

RULE 1168

Adhesive Applications

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOCs) from the application of adhesives, adhesive bonding primers, adhesive primers, or any other primers. This rule applies to all commercial and industrial applications of adhesives, adhesive bonding primers, adhesive primers, or any other primers, unless otherwise specifically exempted by this rule.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

- (1) ACRYLONITRILE-BUTADIENE-STYRENE (ABS) plastic is made by reacting monomers of acrylonitrile, butadiene, and styrene and is normally identified with an ABS marking.
- (2) ADHESIVE is any substance that is used to bond one surface to another surface by attachment.
- (3) ADHESIVE BONDING PRIMER is an adhesive applied to a surface to improve the bond of subsequent adhesives and sometimes to inhibit corrosion.
- (4) ADHESIVE PRIMER is a coating applied to a substrate, prior to the application of an adhesive, to provide a bonding surface.
- (5) ADHESIVE PRIMER FOR PLASTIC is a material applied to a plastic substrate alone or before applying an adhesive in order to obtain better adhesion.
- (6) ADHESIVE PROMOTER is a coating applied to a substrate in a monomolecular thickness to promote wetting and form a chemical bond with the subsequently applied material.
- (7) ADHESIVE SOLID is the nonvolatile portion of an adhesive that remains after heating a sample of the material at 110°C for one hour.
- (8) AEROSOL ADHESIVE is a mixture of rubber, resins, and liquid and gaseous solvents and propellants packaged in a disposable container for hand-held application.

- (9) AEROSOL SPRAY CAN is a hand held, pressurized, non-refillable container which expels adhesives from the container in a finely divided spray when a valve on the container is depressed.
- (10) AEROSPACE COMPONENT is the fabricated part, assembly of parts, or completed unit of any aircraft or space vehicle (excluding tires), and includes models, mock-ups, prototypes, and test coupons.
- (11) AIRCRAFT means any machine designed to travel through the air, without leaving the earth's atmosphere, whether heavier or lighter than air, including airplanes, balloons, dirigibles, helicopters, and missiles.
- (12) AIRCRAFT TIRE REPAIR is the repair and retreading of used tires used on aircraft. This includes the repair of damage to the tire casing, removal of old tread rubber and tread reinforcing materials, and application of new tread and tread reinforcing materials.
- (13) ANY OTHER PRIMER is a coating or adhesive applied to a substrate to improve adhesion of subsequently applied adhesive, except adhesive primer and adhesive bonding primer.
- (14) CARPET PAD INSTALLATION is the installation on a floor or comparable surface of carpet pad (or cushion) which is used beneath a carpet.
- (15) CERAMIC TILE INSTALLATION is the installation of ceramic tile products.
- (16) CERAMIC TILES are a ceramic surfacing unit made from clay or a mixture of clay and other materials.
- (17) CHLORINATED POLYVINYL CHLORIDE (CPVC) plastic is a polymer of the chlorinated polyvinyl monomer that contains 67% chlorine and is normally identified with a CPVC marking.
- (18) COATING SOLID is the nonvolatile portion of a coating that remains after heating a sample of the material at 110°C for one hour.
- (19) COMPUTER DISKETTE MANUFACTURING is the process where the fold-over flaps are glued to the body of a vinyl jacket.
- (20) COVE BASE INSTALLATION is the installation of cove base (or wall base), which is generally made of vinyl or rubber, on a wall or vertical surface at floor level.
- (21) DRY WALL INSTALLATION is the installation of gypsum dry wall to studs or solid surfaces.
- (22) EXEMPT COMPOUNDS are as defined in Rule 102.

