

## Chapter NR 422

**CONTROL OF ORGANIC COMPOUND EMISSIONS FROM  
SURFACE COATING, PRINTING AND ROAD SURFACING  
PROCESSES**

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**NR 422.01 Applicability; purpose.** (1) **APPLICABILITY.** This chapter applies to all surface coating and printing process air contaminant sources and to all owners or operators of a surface coating or printing process air contaminant source.

(2) **PURPOSE.** This chapter is adopted under ss. 144.31 and 144.38, Stats., to categorize organic compound emissions from surface coating and printing processes into separate volatile 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.

**NR 422.02 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.

(1) "Air dried coating" means coatings which are dried by the use of air or forced warm air. Forced warm air includes processes whereby the coated object is heated above ambient temperature up to a maximum of 90°C (194°F) to decrease drying time.

(2) "Application area" means the area where a coating is applied by spraying, dipping or flow coating techniques.

(3) "Asphalt" means a dark-brown to black cementitious material (solid, semisolid, or liquid in consistency) in which the predominating constituents are bitumens which occur in nature as such or which are obtained as residue in refining petroleum.

(4) "Baseline transfer efficiency" means the typical transfer efficiency, as defined by the department, for a specific operation in an industry.

(5) "Blade coating" means the application of a coating material to a substrate by means of drawing the substrate beneath a straight-edged blade that spreads the coating evenly over the full width of the substrate.

(6) "Capture efficiency" means the weight per unit time of an air contaminant entering a capture system and delivered to a control device

divided by the weight per unit time of the air contaminant generated by the source, expressed as a percentage.

(7) "Class II hardboard paneling finish" means finishes which meet the specifications of Voluntary Product Standard PS-59-73 as approved by the American National Standards Institute.

Note: See National Bureau of Standards, Voluntary Product PS-59-73, "Prefinished Hardwood Paneling." Copies of this document are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin and may be obtained from National Bureau of Standards, Washington, D.C. 20234.

(8) "Clear coat" means a coating which lacks color and opacity or is transparent and uses the undercoat as a reflectant base or undertone color.

(9) "Coating applicator" means a device or devices used at a single location in a coating line to apply a surface coating of a particular material.

(10) "Coating line" means one or more apparatus or operations, which may include a coating applicator, flashoff area, and oven, wherein a surface coating is applied, dried, or cured.

(11) "Coil coating" means the coating of any flat metal sheet or strip that comes in rolls or coils.

(12) "Cutback asphalt" means asphalt cement which has been liquefied by blending with petroleum solvents (diluent) other than residual oils. Upon exposure to atmospheric conditions the diluents evaporate, leaving the asphalt cement to perform its function. Asphalt which contains less than 5% by weight petroleum solvents (disregarding any residual oils added) is not included in this definition.

(13) "End sealing compound" means a synthetic rubber compound which is coated onto can ends and which functions as a gasket when the end is assembled on the can.

(14) "Exterior base coating" means a coating applied to the exterior of a can to provide exterior protection to the metal and to provide background for the lithographic or printing operation.

(15) "Extreme performance coatings" means coatings designed for harsh exposure or exposure to one or more of the following: the weather all of the time, temperatures consistently above 95°C, detergents, abrasive and scouring agents, solvents, corrosive atmospheres, or similar environmental conditions.

(16) "Fabric coating" means the coating or printing of a textile substrate with a blade, roll, rotogravure or dip coater, or other coating applicator, to impart properties that are not initially present, such as strength, stability, water or acid repellancy, or appearance.

(17) "Flashoff area" means the space between the application area and the oven.

(18) "Flexographic printing" means the application of words, designs or pictures to a substrate by means of a roll printing technique in which the pattern to be applied is raised above the printing roll and the image carrier is made of rubber or other elastomeric materials.

(19) "Furniture metal coating" means the surface coating of any furniture made of metal or any metal part which will be assembled with other metal, wood, fabric, plastic or glass parts to form a furniture piece.

(20) "Hardboard" means a panel manufactured primarily from interfelted ligno-cellulosic fibers which are consolidated under heat and pressure in a hot press.

(21) "Hardwood plywood" means a plywood whose surface layer is a veneer of hardwood.

