

RULE 2.39 WOOD PRODUCTS COATING OPERATIONS

ADOPTED February 10, 1999

REVISED May 14, 2008

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100 GENERAL

101 **PURPOSE:** The purpose of this rule is to establish limits on the emissions of volatile organic compounds (VOCs) from wood and wood products coating operations.

102 **APPLICABILITY:** This Rule applies to any person who uses or specifies the use of wood products coatings, and/or strippers for use on wood products, or any person who sells or distributes any coating or stripper subject to the provisions of this rule within the District.

110 **EXEMPTIONS - GENERAL:** The provisions of this Rule shall not apply to the following:

110.1 Coatings applied to stationary structures and their appurtenances which are subject to Rule 2.14, ARCHITECTURAL COATINGS; or

110.2 Adhesive coatings which are subject to Rule 2.33, ADHESIVE OPERATIONS; or

110.3 The application of coatings by template in order to add designs, letters, or numbers to products; or

110.4 The application of coatings to musical instruments; or

110.5 Wood products coatings that are sold in non-refillable aerosol-spray containers; or

110.6 Coating operations for the purpose of manufacturing a finished wood panel intended for attachment to the inside walls of buildings, including, but not limited to, homes and office buildings, mobile homes, trailers, prefabricated buildings and similar structures; or a finished exterior wood siding intended for use in construction.

111 **EXEMPTION - SMALL USAGE:** Sources using less than 55 gallons per year, singly or in any combination, of wood products coatings and/or strippers, are exempt from all provisions of this Rule with the exception of Section 501 - USAGE RECORDS.

112 **EXEMPTION, SPECIFIC FINISHES:** The provisions of Sections

301, 302, and 304 of this Rule shall not apply to coatings used to produce the following finishes, provided records are maintained as specified in Section 501 of this Rule:

112.1 Crackle lacquers; or

112.2 Leaf finishes; or

112.3 Faux finishes; or

112.4 Imitation wood grain.

200 DEFINITIONS

201 **AEROSOL-SPRAY CONTAINER:** Any hand-held, pressurized, non-refillable container of one (1) liter (1.1 quarts) or less, where the contents are released when a valve on the container is depressed.

202 **AFFECTED POLLUTANT:** Volatile Organic Compounds (VOC), as defined in Rule 1.1.

203 **AIR ASSISTED AIRLESS SPRAY:** Equipment used to apply coatings that uses fluid air pressure to atomize coating and air pressure between 0.1 and 50 psig to adjust the spray pattern.

204 **BINDERS:** Non-volatile polymeric organic materials (resins) which form the surface film in coating applications.

205 **CLEAR TOPCOAT:** A final coating which contains binders, but not opaque pigments, and is specifically formulated to form a transparent or translucent solid protective film.

206 **CLOSED CONTAINER:** A container which has a cover where the cover meets with the main body of the container without any gaps between the cover and the main body of the container.

207 **COATING:** A material which is applied to a surface and which forms a film in order to beautify and/or protect such surface. "Coating" includes, but is not limited to, materials such as topcoats, stains, sealers, fillers, conversion varnish, pigmented coating, multicolored coating, moldseal coating, washcoat, and toner.

