4.0 Adhesives & Sealants

4.1 Applicability

4.1.1 Except as provided in 4.4 of this regulation, 4.0 of this regulation applies to any person who, on or after May 1, 2009, sells, supplies for sale, offers for sale or manufactures for sale in the State of Delaware any adhesive, sealant, adhesive primer or sealant primer for use in the State of Delaware.

4.1.2 Except as provided in 4.4 of this regulation, 4.0 of this regulation also applies to any person who uses or applies any adhesive, sealant, adhesive primer or sealant primer within the State of Delaware.

4.2 Definitions

Terms used but not defined in 4.0 of this regulation shall have the meaning given them in **7 DE Admin Code** 1101 or the CAA, as amended in 1990, in that order of priority.

"Acrylonitrile-butadiene-styrene welding adhesive" or "ABS welding adhesive" means any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene pipe, which is made by reacting monomers of acrylonitrile, butadiene and styrene.

"Adhesive" means any chemical substance that is applied for the purpose of bonding two surfaces together by other than mechanical means.

"Adhesive primer" means any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to provide a bonding surface.

"Aerospace component" means the fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile, or space vehicle, including passenger safety equipment.

"Aerosol adhesive" means an adhesive packaged as an aerosol product in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without the need for ancillary hoses or spray equipment.

"Architectural sealant or sealant primer" means any sealant or sealant primer intended by the manufacturer to be applied to stationary structures, including mobile homes, and their appurtenances. Appurtenances to an architectural structure include, but are not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain gutters and downspouts, and windows.

“Automotive glass adhesive primer” means an adhesive primer labeled by the manufacturer to be applied to automotive glass prior to installation of the glass using an adhesive/sealant. This primer improves the adhesion to pinch weld and blocks ultraviolet light.

“CARB” means the California Air Resources Board.

“Ceramic tile installation adhesive” means any adhesive intended by the manufacturer for use in the installation of ceramic tiles.

“Chlorinated polyvinyl chloride plastic” or “CPVC plastic” means a polymer of the vinyl chloride monomer that contains 67% chlorine and is normally identified with a CPVC marking.

“Chlorinated polyvinyl chloride welding adhesive” or “CPVC welding adhesive” means an adhesive labeled for welding of chlorinated polyvinyl chloride plastic.

“Cleanup solvent” means a VOC-containing material used to remove a loosely held uncured (i.e., not dry to the touch) adhesive or sealant from a substrate, or to clean equipment used in applying an adhesive or sealant.

“Computer diskette jacket manufacturing adhesive” means any adhesive intended by the manufacturer to glue the fold-over flaps to the body of a vinyl computer diskette jacket.

"Contact bond adhesive" means an adhesive that: (1) is designed for application to both surfaces to be bonded together, and (2) is allowed to dry before the two surfaces are placed in contact with each other, and (3) forms an immediate bond that is impossible, or difficult, to reposition after both adhesive-coated surfaces are placed in contact with each other, and (4) does not need sustained pressure or clamping of surfaces after the adhesive-coated surfaces have been brought together using sufficient momentary pressure to establish full contact between both surfaces. Contact bond adhesive does not include rubber cements that are primarily intended for use on paper substrates. Contact bond adhesive also does not include vulcanizing fluids that are designed and labeled for tire repair only.

“Cove base” means a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or to form an inside corner.

“Cove base installation adhesive” means any adhesive intended by the manufacturer to be used for the installation of cove base or wall base on a wall or vertical surface at floor level.

“Cyanoacrylate adhesive” means any adhesive with a cyanoacrylate content of at least 95% by weight.

“Dry wall installation” means the installation of gypsum dry wall to studs or solid surfaces using an adhesive formulated for that purpose.

“Exempt compound” means a compound identified as exempt under the definition of volatile organic compound (VOC) in **7 DE Admin Code** 1101.

“Flexible vinyl” means non-rigid polyvinyl chloride plastic with at least five percent by weight plasticizer content.

“Fiberglass” means a material consisting of extremely fine glass fibers.

“Indoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesives used to install ceramic tile and perimeter bonded sheet flooring with vinyl backing onto a non-porous substrate, such as flexible vinyl, are excluded from this category.

“Laminate” means a product made by bonding together two or more layers of material.

“Low-solids adhesive, sealant or primer” means any product that contains 120 grams or less of solids per liter of material.

