

Chapter NR 423

CONTROL OF ORGANIC COMPOUND EMISSIONS FROM
SOLVENT CLEANING OPERATIONS

NR 423.01 Applicability; purpose.
NR 423.02 Definitions.
NR 423.03 Solvent metal cleaning.

NR 423.035 Industrial cleaning operations.
NR 423.05 Liquid VOC solvent dry cleaning.

Note: Corrections made under s. 13.93 (2m) (b) 6. and 7., Stats., Register, December, 1996, No. 492.

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. 285.11, 285.13 and 285.17, 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. The definitions contained in chs. NR 400, 419, 420 and 421 apply to the terms used in this chapter. In addition, the following definitions apply to the terms used in this chapter:

(1) “Application equipment” means a device used to apply adhesive, coating, ink or polyester resin materials.

(1g) “Aerosol product” means solvent or solvent solution expelled by a propellant from a hand-held non-refillable pressurized container.

(1r) “Blanket or roller wash” has the meaning given it in s. NR 422.02 (12).

(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.

(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.

(5g) “Electrical apparatus component” means an internal component such as wires, windings, stators, rotors, magnets, contacts, relays, energizers and connections in an apparatus that generates or transmits electrical energy including, but not limited to: alternators, generators, transformers, electric motors, cables and circuit breakers, except for the actual cabinet in which the components are housed. Electrical components of all rotogravure, letterpress, flexographic and lithographic application equipment and hot-line tools are also included in this category.

(5r) “Flexographic printing” has the meaning given it in s. NR 422.02 (35).

(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.

(7m) “Hot-line tool” means a specialized tool used primarily on the transmission systems, sub-transmission systems and dis-

tribution systems for replacing and repairing circuit components or for other types of work with electrically energized circuits.

(8) “Industrial cleaning operations” means the process of cleaning products, product components, tools, equipment or general work areas during production, repair, maintenance or servicing with solvents or solvent solutions.

(8c) “Letterpress printing” means the method in which the image area is raised relative to the non-image area and the ink is transferred directly from the ink roller to the plate cylinder.

(8g) “Lithographic printing” has the meaning given it in s. NR 422.02 (48).

(8L) “Maintenance cleaning” means an activity carried out to keep general work areas, tools, machinery or equipment, excluding application equipment, in clean and good operational condition.

(8p) “Medical device” means an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent or other similar article, including any component or accessory that meets any one of the following conditions:

(a) It is intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment or prevention of disease.

(b) It is intended to affect the structure or function of the body.

(c) It is defined as a “device” under 21 USC 321.

Note: Common examples of such medical devices include but are not limited to x-ray machines, medical lasers, diagnostic ultrasound products, thermometers, bedpans, artificial hearts, pacemakers, pregnancy test kits, scalpels, tongue depressors and bandages.

(8t) “Non-atomized flow” means the use of solvent or solvent solution in the form of a liquid stream without atomization to remove uncured adhesives, uncured inks, uncured coatings or contaminants from an article.

(8x) “On-press component” means a part, component or accessory of a press that is cleaned while still being physically attached to the press. Rollers, blankets, metering rollers, fountains, impression cylinders and plates are considered on-press components even when detached from the press.

(9) “Refrigerated freeboard chiller” means an emission control device which is mounted above the water jacket or primary condenser coils of a vapor degreaser and which consists of secondary coils carrying a refrigerant to provide a chilled air blanket above the solvent vapor.

(9c) “Remote reservoir cleaner” means a cleaning device in which solvents or solvent solutions are pumped from a container to a sink-like work area and the solvents or solvent solutions from the sink-like area drain into an enclosed container while parts are being cleaned.

(9g) “Removable press component” means a part, component or accessory of a press, excluding rollers, blankets, metering rollers, fountains, impression cylinders and plates, that is physically attached to the press but is disassembled and removed from the press prior to being cleaned.

(9n) “Repair cleaning” means a cleaning operation or activity carried out during a repair process.

(9r) "Repair process" means the process of returning a damaged object or an object not operating properly to good operating condition.

(9w) "Rotogravure printing" has the meaning given it in s. NR 422.02 (80).

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

(10g) "Screen printing" has the meaning given it in s. NR 422.02 (82).

(10r) "Surface preparation" means the removal of contaminants such as dust, soil, oil, etc., prior to coating, adhesive or ink applications.

(11) "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.