- (23) FACILITY means any permit unit or grouping of permit units or other air contaminant-emitting activities which are located on one or more contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control). Such above-described groupings, if not contiguous, but connected only by land carrying a pipeline, shall not be considered one facility.
- (24) FIBERGLASS is fine filaments of glass.
- (25) FOAM is a rigid or spongy cellular mass with gas bubbles dispersed throughout.
- (26) GLUE is a hard gelatin obtained from hides, tendons, cartilage, bones, etc., of animals. Through general use, the term "glue" is synonymous with the term "adhesive."
- (27) GRAMS OF VOC PER LITER OF ADHESIVE, LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and adhesive solids, and can be calculated by the following equation:

Grams of VOC per Liter of Adhesive,

$$\text{Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: 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
 V_w = volume of water, in liters
 V_{es} = volume of exempt compounds, in liters

For adhesives that contain reactive diluents, the VOC content of the adhesive is determined after curing. The grams of VOC per liter of adhesive shall be calculated by the following equation:

Grams of VOC per Liter of Adhesive,

$$\text{Less Water and Less Exempt Compounds} = \frac{W_{rs} - W_{rw} - W_{res}}{V_{rm} - V_{rw} - V_{res}}$$

Where: W_{rs} = weight of volatile compounds not consumed during curing, in grams
 W_{rw} = weight of water not consumed during curing, in grams
 W_{res} = weight of exempt compounds not consumed during curing, in grams
 V_{rm} = volume of material prior to reaction, in liters
 V_{rw} = volume of water not consumed during curing, in liters

V_{res} = volume of exempt compounds not consumed during curing, in liters

- (28) Grams of VOC per Liter of Material is the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Where: 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

- (29) **HAND APPLICATION METHODS** is the application of adhesive by manually held equipment. Such equipment includes paint brush, hand roller, trowel, spatula, dauber, rag, sponges, and mechanically- and/or pneumatic-driven syringes without atomization of the materials.
- (30) **HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY** is equipment used to spray a coating by means of a gun that operates between 0.1 and 10 pounds per square inch gauge (psig) air pressure.
- (31) **INDOOR CARPET INSTALLATION** is the installation of a carpet that is in an enclosure and is not exposed to ambient weather conditions during normal use.
- (32) **LOW-SOLIDS ADHESIVE** is an adhesive which has less than one pound of solids per gallon of material.
- (33) **LOW-SOLIDS ADHESIVE PRIMER** is an adhesive primer which has less than one pound of solids per gallon of material.
- (34) **OUTDOOR CARPET INSTALLATION** is the installation of carpet that is not in an enclosure and is exposed to ambient weather conditions during normal use.
- (35) **PANEL INSTALLATION** is 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.
- (36) **PERCENT VOC BY WEIGHT** is the ratio of the weight of the VOC to the weight of the material, expressed as a percentage of VOC by weight. The percent VOC by weight can be calculated as follows:

$$\% \text{ VOC weight} = \frac{W_v}{W} \times 100$$

Where: W_v = Weight of the VOCs, in grams
 W = Weight of material in grams

- (37) PERSON is any individual, firm, association, organization, partnership, business, trust, corporation, company, contractor, supplier, installer, user or owner, or any state or local governmental agency or public district or any other officer or employee thereof. PERSON also means the United States or its agencies to the extent authorized by Federal law.
- (38) PLASTIC CEMENT WELDING is the use of adhesives made of resins and solvents which are used to dissolve the surfaces of plastic, except ABS, CPVC, and PVC plastic, to form a bond between mating surfaces.
- (39) PLASTIC FOAM is a foam constructed of plastics.
- (40) PLASTICS are various synthetic materials chemically formed by the polymerization of organic (carbon-based) substances. Plastics are usually compounded with modifiers, extenders, and/or reinforcers. They are used to produce pipe, solid sheet, film, or bulk products.
- (41) POLYURETHANE FOAMS are plastic foams, as defined in "Whittington's Dictionary of Plastics," page 329, and may be either rigid or flexible.
- (42) POLYVINYL CHLORIDE (PVC) plastic is a polymer of the chlorinated vinyl monomer that contains 57 percent chlorine and is normally identified with a PVC marking.
- (43) POROUS MATERIAL is a substance which has tiny openings, often microscopic, in which fluids may be absorbed or discharged.
- (44) PROPELLANT is a fluid under pressure which expels the contents of a container when a valve is opened.
- (45) REACTIVE DILUENT is a liquid which is a VOC during application and one in which, through chemical and/or physical reactions, such as polymerization, 20 percent or more of the VOC becomes an integral part of a finished material.
- (46) ROLL COATER is a series of mechanical rollers that form a thin coating or adhesive film on the surface roller, which is applied to a substrate by moving the substrate underneath the roller.
- (47) RUBBER FLOORING INSTALLATION is the installation of flooring material in which both the back and the top surface are made of synthetic rubber, and which may be in sheet or tile form.
- (48) RUBBER FOAM is a foam constructed of natural or synthetic rubber.
- (49) SOLVENT WELDING is the softening of the surfaces of two substrates by wetting them with solvents and/or adhesives, and joining them together with a chemical and/or physical reaction(s) to form a fused union.

