipment subject to sub. (3) (e), not required to submit reports under par. (d) because no reportable periods have occurred shall submit semiannual reports so affirming.

(f) Each owner or operator of affected coating mix preparation equipment that is constructed at a time when no affected coating operation is being constructed shall:

1. Be exempt from the reporting requirements specified in s. NR 440.07 (1) (a), (b) and (d); and

2. Submit the notification of actual startup specified in s. NR 440.07 (1) (c).

(g) The owner or operator of affected coating mix preparation equipment that is constructed at the same time as an affected coating operation shall include the affected coating mix preparation equipment in all the reporting requirements for the affected coating operation specified in s. NR 440.07 (1) (a) to (d).

(h) The reports required under pars. (b) to (e) shall be postmarked within 30 days of the end of the reporting period.

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (b) 1. (intro.), 2. d., e., 3. d., e., 5. a. 3) b), 9. c., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.72 Industrial surface coating: surface coating of plastic parts for business machines. **(1)** APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each spray booth in which plastic parts for use in the manufacture of business machines receive prime coats, color coats, texture coats, or touch–up coats.

(b) This section applies to any affected facility for which construction, modification, or reconstruction begins after January 8, 1986.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, all terms not defined in this subsection have the meanings given them in s. NR 440.02.

1. "Business machine" means a device that uses electronic or mechanical methods of process information, perform calculations, print or copy information, or convert sound into electrical impulses for transmission, such as:

a. Products classified as typewriters under SIC code 3572 in the Standard Industrial Classification Manual, incorporated by reference in s. NR 440.17;

b. Products classified as electronic computing devices under SIC Code 3573;

c. Products classified as calculating and accounting machines under SIC Code 3574;

d. Products classified as telephone and telegraph equipment under SIC Code 3661;

e. Products classified as office machines, not elsewhere classified, under SIC Code 3579; and

f. Photocopy machines, a subcategory of products classified as photographic equipment under SIC Code 3861.

2. "Coating operation" means the use of a spray booth for the application of a single type of coating (e.g., prime coat); the use of the same spray booth for the application of another type of coating (e.g., texture coat) constitutes a separate coating operation for which compliance determinations are performed separately.

3. "Coating solids applied" means the coating solids that adhere to the surface of the plastic business machine part being coated.

4. "Color coat" means the coat applied to a part that affects the color and gloss of the part, not including the prime coat or texture coat. This definition includes fog coating, but does not include conductive sensitizers or electromagnetic interference/radio frequency interference (EMI/RFI) shielding coatings.

5. "Conductive sensitizer" means a coating applied to a plastic substrate to render it conductive for purposes of electrostatic application of subsequent prime, color, texture, or touch–up coats.

6. "Electromagnetic interference/radio frequency interference (EMI/RFI) shielding coating" means a conductive coating that is applied to a plastic substrate to attenuate EMI/RFI signals.

7. "Fog coating" (also known as mist coating and uniforming) means a thin coating applied to plastic parts that have molded–in color or texture or both to improve color uniformity.

8. "Nominal 1–month period" means either a calendar month, 30–day month, accounting month, or similar monthly time period that is established prior to the performance test (i.e., in a statement submitted with notification of anticipated actual startup pursuant to s. NR 440.07 (1) (b)).

9. "Plastic parts" means panels, housings, bases, covers, and other business machine components formed of synthetic polymers.

10. "Prime coat" means the initial coat applied to a part when more than one coating is applied, not including conductive sensitizers or electromagnetic interference/radio frequency interference shielding coatings.

11. "Spray booth" means the structure housing automatic or manual spray application equipment where a coating is applied to plastic parts for business machines.

12. "Texture coat" means the rough coat that is characterized by discrete, raised spots on the exterior surface of the part. This definition does not include conductive sensitizers or EMI/RFI shielded coatings.

13. "Touch–up coat" means the coat applied to correct any imperfections in the finish after color or texture coats have been applied. This definition does not include conductive sensitizers or EMI/RFI shielded coatings.

14. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a plastic business machine part to the total amount of coating solids used.

15. "VOC emissions" means the mass of VOCs emitted from the surface coating of plastic parts for business machines expressed as kilograms of VOCs per liter of coating solids applied (i.e., deposited on the surface).

(b) As used in this section, all symbols not defined in this subsection have the meanings given them in s. NR 440.03.

D_c = density of each coating as received (kilograms per liter)

D_d = density of each diluent VOC (kilograms per liter)

L_c = the volume to each coating consumed, as received (liters)

L_d = the volume of each diluent VOC added to coatings (liters)

L_s = the volume of coating solids consumed (liters)

M_d = the mass of diluent VOCs consumed (kilograms)

M_o = the mass of VOCs in coatings consumed, as received (kilograms)

N = the volume–weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter)

T = the transfer efficiency for each type of application equipment used at a coating operation (fraction)

T_{avg} = the volume weighted average transfer efficiency for a coating operation (fraction)

V_s = the proportion of solids in each coating, as received (fraction by volume)

W_o = the proportion of VOCs in each coating, as received (fraction by weight)

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each owner or operator of any affected facility which is subject to the requirements of this section shall comply with the emission limitations set forth in this subsection on and after the date on which the initial performance test, required by s. NR 440.08 and sub. (4) is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after the initial startup, which ever date comes first. No affected facility may cause the discharge into the atmosphere in excess of:

1. 1.5 kilograms of VOCs per liter of coating solids applied from prime coating of plastic parts for business machines.

2. 1.5 kilograms of VOCs per liter of coating solids applied from color coating of plastic parts for business machines.

3. 2.3 kilograms of VOCs per liter of coating solids applied from texture coating of plastic parts for business machines.

4. 2.3 kilograms of VOCs per liter of coatings solids applied from touch–up coating of plastic parts for business machines.

(b) All VOC emissions that are caused by coating applied in each affected facility, regardless of the actual point of discharge of emissions into the atmosphere, shall be included in determining compliance with the emission limits in par. (a).

(4) PERFORMANCE TESTS AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (5) does not apply to the performance test procedures required by this subsection.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08 (1) and thereafter a performance test each nominal 1–month period for each affected facility according to the procedures in this subsection.

1. The owner or operator shall determine the composition of coatings by analysis of each coating, as received, using Reference Method 24 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, from data that have been determined by the coating manufacturer using Reference Method 24, or by other methods approved by the administrator.

2. The owner or operator shall determine the volume of coating and the mass of VOC used for dilution of coatings from company records during each nominal 1–month period. If a common coating distribution system serves more than one affected facility or serves both affected and nonaffected spray booths, the owner or operator shall estimate the volume of coatings used at each facility by using procedures approved by the department.

a. The owner or operator shall calculate the volume–weighted average mass of VOCs in coatings emitted per unit volume of coating solids applied (N) at each coating operation (i.e., for each type of coating used, prime, color, texture, or touch–up) during each nominal 1–month period for each affected facility. Each 1–month calculation is considered a performance test. Except as provided in subd. 2. c., N will be determined by the following procedures:

1) Calculate the mass of VOCs used (M_o+ M_d) for each coating operation during each nominal 1–month period for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}D_{ci}W_{oi} + \sum_{j=1}^{m} L_{dj}D_{dj}$$

where n is the number of coatings of each type used during each nominal 1–month period and m is the number of different diluent VOCs used during each nominal 1–month period. ($\Sigma L_{dj} D_{dj}$ will be 0 if no VOCs are added to the coatings, as received.)