- 208 **CONTROL DEVICE:** Equipment such as an incinerator or adsorber used to prevent air pollutants from reaching the ambient air.
- 209 **CONVERSION VARNISH:** A coating comprised of a homogeneous (alkyd-amino resin) liquid which, when acid catalyzed and applied, hardens upon exposure to air or heat, by evaporation and polymerization, to form a continuous film that imparts protective or decorative properties to wood surfaces. Any conversion varnish used as a self sealing system shall be classified as a conversion varnish.
- 210 **CRACKLE LACQUER:** A clear or pigmented topcoat intended to dry to produce a cracked or crazed appearance.
- 211 **DIP COAT:** A coating which is applied by dipping an object into a vat of coating material and allowing any excess coating material to drain off.
- 212 **ELECTROSTATIC APPLICATION:** The electrical charging of atomized coating droplets for deposition by electrostatic attraction.
- 213 **EMISSION CONTROL SYSTEM:** A control device and its associated collection system.
- 214 **EXEMPT COMPOUND:** As defined in District Rule 1.1, General Provisions and Definitions.
- 215 **FAUX FINISH:** A finish intended to simulate a surface other than wood, including stone, sand, slate, marble, metal, metal flake, or leather.
- 216 **FILLER:** A preparation used to fill in cracks, grains, etc., of wood before applying a coating.
- 217 **FLOW COAT:** A coating which is applied by flowing a stream of coating over an object and allowing any excess coating material to drain off.
- 218 **HIGH-SOLIDS STAIN:** Stains containing more than 454 grams (1 pound) of solids per 3.785 liters (1 gallon), by weight, and can include wiping stains, glazes, and opaque stains.
- 219 **HIGH-VOLUME, LOW-PRESSURE (HVLP) SYSTEM:** Spray equipment permanently labeled as such and which is designed and operated between 0.1 and 10 pounds per square inch gauge

(psig)air atomizing pressure measured dynamically at the center of the air cup and at the air horns.

- 220 **IMITATION WOOD GRAIN:** A hand applied finish that simulates the appearance of a specific natural wood grain.
- 221 **INK:** A fluid that contains dyes and/or colorants and is used to make markings, but not to protect surfaces.
- 222 **LEAF FINISH:** A finish used in conjunction with metal leaf or foil.
- 223 **LOW-SOLIDS STAINS:** Stains containing 454 grams (1 pound) or less of solids per 3.785 liters (1 gallon), by weight.
- 224 **LOW-VOLUME, LOW-PRESSURE (LVLV) EQUIPMENT:** Equipment used to apply coatings by means of a gun which is designed to be operated and which is operated between 0.1 and 10.0 pounds per square inch gauge (psig)air pressure and air volume less than 15.5 cfm per spray gun and which operates at a maximum fluid delivery pressure of 50 psig.
- 225 **MOLD-SEAL COATING:** The initial coating applied to a new mold or repaired mold to provide a smooth surface which, when coated with a mold release coating, prevents products from sticking to the mold.
- 226 **MULTI-COLORED COATING:** A coating which exhibits more than one color when applied, and which is packaged in a single container and applied in a single coat.
- 227 **NEW WOOD PRODUCT:** A wood product which has not been previously coated. A wood product from which uncured coatings have been removed to repair flaws in initial coatings applications is a new wood product.
- 228 **PIGMENTED COATINGS:** Opaque coatings which contain binders and colored pigments which are formulated to hide the wood surface, either as an undercoat or topcoat.
- 229 **REACTIVE DILUENT:** A liquid component of a coating which is a VOC during application, and one in which, through chemical or physical reactions, such as polymerization, becomes an integral part of a finished coating.
- 230 **REFINISHING OPERATION:** The steps necessary to remove cured coatings and to repair, preserve, or restore a wood

product.