“Marine deck sealant” or “marine deck sealant primer” means any sealant or sealant primer labeled for application to wooden marine decks.

“Medical equipment manufacturing” means the manufacture of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheostomy tubes, blood oxygenators, and cardiatory reservoirs.

“Metal to urethane/rubber molding or casting adhesive” means any adhesive intended by the manufacturer to bond metal to high density or elastomeric urethane or molded rubber materials, in heater molding or casting processes, to fabricate products such as rollers for computer printers or other paper handling equipment.

“Multipurpose construction adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including but not limited to drywall, subfloor, panel, fiberglass reinforced plastic (FRP), ceiling tile and acoustical tile.

“Nonmembrane roof installation/repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of nonmembrane roofs and that is not intended for the installation of prefabricated single-ply flexible roofing membrane, including, but not limited to, plastic or asphalt roof cement, asphalt roof coating and cold application cement.

“Outdoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of floor covering that is not

in an enclosure and that is exposed to ambient weather conditions during normal use.

"Panel installation" means the installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, and similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

"Perimeter bonded sheet flooring installation" means the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip of up to four inches wide around the perimeter of the sheet flooring.

"Plastic cement welding adhesive" means any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

"Plastic cement welding adhesive primer" means any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

"Plastic foam" means foam constructed of plastics.

"Plasticizer" means a material, such as a high boiling point organic solvent, that is incorporated into a vinyl to increase its flexibility, workability, or distensibility, as determined by ASTM Method D1045-95 (see 4.6.5 of this regulation).

"Plastics" means synthetic materials chemically formed by the polymerization of organic (carbon-based) substances. Plastics are usually compounded with modifiers, extenders, and/or reinforcers and are capable of being molded, extruded, cast into various shapes and films or drawn into filaments.

"Polyvinyl chloride plastic" or "PVC plastic" means a polymer of the chlorinated vinyl monomer that contains 57% chlorine.

"Polyvinyl chloride welding adhesive" or "PVC welding adhesive" means any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

"Porous material" means a substance that has tiny openings, often microscopic, in which fluids may be absorbed or discharged, including, but not limited to, wood, paper and corrugated paperboard.

"Propellant" means a fluid under pressure that expels the contents of a container when a valve is opened.

"Reactive diluent" means a liquid that is a reactive organic compound during application and one in that, through chemical and/or physical reactions, such as polymerization, twenty (20) percent or more of the reactive organic compound becomes an integral part of a finished material.

“Roadway sealant” means any sealant intended by the manufacturer for application to public streets, highways and other surfaces, including but not limited to curbs, berms, driveways and parking lots.

“Rubber” means any natural or manmade rubber substrate, including but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber, chlorosulfonated polyethylene and ethylene-propylene-diene terpolymer.

“SCAQMD” means the South Coast Air Quality Management District, a part of the California Air Resources Board, which is responsible for the regulation of air quality in the State of California.

“Sealant primer” means any product intended by the manufacturer for application to a substrate, prior to the application of a sealant, to enhance the bonding surface.

“Sealant” means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealants include sealant primers and caulks.

“Sheet-applied rubber installation” means the process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from corrosion or abrasion. These operations also include laminating sheet rubber to fabric by hand.

“Single-ply roof membrane” means a prefabricated single sheet of rubber, normally ethylene-propylene-diene terpolymer, that is field applied to a building roof using one layer of membrane material.

“Single-ply roof membrane installation and repair adhesive” means any adhesive labeled for use in the installation or repair of single-ply roof membrane. Installation includes, as a minimum, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes and ducts that protrude through the membrane. Repair includes gluing the edges of torn membrane together, attaching a patch over a hole and reapplying flashings to vents, pipes or ducts installed through the membrane.

“Single-ply roof membrane adhesive primer” means any primer labeled for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

“Single-ply roof membrane sealant” means any sealant labeled for application to single-ply roof membrane.

“Solvent” means organic compounds that are used as diluents, thinners, dissolvers, viscosity reducers, cleaning agents or other related uses.

“Structural glazing adhesive” means any adhesive intended by the manufacturer to apply glass, ceramic, metal, stone or composite panels to exterior building frames.

“Subfloor installation” means the installation of subflooring material over floor joists, including the construction of any load bearing joists. Subflooring is covered by a finish surface material.

“Surface preparation solvent” means a solvent used to remove dirt, oil and other contaminants from a substrate prior to the application of a primer, adhesive or sealant.