(11g) "VOC composite partial vapor pressure" means the sum of the partial pressures of the compounds defined as VOCs and shall be calculated by one of the following equations:

$$P_{VOC} = \left[\frac{\sum_{i=1}^Q \left(\frac{W_i}{MW_i} \right)}{\frac{W_w}{MW_w} + \sum_{j=1}^K \left(\frac{W_{NVOCj}}{MW_{NVOCj}} \right) + \sum_{i=1}^Q \left(\frac{W_i}{MW_i} \right)} \right] P_{total}$$

or, if the total vapor pressure of the mixture is unknown

$$P_{VOC} = \left[\frac{\sum_{i=1}^Q \left(\frac{W_i VP_i}{MW_i} \right)}{\frac{W_w}{MW_w} + \sum_{j=1}^K \left(\frac{W_{NVOCj}}{MW_{NVOCj}} \right) + \sum_{i=1}^Q \left(\frac{W_i}{MW_i} \right)} \right]$$

where:

P_{VOC} is the VOC composite partial vapor pressure at 20°C (mm Hg)

W_i is the weight of the i th VOC compound (kilograms)

MW_i is the molecular weight of the i th VOC compound (kilograms per kilogram mole)

W_w is the weight of the water (kilograms)

MW_w is the molecular weight of the water (kilograms per kilogram mole)

W_{NVOCj} is the weight of the j th organic compound included in the VOC exclusion list in s. NR 400.02 (162) (kilograms)

MW_{NVOCj} is the molecular weight of the j th organic compound included in the VOC exclusion list in s. NR 400.02 (162) (kilograms per kilogram mole)

P_{total} is the total vapor pressure of the mixture at 20°C (mm Hg)

VP_i is the vapor pressure of i th VOC compound at 20°C (mm Hg)

(11r) "VOC content" means the weight of VOC per volume of solvent or solvent solution and shall be calculated by the following equation:

$$VOC \text{ content} = \left[\frac{W_s - W_w - W_{NVOC}}{V_s} \right]$$

where:

VOC content is in kilograms of VOC per liter of solvent or solvent solution (pounds per gallon)

W_s is the weight of solvent or solvent solution in kilograms (pounds)

W_w is the weight of water in kilograms (pounds)

W_{NVOC} is the weight of organic compounds included in the VOC exclusion list in s. NR 400.02 (162) in kilograms (pounds)

V_s is the volume of solvent or solvent solution in liters (gallons)

(12) "Wipe cleaning" means the cleaning and removing of soils from the metal surfaces of a product or product component by manually wiping the surfaces with solvent using a porous applicator while maintaining the solvent below its boiling point.

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; renum. (9) and (10) to be (10) and (11) and am. (10), cr. (9) and (12), Register, August, 1994, No. 464, eff. 9-1-94; am. (intro.), Register, December, 1995, No. 480, eff. 1-1-96; renum. (3), (3m), (4) and (8) to be s. NR 400.02 (22v), (26o), (26q) and (60s); cr. (1), (1g), (1r), (5g), (5r), (7m), (8) to (8x), (9c) to (9w), (10g), (10r), (11g) and (11r), Register, January, 2001, No. 541, eff. 2-1-01.

NR 423.03 Solvent metal cleaning. (1) APPLICABILITY.

Except as provided in sub. (8), 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 final compliance deadline of May 1, 1988, except as provided in sub. (8), to conveyORIZED non-vapor degreasing operations and, under the compliance provisions of sub. (8) (c), to wipe cleaning operations.

Note: Owners and operators of solvent cleaning operations should refer to sub. (2)(h) and (i) and ch. NR 469.

(2) EXEMPTIONS. The owner or operator of any facility located in Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and which claims to be exempt under this subsection from any requirement of subs. (3) to (7) shall comply with the recordkeeping requirements of sub. (10). The following exemptions apply to the source categories indicated:

(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 VOCs are not more than 6.8 kilograms (15 pounds) in any one day provided the following conditions are met:

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

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 all of the following conditions are met:

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

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

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

(c) An individual cold cleaner which is:

1. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties and which has an open area smaller than 0.10 square meter (1.1 square feet) is exempt from the requirements of sub. (3) (b) to (g).

2. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties is exempt from the requirements of sub. (3) (h), (i) and (j).

3. Located inside Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and which has an open area smaller than 0.10 square meter (1.1 square feet), and to which not more than 5.7 liters (1.5 gallons) of solvent is added per day, is exempt from the requirements of sub. (3) (b) to (j).

(d) An individual open top vapor degreaser which is:

1. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties and which has an open area smaller than 1.0 square meter (10.8 square feet) is exempt from the requirements of sub. (4) (c).

2. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties is exempt from the requirements of sub. (4) (n) to (q).