- 231 **REPAIR COATING:** A coating used to re-coat portions of a product which has sustained mechanical damage to the coating following normal coating operations.
- 232 **ROLL COATER:** A series of mechanical rollers that forms a thin coating film on the surface of the roller, which is applied to a substrate by moving the substrate underneath the roller.
- 233 **SEALER:** A coating, containing binders, which seals the wood prior to application of subsequent coatings.
- 234 **STENCIL COATING:** An ink or a pigmented coating which is rolled or brushed onto a template or stamp in order to add identifying letters and/or numbers to wood products.
- 235 **STRIPPER:** A liquid used to remove cured coatings, cured inks, and/or cured adhesives.
- 236 **SURFACE PREPARATION AND CLEANUP:** The removal of contaminants such as dust, soil, oil, grease, etc., prior to any step in a manufacturing process from parts, products, tools, machinery, equipment, and general work areas.
- 237 **TONER:** A wash coat which contains binders and dyes or pigments to add tint to a coated surface.
- 238 **TRANSFER EFFICIENCY:** The ratio of weight of coating solids deposited upon an object to the total weight of coating solids used in a coating application step, expressed as a percentage.
- 239 **VOLATILE ORGANIC COMPOUND (VOC):** As defined in Rule 1.1, General Provisions and Definitions.
- 240 **VOLATILE ORGANIC COMPOUND COMPOSITE PARTIAL VAPOR PRESSURE:** The sum of the partial pressures of compounds defined as VOC's.
- 241 **VOLATILE ORGANIC COMPOUND (VOC) CONTENT:** Weight of VOC per volume of material as calculated pursuant to the applicable Sections of 600.
- 242 **WASH COAT:** A coating used to seal wood surfaces and control penetration to prevent undesired staining. For

purposes of this Rule, a washcoat is considered a low solids coating and contains less than 454 grams (1 pound) of solids per 3.785 liters (1 gallon), by weight. Coatings exceeding this ratio shall be considered "sealers".

- 243 **WOOD PANEL:** Any piece of wood, or wood composition, which is solid or laminated, and which is larger than 3.049 square meters in size, and which is not subsequently cut into smaller pieces.
- 244 **WOOD PRODUCTS:** Surface-coated products which include cabinets (kitchen, bath, and vanity), tables, chairs, beds, sofas, shutters, art objects, and any other coated objects made of solid wood, and/or wood composition.
- 245 **WOOD PRODUCT COATING APPLICATION OPERATIONS:** A combination of coating application steps which may include use of spray guns, flash-off areas, spray booths, ovens, conveyors, and/or other equipment operated for the purpose of applying coating materials.

300 STANDARDS

- 301 **COATING LIMITS FOR NEW WOOD PRODUCTS:** Any operator subject to the provisions of the rule shall not apply any coating, to a new wood product, which has a VOC content exceeding the applicable limits specified in the Tables below.

TABLE 1. MATERIAL VOC CONTENT LIMITS
Grams of VOC per Liter, or Pounds Per Gallon of
Coating, Excluding Water and Exempt Compounds

Coating Category	VOC Content Limits grams/liter (lbs/gallon)
Clear Topcoat	275 (2.3)
Conversion varnish	550 (4.6)
Filler	275 (2.3)
High-Solid Stain	350 (2.9)
Inks	500 (4.2)
Mold-Seal Coating	750 (6.3)
Multi-Colored Coating	275 (2.3)

Pigmented Coating	275 (2.3)
Sealer	275 (2.3)

TABLE 2. MATERIAL VOC CONTENT LIMITS
Grams per Liter of Coating, or Pounds Per Gallon of Coating

Coating Category	VOC Content Limits grams/liter (lbs/gallon)
Low-Solid Stains, toners Washcoats	120 (1.0)

301.1 Notwithstanding the VOC limits specified in this section, a person may apply a sealer with a VOC content not exceeding 680 grams/liter, provided that the topcoat used on the same wood product does not exceed 275 grams/liter.

302 **COATING LIMITS FOR REFINISHING, REPAIRING, PRESERVING, OR RESTORING WOOD PRODUCTS:** Any operator subject to the provisions of the rule shall not apply any coating, to refinish, repair, preserve, or restore a wood product, which has a volatile organic compound (VOC) content exceeding the applicable limits specified in the Tables below.