2) Calculate the total volume of coating solids consumed (L_s) in each nominal 1–month period for each coating operation for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci}V_{si}$$

where n is the number of coatings of each type used during each nominal 1–month period.

3) Select the appropriate transfer efficiency (T) from Table 1 for each type of coating applications equipment used at each coating operation. If the owner or operator can demonstrate to the satisfaction of the administrator that transfer efficiencies other than those shown are appropriate, the administrator may approve their use on a case–by–case basis. Transfer efficiency values for application methods not listed below may be approved by the administrator on a case–by–case basis. An owner or operator shall submit sufficient data for the administrator to judge the validity of the transfer efficiency claims.

4) Where more than one application method is used within a single coating operation, the owner or operator shall determine the volume of each coating applied by each method through a means acceptable to the department and compute the volume–weighted average transfer efficiency by the following equation:

$$T_{avg} = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} L_{cik}V_{sik}T_k}{L_s}$$

where n is the number of coatings of each type used and p is the number of application methods used

Table 1. Transfer Efficiencies

Application Methods	Transfer Efficiency	Type of Coating
Air atomized spray	0.25	Prime, color, texture, touch–up, and fog coats.
Air assisted airless spray	0.40	Prime and color coats.
Electrostatic air spray	0.40	Prime and color coats.

5) Calculate the volume–weighted average mass of VOCs emitted per unit volume of coating solids applied (N) during each nominal 1–month period for each coating operation for each affected facility by the following equation:

$$N = \frac{M_o + M_d}{L_s T_{avg}}$$

(T_{avg} = T when only one type of coating operation occurs).

b. Where the volume–weighted average mass of VOCs emitted to the atmosphere per unit volume of coating solids applied (N) is less than or equal to 1.5 kilograms per liter for prime coats, is less than or equal to 1.5 kilograms per liter for color coats, is less than or equal to 2.3 kilograms per liter for texture coats, and is less than or equal to 2.3 kilograms per liter for touch–up coats, the affected facility is in compliance.

c. If each individual coating used by an affected facility has a VOC content (kg VOC/l of solids), as received, which when divided by the lowest transfer efficiency at which the coating is applied for each coating operation results in a value equal to or less than 1.5 kilograms per liter for prime and color coats and equal to or less than 2.3 kilograms per liter for texture and touch–up coats, the affected facility is in compliance provided that no VOCs are added to the coatings during distribution or application.

d. If an affected facility uses add–on controls to control VOC emissions and if the owner or operator can demonstrate to the administrator that the volume–weighted average mass of VOCs emitted to the atmosphere during each nominal 1–month period per unit volume of coating solids applied (N) is within each of the applicable limits expressed in subd. 2. b. because of this equipment, the affected facility is in compliance. In such cases, compliance will be determined by the administrator on a case–by–case basis.

(5) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08 (1) apply only to the initial performance test. Each owner or operator subject to the provisions of this section shall include the following data in the report of the initial performance test required under s. NR 440.08 (1).

1. Except as provided for in subd. 2., the volume–weighted average mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) for the initial nominal 1–month period for each coating operation from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4) (b) 2. c., a list of the coatings used during the initial nominal 1–month period, the VOC content of each coating calculated from data determined using Reference Method 24, of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 440.17, and the lowest transfer efficiency at which each coating is applied during the initial nominal 1–month period.

(b) Following the initial report, each owner or operator shall:

1. Report the volume–weighted average mass of VOCs per unit volume of coating solids applied for each coating operation for each affected facility during each nominal 1–month period in which the facility is not in compliance with the applicable emission limits specified in sub. (3). Reports of noncompliance shall be submitted on a quarterly basis, occurring every 3 months following the initial report; and

2. Submit statements that each affected facility has been in compliance with the applicable emission limits specified in sub. (3) during each nominal 1–month period. Statements of compliance shall be submitted on a semiannual basis.

(c) These reports shall be postmarked not later than 10 days after the end of the periods specified in par. (b).

(d) Each owner or operator subject to the provisions of this section shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine monthly VOC emissions from each coating operation for each affected facility as specified in s. NR 440.07 (5).

(e) Reporting and recordkeeping requirements for facilities using add–on controls will be determined by the administrator on a case–by–case basis.

(6) TEST METHODS AND PROCEDURES. (a) The reference methods in Appendix A, of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance with sub. (3) as follows:

1. Method 24 for determination of VOC content of each coating as received.

2. For Method 24, the sample shall be at least a 1–liter sample in a 1–liter container.

(b) Other methods may be used to determine the VOC content of each coating if approved by the administrator before testing.

History: Cr. Register, September, 1990, No. 417, eff. 10–1–90; am. (2) (a) 1. a. and 4. (5) (d), renum. (2) (a) 6. to 14. to be (2) (a) 7. to 15. and am. (2) (a) 12. and 13., cr. (2) (a) 6., Register, July, 1993, No. 451, eff. 8–1–93.

NR 440.73 Calciners and dryers in mineral industries. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which this section applies is each calciner and dryer at a mineral processing plant. Feed and product conveyors are not considered part of the affected facility. For the brick and related clay products industry, only the calcining and drying of raw materials prior to firing of the brick are covered.

(b) An affected facility that is subject to s. NR 440.525, Metallic Mineral Processing Plants, is not subject to this section. Also, the following processes and process units used at mineral processing plants are not subject to this section: vertical shaft kilns in the magnesium compounds industry; the chlorination oxidation process in the titanium dioxide industry; coating kilns, mixers and aerators in the roofing granules industry; and tunnel kilns, tunnel dryers, apron dryers, and grinding equipment that also dries the process material used in any of the 17 mineral industries as defined in sub. (2) (e).

(c) The owner or operator of any facility under par. (a) that commences construction, modification or reconstruction after April 23, 1986, is subject to this section.

(2) DEFINITIONS. All terms not defined in this section have the meanings given in s. NR 440.02. In this section:

(a) "Calciner" means the equipment used to remove combined (chemically bound) water and/or gases from mineral material through direct or indirect heating. This definition includes expansion furnaces and multiple hearth furnaces.

(b) "Control device" means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities.

(c) "Dryer" means the equipment used to remove uncombined (free) water from mineral material through direct or indirect heating.

(d) "Installed in series" means a calciner and dryer installed such that the exhaust gases from one flow through the other and then the combined exhaust gases are discharged to the atmosphere.

(e) "Mineral processing plant" means any facility that processes or produces any of the following minerals, their concentrates or any mixture of which the majority (> 50%) is any of the following minerals or a combination of these minerals: alumina, ball clay, bentonite, diatomite, feldspar, fire clay, fuller's earth, gypsum, industrial sand, kaolin, lightweight aggregate, magnesium compounds, perlite, roofing granules, talc, titanium dioxide, and vermiculite.

(3) STANDARDS FOR PARTICULATE MATTER. Each owner or operator of any affected facility that is subject to this section shall comply with the emission limitations in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 180 days after the initial startup, whichever date comes first. No emissions may be discharged into the atmosphere from any affected facility that:

(a) Contains particulate matter in excess of 0.092 gram per dry standard cubic meter (g/dscm) (0.040 grain per dry standard cubic foot (gr/dscf)) for calciners and for calciners and dryers installed in series and in excess of 0.057 g/dscm for dryers; and

(b) Exhibits greater than 10% opacity, unless the emissions are discharged from an affected facility using a wet scrubbing control device.