“Thin metal laminating adhesive” means any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic in the production of electronic or magnetic components in which the thickness of the bond line or lines is less than 0.25 mils.

“Tire repair” means a process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

“Tire tread adhesive” means any adhesive intended by the manufacturer for application to the back of precure tread rubber and to the casing and cushion rubber. Tire tread adhesive may also be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

“Traffic marking tape” means preformed reflective film intended by the manufacturer for application to public streets, highways and other surfaces, including but not limited to curbs, berms, driveways and parking lots.

“Traffic marking tape adhesive primer” means any primer intended by the manufacturer for application to surfaces prior to installation of traffic marking tape.

“Undersea-based weapons systems components” means the fabrication of parts, assembly of parts or completed units of any portion of a missile launching system used on undersea ships.

“Waterproof resorcinol glue” means a two-part resorcinol-resin-based adhesive designed for applications where the bond line must be resistant to conditions of continuous immersion in fresh or salt water.

4.3 Requirements

4.3.1 Except as provided in 4.3.5 and 4.4 of this regulation, on and after May 1, 2009, no person shall sell, supply for sale or offer for sale in the State of Delaware any adhesive, sealant, adhesive primer or sealant primer manufactured on or after May 1, 2009, or manufacture for sale in the State of Delaware any adhesive, sealant, adhesive primer or sealant primer with a VOC content in

excess of the applicable VOC content limits specified in Table 4-1 of this regulation.

4.3.2 Except as provided in 4.3.5 and 4.4 of this regulation, on and after May 1, 2009, no person shall use or apply any adhesive, sealant, adhesive primer or sealant primer within the State of Delaware with a VOC content in excess of the applicable VOC content limits specified in Table 4-1 of this regulation.

4.3.3 The VOC content limits in Table 4-1 of this regulation for "Adhesives Applied by Substrate" shall apply as follows:

4.3.3.1 For any adhesive or sealant subject to a specific VOC content limit for such adhesive or sealant in Table 4-1 of this regulation, such specific limit is applicable rather than any "Adhesives Applied by Substrate" limit; and

4.3.3.2 If an adhesive is used to bond dissimilar substrates together, the applicable "Adhesives Applied by Substrate" limit that provides for the highest VOC content shall be the limit for such use.

4.3.4 Any person subject to 4.0 of this regulation using a surface preparation solvent or a cleanup solvent shall:

4.3.4.1 Except as provided in 4.3.4.2 of this regulation, not use any surface preparation solvent containing VOCs unless the VOC content of such surface preparation solvent is less than 70 grams per liter;

4.3.4.2 Not use any surface preparation solvent containing VOCs in applying single-ply roofing unless the composite vapor pressure, excluding water and exempt compounds, of the surface preparation solvent is equal to or less than 45 mm Hg at 20 degrees Celsius;

4.3.4.3 Except as provided in 4.3.4.4 of this regulation, not use any cleanup solvent containing VOCs for the removal of adhesives, sealants, adhesive primers or sealant primers from surfaces unless the composite vapor pressure of such solvent used is less than 45 mm Hg at 20 degrees Celsius; and

4.3.4.4 Not use any cleanup solvent containing VOCs for the removal of an adhesive, sealant, adhesive primer or sealant primer from the parts of spray application equipment, unless:

4.3.4.4.1 All cleaning is conducted in an enclosed cleaning system, or equivalent cleaning system as determined by the test method identified in 4.6.8 of this regulation,

4.3.4.4.2 Except as provided for in 4.3.4.4.3 of this regulation, only solvent is used with a VOC content of equal to or less than 70 grams of VOC per liter of material, and

4.3.4.4.3 Parts containing dried adhesive may be soaked in a solvent if the composite vapor pressure of the solvent, excluding water and exempt compounds, is equal to or less than 9.5 mm Hg at 20 degrees Celsius, and the parts and solvent are in a closed container that remains closed except when adding parts to or removing parts from the container.

4.3.5 A person using or applying an adhesive, sealant, adhesive primer or sealant primer subject to 4.0 of this regulation may comply with 4.3.2 and 4.3.4 of this regulation using add-on air pollution control equipment if such equipment meets the following requirements:

4.3.5.1 The VOC emissions from the use or application of all adhesives, sealants, adhesive primers or sealant primers subject to 4.0 of this regulation are reduced by an overall capture and control efficiency of at least 85%, by weight; and

4.3.5.2 The requirements of 4.3.5.1 of this regulation, and any monitoring, recordkeeping and reporting that is necessary to make such requirements enforceable as a practicable manner, are included in a permit issued by the Department pursuant to **7 DE Admin Code** 1102.