TABLE 3. MATERIAL VOC CONTENT LIMITS
Grams of VOC per Liter, or Pounds Per Gallon of Coating, Excluding Water and Exempt Compounds

Coating Category	VOC Content Limits grams/liter (lbs/gallon)
Clear Topcoat	680 (5.7)
Conversion varnish	550 (4.6)
Filler	500 (2.3)
High-Solid Stain	700 (5.8)
Inks	500 (4.2)
Mold-Seal Coating	750 (6.3)
Multi-Colored Coating	680 (5.7)
Pigmented Coating	600 (5.0)

Sealer	680 (5.7)
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TABLE 4. MATERIAL VOC CONTENT LIMITS
Grams per Liter of Coating, or Pounds Per Gallon of
Coating

Coating Category	VOC Content Limits grams/liter (lbs/gallon)
Low-Solid Stains, toners Washcoats	480 (4.0)

303 **STRIPPER LIMITS:** No person shall apply any coating as a stripper on wood products unless:

303.1 It contains less than 350 grams of VOC per liter of material (2.9 pounds per gallon); or

303.2 The VOC composite partial vapor pressure is two (2) mm Hg (0.04 psia) or less at 20°C (68°F), as calculated pursuant to Section 402.

304 **APPLICATION REQUIREMENTS:** A person subject to the provisions of this Rule shall not apply any wood product coating to any wood products, unless one of the following application methods is used:

304.1 Electrostatic application equipment;

304.2 High-Volume, Low-Pressure spray equipment;

304.3 Dip coat;

304.4 Flowcoat;

304.5 Hand application methods, such as brush or roller;

304.6 Roll coater;

304.7 Low-Volume, Low-Pressure spray equipment;

304.8 Air assisted airless; or

304.9 Any other equivalent method which has been approved in writing by the APCO and the EPA.

305 **EMISSION CONTROL EQUIPMENT:** In lieu of complying with the

applicable provisions of Section 300, an operator may use a VOC emission control system that controls emissions from the source operation provided the following conditions are met:

305.1 The VOC emission control system shall be approved in writing by the APCO,

305.2 The VOC emission control system shall be operated with an overall capture and control efficiency that controls emissions to an equivalent or greater level than the limits specified in the applicable provisions of Section 300, calculated pursuant to Section 612.

305.3 When applicable, the capture system shall vent all drying oven exhaust to the control device and shall have one or more inlets for collection of fugitive emissions.

306 **STORAGE AND DISPOSAL - GENERAL:** All VOC-containing materials, whether in its form for intended use or as a waste or used product, including items such as cloth or paper laden with VOC containing materials, shall be stored in non-absorbent, non-leaking containers which shall be kept closed at all times, except when filling or emptying, and disposed of in a manner to prevent evaporation of VOCs into the atmosphere at the facility.

307 **REQUIREMENTS FOR SURFACE PREPARATION AND CLEANUP MATERIALS:** Any solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials used in surface preparation and cleanup operations shall be carried out pursuant to Rule 2.31, Surface Preparation and Cleanup.

400 ADMINISTRATIVE REQUIREMENTS

401 **PROHIBITION OF SPECIFICATION:** A person shall not specify the use of any coating or stripper to be applied to any wood products subject to the provisions of this rule that does not meet the limits and requirements of this rule where such applications result in a violation of this rule. The requirements of this Section shall apply to all written or oral contracts.

402 **COMPLIANCE STATEMENT REQUIREMENT:** Each container of any coating, or stripper manufactured shall display the maximum VOC content of the coating, as applied, and after any thinning as recommended by the manufacturer, or shall have this information provided in a product data sheet supplied with the container. VOC content shall be displayed as grams of VOC per liter of coating (less water and less exempt solvent, and excluding any colorant added to tint bases), or stripper. VOC content displayed may be calculated using product formulation data, or may be determined using the test method in Section 602. Alternatively, containers for strippers subject to the provisions of Section 303 may display only the partial vapor pressure.