(4) RECONSTRUCTION. The cost of replacement of equipment subject to high temperatures and abrasion on processing equipment may not be considered in calculating either the "fixed capital cost of the new components" or the"fixed capital cost that would be required to construct a comparable new facility" under s. NR 440.15. Calciner and dryer equipment subject to high temperatures and abrasion are: end seals, flights and refractory lining.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) With the exception of the process units described in pars. (b), (c) and (d), the owner or operator of an affected facility subject to this section who uses a dry control device to comply with the mass emission standard shall install, calibrate, maintain and operate a continuous monitoring system to measure and record the opacity of emissions discharged into the atmosphere from the control device.

(b) In lieu of a continuous opacity monitoring system, the owner or operator of a ball clay vibrating grate dryer, a bentonite rotary dryer, a diatomite flash dryer, a diatomite rotary calciner, a feldspar rotary dryer, a fire clay rotary dryer, an industrial sand fluid bed dryer, a kaolin rotary calciner, a perlite rotary dryer, a roofing granules fluid bed dryer, a roofing granules rotary dryer, a talc rotary calciner, a titanium dioxide spray dryer, a titanium dioxide fluid bed dryer, a vermiculite fluid bed dryer or a vermiculite rotary dryer who uses a dry control device may have a certified visible emissions observer measure and record 3 6–minute averages of the opacity of visible emissions to the atmosphere each day of operation in accordance with Method 9 of Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17.

(c) The owner or operator of a ball clay rotary dryer, a diatomite rotary dryer, a feldspar fluid bed dryer, a fuller's earth rotary dryer, a gypsum rotary dryer, a gypsum flash calciner, a gypsum kettle calciner, an industrial sand rotary dryer, a kaolin rotary dryer, a kaolin multiple hearth furnace, a perlite expansion furnace, a talc flash dryer, a talc rotary dryer, a titanium dioxide direct or indirect rotary dryer or a vermiculite expansion furnace who uses a dry control device is exempt from the monitoring requirements of this subsection.

(d) The owner or operator of an affected facility subject to this section who uses a wet scrubber to comply with the mass emission standard for any affected facility shall install, calibrate, maintain and operate monitoring devices that continuously measure and record the pressure loss of the gas stream through the scrubber and the scrubbing liquid flow rate to the scrubber. The pressure loss monitoring device shall be certified by the manufacturer to be accurate within 5% of water column gauge pressure at the level of operation. The liquid flow rate monitoring device shall be certified by the manufacturer to be accurate within 5% of design scrubbing liquid flow rate.

(6) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Records of the measurements required in sub. (5) shall be retained for at least 2 years.

(b) Each owner or operator who uses a wet scrubber to comply with sub. (3) shall determine and record once each day, from the recordings of the monitoring devices in sub. (5) (d), an arithmetic average over a 2–hour period of both the change in pressure of the gas stream across the scrubber and the flowrate of the scrubbing liquid.

(c) Each owner or operator shall submit written reports semiannually of exceedances of control device operating parameters required to be monitored by sub. (5). For the purpose of these reports, exceedances are defined as follows:

1. All 6–minute periods during which the average opacity from dry control devices is greater than 10%; or

2. Any daily 2–hour average of the wet scrubber pressure drop determined as described in par. (b) that is less than 90% of the average value recorded according to sub. (7) (c) during the most recent performance test that demonstrated compliance with the particulate matter standard; or

3. Each daily wet scrubber liquid flow rate recorded as described in par. (b) that is less than 80% or greater than 120% of the average value recorded according to sub. (7) (c) during the most recent performance test that demonstrated compliance with the particulate matter standard.

(7) TEST METHODS AND PROCEDURES. (a) In conducting the performance tests required in s. NR 440.08, the owner or operator shall use the following test methods from Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, or other methods and procedures as specified in this subsection, except as provided in s. NR 440.08(2).

(b) The owner or operator shall determine compliance with the particulate matter standards in sub. (3) as follows:

1. Method 5 shall be used to determine the particulate matter concentration. The sampling time and volume for each test run shall be at least 2 hours and 1.70 dscm.

2. Method 9 and the procedures in s. NR 440.11 shall be used to determine opacity from stack emissions.

(c) During the initial performance test of a wet scrubber, the owner or operator shall use the monitoring devices of sub. (5) (d) to determine the average change in pressure of the gas stream across the scrubber and the average flowrate of the scrubber liquid during each of the particulate matter runs. The arithmetic averages of the 3 runs shall be used as the baseline average values for the purposes of sub. (6) (c).

History: Cr., Register, December, 1995, No. 480, eff. 1–1–96.

NR 440.74 Polymeric coating of supporting substrates facilities. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each coating operation and any onsite coating mix preparation equipment used to prepare coatings for the polymeric coating of supporting substrates.

(b) Any affected facility for which the amount of VOC used is less than 95 Mg per 12–month period is subject only to the requirements of subs. (5) (b), (8) (b) and (c). If the amount of VOC used is 95 Mg or greater per 12–month period, the facility is subject to all the requirements of this section. Once a facility has become subject to the requirements of this section it will remain subject to those requirements regardless of changes in annual VOC use.

(c) This section applies to any affected facility for which construction, modification or reconstruction begins after April 30, 1987, except for the facilities specified in par. (d).

(d) This section does not apply to the following:

1. Coating mix preparation equipment used to manufacture coatings at one plant for shipment to another plant for use in an affected facility or for sale to another company for use in an affected facility;

2. Coating mix preparation equipment or coating operations during those times they are used to prepare or apply waterborne coatings so long as the VOC content of the coating does not exceed 9% by weight of the volatile fraction;

3. Web coating operations that print an image on the surface of the substrate or any coating applied on the same printing line that applies the image.

(2) DEFINITIONS, SYMBOLS AND CROSS–REFERENCE TABLES. (a) All terms used in this section not defined as follows have the meaning given to them in s. NR 440.02.

1. "Coating applicator" means any apparatus used to apply a coating to a continuous substrate.

2. "Coating mix preparation equipment" means all mixing vessels in which solvent and mixing vessels in which solvent and other materials are blended to prepare polymeric coatings.

3. "Coating operation" means any coating applicators, flashoff areas and drying ovens located between a substrate unwind station and a rewind station that coats a continuous web to produce a substrate with a polymeric coating. If the coating process does not employ a rewind station, the end of the coating operation is after the last drying oven in the process.

4. "Common emission control device" means a device controlling emissions from an affected coating operation as well as from any other emission source.

5. "Concurrent" means the period of time in which construction of an emission control device serving an affected facility is commenced or completed, beginning 6 months prior to the date that construction of the affected facility commences and ending 2 years after the date that construction of the affected facility is completed.

6. "Control device" means any apparatus that reduces the quantity of a pollutant emitted to the air.

7. "Cover" means, with respect to coating mix preparation equipment, a device that fits over the equipment opening to prevent emission of volatile organic compounds from escaping.

8. "Drying oven" means a chamber within which heat is used to dry a surface coating; drying may be the only process or one of multiple processes performed in the chamber.

9. "Equivalent diameter" means 4 times the area of an opening divided by its perimeter.

10. "Flashoff area" means the portion of a coating operation between the coating applicator and the drying oven where VOC begins to evaporate from the coated substrate.

11. "Natural draft opening" means any opening in a room, building or total enclosure that remains open during operation of the facility and that is not connected to a duct in which a fan is installed. The rate and direction of the natural draft across such an opening is a consequence of the difference in pressure on either side of the wall or barrier containing the opening.