3. Located inside Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and which has an open area smaller than 1.0 square meter (10.8 square feet), and whose emissions of VOCs are not more than 6.8 kilograms (15 pounds) in any one day, is exempt from the requirements of sub. (4) (c), (n), (o) and (p).

(e) An individual conveyorized vapor degreaser which is:

1. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties and which has an open area smaller than 2.0 square meters (21.6 square feet) is exempt from the requirements of sub. (5) (c).

2. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties is exempt from the requirements of sub. (5) (h), (i) and (j).

3. Located inside Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and which has an open area smaller than 2.0 square meters (21.6 square feet), and whose emissions of VOCs are not more than 6.8 kilograms (15 pounds) in any one day, is exempt from the requirements of sub. (5) (c).

(f) An individual conveyorized non-vapor degreaser which is:

1. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties and which has a total horizontal solvent-air interface smaller than 2.0 square meters (21.6 square feet), where such an interface exists, is exempt from the requirements of sub. (6) (a) 2.

2. Located outside of Brown, Calumet, Dane, Dodge, Door, Fond du Lac, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago counties is exempt from sub. (6) (a) 2.

3. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties is exempt from the requirements of sub. (6) (a) 8. and 9.

4. Located inside Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and which has an open area smaller than 2.0 square meters (21.6 square feet), and whose emissions of VOCs are not more

than 6.8 kilograms (15 pounds) in any one day, is exempt from the requirements of sub. (6) (a) 2.

(g) An individual wipe cleaning operation which is:

1. Located outside of Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties is exempt from the requirements of this section.

2. Located inside Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county and whose emissions of VOCs are not more than 6.8 kilograms (15 pounds) in any one day is exempt from the requirements of sub. (7) (d).

(h) This section does not apply to solvent metal cleaning operations using only cleaning solvents that have a VOC content of 2.0% or less by volume.

(i) This section does not apply to any individual cold cleaning, batch vapor degreasing or conveyorized degreasing operation that is subject to ch. NR 469.

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

(a) Equip the cleaner with a cover.

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

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

2. The solvent is agitated.

3. The solvent is heated.

(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.

(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 above 49°C (120°F):

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

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

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

(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.

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

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

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

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

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.

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

(h) Design the cover so that it is either a roll-top cover, a canvas curtain cover, a guillotine (biparting) cover, or any other type of cover that slides off the degreaser in a horizontal motion and is designed such that it can be opened or closed without disturbing

the vapor layer or the solvent surface if any of the following applies:

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

(i) If freeboard is chosen as a control device under par. (d), design or modify the freeboard to give a freeboard ratio greater than or equal to 1.0.

(j) If a system of equivalent control is chosen under par. (d) 3., the level of control shall be equivalent to that achieved under a freeboard ratio of 1.0.

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

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

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

(c) Install and use one of the following control devices:

1. Except when par. (o) applies, a freeboard ratio equal to or greater than 0.75 for all degreasers, with a powered or mechanically assisted cover for any degreaser with an opening which is greater than 1.0 square meter (10.8 square feet).
2. Refrigerated freeboard chiller.
3. Enclosed design (cover or door opens only when the dry part is actually entering or exiting the degreaser).
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.
5. A control system demonstrated to have control efficiency equivalent to or greater than any of subds. 1. to 4. and approved by the department.

(d) Position any ventilation fans so that they do not disturb the degreaser's vapor zone, and limit exhaust ventilation to 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 a higher exhaust rate is necessary to meet OSHA requirements.

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

(f) Always spray below the vapor level.

(g) Minimize solvent carryout by doing all of the following:

1. Racking parts to allow complete drainage.
2. Moving parts in and out of the degreaser at less than 3.3 meters per minute (11 feet per minute).
3. Holding the parts in the vapor zone at least 30 seconds or until condensation ceases.
4. Tipping out any pools of solvent on the cleaned parts before removal from the vapor zone.
5. Allowing parts to dry within the degreaser for at least 15 seconds or until visually dry.

(h) Prevent porous or absorbent materials, such as cloth, leather, wood or rope, from entering the degreaser.

(i) Move parts in and 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.

(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.

(k) Operate the degreaser in a manner that prevents water from being visually detectable in solvent exiting the water separator.

(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 (q) if applicable, and provide supervision or instruction adequate to ensure that the procedures are followed.

(n) Equip the vapor degreaser with an enclosed design, such that the cover or door opens only when the dry part is actually entering or exiting the degreaser, that is either a roll-top cover, a canvas curtain cover, a guillotine (biparting) cover, or any other type of cover that slides off the degreaser in a horizontal motion and is designed such that it can be opened or closed without disturbing the vapor layer or the solvent surface, and if the degreaser opening is greater than 2.0 square meters (21.6 square feet), then design the cover to be an automated, powered or mechanically assisted sliding cover.