(21m) "High performance architectural coatings" means a coating which meets the requirements specified in Architectural Aluminum Manufacturer's Association publication number AAMA 605.2-1985, incorporated by reference in ch. NR 484.

(22) "Interior sheet base coating" means a coating applied by roller coater or spray to the interior side of sheets from which cans are formed to provide a protective lining between the can metal and product.

(23) "Interior body spray" means a coating sprayed on the interior of the can body to provide a protective film between the product and the can.

(24) "Large appliances" means doors, cases, lids, panels and interior support parts of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dishwashers, trash compactors, air conditioners and other similar products. Not included are products of such weight that they are normally lifted only with powered lifting equipment or products which are intended to be permanently fastened in place.

(24m) "Leather coating" means the coating of any raw or processed leather material with a roll coater, spray system, or other coating applicator to impart or enhance properties such as strength, stability, water or acid repellency, color or appearance.

(25) "Low solvent coating or ink" means a coating or ink which contains less organic solvent than the conventional coatings used by the particular industry. Low solvent coatings or inks include water-borne, higher solids, electrodeposition and powder coatings or inks.

(26) "Magnet wire coating" means the process of applying a coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

(27) "Manufacturing plant" means a facility where parts are manufactured, finished or assembled for eventual inclusion into a finished product ready for sale to retailers. With respect to the manufacture of motor vehicles, customizers, body shops and other repainters are not included in this definition.

(28) "Natural finish hardwood plywood panels" means panels whose original grain pattern is enhanced by essentially transparent finishes which may be supplemented by fillers and toners.

(29) "Oven" means, for the purpose of surface coating, a chamber within which heat is used to bake, cure, polymerize, or dry a surface coating.

(30) "Overvarnish" means a coating applied directly over ink to reduce the coefficient of friction, to provide gloss and to protect the finish against abrasion and corrosion.

(31) "Packaging rotogravure printing" means rotogravure printing upon paper, paper board, metal foil, plastic film, or other substrates, which in subsequent operations are formed into packaging products or labels for articles to be sold.

(32) "Paper coating" means application of the uniform coatings put on paper and pressure sensitive tape regardless of substrate. Related web coating processes on plastic fibers and on metal foil are included in this definition but processes such as printing where the coating is not uniform across the web are not included.

(33) "Penetrating prime coat" means an application of low-viscosity liquid asphalt to an absorbent surface to prepare it for an asphalt surface.

(34) "Prime coat" means the first film of coating applied to a product in a multiple-coat surface coating operation.

(35) "Printed interior panels" means panels whose grain or natural surface is obscured by fillers and basecoats upon which a simulated grain or decorative pattern is printed.

(36) "Publication rotogravure printing" means rotogravure printing upon paper which is subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements, and other types of printed materials.

(37) "Quench area" means a chamber where the hot metal exiting the oven is cooled by either a spray of water or a blast of air followed by water cooling.

(38) "Roll coating" means the application of a coating material to a substrate by means of hard rubber or steel rolls.

(39) "Roll printing" means the application of words, designs or pictures to a substrate, usually by means of a series of hard rubber or steel rolls each with only partial coverage.

(40) "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is transferred to the substrate from the recessed areas on the coating roll.

(41) "Rotogravure printing" means the application of words, designs or pictures to a substrate by means of a roll printing technique which involves an intaglio or recessed image areas in the form of cells.

(42) "Single coat" means a single film of coating applied directly to a metal substrate, omitting the primer application.

(43) "Surface coating" means the application of a coating to a product in a coating line.

(44) "Thin particleboard" means a manufactured board 0.64 centimeters ( $\frac{1}{4}$  inch) or less in thickness made of individual wood particles which have been coated with a binder and formed into flat sheets by pressure.

(45) "Three-piece can side-seam spray" means a coating sprayed on the exterior and interior of a welded, cemented or soldered seam to protect the exposed metal.

(46) "Tileboard" means paneling that has a colored waterproof surface coating.

(47) "Topcoat" means the final film of coating applied in a multiple coat operation.

(48) "Transfer efficiency" means the portion of coating solids which adheres to the surface being coated during the application process, expressed as a percentage of the total volume of coating solids delivered to the applicator.

(49) "Two-piece can exterior end coating" means a coating applied by roller coating or spraying to the exterior end of a can to provide protection to the metal.