12. "Nominal 1–month period" means a calendar month or, if established prior to the performance test in a statement submitted with notification of anticipated startup pursuant to s. NR 440.07 (1) (b), a similar monthly time period, for example, 30–day month or accounting month.

13. "Onsite coating mix preparation equipment" means those pieces of coating mix preparation equipment located at the same plant as the coating operation they serve.

14. "Polymeric coating of supporting substrates" means a web coating process that applies elastomers, polymers or prepolymers to a supporting web other than paper, plastic film, metallic foil or metal coil.

15. "Substrate" means the surface to which a coating is applied.

16. 'Temporary enclosure' means a total enclosure that is constructed for the sole purpose of measuring the fugitive VOC emissions from an affected facility.

17. "Total enclosure" means a structure that is constructed around a source of emissions and operated so that all VOC emissions are collected and exhausted through a stack or duct. With a total enclosure, there will be no fugitive emission, only stack emissions. The drying oven itself may be part of the total enclosure.

18. "Vapor capture system" means any device or combination of devices designed to contain, collect and route solvent vapors released from the coating mix preparation equipment or coating operation.

19. "VOC in the applied coating" means the product of Method 24 VOC analyses or formulation data, if those data are demonstrated to be equivalent to Method 24 results, and the total volume of coating fed to the coating applicator.

20. "VOC used" means the amount of VOC delivered to the coating mix preparation equipment of the affected facility, including any contained in premixed coatings or other coating ingredients prepared off the plant site, for the formulation of polymeric coatings to be applied to supporting substrates at the coating operation, plus any solvent added after initial formulation is complete, for example, dilution solvents added at the coating operation. If premixed coatings that require no mixing at the plant site are used, "VOC used" means the amount of VOC delivered to the coating applicators of the affected facility.

21. "Volatile organic compounds" or "VOC" means any organic compounds that participate in atmospheric photochemical reactions; or that are measured by a reference method, an equivalent method, an alternative method or that are determined by procedures specified under any section.

22. "Waterborne coating" means a coating which contains more than 5 weight percent water in its volatile fraction.

23. "Web coating" means the coating of products, such as fabric, paper, plastic film, metallic foil, metal coil, cord and yarn, that are flexible enough to be unrolled from a large roll; and coated as a continuous substrate by methods including, but not limited to, knife coating, roll coating, dip coating, impregnation, rotogravure and extrusion.

(b) The nomenclature used in this section has the following meanings:

1. "A_k" means the area of each natural draft opening (k) in a total enclosure, in square meters.

2. "C_{aj}" means the concentration of VOC in each gas stream (j) exiting the emission control device, in parts per million by volume.

3. "C_{bi}" means the concentration of VOC in each gas stream (i) entering the emission control device, in parts per million by volume.

4. “C_{di}” means the concentration of VOC in each gas stream (i) entering the emission control device from the affected coating operation, in parts per million by volume.

5. “C_{fk}” means the concentration of VOC in each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in parts per million by volume.

6. “C_{gv}” means the concentration of VOC in the gas stream entering each individual carbon absorber vessel (v), in parts per million by volume. For purposes of calculating the efficiency of the individual absorber vessel, C_{gv} may be measured in the carbon adsorption system’s common inlet duct prior to the branching of individual inlet ducts.

7. “C_{hv}” means the concentration of VOC in the gas stream exiting each individual carbon absorber vessel (v), in parts per million by volume.

8. “E” means the control device efficiency achieved for the duration of the emission test, expressed as a fraction.

9. “F” means the VOC emission capture efficiency of the vapor capture system achieved for the duration of the emission test, expressed as a fraction.

10. “FV” means the average inward face velocity across all natural draft openings in a total enclosure, in meters per hour.

11. “H_v” means the individual carbon absorber vessel (v) efficiency achieved for the duration of the emission test, expressed as a fraction.

12. “H_{sys}” means the carbon adsorption system efficiency calculated when each absorber vessel has an individual exhaust stack.

13. “M_{ci}” means the total mass (kg) of each coating (i) applied to the substrate at an affected coating operation during a nominal 1–month period as determined from facility records.

14. “M_r” means the total mass (kg) of VOC recovered for a nominal 1–month period.

15. “Q_{aj}” means the volumetric flow rate of each gas stream (i) exiting the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

16. “Q_{bi}” means the volumetric flow rate of each gas stream (i) entering the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

17. “Q_{di}” means the volumetric flow rate of each gas stream (i) entering the emission control device from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

18. “Q_{fk}” means the volumetric flow rate of each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

19. “Q_{gv}” means the volumetric flow rate of the gas stream entering each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration. For purposes of calculating the efficiency of the individual adsorber vessel, the value of Q_{gv} can be assumed to equal the value of Q_{gv} measured for that adsorber vessel.

20. “Q_{hv}” means the volumetric flow rate of the gas stream exiting each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

21. “$Q_{in\,i}$” means the volumetric flow rate of each gas stream (i) entering the total enclosure through a forced makeup air duct, in standard cubic meters per hour (wet basis).

22. “$Q_{out\,j}$” means the volumetric flow rate of each gas stream (j) exiting the total enclosure through an exhaust duct or hood, in standard cubic meters per hour (wet basis).

23. “R” means the overall VOC emission reduction achieved for the duration of the emission test, expressed as a fraction.

24. “RS_i” means the total mass (kg) of VOC retained on the coated substrate after oven drying or contained in waste coating for a given combination of coating and substrate.

25. “W_{oi}” means the weight fraction of VOC in each coating (i) applied at an affected coating operation during a nominal 1–month period as determined by Method 24.

(c) Tables 1A and 1B present a cross reference of the affected facility status and the relevant subsections of the regulation.

Table 1A. Cross Reference[ab]

Status	Standard	Compliance Provisions – sub. (4)
A. Coating operation:		
1. If projected VOC use is < 95 Mg/yr	Sub. (1) (b): Monitor VOC use	Not applicable
2. If projected VOC use is ≥ 95 Mg/yr	Sub. (3) (b) 1.: Reduce VOC emissions to the atmosphere from the coating operation by at least 90% or: sub. (3) (b) 2.: Install, operate and maintain a total enclosure around the coating operation and vent the captured VOC emissions from the total enclosure to a control device that is at least 95% efficient.	(a) 1., (a) 2., (a) 3. or (a) 4., (b), (e)
B. Coating mix preparation equipment:		
1. If projected VOC use is ≥ 95 Mg/yr but < 130 Mg/yr.	Sub. (3) (c) 3.: a. Install, operate and maintain a cover on each piece of affected equipment; or b. install operate and maintain a cover on each piece of affected equipment and vent VOC emissions to a VOC control device.	(d), (e)

Table 1A. Cross Reference[ab] (continued)

Status	Standard	Compliance Provisions – sub. (4)
2. If projected VOC use is ≥ 130 Mg/yr but there is no concurrent construction of a control device.	Sub. (3) (c) 2.: a. Install, operate and maintain a cover on each piece of affected equipment; or b. install operate and maintain a cover on each piece of affected equipment and vent VOC emissions to a VOC control device.	(d)
3. If projected VOC use is ≥ 130 Mg/yr and there is concurrent construction of a control device.	Sub. (3) (c) 1.: Install, operate and maintain a cover on each piece of affected equipment and vent VOC emissions from the covered equipment to a 95% efficient control device while preparation of the coating is taking place within the vessel.	(c), (e)

[a]This table is presented for the convenience of the user and is not intended to supersede the language of the regulation. For the details of the requirements, refer to the text of the regulation.

