

## Chapter NR 423

CONTROL OF ORGANIC COMPOUND EMISSIONS FROM  
SOLVENT CLEANING OPERATIONS

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**NR 423.01 Applicability; purpose.** (1) **APPLICABILITY.** This chapter applies to all solvent cleaning operation air contaminant sources and to their owners and operators.

(2) **PURPOSE.** This chapter is adopted under ss. 144.31 and 144.38, Stats., to categorize organic compound emissions from solvent cleaning operations into separate organic compound air contaminant source categories and to establish emission limitations for these categories of sources in order to protect air quality.

**History:** Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. Register, February, 1990, No. 410, eff. 3-1-90.

**NR 423.02 Definitions.** In addition to the definitions in this section, the definitions contained in chs. NR 400, 419, 420 and 421 apply to the terms used in this chapter.

(2) "Cartridge filter" means a perforated canister containing filtration paper or activated carbon, or both, that is used to remove solid particles and fugitive dyes from soil-laden solvent.

(3) "Cold cleaning" means the batch process of cleaning and removing soils from metal surfaces by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. Wipe cleaning is not included in this definition.

(3m) "Conveyorized non-vapor degreasing" means the continuous process of cleaning and removing soils from metal surfaces by operating with non-vaporized solvents.

(4) "Conveyorized vapor degreasing" means the continuous process of cleaning and removing soils from metal surfaces by operating with vaporized solvents.

(5) "Dry cleaning facility" means any facility engaged in the cleaning of fabrics or leather in an essentially nonaqueous solvent by means of one or more washes in solvent, extraction of excess solvent by spinning, and drying by tumbling in an airstream. The facility includes but is not limited to any washer, dryer, filter and purification systems, waste disposal systems, holding tanks, pumps, and attendant piping and valves.

(6) "Freeboard height" means, for a cold cleaner, the distance from the liquid solvent level in the degreaser tank to the lip of the tank. For a vapor degreaser it means the distance from the top of the vapor zone to the lip of the degreaser tank.

(7) "Freeboard ratio" means the freeboard height divided by the internal width of the degreaser tank.

(8) "Open top vapor degreasing" means the batch process of cleaning and removing soils from metal surfaces by condensing hot solvent vapor on the colder metal parts.

(9) "Solvent metal cleaning" means the process of cleaning soils from metal surfaces by cold cleaning or open top vapor degreasing or conveyORIZED degreasing.

(10) "Solvent recovery dryer" means a dry cleaning dryer that employs a condenser to liquefy and recover solvent vapors evaporated in a closed-loop, recirculating stream of heated air.

History: Renum. from NR 154.01, Register, September, 1986, No. 369, eff. 10-1-86; cr. (3m), am. (4), Register, January, 1987, No. 385, eff. 2-1-88.

**NR 423.03 Solvent metal cleaning.** (1) **APPLICABILITY.** This section applies, with a final compliance deadline of May 1, 1980, or as provided by a compliance schedule issued or approved pursuant to s. NR 425.03(5), to cold cleaning, open top vapor degreasing and conveyORIZED vapor degreasing operations. This section also applies, with a compliance schedule provided pursuant to s. NR 423.03(6), to conveyORIZED non-vapor degreasing operations.

(2) **EXEMPTIONS.** (a) This section does not apply to individual cold cleaners to which not more than 5.7 liters (1.5 gallons) of solvent is added per day or to individual open top vapor, conveyORIZED vapor or conveyORIZED non-vapor degreasers whose emissions of VOC's are not more than 6.8 kilograms (15 pounds) in any one day, nor more than 1.4 kilograms (3.1 pounds) in any one hour, provided:

1. The degreaser is located outside the counties of Brown, Calumet, Dane, Dodge, Fond du Lac, Jefferson, Kenosha, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago; and

2. The emission rates from open top vapor and conveyORIZED vapor degreasers are determined and certified before October 1, 1979 in a manner approved by the department, and the emission rates from conveyORIZED non-vapor degreasers are determined and certified before May 1, 1988 in a manner approved by the department.