(50) "Vinyl coating" means applying a decorative or protective topcoat or printing on vinyl coated fabric or vinyl sheets.

**History:** Renum. from NR 154.01, Register, September, 1986, No. 369, eff. 10-1-86; cr. (24m), Register, January, 1987, No. 373, eff. 2-1-87; cr. (21m), Register, July, 1988, No. 391, eff. 8-1-88.

**NR 422.03 Exemptions.** Sections NR 422.04 to 422.15 apply to any facility which contains one or more of the surface coating or printing process lines described in ss. NR 422.04 to 422.15 with the following exceptions:

(1) Surface coating process lines whose emissions of VOCs are never greater than 6.8 kilograms (15 pounds) in any one day, and never greater than 1.4 kilograms (3 pounds) in any one hour.

(2) Surface coating facilities covered under s. NR 422.15 which have total emissions of VOCs from all surface coating process lines, with all emission control equipment inoperative, of less than or equal to 10 tons per year.

(3) Surface coating facilities covered under ss. NR 422.05 to 422.08, 422.09 to 422.13 and 422.15 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 and which have total emissions of VOCs from the facility, with all emission control equipment inoperative, of less than or equal to 100 tons per year.

(4) Printing facilities covered under s. NR 422.14 which have total emissions of VOCs from the facility, with all emission control equipment inoperative, of less than or equal to 100 tons per year.

(5) Surface coating process sources used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance where:

(a) The operation of the source is not an integral part of the production process; and

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

(c) The exemption is approved in writing by the department.

(6) Leather surface coating facilities as described under s. NR 422.085 which are:

(a) Located outside the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha; or

(b) Located in the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington, or Waukesha, and which have total emissions of VOCs from the facility, with all emission control equipment inoperative of less than or equal to 100 tons per year.

History: Renum. from NR 154.13 (4) (a) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (3) and cr. (6), Register, January, 1987, No. 373, eff. 2-1-87.

**NR 422.04 Methods of compliance. (1) GENERAL METHODS.** The surface coating emission limitations shall be achieved by:

(a) The application of low solvent content coating technology; or

(b) A vapor recovery system which recovers the solvent for reuse; or

(c) Incineration or catalytic oxidation, provided that 90% of the nonmethane VOCs (VOC measured as total combustible carbon) which enter the incinerator or oxidation unit are oxidized to non-organic compounds; or

(d) An equivalent system or approach demonstrated to reliably control emissions to a level at or below the applicable emission limit and approved by the department.

**(2) HIGH TRANSFER EFFICIENCY COATING APPLICATION.** (a) Surface coating operations covered under ss. NR 422.09 to 422.11 and 422.15 have the added option of achieving compliance with the emission limitations through the use of a high transfer efficiency coating application system, either when used alone or in conjunction with low solvent content coating technology.

(b) Compliance under the option provided in this subsection must be demonstrated to the satisfaction of the department. This requires that:

1. The design, operation, and efficiency of the application system must be certified in writing by the owner or operator, and

2. The solvent usage per coated part for application system must be less than or equal to the solvent usage per coated part at the applicable emission limitation using baseline transfer efficiency.

**(3) CAPTURE SYSTEMS.** The design, operation, and efficiency of any capture system used in conjunction with sub. (1) (b), (c) or (d) shall be certified in writing by the owner or operator. The efficiency of the capture system shall be great enough to insure that the emission rate from the controlled line is less than or equal to an emission rate determined using the equation in s. NR 425.04 (3) (a) 3. The capture system is subject to approval by the department.

History: Renum. from NR 154.13 (4) (b) and am. Register, September, 1986, No. 369, eff. 10-1-86.

**NR 422.05 Can coating. (1) APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to coating applicators and ovens of Register, April, 1989, No. 400

**NR 422.10 Furniture metal coating.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the application areas, flashoff areas, and ovens of furniture metal coating lines involved in prime and topcoat or single coating operations. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a furniture metal coating line shall cause, allow, or permit the emission of any VOCs in excess of 0.36 kilograms per liter of coating (3.0 pounds per gallon), excluding water, delivered to each coating applicator from prime and topcoat or single coat operations.