(o) Under par. (c), if par. (c) 1. is chosen, design or modify the freeboard to give a freeboard ratio equal to or greater than 1.0.

(p) If a system of equivalent control is chosen under par. (c) 5., the level of control shall be equivalent to that achieved under a freeboard ratio of 1.0.

(q) At startup, turn on the refrigerated condenser and the refrigerated freeboard chiller either simultaneously with or before turning on the sump heater. At shutdown, turn off the sump heater either simultaneously with or before turning off the refrigerated condenser and refrigerated freeboard chiller.

(5) CONVEYORIZED VAPOR DEGREASERS. Except as provided under sub. (2) (a), (b), (e), (h) and (i), the owner or operator of a conveyORIZED vapor degreaser shall do all of the following:

(a) 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.

(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.
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.
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.

(c) Install and use one of the following control devices:

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

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

(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.

(f) Minimize carryout emissions by doing all of the following:

1. Using a drying tunnel, rotating (tumbling) basket or their equivalent.
2. Racking parts for best drainage.
3. Maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute).

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

(h) Minimize entrance and exit openings during operation so that no opening dimension exceeds the smallest physically possible by more than 10 centimeters (4 inches) or by more than 10% of the opening dimension, whichever is smaller.

(i) At startup, turn on the refrigerated condenser and the refrigerated freeboard chiller either simultaneously with or before turning on the sump heater. At shutdown, turn off the sump heater either simultaneously with or before turning off the refrigerated condenser and refrigerated freeboard chiller.

(j) 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.

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

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.

- b. A system, demonstrated to have a control efficiency equivalent to or greater than that described in subd. 2. 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 startup.

5. Minimize carryout emissions by:

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

- 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.

7. Repair solvent leaks immediately, or shut down the degreaser and drain it of all solvent until the leaks are repaired.

8. Minimize entrance and exit openings during operation so that no opening dimension exceeds the smallest physically possible by more than 10 centimeters (4 inches) or by more than 10% of the opening dimension, whichever is smaller.

9. Provide a permanent, conspicuous label, summarizing the operating procedures of subs. 4. to 7., and provide supervision or instruction adequate to ensure that the procedures are followed.

(b) *Compliance schedule.* The owner or operator of a conveyORIZED non-vapor degreaser subject to the control requirements of par. (a) 2. shall achieve final compliance on or before May 1, 1988.

(7) WIPE CLEANING. Except as provided under sub. (2) (b), (g) and (h), the owner or operator of a wipe cleaning operation shall do all of the following:

- (a) Immediately after use, place all rags, or any other porous materials used to apply solvent, in a covered container that is labeled as waste solvent, and handled in accordance with local, state and federal regulations.

- (b) Store waste solvent only in covered containers labeled as waste solvent and handled in accordance with local, state and federal regulations.

- (c) Follow operating procedures which prevent solvent from dripping from the applicator during solvent application.

- (d) Install and operate one of the following emission control systems:

1. A vapor collection system that includes a carbon adsorption system demonstrated to have at least a 90% capture efficiency, and a 90% control efficiency as measured across the carbon adsorption equipment and averaged over a complete adsorption cycle.

2. Use of a solvent with a volatility of less than 2 kPa (0.3 psia) measured at 38°C (100°F).

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

(e) Provide a permanent, conspicuous label, summarizing the operating procedures of pars. (a) to (c), and provide supervision or instruction adequate to ensure that the procedures of pars. (a) to (c) are followed.

(8) COMPLIANCE SCHEDULE. This subsection applies only to facilities located in Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties.

(a) *Previously regulated operations.* 1. This paragraph applies only to a facility which is in existence on September 1, 1994 and which:

- a. Prior to September 1, 1994 was subject to all requirements of sub. (3), (4), (5) or (6).

- b. Is subject to sub. (3) (h), (i) or (j), (4) (n) to (q), (5) (h), (i) or (j), or (6) (a) 8. or 9. as of September 1, 1994.

2. The owner or operator of any source identified under subd. 1. shall:

- a. Remain in compliance with all requirements of sub. (3), (4), (5) or (6) to which the owner or operator was subject prior to September 1, 1994.

- b. Achieve final compliance with the requirements of sub. (3) (h), (i) or (j), (4) (n) to (q), (5) (h), (i) or (j), or (6) (a) 8. or 9. as soon as practicable, but no later than May 15, 1995.

