

## Chapter NR 421

## CONTROL OF ORGANIC COMPOUND EMISSIONS FROM CHEMICAL, COATINGS AND RUBBER PRODUCTS MANUFACTURING

NR 421.01 Applicability; purpose.  
NR 421.02 Definitions.  
NR 421.03 Chemical manufacture.

NR 421.04 Pneumatic rubber tire manufacture.  
NR 421.05 Synthetic resin manufacturing.  
NR 421.06 Coatings manufacturing.

**NR 421.01 Applicability; purpose. (1) APPLICABILITY.**

This chapter applies to all chemical, coatings and rubber products manufacturing air contaminant sources and to their owners and operators.

**(2) PURPOSE.** This chapter is adopted under ss. 285.11, 285.13 and 285.17, Stats., to categorize organic compound emissions from chemical, coatings and rubber products manufacturing sources 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; corrections made in (2) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 1996, No. 492.

**NR 421.02 Definitions.** The definitions contained in chs. NR 400, 419 and 420 apply to the terms used in this chapter. In addition, the following definitions apply to the terms used in this chapter and in chs. NR 422 to 425:

**(1)** "Bead dipping" means the dipping of an assembled tire bead into a solvent based cement.

**(2)** "Blending tank" means any vessel in which resin, coating or other materials, or any combination thereof, are added to produce product blend.

**(3)** "Coatings manufacturing facility" means any facility which mixes, blends or compounds paints, varnishes, lacquers, enamels, shellacs or sealers, and which is classified under standard industrial classification code 2851, as described in the Standard Industrial Classification Manual, 1987, incorporated by reference in s. NR 484.05.

**(4)** "Completed resin" is any resin which has completed its processing and is available for use in the basic components of plastics or as a component of surface coating formulations.

**(5)** "Green tires" means assembled tires before molding and curing have occurred.

**(6)** "Green tire spraying" means the spraying of green tires, both inside and outside, with release compounds which help remove air from the tire during molding and prevent the tire from sticking to the mold after curing.

**(7)** "Grinding mill" means any mill with cylindrical chambers containing grinding media such as balls, pebbles, or sand which grind and disperse coating solids.

**(8)** "High speed dispersion mill" means any mixer with one or more blades that rotate at high speed in order to disperse coating solids.

**(9)** "Passenger type tire" means agricultural, airplane, industrial, mobile home, light and medium duty truck, and passenger vehicle tires with a bead diameter up to 50.8 cm (20 inches) and cross section dimension up to 32.5 cm (12.8 inches).

**(10)** "Pneumatic rubber tire manufacture" means the production of pneumatic rubber passenger type tires on a mass production basis.

**(11)** "Production equipment exhaust system" means a device for collecting and directing out of the work area fugitive emissions from reactor openings, centrifuge openings, and other vessel openings at a pharmaceutical manufacturing plant.

**(12)** "Reaction tank" means any piece of equipment in which organic or other materials are reacted to produce a resin. A reaction tank may include a stripping column, condensers, and a water separator, which return the evaporated solvent to the reaction vessel.

**(13)** "Reactor" means a vat or vessel, which may be jacketed to permit temperature control, designed to contain chemical reactions.

**(14)** "Resin" means a solid or semi-solid, water-insoluble, organic material with little or no tendency to crystallize and which is used as the basic components of plastics or as a component of surface-coating formulations.

**(15)** "Roller mill" means any mill with horizontal rollers that grind and disperse coating solids.

**(16)** "Synthesized pharmaceutical manufacturing" means manufacture of pharmaceutical products by chemical synthesis.

**(17)** "Synthetic resin manufacturing facility" means any facility which reacts organic compounds to produce a synthetic resin and which is classified under standard industrial classification code 2821, as described in the Standard Industrial Classification Manual, 1987, incorporated by reference in s. NR 484.05.

**(18)** "Thinning tank" means any vessel in which resin, coating, or other products are combined with solvents to thin the product.

**(19)** "Tread end cementing" means the application of a solvent based cement to tire tread ends.

**(20)** "Undertread cementing" means the application of a solvent based cement to the underside of a tire tread.

**(21)** "VOC emission leak" means a fugitive emission of volatile organic compounds from any valve, pump, sealed agitator, compressor, flange or relief valve for which the fugitive VOC concentration is measured to exceed 10,000 ppm when tested according to Method 21 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04.

**(22)** "Water based sprays" means release compounds, sprayed on the inside and outside of green tires, in which solids, water, and emulsifiers have been substituted for all organic solvents.