[b]Refer to Table 1B to determine which paragraphs of subs. (5), (6) and (8) correspond to each compliance provision (sub. (4)).

Table 1B. Cross Reference

Compliance Provisions – sub. (4)	**Test Methods–** sub. (6)	**Category/ Equipment[a]**	**Monitoring Requirements–** sub. (5)	**Reporting and Recordkeeping Requirements–** sub. (8)
A. Coating Operation:				
(a) 1. – Gaseous emission test for coating operations not using carbon adsorption beds with individual exhausts.	(b)–(g)	General,CA, CO, TI, CI, PE, TE	(a), (i), (j), (k), (c) 1., (d), (e), (f), (g)	(a), (d) 7., (f), (g), (h), (d) 1., (d) 2. a., (d) 3., (d) 4., (d) 5., (d) 6.
(a) 2. – Gaseous emission test for coating operations using carbon adsorption beds with individual exhausts.	(b)–(g)	General, CA, PE, TE	(a), (i), (j), (k), (c) 2., (g)	(a), (d) 7., (f), (g), (h), (d) 1. b., (d) 2. b., (d) 6.
(a) 3. – Monthly liquid material balance – can be used only when a VOC recovery device controls only those emissions from one affected coating operation.	(a)	VOC recovery	(i), (k)	(e), (f), (g), (h)
(a) 4. – Short–term (3 to 7 day) liquid material balance –may be used as an alternative to sub. (4) (a) 3.	(a)	General, CA, CO, PE,TE	(a), (i), (j), (k), (c) 1., (c) 2., (d), (g)	(a), (d) 7., (f), (g), (h), (d) 1., (d) 2., (d) 3., (d) 6.
(b) – Alternative standard for coating operation –demonstrate use of approved total enclosure and emissions vented to a 95% efficient control device.	(b)–(g)	General, CA, CO, TI, CI, PE,TE	(a), (i), (j), (k), (c) 1., (c) 2., (d), (e), (f), (h)	(a), (d) 7., (f), (g), (h), (d) 1., (d) 2., (d) 3., (d) 4., (d) 5., (d) 6.
B. Coating mix preparation equipment:				
(c) – Standard for equipment servicing a coating operation with concurrent construction of a control device that uses at least 130 Mg/yr of VOC – demonstrates that covers meeting specifications are installed and used properly; procedures detailing proper use are posted; the mix equipment is vented to a 95% efficient control device.	(b) – (g)	General, CA, TI, CI	(a), (i), (j), (k), (c) 1., (c) 2., (e), (f)	(a), (d) 7., (f), (g), (h), (d) 1., (d) 2., (d) 4., (d) 5.
(d) – Standard for equipment servicing a coating operation that does not have concurrent construction of a control device but uses at least 130 Mg/yr of VOC or for equipment serving a coating operation that uses < 130 Mg/yr but ≥ 95 Mg/yr of VOC – demonstrate that covers meeting specifications are installed and used properly; procedures detailing proper use are posted; the mix equipment is vented to a control device (optional).	No other requirements apply.	—	—	—

[a]CA = carbon adsorber; CO = condenser; TI = thermal incinerator; CI = catalytic incinerator; PE = partial enclosure; TE = total enclosure

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each owner or operator of an affected facility that is subject to the requirements of this section shall comply with the emissions limitations in this subsection on and after the date on which the initial performance test required by s. NR 440.08 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after initial startup, whichever dates comes first.

(b) For the coating operation, each owner or operator of an affected facility shall either:

1. Reduce VOC emissions to the atmosphere from the coating operation by at least 90% (“emission reduction” standard); or

2. Install, operate and maintain a total enclosure around the coating operation and vent the captured VOC emissions from the total enclosure to a control device that is at least 95% efficient (alternative standard).

(c) For the onsite coating mix preparation equipment of an affected facility, the owner or operator shall comply with the following requirements, as applicable:

1. For an affected facility that has concurrent construction of a control device and uses at least 130 Mg of VOC per 12–month period, the owner or operator shall install, operate and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions from the covered mix equipment to a 95% efficient control device while preparation of the coating is taking place within the vessel.

2. For an affected facility that does not have concurrent construction of a control device but uses at least 130 Mg of VOC per 12–month period, the owner or operator shall either:

a. Install, operate and maintain a cover on each piece of affected coating mix preparation equipment; or

b. Install, operate and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions to a VOC control device.

3. For an affected facility that uses at least 95 Mg but less than 130 Mg of VOC per 12–month period, the owner or operator shall either:

a. Install, operate and maintain a cover on each piece of affected coating mix preparation equipment; or

b. Install, operate and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions to a VOC control device.

(4) COMPLIANCE PROVISIONS. (a) To demonstrate compliance with the emission reduction standard for coating operations specified in sub. (3) (b) 1., the owner or operator of the affected facility shall use one of the following methods.

1. For coating operations not using carbon adsorption beds with individual exhausts the following gaseous emission test method is applicable when the emissions from any affected coating operation are controlled by a control device other than a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel. The owner or operator using this method shall comply with the following procedures:

a. Construct the vapor capture system and control device so that all gaseous volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (6) (b) to (g);

b. Determine capture efficiency from the coating operation by capturing, venting and measuring all VOC emissions from the coating operation. During a performance test, the owner or operator of an affected coating operation located in an area with other sources of VOC shall isolate the coating operation emissions from all other sources of VOC by one of the following methods:

1) Build a temporary enclosure, as defined in sub. (2) (a) and conforming to the requirements of par. (b) 1., around the affected coating operation. The temporary enclosure shall be constructed and ventilated, through stacks suitable for testing, so that it has minimal impact on performance of the capture system; or

2) Shut down all other sources of VOC and continue to exhaust fugitive emissions from the affected coating operation through any building ventilation system and other room exhausts such as those on drying ovens. All such ventilation air shall be vented through stacks suitable for testing because the VOC content in each shall be determined.

c. Operate the emission control device with all emission sources connected and operating.

d. Determine the efficiency (E) of the control device by Equation 1:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}C_{bi} - \sum_{j=1}^{n} Q_{aj}C_{aj}}{\sum_{i=1}^{n} Q_{bi}C_{bi}} \qquad \text{(Equation 1)}$$

e. Determine the efficiency (F) of the vapor capture system by Equation 2:

$$F = \frac{\sum_{i=1}^{n} Q_{di}C_{di}}{\sum_{i=1}^{n} Q_{di}C_{di} + \sum_{k=1}^{p} Q_{fk}C_{fk}} \qquad \text{(Equation 2)}$$

f. For each affected coating operation subject to sub. (3) (b) 1. (emission reduction standard for coating operations), compliance is demonstrated if the product of (E) × (F) is equal to or greater than 0.90.

2. For coating operations using carbon adsorption beds with individual exhausts the following gaseous emission test method is applicable when emissions from any affected coating operation are controlled by a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel. The owner or operator using this method shall comply with the following procedures:

a. Construct the vapor capture system and control device so that each volumetric flow rate and the total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (6) (b) to (g);

b. Assure that all VOC emissions from the coating operation are segregated from other VOC sources and that the emissions can be captured for measurement, as described in sub. (4) (a) 1. b. 1) and 2);

c. Operate the emission control device with all emission sources connected and operating;

d. Determine the efficiency (H_v) of each individual adsorber vessel (v) using Equation 3:

$$H_v = \frac{Q_{gv}C_{gv} - Q_{hv}C_{hv}}{Q_{gv}C_{gv}} \qquad \text{(Equation 3)}$$

e. Determine the efficiency of the carbon adsorption system (H_{sys}) by computing the average efficiency of the adsorber vessels as weighted by the volumetric flow rate (Q_{hv}) of each individual adsorber vessel (v) using Equation 4:

$$H_{sys} = \frac{\sum_{v=1}^{q} H_v Q_{hv}}{\sum_{v=1}^{q} Q_{hv}} \qquad \text{(Equation 4)}$$

f. Determine the efficiency (F) of the vapor capture system using Equation (2).

g. For each affected coating operation subject to sub. (3) (b) 1. (emission reduction standard for coating operations), compliance is demonstrated if the product of (H_{sys}) × (F) is equal to or greater than 0.90.