4.3.6 Any person using or applying adhesives, sealants, adhesive primers, sealant primers, surface preparation solvents or clean-up solvents subject to 4.0 of this regulation shall store or dispose of all absorbent materials, such as cloth or paper, which are moistened with adhesives, sealants, primers or solvents, in non-absorbent containers that shall be closed except when placing materials in or removing materials from the container.

4.3.7 No person shall solicit, require the use or specify the application of any adhesive, sealant, adhesive primer, sealant primer, surface preparation or clean-up solvent if such use or application results in a violation of the provisions of 4.0 of this regulation. The prohibition of 4.3.7 of this regulation shall apply to all written or oral contracts under which any adhesive, sealant, adhesive primer, sealant primer, surface preparation solvents or clean-up solvent subject to 4.0 of this regulation is to be used at any location in the State of Delaware.

Table 4-1. VOC Content Limits for Adhesives, Sealants, Adhesive Primers, Sealant Primers and Adhesives Applied by Substrate

Adhesive, Sealant, Adhesive Primer or Sealant Primer Category	VOC Content Limit (grams VOC per liter*)
Adhesives	
ABS welding	400
Ceramic tile installation	130
Computer diskette jacket manufacturing	850
Contact bond	250
Cove base installation	150

Adhesive, Sealant, Adhesive Primer or Sealant Primer Category	VOC Content Limit (grams VOC per liter*)
CPVC welding	490
Indoor floor covering installation	150
Metal to urethane/rubber molding or casting	850
Multipurpose construction	200
Nonmembrane roof installation/repair	300
Other plastic cement welding	510
Outdoor floor covering installation	250
PVC welding	510
Single-ply roof membrane installation/repair	250 **
Structural glazing	100
Thin metal laminating	780
Tire retread	100
Perimeter bonded sheet vinyl flooring installation	660
Waterproof resorcinol glue	170
Sheet-applied rubber installation	850
Sealants	
Architectural	250
Marine deck	760
Nonmembrane roof installation/repair	300
Roadway	250
Single-ply roof membrane	450 **
Other	420
Adhesive Primers	
Automotive glass	700
Plastic cement welding	650
Single-ply roof membrane	250 **
Traffic marking tape	150
Other	250
Sealant Primers	
Non-porous architectural	250
Porous architectural	775
Marine deck	760
Other	750

Adhesive, Sealant, Adhesive Primer or Sealant Primer Category	VOC Content Limit (grams VOC per liter*)
Adhesive Applied by Substrate	
Flexible vinyl	250
Fiberglass	200
Metal	30
Porous material	120
Rubber	250
Other substrates	250

* The VOC content is determined as the weight of volatile compounds, less water and exempt compounds as specified pursuant to 4.6 of this regulation.

**For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.

4.4 Exemptions and Exceptions

4.4.1 The requirements of 4.0 of this regulation shall not apply to the following compounds:

4.4.1.1 Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory, provided records are maintained as required in 4.5 of this regulation;

4.4.1.2 Adhesives, sealants, adhesive primers and sealant primers that are subject to 2.0 of this regulation;

4.4.1.3 Adhesives and sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and less exempt compounds, as applied;

4.4.1.4 Adhesives, sealants, adhesive primers and sealant primers that are subject to **7 DE Admin Code** 1124

4.4.1.5 Cyanoacrylate adhesives; and

4.4.1.6 Except for plastic cement welding adhesives and contact adhesives, any adhesive, sealant, adhesive primer or sealant primer that is sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less,.

4.4.1.7 Contact adhesives that are sold or supplied by the manufacturer or supplier in containers with a net volume of one gallon or less.

4.4.2 The requirements of 4.0 of this regulation shall not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation and cleanup solvents in the following operations:

4.4.2.1 Tire repair operations, provided the label of the adhesive states "For tire repair only;"

4.4.2.2 Assembly, repair and manufacture of aerospace components or undersea-based weapon systems components;

4.4.2.3 Medical equipment manufacturing;

4.4.2.4 Automobile and light duty truck original equipment manufacture regulated under other VOC limiting regulations by the State of Delaware.