**History:** Renum. from NR 154.01, cr. (1m), (2e), (2s), (4e), (4s), (9m), (10e), (10s), (11e) and (11s), Register, September, 1986, No. 369, eff. 10-1-86; renum. (2) and (5) to be NR 400.02 (22) and (51m), cr. (12m), Register, February, 1990, No. 410, eff. 3-1-90; renum. (10) and (11) to be (10w) and (11w) under s. 13.93 (2m) (b) 1., Stats., Register, August, 1990, No. 416; renum. (1m) to be (2), Register, May, 1992, No. 437, eff. 6-1-92; am. (2e) and (11e), Register, December, 1993, No. 456, eff. 1-1-94; am. (intro.), renum. (2e) to (13) to be (3) to (22) and am. (3), (17) and (21), Register, December, 1995, No. 480, eff. 1-1-96.

**NR 421.03 Chemical manufacture. (1) PHARMACEUTICAL MANUFACTURE. (a) Applicability.**

This subsection applies, subject to the provisions of s. NR 425.03, to all operations at pharmaceutical manufacturing facilities involved in the manufacture of pharmaceutical products by chemical synthesis, with the exception of any reactor, distillation unit, dryer, filter, crystallizer, centrifuge, or other individual operation that has an actual emission rate of less than 6.8 kilograms per day (15 pounds per day) with all emission control equipment inoperative.

(b) *Emission control requirements.* Except as provided under par. (a), the owner or operator of a synthesized pharmaceutical manufacturing facility shall:

1. Equip each vent from reactors, distillation operations, crystallizers, centrifuges, or vacuum dryers with surface condensers or an equally effective control device as approved by the department. If a surface condenser is used, the condenser outlet gas temperature may not exceed:

a.  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ) for VOCs with vapor pressure greater than 40 kPa (5.8 psia) as measured at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

b.  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ) for VOCs with vapor pressure between 20 kPa (2.9 psia) and 40 kPa (5.8 psia) as measured at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

c.  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ) for VOCs with vapor pressure between 10 kPa (1.5 psia) and 20 kPa (2.9 psia) as measured at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

d.  $10^{\circ}\text{C}$  ( $50^{\circ}\text{F}$ ) for VOCs with vapor pressure between 7 kPa (1.0 psia) and 10 kPa (1.5 psia) as measured at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

e.  $25^{\circ}\text{C}$  ( $77^{\circ}\text{F}$ ) for VOCs with vapor pressure between 3.5 kPa (0.5 psia) and 7 kPa (1.0 psia) as measured at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

2. Limit the VOC emissions from air dryer exhaust systems and production equipment exhaust systems to 15.0 kilograms per day (33 pounds per day) or to 10% of the uncontrolled emission rate of the system, whichever is less stringent.

3. Enclose all centrifuges, rotary vacuum filters, and any other filters having an exposed liquid surface, where the liquid contains VOCs and exerts a total VOC vapor pressure of 3.5 kPa (0.5 psia) or more at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ).

4. Install covers on all in-process tanks that contain a VOC at any time. Covers are to be closed except for necessary operator access during production, sampling, maintenance or inspection.

5. Repair all visually detectable leaks of liquid VOCs the first time the equipment is off-line for a period long enough to complete the repair.

(2) **TRANSFER OF VOCs AT PHARMACEUTICAL MANUFACTURING FACILITIES.** (a) *Applicability.* Subject to the provisions of s. NR 425.03, this subsection applies to all storage vessels for VOCs of more than 7,751 liter (2,000 gallon) capacity at a synthetic pharmaceutical manufacturing facility.

(b) *Emission reduction requirements.* No owner or operator of a synthetic pharmaceutical manufacturing facility may permit the delivery of VOCs with vapor pressure in excess of 28.0 kPa (4.1 psia) at  $20^{\circ}\text{C}$  from a truck or railcar to the storage vessel unless a vapor balance or equivalent control system is provided. The system must be at least 90% effective in reducing emissions from transfer operations.

(3) **STORAGE OF VOCs AT PHARMACEUTICAL MANUFACTURING FACILITIES.** (a) *Applicability.* This subsection applies, subject to the provisions of s. NR 425.03, to all storage vessels for VOCs of more than 3,785 liters (1,000 gallon) capacity at synthetic pharmaceutical manufacturing facilities.

(b) *Storage requirements.* The owner or operator of any storage vessel shall install pressure-vacuum conservation vents set at  $\pm 0.2$  kPa, or an equally effective control device approved by the department, on all storage vessels that store VOCs with vapor pressures in excess of 10.5 kPa (1.52 psia) at  $21^{\circ}\text{C}$  ( $70^{\circ}\text{F}$ ).