(b) *Previously exempt operations.* 1. This paragraph applies only to a facility which is in existence on September 1, 1994 and which is subject to requirements under sub. (3) (b) to (g), (4) (c), (5) (c) or (6) (a) 2. as of September 1, 1994 and which prior to September 1, 1994 was exempt from the requirements of sub. (3) (b) to (g) under sub. (2) (c), from the requirements of sub. (4) (c) under sub. (2) (d), from the requirements of sub. (5) (c) under sub. (2) (e), or from the requirements of sub. (6) (a) 2. under sub. (2) (f).

2. The owner or operator of any source identified under subd. 1. shall achieve final compliance with the applicable requirements as soon as practicable, but no later than September 15, 1995.

(c) *Wipe cleaning operations.* 1. This paragraph applies only to a facility which is in existence on September 1, 1994 and which is subject to the requirements of sub. (7) as of September 1, 1994.

2. The owner or operator of any source identified under subd. 1. shall achieve final compliance with the requirements of sub. (7) as soon as practicable, but no later than May 15, 1996.

(9) EQUIVALENT CONTROL. Any equivalent control system approved by the department under sub. (3) (d) 3. or (j), (4) (c) 5. or (p), (5) (c) 3., (6) (a) 2. b. or (7) (d) 3. shall be submitted to, and will not become effective for federal purposes until approved by, the administrator as a source-specific revision to the department's state implementation plan for ozone.

(10) RECORDKEEPING. This subsection applies only to facilities located in Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county. As of September 1, 1994, each owner or operator of a degreasing operation that is exempt from the requirements of subs. (3) to (7), under sub. (2) (c) to (g), shall collect and record the information specified in this paragraph, as appropriate to support the exemption. The following information shall be maintained on the facility premises for a minimum of 3 years and shall be made available upon request to an authorized department representative at any time during normal working hours:

(a) A unique name or identification number for each degreaser or wipe cleaning operation.

(b) The volume of solvent used or added per day for each individual degreaser or wipe cleaning operation, in units of gallons.

(c) The VOC emissions, in units of pounds or kilograms per day, from each individual degreaser or wipe cleaning operation.

(d) The density of the solvent used, in units of pounds per gallon.

(e) The VOC content of the solvent, expressed as percent by volume.

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; am. (2) (a) 1. and (f), a. (7), Register, December, 1993, No. 456, eff. 1-1-94; am. (1), (2) (a) (intro.), (3) (a) (intro.) and (g) 4., (4) (intro.), (c) 2., (i) and (m), (5) (intro.), (c) 1. and (g), (6) (a) (intro.) and 7., renum. (7) to be (9) and am., cr. (2) (intro.), (g), (h), (3) (h) to (j), (4) (n) to (q), (5) (h) to (j), (6) (a) 8. and 9., (7), (8) and (10), r. and recr. (2) (c) to (f), Register, August, 1994, No. 464, eff. 9-1-94; am. (4) (a) (intro.) and (m), (5) (intro.), (6) (a) (intro.) and (b) (intro.) and (9), r. (6) (b) 1. to 5., Register, December, 1995, No. 480, eff. 1-1-96; am. (1), (2) (intro.), (a) (intro.), (b) (intro.), (3) (intro.), (b) (intro.), (g) (intro.), (h) (intro.), (4) (g) (intro.), (5) (f) (intro.), (6) (a) (intro.), (7) (intro.), (8) (b) 1. (intro.), r. (8) (b) 1. a. to d., Register, December, 1996, No. 492, eff. 1-1-97; cr. (2) (i) and am. (3) (intro.), (4) (intro.), (5) (intro.) and (6) (a) (intro.), Register, March, 1997, No. 495, eff. 4-1-97; am. (2) (g) 2., (4) (c) (intro.), 1., (d), (h), (k), (5) (c) (intro.) and (7) (c), Register, October, 1999, No. 526, eff. 11-1-99.

NR 423.035 Industrial cleaning operations.

(1) APPLICABILITY. (a) Except as provided in sub. (9) (a), this section applies to industrial cleaning operations at facilities that are located in Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha county and have maximum theoretical emissions of VOCs from the facility, excluding any maximum theoretical emissions of VOCs specifically subject to s. NR 419.05, 419.06 or 419.08, ch. NR 420, 421 or 422, or s. NR 423.03, 423.05, 424.04 or 424.05, of 25 tons per year or more.

