

Rule 1114

Wood Products Coating Operations

(A) General

- (1) Purpose
 - (a) The purpose of this Rule is to limit the emission of Volatile Organic Compounds from Wood Products Coating Application Operations.
- (2) Applicability
 - (a) This Rule applies to Wood Products Coating Application Operations within the Mojave Desert Air Quality Management District.

(B) Definitions

The definitions contained in District Rule 102 – *Definition of Terms* shall apply unless the term is otherwise defined herein:

- (1) “Binders” – Non-volatile polymeric Organic Materials (resins) which form the surface film in Coating applications.
- (2) “Clear Sealer” – A Coating containing Binders, but not opaque pigments, which seals the Wood Products prior to application of the subsequent Coatings.
- (3) “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 and associated surface preparation and cleanup.
- (4) “Composite Wood” – A manufactured material consisting of tightly compressed wood fibers bonded with resins which includes, but is not limited to, particleboard, fiberboard and hardboard.
- (5) “Conversion Varnish” – A topcoat or sealer which is comprised of an alkyd or other resin, blended with amino resin, in a homogeneous liquid that, when acid catalyzed and applied, hardens by evaporation and polymerization.
- (6) “Crackle Lacquer” – A clear or Pigmented Topcoat intended to produce a cracked or crazed appearance when dry.

- (7) “Custom Replica Furniture” – New, made-to-order furniture that looks like antique furniture, rather than new furniture. It features detailed wood carvings and bruising of the wood to simulate antique furniture.
- (8) “Faux Finishes” – A finish intended to simulate a surface other than wood, including sand, slate, marble, metal, metal flake, or leather.
- (9) “Filler” – A material which is applied to a Wood Product, and whose primary function is to build up, or fill the voids and imperfections in the Wood Product to be coated.
- (10) “High-Solids Stains” – Stains containing more than one (1) pound of solids per gallon by weight.
- (11) “Imitation Wood Grain” – A hand applied finish that simulates the appearance of a specific natural wood grain.
- (12) “Leaf Finishes” – A finish used in conjunction with metal leaf or foil.
- (13) “Low-Solids Stains, Toners and Washcoats” – Stains, Toners and Washcoats containing one (1) pound of solids per gallon, or less, by weight.
- (14) “Low-Volume, Low-Pressure” (LVLP) – Spray Coating application Equipment with air pressure between 0.1 and 10.0 psig and air volume less than 15.5 cfm per spray gun and which operates at a maximum fluid delivery pressure of 50 psig.
- (15) “Medium Density Fiberboard (MDF) Coatings” – The initial Coating which is applied directly to the surface of MDF. MDF is a wood product composed of tightly compressed wood fibers bonded with resins, and has a density greater than 45 pounds per cubic foot.
- (16) “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.
- (17) “New Wood Product” – A Wood Product which has not been previously coated. A Wood Product from which Coatings have been removed to repair flaws in initial Coating applications is a New Wood Product.
- (18) “Panel” – A flat piece of wood or Wood Products, usually rectangular, and used inside homes and mobile homes for wall decorations.
- (19) “Pigmented Primers, Sealers and Undercoats” – Opaque Coatings which contain Binders and colored pigments which are formulated to hide the wood surface, that are applied prior to the topcoat to provide a firm bond, level the wood product surface, or seal the wood product surface.