**History:** Renum. from NR 154.13 (2) (b), (3) (e) and (9) and am., Register, September, 1986, No. 369, eff. 10-1-86; am. (1) (b) 1. and (2) (b), Register, February, 1990, No. 410, eff. 3-1-90; am. (1) (a), Register, December, 1993, No. 456, eff. 1-1-94.

#### NR 421.04 Pneumatic rubber tire manufacture.

(1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to all pneumatic rubber tire manufacturing facilities involved in undertread cementing, tread end cementing, bead dipping, or green tire spraying operations.

(2) **EXEMPTIONS.** (a) This section does not apply to the production of specialty tires for antique or other vehicles when produced on an irregular basis or with short production runs. This

exemption applies only to tires produced on equipment separate from normal production lines for passenger type tires.

(b) The requirements of sub. (3) do not apply provided the combined total VOC emissions from all undertread cementing, tread end cementing, bead dipping and green tire spraying operations are less than or equal to 57 grams per tire produced and the emission rates are determined and certified by August 31, 1981.

(3) **EMISSION CONTROL REQUIREMENTS.** The owner or operator of a pneumatic rubber tire manufacturing facility shall:

(a) For all undertread cementing, tread end cementing and bead dipping operations install and operate one of the following:

1. A carbon adsorption system which reduces the VOC emissions from the capture system by at least 90% by weight.

2. An incineration or catalytic oxidation system which oxidizes at least 90% of the nonmethane VOCs (measured as total combustible carbon) which enter the incineration or oxidation unit, to nonorganic compounds.

3. An alternative VOC emission reduction system demonstrated to have at least 90% reduction efficiency measured across the control system, as approved by the department.

(b) For green tire spraying operations, implement one of following control strategies:

1. Utilize water-based mold release compound sprays with a volatile fraction containing, at a minimum, 90% water.

2. Install and operate a carbon adsorption system which reduces the VOC emission from the capture system by at least 90% by weight.

3. Install and operate an incineration or catalytic oxidation system which oxidizes at least 90% of the nonmethane VOCs (VOC measured as total combustible carbon) which enter the incinerator or oxidation unit to nonorganic compounds.

4. Install and operate an alternate VOC emission reduction system demonstrated to have at least a 90% reduction efficiency, measured across the control system, as approved by the department.

(c) For any control device required by this section, install and operate a capture system, as approved by the department, which is designed to provide maximum reasonable capture and transfer of VOCs to the control device. Maximum reasonable capture and transfer shall be in accord with guidance provided by:

1. Industrial Ventilation: A Manual of Recommended Practice, 20th ed., incorporated by reference in s. NR 484.11.

2. Recommended Industrial Ventilation Guidelines, incorporated by reference in s. NR 484.05.

**History:** Renum. from NR 154.13 (8) and am. (1), Register, September, 1986, No. 369, eff. 10-1-86; am. (4) (intro.), Register, February, 1990, No. 410, eff. 3-1-90; am. (3) (c) 1. and 2., Register, May, 1992, No. 437, eff. 6-1-92; am. (3) (c) 1. and 2., r. (4), Register, December, 1995, No. 480, eff. 1-1-96; correction in (2) (b) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 1995, No. 480; am. (3) (a) (intro.), (c) 1., Register, December, 1996, No. 492, eff. 1-1-97; am. (3) (a) 2., Register, October, 1999, No. 526, eff. 11-1-99.

#### NR 421.05 Synthetic resin manufacturing.

(1) **APPLICABILITY.** (a) Effective October 1, 1986, this section applies to reaction tanks, thinning tanks, blending tanks and other process vessels used in any synthetic resin manufacturing facility which has maximum theoretical emissions of VOCs from the processes greater than or equal to 100 tons per year and which is located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha.

(b) Effective January 1, 1994, this section applies to reaction tanks, thinning tanks, blending tanks and other process vessels used in any synthetic resin manufacturing facility which has maximum theoretical emissions of VOCs from the processes greater than or equal to one of the following:

1. 25 tons per year for a facility located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha.

2. 100 tons per year for a facility located in the county of Door, Kewaunee, Manitowoc, Sheboygan or Walworth.