Note: To determine the maximum theoretical emissions of VOCs from a facility, excluding any maximum theoretical emissions of VOCs specifically subject to the cited provisions, use the following procedure. 1. Calculate the maximum theoretical emissions of VOCs from the facility. 2. Calculate the maximum theoretical emissions of VOCs from the facility subject to s. NR 419.05, 419.06 or 419.08, ch. NR 420, 421 or 422, or s. NR 423.03, 423.05, 424.04 or 424.05. 3. Subtract the emissions calculated in step 2 from the emissions calculated in step 1. 4. If the quantity calculated in step 3 is less than 25 tons per year, then the only requirements of this section that apply to the facility are the recordkeeping requirements of sub. (9)(a).

(b) Except as provided in sub. (9) (a), this section applies to industrial cleaning operations at facilities that are located in Kewaunee, Manitowoc or Sheboygan county and have maximum theoretical emissions of VOCs from the facility, excluding any maximum theoretical emissions of VOCs specifically subject to s. NR 419.05, 419.06 or 419.08, ch. NR 420, 421 or 422, or s. NR 423.03, 423.05, 424.04 or 424.05, of 100 tons per year or more.

Note: To determine the maximum theoretical emissions of VOCs from a facility, excluding any maximum theoretical emissions of VOCs specifically subject to the cited provisions, use the following procedure. 1. Calculate the maximum theoretical emissions of VOCs from the facility. 2. Calculate the maximum theoretical emissions of VOCs from the facility subject to s. NR 419.05, 419.06 or 419.08, ch. NR 420, 421 or 422, or s. NR 423.03, 423.05, 424.04 or 424.05. 3. Subtract the emissions calculated in step 2 from the emissions calculated in step 1. 4. If the quantity calculated in step 3 is less than 100 tons per year, then the only requirements of this section that apply to the facility are the recordkeeping requirements of sub. (9)(a).

(2) EXEMPTIONS. If an exemption level in this subsection is exceeded, the exemption will no longer apply to the facility. Exemptions include the following:

(a) This section does not apply to:

1. Operations regulated under s. NR 421.06 (2) (c), 422.095 (6), 422.142 (2) (c), 422.145 (2) (d), 422.15 (8), 422.155 (3) or 423.03.

2. Stripping of cured coatings, cured inks or cured adhesives.

3. Cleaning operations in graphic arts pre-press areas including the cleaning of film processors, color scanners or plate processors, or film cleaning and plate cleaning.

(b) Subsection (3) does not apply to any of the following:

1. Cleaning conducted in conjunction with performance laboratory tests on coatings, adhesives or inks; research and development programs; and laboratory tests in quality assurance laboratories.

2. Cleaning of electrostatic printing and coating application equipment.

3. Medical device and pharmaceutical manufacturing facilities using less than a total of 1.5 gallons per day of VOC-containing solvents and solvent solutions for industrial cleaning operations.

4. Facilities where the aggregate use of solvent and solvent solutions which do not comply with the applicable VOC content limits in sub. (3) and of any coatings and inks exempt under s. NR 422.03 (7) does not exceed 55 gallons during any 12 consecutive months at the facility.

(c) Subsections (3) and (7) do not apply to cleaning with aerosol product if 160 fluid ounces or less of VOC-containing aerosol product are used per day for industrial cleaning operations, per facility.

(d) Subsection (7) does not apply to cleaning with solvents or solvent solutions in spray bottles or containers described in sub. (4) (b).

(e) Subsection (7) does not apply to the cleaning of the nozzle tips of automated spray equipment systems except for robotic systems that can be programmed to spray into a closed container.

(f) Subsection (7) does not apply to automatically applied blanket or roller wash.

(g) Subsections (4) to (8) do not apply to cleaning using solvents or solvent solutions containing no more than 0.05 kilograms of VOC per liter.

(3) SOLVENT AND SOLVENT SOLUTION REQUIREMENTS. Except as provided under sub. (6), no owner or operator of a facility may cause, allow or permit the use of a solvent or solvent solution for industrial cleaning operations on or after January 1, 2002 unless the VOC content of the solvent or solvent solution is less than or equal to the applicable VOC content listed in Table 1.

Table 1
VOC Content Limits for Solvents and Solvent Solutions Used in Industrial Cleaning Operations