4.4.3 The provisions of 4.0 of this regulation shall not apply if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the source are less than 200 pounds per calendar year, or an equivalent volume. Any person claiming exemption pursuant to 4.4.3 of this regulation shall record and maintain monthly operational records sufficient to demonstrate compliance and in accordance with 4.5 of this regulation.

4.4.4 The provisions of 4.3.2 and 4.3.4 of this regulation shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per calendar year. Any person claiming exemption pursuant to 4.4.4 of this regulation shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with 4.5 of this regulation.

4.4.5 The provisions of 4.0 of this regulation shall not apply to a manufacturer or distributor who sells, supplies for sale or offers for sale in the State of Delaware any adhesive, sealant, adhesive primer or sealant primer that does not comply with 4.3.1 of this regulation provided that such manufacturer or distributor makes and keeps records demonstrating:

4.4.5.1 The adhesive, sealant, adhesive primer or sealant primer is intended for shipment and use outside of the State of Delaware; and

4.4.5.2 The manufacturer or distributor has taken reasonable precautions to assure that the adhesive, sealant, adhesive primer or sealant primer is not distributed to or within the State of Delaware.

4.4.6 The provisions of 4.4.5 of this regulation shall not apply to any adhesive, sealant, adhesive primer or sealant primer that is sold, supplied for sale or offered for sale by any person to a retail outlet in the State of Delaware.

4.4.7 The provisions of 4.3.1 of this regulation shall not apply to the sale of any adhesive, sealant, adhesive primer or sealant primer to a person using State of Delaware permitted add-on air pollution control equipment, pursuant to 4.3.5 of this regulation, to comply with the requirements of 4.0 of this regulation.

4.5 Administrative Requirements

4.5.1 Each person subject to 4.0 of this regulation shall maintain records of each adhesive, sealant, adhesive primer, sealant primer cleanup solvent and surface preparation solvent in use and in storage at the facility, including, but not limited to, the following information:

4.5.1.1 A list of each adhesive, sealant, adhesive primer, sealant primer cleanup solvent and surface preparation solvent;

4.5.1.2 A data sheet or material list which provides the material name, manufacturer identification, and material application;

4.5.1.3 Catalysts, reducers or other components used, and the mix ratio;

4.5.1.4 The VOC content of each product as supplied;

4.5.1.5 The final VOC content or vapor pressure, as applied; and

4.5.1.6 The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup or surface preparation solvent used.

4.5.2 All records made to determine compliance with 4.0 of this regulation shall be maintained for five (5) years from the date such record is created and shall be made available to the Department within 90 days of a request.

4.5.3 For adhesives, sealants, adhesive primers and sealant primers subject to the laboratory testing exemption pursuant to 4.4.1.1 of this regulation, the person conducting the testing shall make and maintain records of all such materials used, including, but not limited to, the product name, the product category of the material or type of application and the VOC content of each material.

4.6 Compliance procedures and test methods

4.6.1 Except as provided in 4.6.3, 4.6.4 and 4.6.5 of this regulation, the VOC and solids content of all non-aerosol adhesives, adhesive primers and cleanup solvents shall be determined using U.S. EPA Reference Method 24, as identified in 40 CFR 60, Appendix A, or SCAQMD Method 304 hereby incorporated by reference.

4.6.2 The organic content of exempt organic compounds shall be determined using ASTM D4457-85, as applicable, hereby incorporated by reference.

4.6.3 The VOC content of any plastic welding cement adhesive or primer shall be determined using SCAQMD Method 316A, hereby incorporated by reference.

4.6.4 To determine if a diluent is a reactive diluent, the percent of the reactive organic compound that becomes an integral part of the finished materials shall be determined using SCAQMD Method 316A.