- (50) SPACE VEHICLE is a vehicle designed to travel beyond Earth's atmosphere.
- (51) SUBFLOOR INSTALLATION is the installation of subflooring material over floor joists; and includes the construction of any load bearing joints in joists or trusses.
- (52) THIN METAL LAMINATING is a process of 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(s) is less than 0.25 mil.
- (53) TIRE REPAIR is the expanding of a hole, tear, fissure, or blemish in a tire casing by grinding or gouging, applying adhesive, and filling the hole or crevice with rubber.
- (54) TRANSFER EFFICIENCY is the ratio of the weight or volume of coating solids adhering to an object to the total weight or volume, respectively, of coating solids used in the application process, expressed as a percentage.
- (55) VCT means vinyl composition tile.
- (56) VISCOSITY is the internal friction of a liquid that makes it resistant to flow.
- (57) VOLATILE ORGANIC Compound (VOC) is any volatile compound which contains the element carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and excluding exempt compounds.
- (58) WOOD FLOORING INSTALLATION is the installation of a wood floor surface, which may be in the form of parquet tiles, planks, or strip-wood.
- (59) WOOD PARQUET FLOORING is wood flooring in tile form constructed of smaller pieces of wood which are joined together in a pattern by the maker to form the tile.
- (60) WOOD PLANK Flooring is solid or laminated wood in plank form.

(c) **Requirements**

- (1) After January 1, 1993, a person shall not apply adhesives, adhesive bonding primers, adhesive primers, or any other primer which have a VOC content in excess of 250 g/L less water and less exempt compounds unless otherwise specified in paragraph (c)(2).
- (2) A person shall not apply adhesives, adhesive bonding primers, adhesive primers, or any other primer which have a VOC content in excess of the limits specified below:

- (A) For adhesives, adhesive bonding primers, adhesive primers, or any other primer used in the following welding or installation operations:

<u>Operation</u>	<u>VOC - Less Water and Less Exempt Compounds Grams</u>			
	<u>Effective 1/1/93</u>	<u>Effective 1/1/94</u>	<u>Per Liter Effective 4/11/97</u>	<u>Effective 1/1/03</u>
Non-Vinyl Backed Indoor Carpet Installation	150	150	150	150
Carpet Pad Installation	150	150	150	150
Wood Flooring Installation	150	150	150	150
Ceramic Tile Installation	130	130	130	130
Dry Wall and Panel Installation	200	200	200	200
Subfloor Installation	200	200	200	200
Rubber Floor Installation	150	150	150	150
VCT and Asphalt Tile Installation	150	150	150	150
PVC Welding	850	450	510	285
CPVC Welding	850	450	490	270
ABS Welding	850	350	400	400
Plastic Cement Welding	850	350	350	250
Cove Base Installation	150	150	150	150
Adhesive Primer for Plastic	650	650	650	250
Computer Diskette Mfg			350	350

- (B) For adhesives, adhesive bonding primers, or any other primer not regulated by (c)(2)(A) and applied to the following substrates, the following limits shall apply:

<u>Substrate</u>	<u>VOC - Less Water and Less Exempt Compounds Grams Per Liter Effective 1/1/93</u>
Metal to Metal	30
Plastic Foams	120
Porous Material (except wood)	120
Wood	30
Fiberglass	200

If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.