- (20) “Pigmented Topcoat” – A final opaque Coating which contains Binders and colored pigments, and is specifically formulated to hide the wood surface and form a solid protective film.
- (21) “Rate Per Day” – The amount applied between 12:00 a.m. and 11:59 p.m. on the same calendar day.
- (22) “Refinished Wood Product” – A post-consumer Wood Product which has had some or all of the Coatings removed, and to which new Coatings are applied in order to preserve or restore the post-consumer wood product to its original condition. A wood product from which Coatings have been removed to repair flaws in initial Coating applications is not a Refinished Wood Product.
- (23) “Shutter” – An exterior screen or cover for a window, usually hinged and often fitted with louvers. This includes non-functional Shutters.
- (24) “Simulated Wood Materials” – Materials, such as plastic, glass, metal, that are made to give a wood-like appearance or are processed like Wood Products.
- (25) “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.
- (26) “Tint” – A colorant added in small quantities to a Stain to achieve a particular color for the finished product.
- (27) “Toner” – A Wash Coat which contains Binders and dyes or pigments to add Tint to a coated surface.
- (28) “VOC Content” – The weight of VOC per volume of Coating. VOC Content is VOC Regulatory, as defined in subsection (G)(4)(a)(i), for all Coatings except those in the Low Solids category. For Coating in the Low Solids category, the VOC Content is VOC Actual, as defined in subsection (G)(4)(a)(ii). If the Coating is a multi-component product, the VOC Content is VOC Content as mixed or catalyzed. If the Coating contains silanes, siloxanes, or other ingredients that generate ethanol or other VOCs during the curing process, the VOC content must include the VOCs emitted during curing.
- (29) “Wash Coat” – A Coating that contains no more than 1.0 pounds of solids per gallon, by weight, which is used to seal wood surfaces, prevent undesired staining, and control penetration.
- (30) “Wood Products” – Those surface coated room furnishings which include cabinets (kitchen, bath, and vanity), tables, chairs, beds, sofas, Shutters, art objects, and any other coated object made of solid wood and/or Composite Wood and/or made of Simulated Wood Material used in combination with solid wood or Composite Wood.

(C) Requirements

(1) Limits for VOC Content of Coatings & Adhesives for New Wood Products

- (a) Except as provided in subsections (C)(4) or (C)(5), no Person shall apply any Coatings to a New Wood Product if such materials have a VOC Content exceeding the applicable limits specified in Table 1. The VOC Content of Coatings, except Low-Solids Stains, Toners, Washcoats and Solvents shall be determined in accordance with subsection (G)(4)(a)(i) and (G)(2)(a). The VOC Content of Low-Solids Stains, Toners, Washcoats and Solvents shall be determined in accordance with subsection (G)(4)(a)(ii) and (G)(2)(a). VOC limits expressed in grams VOC per liter of Coating shall be used.

Table 1
VOC Content of Coatings and Adhesives for New Wood Products

Coating	g/L (lb/gal) Less Water and Less Exempt Compounds
General	275 (2.3)
Adhesives	250 (2.1)
Clear Sealers	275 (2.3)
Clear Topcoats	275 (2.3)
Conversion Varnish	550 (4.6)
Fillers	275 (2.3)
High-Solids Stains	240 (2.0)
Inks	500 (4.2)
Low-Solids Stains, Toners and Washcoats	120 (1.0)
Medium Density Fiberboard (MDF) Coatings	275 (2.3)
Mold Seal	750 (6.3)
Multi-Colored Coatings	275 (2.3)
Pigmented Primers, Sealers and Undercoats	275 (2.3)
Pigmented Topcoats	275 (2.3)

(2) Limits for VOC Content of Coatings & Adhesives for Refinishing, Repairing, Preserving or Restoring Wood Products

- (a) Except as provided in subsections (C)(4) or (C)(5), no Person shall apply any Coatings to refinish, repair, preserve or restore a wood product if such materials have a VOC Content exceeding the applicable limits specified in Table 2. The VOC Content of Coatings, except Low-Solids Stains, Toners, Washcoats and Solvents shall be determined in accordance with subsection (G)(4)(a)(i) and (G)(2)(a). The VOC Content of Low-Solids Stains, Toners, Washcoats and Solvents shall be determined in accordance

with subsection (G)(4)(a)(ii) and (G)(2)(a). VOC limits expressed in grams VOC per liter of Coating shall be used.

Table 2
VOC Content of Coatings and Adhesives for Refinishing,
Repairing, Preserving, or Restoring Wood Products

Coating	g/l (lb/gal) Less Water and Less Exempt Compounds
General	420 (3.5)
Clear Topcoats	680 (5.7)
Conversion Varnishes	550 (4.6)
Fillers	500 (4.2)
High-Solids Stains	700 (5.8)
Inks	500 (4.2)
Low-Solids Stains, Toners and Washcoats	480 (4.0)
Medium Density Fiberboard (MDF) Coatings	680 (5.7)
Mold-Seal Coating	750 (6.3)
Multi-Colored Coatings	680 (5.7)
Pigmented Coatings	600 (5.0)
Sealers	680 (5.7)

(3) Transfer Efficiency

(a) A Person or Facility shall not apply Coatings to Wood Products subject to the provisions of this Rule unless the Coating is applied with properly operating Equipment, according to manufacturer's suggested guidelines, and by the use of one of the following methods:

- (i) Flow Coat;
- (ii) Dip Coat;
- (iii) High-Volume Low-Pressure (HVLP) spray;
- (iv) Low-Volume Low-Pressure spray Equipment;
- (v) Paint brush;
- (vi) Hand roller;
- (vii) Roll Coater;
- (viii) Air-Assisted Airless Spray (for Touch-Up and Repair Coating only);
- (ix) Electrostatic Application Equipment; or
- (x) Such other Coating application methods as are demonstrated to the Air Pollution Control Officer to have a Transfer Efficiency equal to or better than achieved by HVLP spraying and for which written approval of the Air Pollution Control Officer has been obtained.