(b) This section also does not apply to sources used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance where:

1. The operation of the source is not an integral part of the production process; and

2. The emissions from the source do not exceed 363 kilograms (800 pounds) in any calendar month; and

3. The exemption is approved in writing by the department.

(c) The requirements of sub. (3) (b) to (g) do not apply to cold cleaners with an open area smaller than 0.10 square meter (1.1 square feet).

(d) The requirements of sub. (4) (c), do not apply to open top vapor degreasers with an open area smaller than 1.0 square meter (10.8 square feet).

(e) The requirements of sub. (5) (c) do not apply to conveyORIZED vapor degreasers with an air-vapor interface smaller than 2.0 square meters (21.6 square feet).

(f) The requirements of sub. (6)(a)2. do not apply to conveyORIZED non-vapor degreasers with a total horizontal solvent-air interface smaller than 2.0 square meters (21.6 square feet), where such an interface exists, or to conveyORIZED non-vapor degreasers which are located outside the counties of Brown, Calumet, Dane, Dodge, Fond du Lac, Jefferson, Kenosha, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago.

(3) COLD CLEANERS. Except as provided under sub. (2) (a), (b) and (c), the owner or operator of a cold cleaning facility shall:

(a) Equip the cleaner with a cover; and

(b) Design the cover so that it can be easily operated with one hand if:

1. The solvent volatility is greater than 2 kPa (0.3 psia) measured at 38°C (100°F); or

2. The solvent is agitated; or

3. The solvent is heated; and

(c) Equip the cleaner with a facility for draining cleaned parts, and the drainage facility shall be constructed internally so that parts are enclosed under the cover while draining if the solvent volatility is greater than 4.3 kPa (0.6 psia) measured at 38°C (100°F), except that the drainage facility may be external for applications where an internal type cannot fit into the cleaning system; and

(d) Install one of the following control devices if the solvent volatility is greater than 4.3 kPa (0.6 psia) measured at 38°C (100°F), or if the solvent is heated about 49°C (120°F):

1. Freeboard that gives a freeboard ratio greater than or equal to 0.70; or

2. Water cover (solvent must be insoluble in and heavier than water); or

3. Other systems of equivalent control, such as refrigerated chiller or carbon adsorption, approved by the department; and

(e) If used, supply a solvent spray that is a solid fluid stream (not a fine, atomized or shower type spray) at a pressure which does not cause extensive splashing; and

(f) Provide a permanent, conspicuous label, summarizing the operating requirements; and

(g) Provide supervision or instruction adequate to ensure that the operation is conducted in accord with the following:

1. Close the cover whenever parts are not being handled in the cleaner; and

2. Drain the cleaned parts for at least 15 seconds or until dripping ceases; and

3. Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another person in such a way as to cause greater than 15% of the waste solvent (by weight) to evaporate into the ambient air during the ozone season, s. NR 419.04 notwithstanding; and

4. Repair solvent leaks immediately, or shut down the degreaser until the leaks are repaired.

(4) OPEN TOP VAPOR DEGREASERS. Except as provided under sub. (2) (a), (b) and (d), the owner or operator of an open top vapor degreaser shall:

(a) Equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and

(b) Provide the following safety switches:

1. A condenser flow switch or other switching system which shuts off the sump heat if the condenser coolant is either not circulating or too warm; and

2. A thermostatically activated control switch which shuts off the sump heat when the vapor level rises above the upper boundary of the normal range; and

3. A spray safety switch which shuts off the spray pump if the vapor level does not stay within the normal range; and

(c) Install one of the following control devices:

1. A freeboard ratio equal to or greater than 0.75, with a powered or mechanically assisted cover if the degreaser opening is greater than 1.0 square meter (10.8 square feet); or

2. Refrigerated chiller; or

3. Enclosed design (cover or door opens only when the dry part is actually entering or exiting the degreaser); or

4. Ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air-vapor area (when cover is open), all passing through a carbon adsorption system which exhausts less than 25 parts per million of solvent averaged over one complete adsorption cycle; or

5. A control system demonstrated to have control efficiency equivalent to or greater than any of subs. 1 to 4 and approved by the department; and

(d) Not position ventilation fans so as to disturb the degreaser's vapor zone, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser open area during the ozone season, unless necessary to meet OSHA requirements; and