3. The monthly liquid material balance method can be used only when a VOC recovery device controls only those emissions from one affected coating operation. It may not be used if the VOC recovery device controls emissions from any other VOC emission sources. When demonstrating compliance by this method, s. NR 440.08 (6) does not apply. The owner or operator using this method shall comply with the following procedures to determine the VOC emission reduction for each nominal 1–month period:

a. Measure the amount of coating applied at the coating applicator. This quantity shall be determined at a time and location in the process after all ingredients, including any dilution solvent, have been added to the coating or appropriate adjustments shall be made to account for any ingredients added after the amount of coating has been determined:

b. Determine the VOC content of all coatings applied using the test method specified in sub. (6) (a). This value shall be determined at a time and location in the process after all ingredients, including any dilution solvent, have been added to the coating or appropriate adjustments shall be made to account for any ingredients added after the VOC content in the coating has been determined;

c. Install, calibrate, maintain and operate, according to the manufacturer's specifications, a device that indicates the cumulative amount of VOC recovered by the control device over each nominal 1–month period. The device shall be certified by the manufacturer to be accurate to within ±2.0%;

d. Measure the amount of VOC recovered; and

e. Calculate the overall VOC emission reduction (R) for each and every nominal 1–month period using Equation 5. Emissions during startups and shutdowns are to be included when determining R because startups and shutdowns are part of normal operation for this source category.

$$R = \frac{M_r}{\sum_{i=1}^{n}\left(W_{oi}M_{ci} - RS_i\right)} \qquad \text{(Equation 5)}$$

If the value of R_i is equal to or greater than 0.90, compliance with sub. (3) (b) 1. is demonstrated.

1) The value of RS_i is zero unless the owner or operator submits the following information to the administrator for approval of a measured value of RS_i, that is greater than zero but less than or equal to 6% by weight of the liquid VOC applied:

a) Measurement techniques; and

b) Documentation that the measured value of RS_i, exceeds zero but is less than or equal to 6% by weight of the liquid VOC applied.

2) For those facilities not subject to subd. 3. e. 1), the value of RS_i is zero unless the owner or operator submits the following information to the administrator for approval of a measured value of RS_i that is greater than 6% by weight of the liquid VOC applied:

a) Measurement techniques;

b) Documentation that the measured value of RS_i exceeds 6% by weight of the liquid VOC applied; and

c) Either documentation of customer specifications requiring higher values or documentation that the desired properties of the product make necessary for RS_i to exceed 6% by weight of the liquid VOC applied and that such properties cannot be achieved by other means.

3) The measurement techniques of subd. 3. e. 1) a) and 2) a) shall be submitted to the department for approval with the notification of anticipated startup required under s. NR 440.07 (1) (b).

f. The point at which M_r is to be measured shall be established when the compliance procedures are approved. The presumptive point of measurement shall be prior to separation/purification; a point after separation/purification may be adopted for enhanced convenience or accuracy.

4. Short–term liquid material balance. This method may be used as an alternative to the monthly liquid material balance described in subd. 3. The owner or operator using this method shall comply with the following procedures to determine VOC emission reduction for a 3 to 7 day period and shall continuously monitor VOC emissions as specified in sub. (5).

a. Use the procedures described in subd. 3. a. through f. to determine the overall emission reduction, R. Compliance is demonstrated if the value of R is equal to or greater than 0.90.

b. The number of days for the performance test is to be based on the affected facility's representative performance consistent with the requirements of s. NR 440.08 (3). Data demonstrating that the chosen test period is representative shall be submitted to the department for approval with the notification of anticipated startup required under s. NR 440.07 (1) (b).

(b) Each owner or operator of an affected coating operation subject to the standard specified in sub. (3) (b) 2. shall:

1. Demonstrate that a total enclosure is installed. The total enclosure shall either be approved by the department in accordance with the provisions of 40 CFR 60.746 or meet the requirements in subd. 1. a. to f. as follows:

a. The only openings in the enclosure are forced makeup air and exhaust ducts and natural draft openings such as those through which raw materials enter and exit the coating operation;

b. Total area of all natural draft openings does not exceed 5% of the total surface are of the total enclosure's walls, floor and ceiling;

c. All access doors and windows are closed during normal operation of the enclosed coating operation, except for brief, occasional openings to accommodate process equipment adjustments. If openings are frequent or if the access door or window remains open for a significant amount of time during the process operation, it shall be considered a natural draft opening. Access doors used routinely by workers to enter and exit the enclosed area shall be equipped with automatic closure devices;

d. Average inward face velocity (FV) across all natural draft openings is a minimum of 3,600 meters per hour as determined by the following procedures:

1) Construct all forced makeup air ducts and all exhaust ducts so that the volumetric flow rate in each can be accurately determined by the test methods and procedures specified in sub. (6) (c) and (d). Volumetric flow rates shall be calculated without the adjustment normally made for moisture content; and

2) Determine FV by Equation 6:

$$FV = \frac{\sum_{j=1}^{n} Q_{out\,j} - \sum_{i=1}^{p} Q_{in\,i}}{\sum_{k=1}^{q} A_k} \qquad \text{(Equation 6)}$$

e. The air passing through all natural draft openings flows into the enclosure continuously. If FV is less than or equal to 9,000 meters per hour, the continuous inward airflow shall be verified by continuous observation using smoke tubes, streamers, tracer gases or other means approved by the department over the period that the volumetric flow rate tests required to determine FV are carried out. If FV is greater than 9,000 meters per hour, the direction of airflow through the natural draft openings shall be presumed to be inward at all times without verification.

f. All sources of emissions within the enclosure shall be a minimum of 4 equivalent diameters away from each natural draft opening.

2. Determine the control device efficiency using Equation (1) or Equations (3) and (4), as applicable and the test methods and procedures specified in sub. (6) (b) to (g).

3. Compliance is demonstrated if the installation of a total enclosure is demonstrated and the value of E determined from Equation (1) or the value of H_{sys} determined from Equations (3) and (4), as applicable, is equal to or greater than 0.95.

(c) To demonstrate compliance with sub. (3) (c) 1., standard for coating mix preparation equipment servicing a coating operation with concurrent construction of a control device that uses at least 130 Mg per year of VOC, each owner or operator of affected coating mix preparation equipment shall demonstrate that:

1. Covers meeting the following specifications have been installed and are being used properly:

a. Cover shall be closed at all times except when adding ingredients, withdrawing samples, transferring the contents or making visual inspection when such activities cannot be carried out with cover in place. Activities shall be carried out through ports of the minimum practical size;

b. Cover shall extend at least 2 centimeters beyond the outer rim of the opening or shall be attached to the rim;

c. Cover shall be of such design and construction that contact is maintained between cover and rim along the entire perimeter;

d. Any breach in the cover, such as a slit for insertion of a mixer shaft or port for addition of ingredients, shall be covered consistent with subd. 1. a. to c. when not actively in use. An opening sufficient to allow safe clearance for a mixer shaft is acceptable during those periods when the shaft is in place; and

e. A polyethylene or nonpermanent cover may be used provided it meets the requirements of subd. 1. b. to d. A cover may not be reused after once being removed.