Cleaning Activity	VOC Content of Solvent or Solvent Solution in kilograms per liter (pounds per gallon)
(a) Product cleaning during manufacturing process or surface preparation for coating, adhesive or ink application	
1. General	0.05 (0.42)
2. Electrical apparatus components and electronic components	0.50 (4.2)
3. Laminated wood products – removal of contact adhesives	
a. General	0.46 (3.8)
b. Polyvinylchloride surfaces	0.70 (5.8)
4. Medical devices and pharmaceuticals	0.80 (6.7)
5. Screen printing – removal of adhesives from plastic substrates	0.77 (6.4)
(b) Repair and maintenance cleaning	
1. General	0.05 (0.42)
2. Electrical apparatus components and electronic components	0.90 (7.5)
3. Medical devices and pharmaceuticals	
a. Tools, equipment and machinery	0.80 (6.7)
b. General work surfaces	0.60 (5.0)
4. Screen printing – removal of oils and adhesives from cutting dies	0.55 (4.6)
(c) Cleaning of coatings application equipment or adhesives application equipment	
1. General	0.55 (4.6)
2. Architectural coatings	0.95 (7.9)
3. Ultraviolet coatings	0.80 (6.7)
(d) Cleaning of ink application equipment	
1. General	0.05 (0.42)
2. Flexographic printing	
a. General	0.05 (0.42)
b. Plastics, coated papers and metal foils	0.89 (7.4)
3. Rotogravure printing	
a. Publication	0.75 (6.3)
b. Packaging	0.05 (0.42)
4. Lithographic or letterpress printing	
a. On-press components	*
b. Removable press components	0.05 (0.42)
5. Screen printing	0.77 (6.4)
6. Ultraviolet ink application equipment (except screen printing)	0.80 (6.7)
(e) Cleaning of polyester resin application equipment	0.05 (0.42)

* A maximum VOC content of 30% by weight.

(4) CLEANING DEVICES AND METHODS REQUIREMENTS. Except as provided under sub. (6), on or after January 1, 2002, the owner or operator of a facility shall employ one or more of the following cleaning devices or methods when using solvents or solvent solutions:

(a) Physically rubbing a surface with a porous applicator such as a rag, paper, sponge or a cotton swab moistened with solvent or solvent solution.

(b) Closed containers or hand held spray bottles from which solvents or solvent solutions are applied without a propellant-induced force.

(c) Cleaning equipment which has a solvent or solvent solution container that is closed during cleaning operations, except when depositing and removing objects to be cleaned, and is closed during non-operation with the exception of maintenance and repair to the cleaning equipment itself.

(d) A remote reservoir cleaner operated in compliance with all of the following requirements:

1. Solvent vapors are prevented from escaping from the solvent or solvent solution container by using devices such as a cover or a valve when the remote reservoir is not being used, cleaned or repaired.

2. Flow is directed in a manner that prevents solvent or solvent solution from splashing outside of the remote reservoir cleaner.

3. The cleaner is not used for cleaning porous or absorbent materials, such as cloth, leather, wood or rope.

4. Only solvent or solvent solution containers free of all liquid leaks are used. Auxiliary equipment, such as pumps, pipelines or flanges, may not have any liquid leaks, visible tears or cracks. Any liquid leak, visible tear or crack detected shall be repaired within one calendar day, or the leaking section of the remote reservoir cleaner shall be drained of all solvents or solvent solutions and shut down until it is replaced or repaired.

(e) A non-atomized flow method where the used solvents or solvent solutions are collected in a container or a collection system which is closed, except for the solvent or solvent solution collection openings that may be open when filling or emptying, or the opening caused by use of a pressure relief valve.

(f) A flushing method where the used solvents or solvent solutions are discharged into a container which is closed, except for the solvent or solvent solution collection openings that may be open when filling or emptying, or the opening caused by use of a pressure relief valve. The discharged solvents or solvent solutions shall be collected into containers without atomizing into the open air.

(5) STORAGE AND DISPOSAL. The owner or operator of a facility shall store all solvents or solvent solutions used in industrial cleaning operations in non-absorbent, non-leaking containers which shall be kept covered except when filling or emptying. Cloth and paper moistened with solvents or solvent solutions shall be stored in covered, non-absorbent, non-leaking containers.

(6) CONTROL EQUIPMENT. In lieu of complying with the requirements in sub. (3) or (4), the owner or operator of a facility may use a VOC emission control system to control VOC emissions from the industrial cleaning operations at the facility provided one of the following requirements is met:

- (a) The emission control system has an overall emission reduction efficiency of 85% for VOC emissions as determined in accordance with s. NR 439.06 (3) (am).

- (b) The emission control system has a VOC capture efficiency of 90% and an output of VOC emissions of less than 50 ppm calculated as carbon, not including methane and ethane, with no dilution, as determined in accordance with s. NR 439.06 (3) (a).

- (c) The emission control system meets the requirements of the applicable source specific rule in chs. NR 420 to 422.

(7) GENERAL PROHIBITIONS. The owner or operator of a facility may not atomize any solvent or solvent solution unless the resulting VOC emissions are controlled by an air pollution control system that meets one of the requirements of sub. (6).