(2) EMISSION CONTROL REQUIREMENTS. The owner or operator of a synthetic resin manufacturing facility shall:

(a) Equip each vent from reaction tanks, and all blending tanks and thinning tanks, with an emission control system which meets one of the conditions listed in this paragraph. Any equally effective control method or equivalent system approved by the department under this paragraph shall be submitted to, and will not become effective for federal purposes until approved by, the administrator or designee as a source-specific revision to the department's state implementation plan for ozone. The emission control system shall be one of the following:

1. A surface condenser, or equally effective control device approved by the department, and a vapor recovery or control system that reduces emissions from the surface condenser or equally effective device by 85%.

2. An equivalent system or approach demonstrated to reliably control emissions from a process that does not include a condenser by not less than 90% as approved by the department.

(b) If a surface condenser is used, continuously record the condenser outlet gas temperature, and prevent the condenser outlet gas temperature from exceeding 32°C (90°F).

(c) Enclose all centrifuges, rotary vacuum filters, and any other filters having an exposed liquid surface, where the liquid contains VOCs.

(d) Install covers on all in-process tanks that contain a VOC at any time. Covers shall be closed except for necessary operator access during production, sampling, maintenance or inspection.

(e) Monitor each valve, pump, sealed agitator, compressor, flange and relief valve used with a process stream which contains at least 10.0% VOCs by weight using Method 21 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 484.04. The monitoring schedule shall be as follows:

1. Monitor each valve, pump, sealed agitator, compressor and relief valve that is located within 2.0 meters (6.6 feet) of a permanent support surface once during each calendar quarter.

2. Monitor all other valves, pumps, sealed agitators, compressors and relief valves, and all flanges, once during each calendar year.

3. Notwithstanding subd. 1., if less than or equal to 2% of the valves monitored pursuant to subd. 1. are found to leak for 5 consecutive quarters, monitoring of valves under subd. 1. will not be required for the following 3 consecutive quarters. Monitoring shall be conducted during the next quarter and every fourth quarter thereafter. If, during monitoring required under this subdivision, more than 2% of valves monitored are found to leak, quarterly monitoring under subd. 1. shall be reinstated in the next quarter.

(f) Check bimonthly by visual inspection each valve, pump, sealed agitator, compressor, flange and relief valve for indications of dripping liquid.

(g) Repair all leaks detected as soon as practicable, but not later than 15 calendar days after leak detection unless the repair is technically infeasible without a process unit shutdown. In the case of such infeasibility, repair shall occur before the end of the next process unit shutdown.

(h) Document to the department all repairs of detectable leaks of VOCs for each calendar quarter. This documentation is to include a description of the equipment that leaked, date of detection, date of repair, dates of follow-up inspection, and an explanation of what caused the leak. This documentation is to be submitted to the department within one month after the close of the calendar quarter during which the leaks were detected and repaired.

(3) COMPLIANCE SCHEDULE. (a) This subsection applies only to a synthetic resin manufacturing facility which is in existence on January 1, 1994 and which meets one of the following criteria:

1. The facility is located in the county of Door, Kewaunee, Manitowoc, Sheboygan or Walworth.

2. The facility is located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha and was not subject to this section prior to January 1, 1994.

(b) The owner or operator of any source identified under par. (a) shall:

1. Notify the department's bureau of air management in writing by April 1, 1994. This notification shall provide the name and location of the affected facility and include VOC emission data if necessary to support eligibility under this subsection.

2. Achieve final compliance with the requirements of this section no later than May 31, 1995.

**Note:** "Maximum theoretical emissions" has the meaning given in s. NR 419.02 (11).

**History:** Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (1), (2) (a) 1. and b. and (b), (3) (b) and (c) 4., r. and recr. (2) (e), renum. (2) (f) to be (2) (h) and am., cr. (2) (f) and (g), r. (3) (c) 5., Register, February, 1990, No. 410, eff. 3-1-90; am. (1), (2) (a) (intro.) and (b), cr. (1) (b), r. and recr. (3), Register, December, 1993, No. 456, eff. 1-1-94; am. (2) (a) (intro.), (e) (intro.) and 2., cr. (2) (e) 3., Register, December, 1995, No. 480, eff. 1-1-96; am. (1) (b), (2) (a) (intro.), 1., (3) (a), Register, August, 1996, No. 488, eff. 9-1-96; am. (2) (e) 3., Register, October, 1999, No. 526, eff. 11-1-99.

**NR 421.06 Coatings manufacturing. (1) APPLICABILITY.** (a) Effective October 1, 1986, this section applies to pigment dispersion chambers, thinning tanks, tinting, straining, blending tanks and other process vessels used in any coatings manufacturing facility which has maximum theoretical emissions of VOCs from the processes greater than or equal to 100 tons per year and which is located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha.