(e) Keep the cover closed at all times except when processing workloads through the degreaser; and

(f) Always spray below the vapor level; and

(g) Minimize solvent carryout by:

1. Racking parts to allow complete drainage; and
  2. Moving parts in and out of the degreaser at less than 3.3 meters per minute (11 feet per minute); and
  3. Holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and
  4. Tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and
  5. Allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and
- (h) Not degrease porous or absorbent materials, such as cloth, leather, wood or rope; and
- (i) Move parts out of the degreaser at less than 1.5 meters per minute (4.9 feet per minute) if the workload occupies more than 50% of the degreaser's open top area; and
- (j) Except where a load cannot be divided, avoid loading the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is placed in the vapor zone; and
- (k) Not operate the degreaser so as to allow water to be visually detectable in solvent exiting the water separator; and
- (l) Follow the requirements of sub. (3) (g) 3. and 4.
- (m) Provide a permanent, conspicuous label, summarizing the operating procedures of pars. (e) to (i), and provide supervision or instruction adequate to ensure that the procedures are followed.
- (5) CONVEYORIZED VAPOR DEGREASERS. Except as provided under sub. (2) (a), (b) and (e), the owner or operator of a conveyORIZED vapor degreaser shall:
- (a) Minimize entrance and exit openings during operations so that no opening dimension exceeds the smallest physically possible by more than 20 centimeters (8 inches) or by more than 20% of the opening dimension, whichever is smaller; and
- (b) Provide the following safety switches:
1. A condenser flow switch or other switching system which shuts off the sump heat if the condenser coolant is either not circulating or too warm; and
  2. A thermostatically activated control switch which shuts off the sump heat when the vapor level rises above the upper boundary of the normal range; and
  3. A spray safety switch which shuts off the spray pump or the conveyor if the vapor level does not stay within the normal range; and
- (c) Install one of the following control devices:
1. Refrigerated chiller; or
  2. Carbon adsorption system, with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute

per square foot) of air-vapor area (when downtime covers are open), and exhausting less than 25 parts per million of solvent by volume averaged over a complete adsorption cycle; or

3. A system, demonstrated to have a control efficiency equivalent to or greater than subd. 1 or 2, and approved by the department; and

(d) Provide downtime covers for closing off the entrance and exit during shutdown hours; and

(e) Place downtime covers over entrances and exits of conveyORIZED vapor degreasers immediately after the conveyors and exhausts are shut down and not remove them until just before startup; and

(f) Minimize carryout emissions by:

1. Using a drying tunnel, rotating (tumbling) basket or their equivalent; and

2. Racking parts for best drainage; and

3. Maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and

(g) Follow the requirements of subs. (3) (g) 3. and 4. and (4) (d) and (k).

(6) CONVEYORIZED NON-VAPOR DEGREASERS. (a) *Control requirements.* Except as provided under sub. (2)(a), (b) and (f), the owner or operator of a conveyORIZED non-vapor degreaser shall:

1. Minimize entrance and exit openings during operation so that no opening dimension exceeds the smallest physically possible by more than 20 centimeters (8 inches) or by more than 20% of the opening dimension, whichever is smaller;

2. Install and operate one of the following control systems:

a. A carbon adsorption system demonstrated to have at least a 95% control efficiency, as measured across the carbon adsorption equipment and averaged over a complete adsorption cycle; or

b. A system, demonstrated to have a control efficiency equivalent to or greater than that described in subpar. a., and approved by the department;

3. Provide downtime covers for closing off the entrance and exit during shutdown hours;

4. Place downtime covers over the entrances and exits of conveyORIZED non-vapor degreasers immediately after the conveyors and exhausts are shut down and not remove them until just before start-up;

5. Minimize carryout emissions by:

a. Use of rollers to remove excess solvent in strip cleaning operations; or

b. Arranging parts for best drainage in mesh belt cleaning operations and other conveyORIZED non-vapor degreasing operations;

6. Store waste solvent in covered containers and not dispose of waste solvents or transfer it to another person in such a way as to cause greater than 15% of the waste solvent (by weight) to evaporate into the ambient air during the ozone season; and