- (3) For low-solids adhesives and low-solids adhesive primers, the appropriate limits in paragraph (c)(1), and paragraph (c)(2) shall be expressed in Grams of VOC per Liter of Material.

- (4) Containers used to dispose of VOC-laden cloth or paper used in stripping cured adhesives shall be closed except when depositing or removing VOC-laden cloth or paper from the container.
- (5) Solvent Cleaning Operations; Storage and Disposal of VOC-containing Materials shall be conducted in accordance with the provisions of (Rule 1171 - Solvent Cleaning Operations).
- (6) Transfer Efficiency

A person shall not apply adhesives unless the adhesive is applied with properly operating equipment in accordance with operating procedures specified by either the equipment manufacturer or the Executive Officer. Application of adhesives shall be accomplished only by the use of one of the following methods:

- (A) Electrostatic application; or
 - (B) Flow coat; or
 - (C) Dip coat; or
 - (D) Roll coater; or
 - (E) High-Volume, Low-Pressure (HVLP) spray; or
 - (F) Hand Application Methods; or
 - (G) Such other adhesive application methods as are demonstrated to the Executive Officer to be capable of achieving at least 65 percent transfer efficiency and for which prior written approval of the Executive Officer has been obtained; or
 - (H) For adhesives with a viscosity of 200 centipoise or greater, as applied, airless spray, air-assisted airless, and air-atomized spray may also be used.
- (7) A person may comply with the provisions of paragraphs (c)(1), (c)(2), or (c)(6), or all three, by using approved air pollution control equipment, provided that the VOC emissions from such operations and/or materials are reduced by 80 percent overall, by weight.
 - (8) A person may comply with the provisions of paragraph (c)(1) and paragraph (c)(2) by means of an Alternative Emission Control Plan pursuant to Rule 108.

(d) Air Quality Management Plan (AQMP) Technology Assessment

By 2002, the AQMD will perform a Technology Assessment to determine whether additional reductions from adhesive operations are feasible or necessary in order to achieve the objectives of the AQMP and to determine whether the emission limits for PVC Welding, CPVC Welding, Plastic Cement Welding, and Adhesive Primer for Plastic will be feasible by the effective date of January 1, 2003.

(e) Recordkeeping Requirements

Notwithstanding provisions of subdivision (i), records shall be maintained pursuant to Rule 109.

(f) Methods of Analysis

The VOC content of cleaning materials and adhesives shall be determined by using USEPA Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating, Code of Federal Regulations Title 40, Appendix A, utilizing Procedure B of ASTM Method D2369), or the SCAQMD Method 304.

The exempt compound's content shall be determined by Methods 302 and 303 in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples."

The VOC content of PVC, CPVC, and ABS pipe cements, adhesive primer for plastic, and adhesive used in computer diskette manufacturing containing reactive diluents shall be determined by Method 316a in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Method of Analysis for Enforcement Samples."

(g) Test Methods

(1) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined by USEPA's Test Method 18, or Air Resources Board (ARB) Method 422 for the determination of emissions of Exempt Compounds and USEPA's Test Methods 25, 25A, or SCAQMD's Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) for the determination of total organic compound emissions. Emissions determined to exceed any limits established by this rule through the use of any of the above-referenced test methods shall constitute a violation of the rule.

(2) Viscosity will be determined by ASTM D 1084-88.

- (3) The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the coating formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the SCAQMD, that can be used to quantify the amounts of each exempt compound.

(h) Prohibition of Specifications

- (1) A person shall not solicit or require any other person to use, in the District, any adhesives or combination of adhesives in violation of the requirements of this rule.
- (2) The requirements of this paragraph shall apply to all written or oral agreements executed or entered into after July 1, 1989.