- (4) Strippers, Surface Preparation, Clean-up Solvent and Equipment Cleaning
- (a) The requirements of this Section shall apply to any Person using Solvent for surface preparation and cleanup.
- (i) A Person shall not use an organic compound for surface preparation or cleanup, except Strippers, with a VOC Content in excess of 25 Grams of VOC Per Liter of Material (0.21 pounds per gallon).
- (ii) A Person shall use closed, non-leaking, and non-absorbent containers for the storage or disposal of cloth or paper used for Solvent surface preparation and cleanup.
- (iii) A Person shall store fresh or spent Solvent in closed containers.
- (iv) A Person shall not use organic compounds for the cleanup of spray Equipment, including paint lines, unless Equipment for collecting the cleaning compounds and minimizing their evaporation to the Atmosphere is used.
- (v) Spray gun nozzles only, may be soaked in Solvent-based materials for cleaning, provided the container is not more than five (5) gallons in size, and is kept tightly covered at all times except when accessing the container.
- (vi) A Person shall not use Solvent based VOC-containing materials for the clean-up of spray Equipment used in Wood Products Coating Application Operations, unless the spray Equipment is disassembled and cleaned in an enclosed gun cleaner.
- (b) A Person shall not use a Stripper on wood products unless:
- (i) The Stripper contains less than 200 Grams of VOC Per Liter of Material; or
- (ii) The VOC composite partial vapor pressure for the Stripper is 2 mm Hg (0.04 psia) or less at 68 °F (20 °C), as calculated pursuant to subsection (G)(5).
- (5) Add-On Control System
- (a) In lieu of complying with the VOC Content limitations in subsection (C)(1), (C)(2), and/or (C)(4) above, air pollution Control Equipment with a capture and control system combined efficiency of at least 90 percent, as determined pursuant to subsections (G)(2)(b) and (G)(2)(c) of this Rule, may be used.
- (b) A Person using Control Equipment pursuant to (C)(5)(a) shall submit to the APCO for approval an Operation and Maintenance Plan for the proposed emission control device and emission collection system and receive approval prior to operation of the Control Equipment. Such Plan shall:

- (i) Identify all key system operating parameters. Key system operating parameters are those necessary to ensure compliance with subsection (C)(5)(a), such as temperature, pressure, and/or flow rate; and
 - (ii) Include proposed inspection schedules, anticipated ongoing maintenance, and proposed recordkeeping practices regarding key operating system parameters.

- (6) Prohibition of Specifications
 - (a) Any Person shall not specify the use in the District of any Coating 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. The requirements of this paragraph shall apply to all written or oral contracts.

- (7) Compliance Statement Requirement
 - (a) The manufacturer of Coatings subject to this Rule shall include a statement of VOC Content as supplied on data sheets; including Coating components, expressed in grams per liter or pounds per gallon, excluding water and exempt Solvents.

- (8) Work Practice Implementation Plan Requirement
 - (a) Any Person subject to this Rule shall prepare and maintain a written work practice implementation plan ensuring that the following requirements are met:
 - (i) Finishing, Cleaning, and Washoff:
 - a. Covered storage of finishing, cleaning, and washoff materials.
 - b. Develop a written inspection and maintenance plan to address and prevent leaks. The plan must identify a monthly (minimum) inspection frequency and procedures for addressing malfunctions. Repairs to leaking equipment must be made within 15 days, unless replacement equipment has to be ordered.
 - c. Coatings must be applied with HVLP, electrostatic, and/or airless spray equipment.
 - (ii) Cleaning and Washoff Operations
 - a. Gun/Line Cleaning
 - i. Cleaning solvent must be collected in a container that can be closed.
 - ii. Cleaning solvent containers must be closed when not in use.