**History:** Renum. from NR 154.13 (4) (h) and am. Register, September, 1986, No. 369, eff. 10-1-86.

**NR 422.11 Surface coating of large appliances.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to application areas, flashoff areas, and ovens of large appliance coating lines involved in single, prime, or topcoat coating operations. This section does not apply to:

(a) Sources exempted under s. NR 422.03; or

(b) The use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 0.95 liters (1 quart) in any one 8-hour period for any appliance coating line.

(2) **EMISSION LIMITATIONS.** No owner or operator of a large appliance coating line shall cause, allow or permit the emission of any VOCs in excess of 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to each coating applicator from single, prime, or topcoat coating operations.

**History:** Renum. from NR 154.13 (4) (i) and am. Register, September, 1986, No. 369, eff. 10-1-86.

**NR 422.12 Magnet wire coating.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the ovens of magnet wire coating operations. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATION.** No owner or operator of a magnet wire coating oven shall cause, allow or permit the emission of any VOCs in excess of 0.20 kilograms per liter of coating (1.7 pounds per gallon), excluding water, delivered to each coating applicator from magnet wire coating operations.

**History:** Renum. from NR 154.13 (4) (j) and am. Register, September, 1986, No. 369, eff. 10-1-86.

**NR 422.13 Flat wood panel coating.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the coating lines of flat wood panel facilities involved in the surface coating of printed interior panels made of hardwood plywood and thin particleboard, natural finish hardwood plywood panels, or hardboard paneling with class II finishes. This section does not apply to the manufacture of exterior siding, tileboard, or particleboard used as a furniture component; or to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a flat wood panel coating line shall cause, allow, or permit the emission of any VOCs from a coating application system in excess of:

(a) 2.9 kilograms per 100 square meters of coated finished product (6.0 pounds per 1,000 square feet) from printed interior panels, regardless of the number of coats applied;

(b) 5.8 kilograms per 100 square meters of coated finished product (12.0 pounds per 1,000 square feet) from natural finish hardwood plywood panels, regardless of the number of coats applied; and

(c) 4.8 kilograms per 100 square meters of coated finished product (10.0 pounds per 1,000 square feet) from class II finishes on hardboard panels, regardless of the number of coats applied.

History: Renum. from NR 154.13 (4) (k), Register, September, 1986, No. 369, eff. 10-1-86.

**NR 422.14 Graphic arts.** (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the printing lines of all packaging rotogravure, publication rotogravure, and flexographic printing facilities. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing line shall operate, or cause, allow or permit the operation of the line unless:

(a) The volatile fraction of ink, as it is applied to the substrate, contains 25% by volume or less of organic solvent and 75% by volume or more of water;

(b) The ink, as it is applied to the substrate, less water, contains 60% by volume or more nonvolatile material; or

(c) The owner or operator installs and operates:

1. A vapor recovery system which reduces the VOC emissions from the capture system by at least 90% by weight;

2. An incineration or catalytic oxidation system, provided that 90% of the nonmethane VOCs (VOC measured as total combustible carbon) which enter the incinerator or oxidation unit are oxidized to non-organic compounds; or

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

(3) **CAPTURE SYSTEM.** The design, operation and efficiency of any capture system used in conjunction with sub. (2) (c) shall be certified in writing by the owner or operator and is subject to approval by the department. The capture efficiency shall be at a minimum:

(a) 75% where a publication rotogravure process is employed;

(b) 70% where a packaging rotogravure process is employed; or

(c) 65% where a flexographic printing process is employed.

History: Renum. from NR 154.13 (2) (l) and am. Register, September, 1986, No. 369, eff. 10-1-86.

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**NR 422.15 Miscellaneous metal parts and products. (1) APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to all coating line application areas, conveyors, flashoff areas, air and forced air driers, and ovens of any industry categorized under standard industrial classification codes of major groups 33 to 39 which are involved in the surface coating of miscellaneous metal parts and products with the following exceptions:

- (a) Coating of airplane exteriors;
- (b) Coating of marine vessel exteriors;
- (c) Automobile refinishing;
- (d) Customized topcoating of automobiles and trucks if production is less than 35 vehicles per day;
- (e) Adhesives and materials used to prepare a surface for adhesives;
- (f) Specialized coatings required by state or federal agencies on products made for their use;
- (g) Sealants or fillers whose purpose is to seal or fill seams, joints, holes and minor imperfections of surfaces;
- (h) Coating lines covered under ss. NR 422.05 to 422.12;
- (i) Sources exempted under s. NR 422.03; or
- (j) Silk screening of metal parts and products.