2. Procedures detailing the proper use of covers, as specified in subd. 1. a., have been posted in all areas where affected coatings mix preparations equipment is used;

3. The coating mix preparation equipment is vented to a control device while preparation of the coating is taking place within the vessel; and

4. The control device efficiency, E or H_{sys} as applicable, determined using Equation (1) or Equations (3) and (4), respectively and the test methods and procedures specified in sub. (6) (b) to (g) is equal to or greater than 0.95.

(d) To demonstrate compliance with sub. (3) (c) 2., standard for coating mix preparation equipment servicing a coating operation that does not have concurrent construction of a control device but uses at least 130 Mg of VOC per year, or sub. (3) (c) 3., standard for coating mix preparation equipment servicing a coating operation that uses at least 95 Mg but less than 130 Mg of VOC per year, each owner or operator of affected coating mix preparation equipment shall demonstrate upon inspection that:

1. Covers satisfying the specifications in par. (c) 1. a. to e. have been installed and are being properly operated and maintained; and

2. Procedures detailing the proper use of covers, as specified in par. (c) 1. a., have been posted in all areas where affected coating mix preparation equipment is used.

3. Owners or operators meeting the standard specified in sub. (3) (c) 2. b. or 3. b. shall also demonstrate that the coating mix preparation equipment is vented to a control device.

(e) If a control device other than a carbon adsorber, condenser or incinerator is used to control emissions from an affected facility, the necessary operating specifications for that device shall be approved by the administrator. An example of such a device is a flare.

(5) MONITORING REQUIREMENTS. (a) Each owner or operator of an affected facility shall install and calibrate all monitoring devices required under the provisions of this subsection according to the manufacturer's specifications, prior to the initial performance test in locations such that representative values of the monitored parameters will be obtained. The parameters to be monitored shall be continuously measured and recorded during each performance test.

(b) Each owner or operator of an affected facility that uses less that 95 Mg of VOC per year and each owner or operator of an affected facility subject to the provisions specified in sub. (3) (c) 3. shall:

1. Make semiannual estimates of the projected annual amount of VOC to be used for the manufacture of polymeric coated substrate at the affected coating operation in that year; and

2. Maintain records of actual VOC use.

(c) Each owner or operator of an affected facility controlled by a carbon adsorption system and demonstrating compliance by the procedures described in sub. (4) (a) 1., 2., (b) or (c), which include control device efficiency determinations, or sub. (4) (a) 4., short-term liquid material balance, shall carry out the monitoring provisions of subd. 1. or 2., as appropriate.

1. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in either the control device outlet gas stream or in both the control device inlet and outlet gas streams. The outlet gas stream shall be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in sub. (8) (d) 1. a. The inlet and outlet gas streams shall be monitored if the percent control device efficiency is used as the basis for reporting, as described in sub. (8) (d) 2. a.

2. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in the outlet gas stream for a minimum of one complete adsorption cycle per day for each adsorber vessel. The owner or operator may also monitor and record the concentration level of organic compounds in the common carbon adsorption system inlet gas stream or in each individual carbon adsorber vessel inlet stream. The outlet gas streams shall be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in sub. (8) (d) 1. b. In this case, the owner or operator shall compute daily a 3-day rolling average concentration level of organics in the outlet gas stream from each individual adsorber vessel. The inlet and outlet gas streams shall be monitored if the percent control device efficiency is used as the basis for reporting, as described in sub. (8) (d) 2. b. In this case, the owner or operator shall compute daily a 3-day rolling average efficiency for each individual adsorber vessel.

(d) Each owner or operator of an affected facility controlled by a condensation system and demonstrating compliance by the test methods described in sub. (4) (a) 1., 2., (b) or (c), which include control device efficiency determinations, or sub. (4) (a) 4., short-term liquid material balance, shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the temperature of the condenser exhaust stream.

(e) Each owner or operator of an affected facility controlled by a thermal incinerator and demonstrating compliance by the test methods described in sub. (4) (a) 1., 2., (b) or (c), which include control device efficiency determinations, shall install, calibrate maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the combustion temperature of the incinerator. The monitoring device shall have an accuracy within ± 1% of the temperature being measured in Celsius degrees.

(f) Each owner or operator of an affected facility controlled by a catalytic incinerator and demonstrating compliance by the test methods described in sub. (4) (a) 1., 2., (b) or (c), which include control device efficiency determinations, shall install, calibrate maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed. The monitoring device shall have an accuracy within ± 1% of the temperature being measured in Celsius degrees.

(g) Each owner or operator of an affected facility who demonstrates compliance by the test methods described in sub. (4) (a) 1. or 2., which include vapor capture system efficiency determinations, or sub. (4) (a) 4., short-term liquid material balance, shall submit a monitoring plan for the vapor capture system to the department for approval with the notification of anticipated startup required under s. NR 440.07 (1) (b). This plan shall identify the parameter to be monitored as an indicator of vapor capture system performance, for example, the amperage to the exhaust fans or duct flow rates, and the method for monitoring the chosen parameter. The owner or operator shall install, calibrate, maintain and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the value of the chosen parameter.

(h) Each owner or operator of an affected facility who demonstrates compliance as described in sub. (4) (b) shall follow the procedures described in par. (g) to establish a monitoring system for the total enclosure.

(i) Each owner or operator of an affected facility shall record time periods of mixing or coating operations when the emission control device is malfunctioning or not in use.

(j) Each owner or operator of an affected facility shall record time periods of mixing or coating operations when each monitoring device is malfunctioning or not in use.

(k) Records of the measurements and calculations required in subs. (4) and (5) shall be retained for at least 2 years following the date of the measurements and calculations.

(6) TEST METHODS AND PROCEDURES. Methods in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08 (2), shall be used to determine compliance as follows:

(a) Method 24 is used to determine the VOC content in coatings. If it is demonstrated to the satisfaction of the administrator that coating formulation data are equivalent to Method 24 results, formulation data may be used. In the event of any inconsistency between a Method 24 test and a facility's formulation data, the Method 24 test will govern. For Method 24, the coating sample shall be a 1–liter sample collected in a 1–liter container at a point in the process where the sample will be representative of the coating applied to the substrate, that is, the sample shall include any dilution solvent or other VOC added during the manufacturing process. The container shall be tightly sealed immediately after the sample is collected. Any solvent or other VOC added after the sample is taken shall be measured and accounted for in the calculations that use Method 24 results.

(b) Method 25 shall be used to determine VOC concentrations from incinerator gas streams. Alternative Methods (18 or 25A), may be used as explained in the applicability section of Method 25 in cases where use of Method 25 is demonstrated to be technically infeasible. The owner or operator shall submit notice of the intended test method to the department for approval along with the notification of the performance test required under s. NR 440.08 (4). Except as indicated in subds. 1. and 2., the test shall consist of 3 separate runs, each lasting a minimum of 30 minutes.

1. When the method is to be used in the determination of the efficiency of a fixed–bed carbon adsorption system with a common exhaust stack for all the individual adsorber vessels pursuant to sub. (4) (a) 1., (b) or (c), the test shall consist of 3 separate runs, each coinciding with one or more complete system rotations through the adsorption cycles of all the individual adsorber vessels.