7. Repair solvent leaks immediately, or shut down the degreaser until the leaks are repaired.

(b) *Compliance schedule.* The owner or operator of a conveyORIZED non-vapor degreaser subject to the control requirements of par. (a)2. shall meet the following schedule:

1. Submit plans for achieving compliance on or before December 31, 1987.

2. Award any necessary contracts on or before January 31, 1988.

3. Commence construction of control equipment on or before February 28, 1988.

4. Complete construction of control equipment on or before March 31, 1988.

5. Achieve final compliance on or before May 1, 1988.

*History:* Renum. from NR 154.13 (6) (a) and am. Register, September, 1986, No. 369, eff. 10-1-86.; am. (1), (2)(a)(intro.), 2. and (e), (5)(intro.) and (e), cr. (2)(f) and (6), Register, January, 1988, No. 385, eff. 2-1-88; am. (2) (a) (intro.) and (c) and (3) (d) 1., Register, February, 1990, No. 410, eff. 3-1-90.

**NR 423.04 Perchloroethylene dry cleaning.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to all dry cleaning facilities in which perchloroethylene solvent is used.

(2) **EXEMPTIONS.** The requirements of sub. (3) (a) do not apply to perchloroethylene dry cleaning facilities which provide satisfactory documentation to the department showing that an adsorber cannot be accommodated because of inadequate space or because insufficient steam capacity is available to desorb adsorbers.

(3) **REQUIREMENTS.** Except as provided under sub. (2), the owner or operator of a perchloroethylene dry cleaning facility shall:

(a) Vent the entire dryer exhaust through:

1. A carbon adsorption system which may emit no more than 100 ppm of VOC, before dilution; or

2. An alternative VOC emission control system demonstrated to achieve an equivalent VOC emission reduction as approved by the department.

(b) Maintain the facility so as to prevent leakage of organic solvent from any components in the system and repair any leaks immediately;

(c) Cook or treat all diatomaceous earth filters so that the residue contains 25 kilograms or less of VOCs per 100 kilograms of wet waste material;

(d) Reduce the VOC content of all solvent still waste to 60 kilograms or less per 100 kilograms of wet waste material;

(e) Drain all filtration cartridges, in the filter housing or other sealed container, for at least 24 hours before discarding the cartridges;

(f) If transferring cartridges to another sealed container, make such transfer without permitting any solvent to be spilled; and

(g) When possible, dry all drained cartridges without emitting VOCs to the atmosphere.

History: Renum. from NR 154.13 (6) (b) and am. Register, September, 1986, No. 369, eff. 10-1-86.

**NR 423.05 Petroleum liquid solvent dry cleaning.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to petroleum liquid solvent washers, dryers, solvent filters, settling tanks, vacuum stills, piping, ductwork, pumps, storage tanks, and other containers and conveyors of petroleum liquid solvent that are used in petroleum liquid solvent dry cleaning facilities which have the potential to emit VOCs from the facility in an amount totaling more than 100 tons per year and which are located within the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington, or Waukesha.

(2) **REQUIREMENTS.** (a) The owner or operator of a petroleum liquid solvent dry cleaning facility shall limit VOC emissions from each petroleum liquid solvent dry cleaning dryer to an average of 3.5 kilograms per 100 kilograms, dry weight, of articles cleaned, or install and operate a solvent recovery dryer in a manner such that the dryer remains closed and the recovery phase continues until the flow rate of recovered solvent no longer exceeds 50 milliliters per minute.

(b) The owner or operator of a petroleum liquid solvent dry cleaning facility shall reduce the VOC content of all filtration wastes to not more than 1.0 kilogram per 100 kilograms, dry weight, of articles cleaned before disposing of such wastes or exposing them to the atmosphere, or install and operate a cartridge filtration system, and drain the filter cartridges in their sealed housings for at least 8 hours before removing them.

(c) The owner or operator of a petroleum liquid solvent dry cleaning facility shall repair all solvent vapor and liquid leaks within 3 working days of their discovery. If necessary repair parts are not on hand, the owner or operator shall order them within 3 working days following discovery of solvent vapor or liquid leaks and repair the leaks within 3 working days following receipt of the parts.

History: Renum. from NR 154.13 (6) (c) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (1), Register, February, 1990, No. 410, eff. 3-1-90.