(b) Effective January 1, 1994, this section applies to pigment dispersion chambers, thinning tanks, tinting, straining, blending tanks and other process vessels used in any coatings manufacturing facility which has maximum theoretical emissions of VOCs from the processes greater than or equal to one of the following:

1. 25 tons per year for a facility located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha.

2. 100 tons per year for a facility located in the county of Door, Kewaunee, Manitowoc, Sheboygan or Walworth.

(2) EMISSION CONTROL REQUIREMENTS. The owner or operator of a coatings manufacturing facility shall:

(a) Keep all portable mixing vats covered with lids, except to add ingredients or to take samples. The lids shall extend at least 1/2 inch beyond the outer rim of the vat or be attached to the rim of the vat and shall be maintained in good condition such that, when in place, they maintain contact with the rim for at least 90% of the circumference of the rim of the vat. The lids may have a slit to allow clearance for insertion of a mixer shaft. The slit shall be covered after insertion of the mixer, except to allow safe clearance for the mixer shaft.

(b) Keep all stationary vats covered, except to add ingredients or take samples.

(c) Clean all portable mixing vats, stationary vats, high speed dispersion mills, grinding mills, and roller mills in a way which minimizes the emissions of VOCs into the atmosphere and which is approved by the department.

(d) Equip any grinding mill installed after October 1, 1986 with fully enclosed screens.

(e) Monitor each valve, pump, sealed agitator, compressor, flange and relief valve used with a process stream which contains at least 10.0% VOCs by weight using Method 21 of Appendix A, 40 CFR part 60, incorporated by reference in s. NR 484.04. The monitoring schedule shall be as follows:

1. Monitor each valve, pump, sealed agitator, compressor and relief valve that is located within 2.0 meters (6.6 feet) of a permanent support surface once during each calendar quarter.

2. Monitor all other valves, pumps, sealed agitators, compressors and relief valves, and all flanges, once during each calendar year.

3. Notwithstanding subd. 1., if less than or equal to 2% of the valves monitored pursuant to subd. 1. are found to leak for 5 consecutive quarters, monitoring of valves under subd. 1. will not be required for the following 3 consecutive quarters. Monitoring shall be conducted during the next quarter and every fourth quarter thereafter. If, during monitoring required under this subdivision, more than 2% of valves monitored are found to leak, quarterly monitoring under subd. 1. shall be reinstated in the next quarter.

(f) Check bimonthly by visual inspection each valve, pump, sealed agitator, compressor, flange and relief valve for indications of dripping liquid.

(g) Repair all leaks detected as soon as practicable, but not later than 15 calendar days after leak detection unless the repair is technically infeasible without a process unit shutdown. In the case of such infeasibility, repair shall occur before the end of the next process unit shutdown.

(h) Document to the department all repairs of detectable leaks of VOCs for each calendar quarter. This documentation is to include a description of the equipment that caused the leak, date of detection, date of repair, date of follow-up inspection, and an

explanation of what caused the leak. This documentation is to be submitted to the department within one month after the close of the calendar quarter during which the leaks were detected and repaired.

**(3) COMPLIANCE SCHEDULE.** (a) This subsection applies only to a coatings manufacturing facility which is in existence on January 1, 1994 and which meets one of the following criteria:

1. The facility is located in the county of Door, Kewaunee, Manitowoc, Sheboygan or Walworth.

2. The facility is located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha and was not subject to this section prior to January 1, 1994.

(b) The owner or operator of any source identified under par. (a) shall:

1. Notify the department's bureau of air management in writing by April 1, 1994. This notification shall provide the name and location of the affected facility and include VOC emission data if necessary to support eligibility under this subsection.

2. Achieve final compliance with the requirements of this section no later than May 31, 1995.

**Note:** "Maximum theoretical emissions" has the meaning given in s. NR 419.02 (11).

**History:** Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (1) and (3) (c) 4., r. and recr. (2) (e), renum. (2) (f) to be (2) (h) and am., cr. (2) (f) and (g), r. (3) (c) 5., Register, February, 1990, No. 410, eff. 3-1-90; am. (1), cr. (1) (b), r. and recr. (3), Register, December, 1993, No. 456, eff. 1-1-94; am. (2) (e), cr. (2) (e) 3., Register, December, 1995, No. 480, eff. 1-1-96; am. (1) (b), (2) (a) (intro.), (3) (a), r. (2) (a) 1. to 3., Register, December, 1996, No. 492, eff. 1-1-97; am. (2) (e) 3., Register, October, 1999, No. 526, eff. 11-1-99.