(i) Rule 442 Applicability

- (1) Any adhesive, adhesive coating operation, or person which is subject to this rule shall comply with the provisions of Rule 442 until such time as compliance with the limits specified in this rule is required unless achieved earlier.
- (2) Any adhesive, adhesive application operation, or person which is exempt from all or a portion of this rule, shall comply with the provisions of Rule 442.

(j) Exemptions

- (1) The provisions of paragraph (c)(1) and paragraph (c)2) shall not apply to the following:
 - (A) Adhesives used in tire repair; or
 - (B) Adhesives and/or adhesive application processes in compliance with Rules 1104, 1106, 1124, 1128, 1130 and 1130.1.
- (2) The provisions of this rule shall not apply to aerospace components.
- (3) The provisions of paragraph (c)(7) and subdivision (e) shall not be applied to the application of adhesives that contain less than 20 g/L of VOC per liter of adhesives, less water and less exempt compounds.

- (4) The provisions of paragraph (c)(1) of this rule shall not apply to adhesives which are sold or supplied by the manufacturers or suppliers in the following containers:
- (A) Tubes that have a capacity of eight liquid ounces or less; or
 - (B) Any other container, that has a capacity of 5 liquid ounces or less.
- (5) The provisions of this rule shall not apply to any facility that uses less than one pint of adhesives in any one day.
- (6) The provisions of subdivision (c) shall not apply to research and development programs and quality assurance labs, provided that:
- (A) A record is kept of:
 - (i) the date when the adhesives are used, and the type of application(s); and
 - (ii) the amount of adhesives used and the VOC content of such adhesives; and
 - (iii) the amount of solvents used and VOC content of such solvents; and
 - (B) Such records shall be retained in accordance with the provisions of subdivision (e) of this rule.
- (7) The provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to adhesives, adhesive primers, and adhesive bonding primers with separate formulations that are used in volumes of less than 10 gallons each per facility per year .
- (8) The provisions of this rule shall not apply to adhesives used to glue whole flowers to parade floats.
- (9) The provisions of subdivision (c) shall not apply to solvent welding operations used in the manufacturing of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheotomy tubes, blood oxygenators, and cardiatory reservoirs.
- (10) The provisions of this rule shall not apply to aerosol adhesives and primers dispensed from aerosol spray cans.
- (11) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using four gallons per day or less of adhesive used exclusively for computer diskette manufacturing, provided that the adhesive contains less than 550 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.

- (12) Until January 1, 2003, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using three gallons per day or less of adhesive used exclusively for thin metal laminating operations, provided that the adhesive contains less than 780 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.
- (13) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using nine gallons per day or less of adhesive based on a monthly average used exclusively for applying fabric to neoprene sponge in wet suit manufacturing operations, provided that the adhesive contains less than 625 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.
- (14) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using two gallons per day or less of hot bond adhesive used exclusively for rubber gasket splicing operations, provided that the adhesive contains less than 625 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.
- (15) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using two gallons per day or less of hot bond adhesive used exclusively for inflatable rubber seal manufacturing operations, provided that the adhesive contains less than 625 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.
- (16) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using three gallons per day or less of hot bond adhesive used exclusively for the manufacture of molded rubber components with metal or resin inserts, provided that the adhesive contains less than 650 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied.
- (17) Until January 1, 1998, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any facility using ten gallons per day or less of adhesive and primer used exclusively for rubber sheet-applied lining operations, provided that the adhesive contains less than 850 grams of VOC per liter of adhesive or primer, less water and less exempt compounds, as applied.

[SIP: Submitted as amended 12/10/93 on 10/19/94; Submitted as amended 12/4/92 on 5/13/93; Submitted as amended 8/2/91 on 9/14/92; Submitted as amended _____ on 12/31/90; Submitted as amended _____ on 3/26/90]