4.6.5 The composite vapor pressure of organic compounds in cleaning materials shall be determined by quantifying the amount of each compound in the blend using gas chromatographic analysis (ASTM D 1045-95), hereby incorporated by reference, for organics and ASTM D3792-05, hereby incorporated by reference, for water content, as applicable, and the following equation:

where:

$$Pp_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i)/Mw_i}{W_w / Mw_w + \sum_{j=1}^{m} We_j / Mwe_j + \sum_{i=1}^{n} W_i / Mw_i} \qquad (4\text{-}1)$$

Pp_c = VOC composite partial pressure at 20°C, in mm Hg

W_i = Weight of the "i"th VOC compound, in grams, as determined by ASTM E 260-91

Ww = Weight of water, in grams as determined by ASTM D 3792-05

We_j = Weight of the "j"th exempt compound, in grams, as determined by ASTM D 1045-95

Mw_i = Molecular weight of the "i"th VOC compound, in grams per g-mole, as given in chemical reference literature

Mww = Molecular weight of water, 18 grams per g-mole

Mwe_j = Molecular weight of the "j"th exempt compound, in grams per g-mole, as given in chemical reference literature

Vp_i = Vapor pressure of the "i"th VOC compound at 20°C, in mm Hg, as determined by 4.6.6 of this regulation

4.6.6 The vapor pressure of each single component compound may be determined from ASTM D2879-97, hereby incorporated by reference, or by any method approved by the Department and EPA.

4.6.7 If air pollution control equipment is used to meet the requirements of this rule, the owner or operator shall make the following determinations:

4.6.7.1 The measurement of capture efficiency shall be conducted and reported in accordance with the EPA Technical Document "Guidelines for Determining Capture Efficiency," issued January 9, 1995, hereby incorporated by reference; and

4.6.7.2 The control efficiency shall be determined in accordance with U.S. EPA Methods 25, 25A, 25B or CARB Method 100, hereby incorporated by reference.

4.6.8 The active and passive solvent losses from spray gun cleaning systems shall be determined using SCAQMD's “General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems,” dated October 3, 1989, hereby incorporated by reference. The test solvent for this determination shall be any lacquer thinner with a minimum vapor pressure of 105 mm of Hg at 20 degrees Celsius, and the minimum test temperature shall be 15 degrees Celsius.

4.6.9 For adhesives that do not contain reactive diluents, grams of VOC per liter of adhesive, less water and exempt compounds, shall be calculated according to the following equation:

$$VOC, grams\ per\ liter\ of\ adhesive = \frac{Ws - Ww - We}{Vm - Vw - Ve} \qquad (4\text{-}2)$$

where

Ws	=	weight of volatile compounds, in grams
Ww	=	weight of water, in grams
We	=	weight of exempt compounds, in grams
Vm	=	volume of material, in liters
Vw	=	volume of water, in liters
Ve	=	volume of exempt compounds, in liters

4.6.10 For adhesives that contain reactive diluents, the VOC content of the adhesive is determined after curing. The grams of VOC per liter of adhesive, less water and exempt compounds, shall be calculated according to the following equation:

$$VOC, grams\ per\ liter\ of\ adhesive = \frac{Wrs - Wrw - Wre}{Vrm - Vrw - Vre} \qquad (4\text{-}3)$$

where

Wrs = weight of volatile compounds not consumed during curing, in grams

Wrw = weight of water not consumed during curing, in grams
Wre = weight of exempt compounds not consumed during curing, in grams
Vrm = volume of material not consumed during curing, in liters
Vrw = volume of water not consumed during curing, in liters
Vre = volume of exempt compounds not consumed during curing, in liters

4.6.11 Grams of VOC per liter of material shall be calculated according to the following equation:

$$VOC, grams\ per\ liter\ of\ materials = \frac{Ws - Ww - We}{Vm} \qquad (4\text{-}4)$$

where
Ws = weight of volatile compounds, in grams
Ww = weight of water, in grams
We = weight of exempt compounds, in grams
Vm = volume of material, in liters

4.6.12 Percent VOC by weight shall be calculated according to the following equation:

$$\%VOC\ by\ weight = \frac{Wv}{W} \times 100 \qquad (4\text{-}5)$$

where
Wv = weight of VOCs in grams
W = weight of material in grams

4.7 Container labeling. Each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to 4.0 of this regulation shall display the following information on the product container or label:

4.7.1 A statement of the manufacturer's recommendation regarding thinning, reducing, or mixing of the product, except that:

4.7.1.1 This requirement does not apply to the thinning of a product with water; and

4.7.1.2. If thinning of the product prior to use is not necessary, the recommendation must specify that the product is to be applied without thinning;

4.7.2. The maximum or the actual VOC content of the product in accordance with 4.6 of this regulation, as supplied, displayed in grams of VOC per liter of product; and

4.7.3. The maximum or the actual VOC content of the product in accordance with 4.6 of this regulation, which includes the manufacturer's maximum recommendation for thinning, as applied, displayed in grams of VOC per liter of product.