- b. Spray Booth Cleaning
 - i. Use of organic solvents for spray booth cleaning is prohibited.
 - ii. Use strippable spray booth coating with a VOC content of no greater than 0.8 kg VOC/kg solids (1b VOC/lb solids).
 - iii. Do not use solvents unless cleaning conveyors or metal filters, or refurbishing the spray booth.
 - c. Furniture Washoff
 - i. Cover washoff tanks when not in use.
 - ii. Minimize dripping by tilting and/or rotating pieces.
 - d. General Cleaning/Washoff Activities
 - i. Cleaning and washoff accounting system.
 - aa. Log of quantity and type of solvent used for washoff and cleaning, the number of pieces washed off, and reason for washoff.
 - bb. Record quantity of spent solvent generated from each activity and its ultimate fate.
 - cc. Calculate net cleaning and washoff solvent usage quantities, accounting for disposal and recycling of spent solvent, monthly.
 - ii. Keep washoff tanks must be closed when not in use.
 - iii. Minimize dragout by tilting and/or rotating part to drain as much solvent as possible and allowing sufficient dry time.
 - iv. Maintain a log of the quantity and type of solvent used for washoff and cleaning, as well as the quantity of waste solvent shipped offsite, and the fate of this waste (recycling or disposal).
 - v. Maintain a log of the number of pieces washed off, and the reason for the washoff.
- (iii) Operator Training Requirements: The work practice implementation plan shall include an Operator training program with the following requirements:
- a. An Operator training program to train new employees must be implemented for hiring and retraining all employees annually. Any Person hired after the effective date of this Rule shall be trained upon hiring, and any existing Person hired before the effective date of this Rule shall be trained within 6 months of the effective date of this Rule.
 - b. The Operator training program must address the requirements stated in Subsection (8)(a)(i), Subsection (8)(a)(ii), and Subsection (8)(a)(iii) of this Rule.
 - c. The Operator training program shall also include:
 - i. A list of all current personnel by name and job description that are required to be trained;

- ii. An outline of the subjects to be covered in the initial and refresher training for each position, or group of personnel;
 - iii. Lesson plans for courses to be given at the initial hire and the annual refresher training that include, at a minimum:
 - aa. Appropriate application techniques;
 - bb. Appropriate cleaning and washoff procedures;
 - cc. Appropriate equipment setup and adjustment to minimize material usage and overspray; and
 - dd. Appropriate management of cleanup wastes;
 - iv. A description of the methods to be used at the completion of initial or refresher training to demonstrate and document successful completion and a record of the date each employee is trained.
 - d. The Operator training program shall be written and retained onsite.
- (iv) Record Requirements: Any Person subject to this Rule shall maintain onsite the work practice implementation plan and all records associated with fulfilling the requirements of that plan, including, but not limited to:
- a. Records demonstrating that the operator training program is in place;
 - b. Records maintained in accordance with the inspection and maintenance plan;
 - c. Copies of logs and other documentation developed to demonstrate that the other provisions of the work practice implementation plan are followed.
- (v) General Work Practice Requirements
- a. Implementation plan must be developed and maintained onsite to demonstrate compliance with work practice requirements.
 - b. The written work practice implementation plan shall be developed within no more than 60 days after the adoption of this Rule.
 - c. The written work practice implementation plan shall be available for inspection by the District, upon request.

(D) Exemptions

- (1) The provisions of subsections (C)(1)(a), (C)(2)(a), (C)(3)(a) and (C)(4) of this Rule shall not apply to:
 - (a) The use of Aerosol Products.
 - (b) Facilities whose Rate Per Day of Coating use is less than one (1) gallon including any VOC-containing materials added to the original Coating as supplied by the manufacturer (only Coatings subject to this Rule shall be included in this calculation), and whose Wood Coating Application Operations do not emit more than 3 pounds of VOCs per day and not more than 200 pounds of VOCs per calendar year.
 - (c) Laminating of fiberglass, metal, or plastic sheets to wood Panels.
 - (d) The application of Coatings to musical instruments.
 - (e) The application of Coatings to billiard tables.
- (2) The provisions of subsection (C)(1)(a), and (C)(2)(a) shall not apply to Touch-Up and Repair Coatings or Stencil Coatings.
- (3) Any Facility classified as exempt or claiming to be exempt under this Section (D), shall meet the record keeping requirements of this Rule so as to be able to certify the exemption status.
- (4) Residential non-commercial operations are exempt from the provisions of this Rule.
- (5) Facilities which use less than 20 gallons per year of Wood Products Coatings and/or Strippers (singly or in any combination) are exempt from the provisions of this Rule with the exception of Section (F).
- (6) Coatings used to provide the following finishes are exempt from the provision of subsection (C)(1)(a) and (C)(2)(a), provided that the records are maintained as specified in Section (F):
 - (a) Crackle Lacquers;
 - (b) Faux Finishes;
 - (c) Imitation Wood Grain;
 - (d) Leaf Finishes.