403 **OPERATION AND MAINTENANCE PLAN (O&M Plan):** Any person using an emission control device pursuant to Section 305, as a means of complying with this Rule, must submit, with the application for Authority to Construct, pursuant to Rule 3.1 - GENERAL PERMIT REQUIREMENTS, an O&M Plan for the emission control device to the APCO for approval. The O&M Plan shall specify operation and maintenance procedures which will demonstrate continuous operation of the control device during periods of emissions producing operations. The O&M Plan shall also specify which records must be kept to document these operations and maintenance procedures. These records shall comply with the requirements of Section 501 and 502 of this Rule. Any person using an emission control device must fully comply with all O&M Plans submitted for approval, even if such O&M Plans have not yet been approved, unless notified in writing by the APCO.

500 MONITORING AND RECORDS:

501 **RECORD KEEPING - GENERAL:** Any person subject to this Rule shall maintain the following records in order to evaluate compliance:

501.1 A data sheet, material list, or invoice giving material name, manufacturer identification, material application, and VOC content; and

501.2 Any catalysts, reducers, or other components used, and the mix ratio; and the applicable VOC limit from Section 301 or 302, and the actual VOC content of the wood product coating as applied.

501.3 For persons using coatings or materials which comply with the VOC limits specified in Sections 301, 302, and 303, records shall be maintained on a quarterly basis, showing the type and volume of coatings and strippers used. Coating type shall be designated according to the coating categories as listed in Sections 301, 302, and 303.

502 **RECORD KEEPING - EMISSION CONTROL SYSTEMS:** If compliance with this rule is achieved through the use of a emission control system, in addition to the provisions of Section 501, the owner or operator shall maintain:

502.1 Daily usage records of coatings and solvents

502.2 Maintain daily records of key operating and maintenance parameters, such as temperatures, pressures, and/or flowrates, for the emission control equipment which will demonstrate continuous operation and compliance of the equipment during periods of emission producing activities.

502.3 During any period of operation of a thermal incinerator, combustion temperature shall be continuously monitored.

502.4 During any period of operation of a catalytic incinerator, exhaust gas temperature shall be continuously monitored.

503 **REPORTING:** All records required by this Rule shall be maintained on site for a period of two years and made available to the APCO upon request.

600 TEST METHODS AND CALCULATIONS

601 **GENERAL:** For the purposes of this Rule, the following test methods or calculation methods shall be used. Other test methods determined to be equivalent and approved in writing by the District and the EPA may also be used. VOC emissions or other parameters determined to exceed any limits established by this Rule through the use of any of the following test methods or calculations shall constitute a violation of this Rule.

602 **VOC CONTENT AND SOLIDS CONTENT:** VOC content of wood

product coatings, and strippers, subject to this Rule, shall be determined by procedures contained in EPA Reference Test Method 24 (40 CFR 60, Appendix A).

603 **COMPOSITION OF VOC:** The composition of VOC shall be as specified on the manufacturer's label or data sheet, or as determined by ASTM Method E-260, General Gas Chromatograph.

604 **EXEMPT COMPOUNDS:** Compounds exempted from VOC definition shall be determined in accordance with ASTM D-4457-85, or ARB Method 432. If any of the perfluorocarbons or volatile cyclic and linear methyl siloxanes are being claimed as exempt compounds, the person making the claim must state in advance which compounds are present, and the EPA-approved test method used to make the determination of these compounds.

605 **CALCULATION OF VOC CONTENT:** The VOC content per volume of material shall be calculated as follows:

605.1 The VOC content per volume of coatings except low-solid stains, toners, and washcoats, shall be calculated less water and less exempt compounds as follows:

$$\text{VOC}_{\text{con}} = \frac{W_s - W_w - W_{\text{es}}}{V_m - V_w - V_{\text{es}}}$$

Where: VOC_{con} = Grams of VOC per liter of material
 W_s = Weight of volatile compounds in grams
 W_w = Weight of water in grams
 W_{es} = Weight of exempt compounds in grams
 V_m = Volume of coating materials in liters
 V_w = Volume of water in liters
 V_{es} = Volume of exempt compounds in liters