(8) ALTERNATIVE COMPLIANCE OPTION. In lieu of complying with the requirements in sub. (3), the owner or operator of a facility may use solvents or solvent solutions for industrial cleaning operations which have a VOC composite partial vapor pressure of less than or equal to 10 mm of Hg at 20°C.

(9) RECORDKEEPING REQUIREMENTS. (a) To determine applicability under sub. (1), each owner or operator of an industrial cleaning operation at a facility located in Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county shall maintain records of the maximum theoretical emissions of VOCs from the facility excluding any maximum theoretical emissions of VOCs specifically subject to s. NR 419.05, 419.06 or 419.08, ch. NR 420, 421 or 422, or s. NR 423.03, 423.05, 424.04 or 424.05.

(b) Each owner or operator of a facility that is exempt under sub. (2) shall collect and record the information specified in this paragraph as appropriate:

1. Any owner or operator claiming to be exempt under sub. (2) (b) 3. shall maintain records of the daily quantity in gallons of VOC-containing solvents and solvent solutions used for industrial cleaning operations.

2. Any owner or operator claiming to be exempt under sub. (2) (b) 4. shall maintain records of the amount used in gallons of non-compliant solvents and solvent solutions and the amount used in gallons of any coatings and inks exempt under s. NR 422.03 (7) during any 12 consecutive months at a facility.

3. Any owner or operator claiming to be exempt under sub. (2) (c) shall maintain records of the daily quantity in fluid ounces of VOC-containing aerosol product used for industrial cleaning operations.

4. Any owner or operator claiming to be exempt under sub. (2) (g) shall maintain a record of the VOC contents of the solvents or solvent solutions used in kilograms per liter or pounds per gallon.

(c) Each owner or operator of a facility that is subject to this section shall collect and record the information specified in this paragraph as appropriate:

1. Any owner or operator subject to sub. (3) shall maintain a record of the VOC contents of the solvents or solvent solutions used in industrial cleaning operations in kilograms per liter, pounds per gallon or weight percent.

2. Any owner or operator subject to sub. (6) shall keep a record of the results of any testing conducted as required under sub. (6).

3. Any owner or operator subject to sub. (8) shall keep a record of the VOC composite partial vapor pressures of solvents or solvent solutions used in industrial cleaning operations.

(d) Records required under this subsection shall be kept for five years unless another time period is approved by the department.

History: Cr. Register, January, 2001, No. 541, eff. 2-1-01; **CR 02-097: am. (1) Register June 2004 No. 582, eff. 7-1-04, correction in (9) (a) made under s. 13.93 (2m) (b) 7. stats., Register June 2004 No. 582.**

NR 423.04 Perchloroethylene dry cleaning. History: Renum. from NR 154.13 (6) (b) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, December, 1993, No. 456, eff. 1-1-94; am. (3) (a) 1., renum. (3) (a) 2. to be (3) (a) 3., cr. (3) (a) 2., Register, June, 1995, No. 474, eff. 7-1-95; am. (3) (intro.), (a) (intro.), Register, December, 1996, No. 492, eff. 1-1-97; **CR 02-097: r. Register June 2004 No. 582, eff. 7-1-04.**

NR 423.05 Liquid VOC solvent dry cleaning.

(1) APPLICABILITY. This section applies to liquid VOC solvent washers, dryers, solvent filters, settling tanks, vacuum stills, piping, ductwork, pumps, storage tanks, and other containers and conveyors of liquid VOC solvent that are used in a liquid VOC solvent dry cleaning facility which has maximum theoretical emissions of VOCs from the facility greater than or equal to one of the following:

- (a) 25 tons per year for a facility which is located in the county of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha.

- (b) 100 tons per year for a facility which is located in the county of Door, Kewaunee, Manitowoc, Sheboygan or Walworth.

(2) REQUIREMENTS. (a) The owner or operator of a liquid VOC solvent dry cleaning facility shall limit VOC emissions from each liquid VOC 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 liquid VOC 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 liquid VOC 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.

(3) COMPLIANCE SCHEDULES. The requirements of this section are applicable on startup except that a petroleum liquid dry cleaning facility in existence on January 1, 1994 and which was not subject to this section prior to January 1, 1994 shall 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: 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; renum. (1) to be (1) (intro.) and am., cr. (1) (a) and (b) and (3), Register, December, 1993, No. 456, eff. 1-1-94; am. (1), (2), (3) (a), Register, December, 1996, No. 492, eff. 1-1-97; CR 02-146: am. (1) (intro.), (2) and (3) Register October 2003 No. 574, eff. 11-1-03; **correction in (3) made under s. 13.93 (2m) (b) 7., Stats., Register June 2004 No. 582.**