- (7) Tints applied to Stains in quantities not to exceed one (1) pint of Tint in any operating day are exempt from all the provisions of this Rule, provided that the records are maintained as specified in Section (F).

(E) Administrative Requirements

- (1) Rule 442 Applicability
 - (a) Any Coating, Coating Operation, or Facility which is exempt from all or a portion of the VOC Content limits of this Rule shall comply with the provisions of Rule 442 regulating those exempted activities unless compliance with the limits specified in this Rule are achieved.

(F) Monitoring and Records

- (1) Coating Records
 - (a) Any Person subject to this Rule shall comply with the following requirements:
 - (i) The Person shall maintain and have available during an inspection, a current list of Coatings in use which provides all of the Coating data necessary to evaluate compliance, including the following information, as applicable:
 - a. Coating, catalyst, and reducer used.
 - b. Mix ratio of components used.
 - c. VOC Content of Coating as applied.
 - d. A data sheet, material list, or invoice giving material name, manufacturer, identification, material application and VOC Content.
 - (ii) The Person shall maintain records on a daily basis including:
 - a. Coating and mix ratio of components used in the Coating; and
 - b. Quantity of each Coating applied.
 - (iii) The Person shall maintain records on a daily basis showing the type and amount of Solvent and Stripper used for cleanup, surface preparation, and paint removal.
 - (b) Notwithstanding the provisions of subsection (F)(1)(a), a Person or Facility which exclusively uses Coating formulations compliant with subsection (C)(1)(a) and (C)(2)(a) may maintain usage records on a monthly basis.
 - (c) Persons using Stains and/or Tints and subject to this Rule shall maintain records on a monthly basis that provide the following information:

- (i) Name, description, container size and actual VOC Content of any Tints used to color Stains.
 - (ii) Records of any Tint use shall be maintained on a daily basis.
- (2) Compliance Assurance Monitoring
 - (a) Each Coating Application Operation subject to subparagraph (C)(1)(a) or (C)(2)(a) which is using air pollution abatement Equipment to meet the control requirement shall:
 - (i) Utilize Compliance Assurance Monitoring, as approved by the APCO. Each monitoring device(s), mechanism and/or technique shall be calibrated/maintained in a manner approved by the APCO; and
 - (ii) Maintain and produce daily records of key system operating parameters and maintenance procedures which will demonstrate continuous operation and compliance of the air pollution abatement Equipment during periods of emission-producing activities. Key system operating parameters are those necessary to ensure compliance with subsection (C)(5), such as temperatures, pressures and flow rates.
 - (b) Compliance with subsection (C)(5) shall be determined by compliance testing as prescribed in subsections (G)(2)(b) and (c) and by evaluating Compliance Assurance Monitoring data.
- (4) All records for the previous five (5) year period maintained and produced pursuant to this Section shall be retained and available for inspection by the APCO upon request.

(G) Test Methods

- (1) A violation of the limits contained in this Rule, as determined by any one of these test methods, shall constitute a violation of this Rule.
- (2) The following specified test methods shall be used to determine compliance with the provisions of this Rule.
 - (a) Determination of VOC Content and solids content: Samples of Coatings and Solvent as specified in Section (C) shall be analyzed as prescribed by EPA Reference Method 24 – *Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings* for VOC Content and solids content (without correction for Exempt Compounds) and ASTM D4457-02(2008) - *Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph*, or

ARB Method 432 – *Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings* (09/12/1989) for determination of emissions of Exempt Compounds. Perfluorocarbon compounds shall be assumed to be absent from a product or process unless a manufacturer or Facility Operator identifies the specific individual compounds (from the broad classes of perfluorocarbon compounds) and the amounts present in the product or process and provides a test method acceptable to EPA and ARB which can be used to quantify the specific compounds.