2. When the method is to be used in the determination of the efficiency of a fixed–bed carbon adsorption system with individual exhaust stacks for each adsorber vessel pursuant to sub. (4) (a) 2., (b) or (c), each adsorber vessel shall be tested individually. Each test shall consist of 3 separate runs, each coinciding with one or more complete adsorption cycles.

(c) Method 1 or 1A is used for sample and velocity traverses;

(d) Method 2, 2A, 2C or 2D is used for velocity and volumetric flow rates;

(e) Method 3 is used for gas analysis;

(f) Method 4 is used for stack gas moisture;

(g) Methods 2, 2A 2C or 2D; 3; and 4 shall be performed as applicable at least twice during each test run.

Note: Under 40 CFR 60.746, if, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions of VOC from any emission point subject to sub. (3) (c) at least equivalent to that required by sub. (3) (b) 2. or (3) (c), respectively, the administrator will publish in the Federal Register a notice permitting the use of the alternative means. The administrator may condition permission on requirements that may be necessary to ensure operation and maintenance to achieve the emission reduction as specified in sub. (3) (b) 2. or (3) (c), respectively. Any such notice shall be published only after public notice and an opportunity for a public hearing. Any person seeking permission under 40 CFR 60.746 shall submit to the administrator either results from an emission test that accurately collects and measures all VOC emissions from a given control device or an engineering evaluation that accurately determines such emissions.

(8) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) For each affected facility subject to the requirements of sub. (3) (b) and (c), the owner or operator shall submit the performance test data and results to the department as specified in s. NR 440.08 (1). In addition, the average values of the monitored parameters measured at least every 15 minutes and averaged over the period of the performance test shall be submitted with the results of all performance tests.

(b) Each owner or operator of an affected facility subject to the provisions specified in sub. (3) (c) 3. and claiming to use less than 130 Mg of VOC in the first year of operation and each owner or operator of an affected facility claiming to use less than 95 Mg of VOC in the first year of operation shall submit to the department, with the notification of anticipated startup required under s. NR 440.07 (1) (b), a material flow chart indicating projected VOC use. The owner or operator shall also submit actual VOC use records at the end of the initial year.

(c) Each owner or operator of an affected facility subject to the provisions of sub. (3) (c) 3. and initially using less that 130 Mg of VOC per year and each owner or operator of an affected facility initially using less than 95 Mg of VOC per year shall:

1. Record semiannual estimates of projected VOC use and actual 12–month VOC use;

2. Report the first semiannual estimate in which projected annual VOC use exceeds the applicable cutoff; and

3. Report the first 12–month period in which the actual VOC use exceeds the applicable cutoff.

(d) Each owner or operator of an affected facility demonstrating compliance by the methods described in sub. (4) (a) 1., 2., 4., (b) or (c) shall maintain records and submit quarterly reports to the department documenting the following:

1. For those affected facilities monitoring only the carbon adsorption system outlet concentration levels of organic compounds, the periods, during actual coating operations, specified in subd. 1. a. or b., as applicable.

a. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of 3 consecutive system rotations through the adsorption cycles of all the individual adsorber vessels during which the average value of the concentration level of organic compounds in the common outlet gas stream is more the 20% greater than the average value measured during the most recent performance test that demonstrated compliance.

b. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3–day rolling averages for each adsorber vessel when the concentration level of organic compounds in the individual gas stream is more than 20% greater than the average value for that adsorber vessel measured during the most recent performance test that demonstrated compliance.

2. For those affected facilities monitoring both the carbon adsorption system inlet and outlet concentration levels of organic compounds, the periods, during actual coating operations, specified in subd. 2. a. or b., as applicable.

a. For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of 3 consecutive adsorption cycles of all the individual adsorber vessels during which the average carbon adsorption system efficiency falls below the applicable level as follows:

1) For those affected facilities demonstrating compliance by the performance test method described in sub. (4) (a) 1., the value of E determined using Equation (1) during the most recent performance test that demonstrated compliance.

2) For those affected facilities demonstrating compliance by the performance test described in sub. (4) (a) 4., the average value of the system efficiency measured with the monitor during the most recent performance test that demonstrated compliance.

3) For those affected facilities demonstrating compliance pursuant to sub. (4) (b) or (c), 0.95.

b. For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3–day rolling averages for each adsorber vessel during which the average carbon adsorber vessel efficiency falls below the applicable level as follows:

1) For those affected facilities demonstrating compliance by the performance test method described in sub. (4) (a) 2., (b) or (c), the value of H_v determined using Equation (3) during the most recent performance test that demonstrated compliance.

2) For those affected facilities demonstrating compliance by the performance test described in sub. (4) (a) 4., the average efficiency for that adsorber vessel measured with the monitor during the most recent performance test that demonstrated compliance.

3. For those affected facilities monitoring condenser exhaust gas temperature, all 3–hour periods, during actual coating operations, during which the average exhaust temperature is 5 or more Celsius degrees above the average temperature measured during the most recent performance test that demonstrated compliance;

4. For those affected facilities monitoring thermal incinerator combustion exhaust gas temperature, all 3–hour periods, during actual coating operations, during which the average combustion temperature of the device is more than 28 Celsius degrees below the average combustion temperature of the device during the most recent performance test that demonstrated compliance;

5. For those affected facilities monitoring catalytic incinerator catalyst bed temperature, all 3–hour periods, during actual coating operations, during which the average gas temperature immediately before the catalyst bed is more than 28 Celsius degrees below the average gas temperature during the most recent performance test that demonstrated compliance and all 3–hour periods, during actual coating operations, during which the average gas temperature difference across the catalyst bed is less than 80% of the average gas temperature difference during the most recent performance test that demonstrated compliance;

6. For each affected facility monitoring a total enclosure pursuant to sub. (5) (h) or vapor capture system pursuant to sub. (5) (g), all 3–hour periods, during actual coating operations, during which the average total enclosure or vapor capture system monitor readings vary by 5% or more from the average value measured during the most recent performance test that demonstrated compliance.

7. Each owner or operator of an affected coating operation not required to submit reports under subds. 1. to 6. because no reportable periods have occurred shall submit semiannual statements clarifying this fact.

(e) Each owner or operator of an affected coating operation, demonstrating compliance by the test methods described in sub. (4) (a) 3., liquid–liquid material balance, shall submit the following:

1. For months of compliance, semiannual reports to the department stating that the affected coating operation was in compliance for each 1–month period; and

2. For months of noncompliance, quarterly reports to the department documenting the 1–month amount of VOC contained in the coatings, the 1–month amount of VOC recovered and the percent emission reduction for each month.

(f) Each owner or operator of an affected coating operation, either by itself or with associated coating mix preparation equipment, shall submit the following with the reports required under pars. (d) and (e):

1. All periods during actual mixing or coating operations when a required monitoring device, if any, was malfunctioning or not operating; and

2. All periods during actual mixing or coating operations when the control device was malfunctioning or not operating.

(g) The reports required under pars. (b) to (e) shall be postmarked within 30 days of the end of the reporting period.

(h) Records required in this subsection shall be retained for at least 2 years.

History: Cr. Register, July, 1993, No. 451, eff. 8–1–93; am. (4) (a) 1. d., e., 2. d., e., 3. e. (intro.), (b) 1. d. 2), (8) (h), Register, December, 1995, No. 480, eff. 1–1–96; **correction in (4) (b) and (5) (c) made under s. 13.93 (2m) (b) 7., Register, November, 1999, No. 527.**