**(2) EMISSION LIMITATIONS — CURED COATINGS.** No owner or operator of a miscellaneous metal parts or products coating line using a baked or specially cured coating technology shall cause, allow, or permit the emission of any VOCs in excess of:

- (a) 0.52 kilograms per liter (4.3 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies clear coatings;
- (b) 0.42 kilograms per liter (3.5 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies extreme performance coatings; and
- (c) 0.36 kilograms per liter (3.0 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

**(3) EMISSION LIMITATIONS — AIR DRIED COATINGS.** No owner or operator of a miscellaneous metal parts or products coating line using an air dried coating technology shall cause, allow, or permit the emission of any VOCs in excess of:

- (a) After December 31, 1982, 0.58 kilograms per liter (4.8 pounds per gallon) of any coating, excluding water, delivered to a coating applicator;
- (b) After December 31, 1985, 0.52 kilograms per liter (4.3 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies clear coatings;
- (c) After December 31, 1985, 0.42 kilograms per liter (3.5 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

(4) **EMISSION LIMITATIONS AND REQUIREMENTS — HIGH PERFORMANCE ARCHITECTURAL COATINGS.** This subsection applies to miscellaneous metal parts and products coating lines which were involved in the application of high performance architectural coatings, prior to July 1, 1983, and 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.

(a) No owner or operator of a miscellaneous metal parts or products coating line which applies a high performance architectural coating may cause, allow or permit the emission of any VOCs from the coating in excess of:

1. 0.65 kilograms per liter (5.4 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies prime coatings;

2. 0.70 kilograms per liter (5.8 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

(b) The owner or operator of a miscellaneous metal parts and products coating line may demonstrate compliance with the emission limits of this subsection by demonstrating, on a daily basis, that the combined emission rate from all high performance architectural coatings is less than or equal to the allowable emission rate as determined by the equation in s. NR 425.04 (3) (a) 3.

(5) **CHANGE IN TECHNOLOGY.** Miscellaneous metal parts or products coating lines which, prior to January 1, 1980, used a baked or specially cured coating technology shall meet the emission limitations of sub. (2) notwithstanding the coating technology presently in use.

(6) **MULTIPLE LIMITATIONS.** If more than one emission limitation in sub. (2) applies to a specific coating, then the least stringent emission limitation shall be applied.

(7) **SOLVENT WASHINGS.** All VOC emissions from solvent washings shall be considered in the emission limitations in subs. (2) and (3), unless the used wash solvent is directed into containers that prevent evaporation into the atmosphere.

**History:** Renum. from NR 154.13 (4) (m) and am. Register, September, 1986, No. 369, eff. 10-1-86; renum. (4) to (6) to be (5) to (7), cr. (4), Register, July, 1988, No. 391, eff. 8-1-88; am. (1) (h) and (i), cr. (1) (j), Register, April, 1989, No. 400 eff. 5-1-89.

**NR 422.16 Use of road surfacing materials. (1) APPLICABILITY.** This section applies to the mixing, storage, use and application of cutback asphalts in Wisconsin. This section does not apply to cutback asphalts intended for uses other than application to surfaces traversed by motor vehicles, bicycles or pedestrians.

(2) **RESTRICTED MATERIALS.** The following restrictions apply to the mixing, open storage, use or application of cutback asphalts during the ozone season:

(a) After August 1, 1979, the use of rapid curing cutback asphalts shall not be permitted.

(b) After May 1, 1980, the use of cutback asphalts for sealcoating operations shall not be permitted except where a single coat of liquid asphalt is applied to an aggregate base to control dust.

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(c) After May 1, 1981, the use of cutback asphalts shall not be permitted except for the aggregate base application allowed in par. (b), and for use as a penetrating prime coat during the first and last months of the ozone season.

History: Renum. from NR 154.13 (5) (a) and am. Register, September, 1986, No. 369, eff. 10-1-86.