- (b) Determination of Emissions: For any Owners and/or Operators who choose to comply with the provisions of Section (C)(1)(a) or (C)(2)(a) through the use of air pollution abatement Equipment, emission of VOCs shall be measured as prescribed by EPA Reference Method 25 – *Gaseous Nonmethane Organic Emissions* and EPA Reference Method 25A – *Determination of Total Gaseous Organic Concentration using a Flame Ionization Analyzer* for determination of VOC emissions (without correction for Exempt Compounds) and EPA Method 18 – *Volatile Organic Compounds by Gas Chromatography*, or ARB Method 422 – *Determination of Volatile Organic Compounds in Emissions from Stationary Sources (Exempt VOCs)* (12/13/1991) for measuring emission of Exempt Compounds.
 - (c) Determination of Overall Control Efficiency: The Overall Control Efficiency of air pollution abatement Equipment shall be determined by a minimum of three sampling runs conducted according to USEPA’s technical guidance document “Guidelines for Determining Capture Efficiency”, January 9, 1995, and 40 CFR 51, Appendix M, Methods 204-204F, as applicable.
- (3) Demonstration of Transfer Efficiency of alternative application methods subject to subsection (C)(3)(a) shall be conducted in accordance with South Coast Air Quality Management District’s “Spray Equipment Transfer Efficiency Test Procedure for Equipment User” (May 24, 1989), and South Coast Air Quality Management District “Guidelines for Demonstrating Equivalency With District Approved Transfer Efficiency Spray Gun” September 26, 2002.
- (4) Calculation of VOC Content:
- (a) For the purpose of determining compliance with the VOC Content limits in Section (C), the VOC Content of a Coating shall be determined by using the procedures in subsection (i) or (ii) below, as appropriate. If the manufacturer does not recommend thinning, the VOC Content must be calculated for the product as supplied. The VOC Content of a Tint Base shall be determined without Colorant that is added after the Tint Base is manufactured. Effective (1 year after date of adoption), if the Coating is a multi-component product, the VOC Content must be calculated as mixed or catalyzed. Effective (1 year after date of adoption), if the Coating

contains Silanes, siloxanes, or other ingredients that generate ethanol or other VOCs during the curing process, the VOC Content must include the VOCs emitted during curing.

- (i) Regulatory VOC Content – The weight of VOC per combined volume of VOC and Coating solids, shall be calculated by the following equation:

$$VOC_{Regulatory} = \frac{W_v - W_w - W_{ec}}{V_m - V_w - V_{ec}}$$

Where:

$VOC_{Regulatory}$ = Weight of VOC per liter of Coating, less water and less Exempt Compounds

W_v = Weight of all volatile compounds, in grams

W_w = Weight of water, in grams

W_{ec} = Weight of Exempt Compounds, in grams

V_m = Volume of Coating material, in liters

V_w = Volume of water, in liters

V_{ec} = Volume of Exempt Compounds, in liters

- (ii) Actual VOC Content – The weight (in grams) of VOC per liter of Wood Products Coating material is expressed as grams VOC per liter of material, and shall be calculated by the following equation:

$$VOC_{Actual} = \frac{W_v - W_w - W_{ec}}{V_m}$$

VOC_{Actual} = Weight of VOC per liter of Coating

W_v = Weight of all volatile compounds, in grams

W_w = Weight of water, in grams

W_{ec} = Weight of Exempt Compounds, in grams

V_m = Volume of Coating material, including any added VOC-containing Solvents or reducers but excluding any colorant added to Tint the base in liters

- (5) VOC Composite Partial Vapor Pressure:

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

Where:

- PP_c = VOC composite partial pressure at 68 °F (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 68 °F (20 °C), in mm Hg

- (6) Overall Control Efficiency (C.E.) shall be calculated using the following equations:

$$\text{Capture Efficiency (\%)} = \left(\frac{W_c}{W_e} \right) \times 100$$

Where:

- W_c = Weight of VOC entering control device
- W_e = Weight of VOC emitted from the source

$$\text{Control Device Efficiency (\%)} = \frac{(W_c - W_a)}{W_c} \times 100$$

Where:

W_c = Weight of VOC entering control device

W_a = Weight of VOC discharged from the control device

$$C.E. (\%) = \frac{(\text{Capture Efficiency}) \times (\text{Control Device Efficiency})}{100}$$

See SIP Table at <http://www.mdaqmd.ca.gov>