605.2 The VOC content per volume of strippers, and low-solid stains, toners and washcoats shall be calculated by the following equation:

$$\text{VOC}_{\text{con}} = \frac{(W_s - W_w - W_{\text{ES}})}{V_M}$$

Where: VOC_{con} = Grams of VOC per liter of material
 W_s = Weight of volatile compounds in grams
 W_w = Weight of water in grams
 W_{ES} = Weight of exempt compounds in grams

V_M = Volume of material in liters

606 **CALCULATION FOR DETERMINING VOLATILE ORGANIC COMPOUND COMPOSITE PARTIAL VAPOR PRESSURE:** VOC composite partial vapor pressure for determination of compliance with Section 303 shall be calculated by the following equation:

$$PP_c = \frac{\sum_{i=1}^n (W_i) (VP_i) / MW_i}{\frac{W_w}{MW_w} + \sum_{i=1}^n \frac{W_e}{MW_e} + \sum_{i=1}^n \frac{W_i}{MW_i}}$$

Where:

- PP_c = VOC composite partial pressure at 20°C, in mm Hg.
 W_i = Weight of the "i"_{th} VOC compound, in grams.
 W_w = Weight of water, in grams.
 W_e = Weight of exempt compounds, in grams.
 MW_i = Molecular weight of the "i"_{th} VOC compound, in (g/g-mole).
 MW_w = Molecular weight of water, in (g/g-mole).
 MW_e = Molecular weight of exempt compound, in (g/g-mole).
 VP_i = Vapor pressure of the "i"_{th} VOC compound at 20°C, in mm Hg.

607 **VAPOR PRESSURE:** Vapor pressures may be obtained from standard reference texts or may be determined by ASTM D-2879.

608 **VOLATILE CONTENT OF RADIATION CURABLE MATERIALS:** Volatile content of radiation curable materials shall be obtained in accordance with ASTM Method D5403.

609 **CALCULATION FOR THE DETERMINATION OF THE MINIMUM REQUIRED OVERALL CAPTURE AND CONTROL EFFICIENCY:** The minimum required overall capture and control efficiency of an emission system at which an equivalent or greater level of VOC reduction will be achieved, shall be calculated by the following equation:

$$C.E. = [1 - \left(\frac{(VOC_{LWc})}{(VOC_{LWnMax})} \times \frac{(1 - (VOC_{LWnMax} / (D_{nMax}))}{(1 - (VOC_{LWc} / D_c))} \right)] \times 100$$

WHERE: C.E. = Overall Control Efficiency, percent.

VOC_{LWc} = VOC Limit of Rule 2.39, less water and less exempt compounds, pursuant to Sections 302, 303, and/or 304.

VOC_{LWn,Max} = Maximum VOC content of non-compliant coating used in conjunction with a control device, less water and less exempt compounds.

D_{n,Max} = Density of solvent, reducer, or thinner contained in the non-compliant coating, containing the maximum VOC content of the multi-component coating.

D_c = Density of corresponding solvent, reducer, or thinner used in the compliant coating system = 880 g/l.

610 **CAPTURE EFFICIENCY:** The capture efficiency of a VOC emission control system's collection device shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Methods 204-204F, as applicable.

611 **CONTROL EFFICIENCY:** The control efficiency of a VOC emission control system's collection device shall be determined by using EPA Methods 2, 2A, or 2D for measuring flow rates and EPA Method 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device. EPA Method 18 or CARB Method 422 shall be used to determine the emissions of exempt compounds.

612 **OVERALL CAPTURE AND CONTROL EFFICIENCY:** For VOC emission control systems that consist of a single VOC emission control device, the overall capture and control efficiency shall be calculated by using the following equation:

$$CE_{\text{Overall}} = [CE_{\text{capture}} \times CE_{\text{control}}] / 100\%$$

Where: CE_{Overall} = Overall Capture and Control Efficiency

CE_{capture} = Capture Efficiency of the device*

CEcontrol = Control Efficiency of the
collection device**

*As determined in Section 610

**As determined in Section 611