

TEHAMA COUNTY AIR POLLUTION CONTROL DISTRICT
Rule 4:29 Polyester Resin Operations (Volatile Organic Compound Control Measure)
Adopt 3/14/95

- 1 Purpose: To control Volatile Organic Compound emissions from polyester resin operations.
- 2 Applicability: This rule is applicable to all commercial and industrial stationary sources performing polyester resin operations.
- 3 Exemption, Touch-Up and Repair: The provisions of section [5](#) shall not apply to touch-up and repair.
- 4 Definitions:
 - 4.1 Airless Spray: A coatings spray application system using high fluid pressure to atomize the coating without compressed air.
 - 4.2 Air-Assisted Airless Spray: A coating application system in which the coating fluid is supplied to the gun under fluid pressure and air is combined at the spray cap.
 - 4.3 Catalyst: A substance added to the resin to initiate polymerization.
 - 4.4 Cleaning Materials: Materials used for cleaning, including but not limited to, hands, tools, molds, application equipment, and work areas.
 - 4.5 Closed Mold System: A method of forming an object from polyester resins by placing the material in a confining mold cavity and applying pressure and/or heat.
 - 4.6 Control System: An emission control device and its associated collection system.
 - 4.7 Corrosion-Resistant Materials: Polyester resin materials used to make products for corrosion resistant applications such as tooling, fuel, or chemical tanks and boat hulls.
 - 4.8 Cross-Linking: The process of chemically bonding two or more polymer chains together.
 - 4.9 Cure: To polymerize, i.e., to transform from a liquid to a solid or semi-solid state to achieve desired product physical properties, including hardness.
 - 4.10 Electrostatic Spray: The spray application of coatings where an electrostatic potential is created between the part to be coated and the coating particles.
 - 4.11 Fiberglass: A fiber similar in appearance to wool or cotton fiber but made from glass.
 - 4.12 Gel Coat: A polyester resin surface coating that provides a cosmetic enhancement and improves resistance to degradation from exposure to the environment.
 - 4.13 Grams of VOC Per Liter of Material: The weight of VOC per volume of material as calculated by the following equation:

$$D = \frac{(W_s - W_w - W_{es})}{V_m}$$

where: D = Grams of VOC per Liter of Material
W_s = Mass of volatile materials in grams
W_w = Mass of water in grams

W_{es} = Mass of exempt compounds in grams
 V_m = Volume of materials in liters.

- 4.14 High Volume-Low Pressure: Spray equipment used to apply coatings by means of a gun which operates between 0.1 and 10 psi air pressure at the air cap of the spray gun.
- 4.15 Inhibitor: A substance used to slow down or prevent a chemical reaction.
- 4.16 Low-VOC Emissions Resin Systems: Polyester resin materials which contain vapor suppressants to reduce monomer evaporation loss.
- 4.17 Monomer: A comparatively volatile unsaturated compound such as styrene used to dissolve and subsequently copolymerize with less volatile unsaturated polyesters, for practical purposes, the volatile portion of a polyester resin liquid.
- 4.18 Polyester: A polymer containing repeating ester groups and multiple sites of unsaturation and which is soluble in styrene.
- 4.19 Polyester Resin Materials: Materials including, but not limited to, unsaturated polyester resins such as isophthalic, orthophthalic, halogenated, bisphenol-A, vinyl-ester, or furan resins; cross-linking agents; catalysts, gel coats, inhibitors, accelerators, promoters, and any other VOC-containing materials in polyester resin operations.
- 4.20 Polyester Resin Operations: Methods used for the production, rework, repair or touch-up of products by mixing, pouring, hand lay-up, impregnating, injecting, forming, winding, spraying, and/or curing unsaturated polyester resin materials.
- 4.21 Polymer: A chemical compound comprised of a large number of chemical units and which is formed by the chemical linking of monomers.
- 4.22 Repair: That part of the fabrication process that requires the addition of polyester resin material to portions of a previously fabricated product in order to mend structural damage.
- 4.23 Resin: Any of a class of organic polymers of natural or synthetic origin used in reinforced products to surround and hold fibers, and is solid or semi-solid in the cured state.
- 4.24 Specialty Resin: Any halogenated, furan, bisphenol-A, vinyl ester, or isophthalic resin used to make products for exposure to one or more of the following extreme environmental conditions: acute or chronic exposure to corrosive, caustic or acidic agents, or flame.
- 4.25 Touch-Up: That portion of the fabrication process that is necessary to cover minor imperfections.
- 4.26 Volatile Organic Compound (VOC): Any compound as defined in District Rule 1:2 - Definitions.
- 4.27 Vapor Suppressant: A substance added to a resin to minimize the outward diffusion of monomer vapor into the atmosphere.
- 4.28 Waste Materials: Those materials that include, but are not limited to, scraps resulting from cutting and grinding operations, any paper or cloth used for cleaning operations, waste resins, and any spent cleaning materials.

5 Standards:

- 5.1 Process and Control Requirements:

5.1.1 Any person operating a polyester resin operation shall comply with one or more of the following, as applicable:

5.1.1.1 The use of polyester resin material with a monomer content of no more than the following limits:

Monomer Content in Uncatalyzed Polyester Resin Materials as Applied (Weight Percent as Determined by South Coast)	
Polyester Resin Materials	AQMD Method 312
General Purpose Polyester Resin	35
Corrosion-Resistant	48
Fire Retardant	42
High Strength	48
Clear Gel Coat	50
Pigmented Gel Coat	45
Specialty Resin	50

5.1.1.2 The use of a resin containing a vapor suppressant, so that weight loss from VOC emissions does not exceed 60 grams per square meter of exposed surface area during resin polymerization; as determined by section [5.1.1](#), [6.1.1](#) of this rule; or

5.1.1.3 The use of a closed-mold system; or

5.1.1.4 The use of an emissions control system approved by the APCO which is designed and operated for the collection of fugitive emissions from polyester resin material, and which has a control device with an overall control and capture efficiency of 85 percent or more on a mass basis as determined by sections [6.1.2](#) and [6.1.7](#) of this rule.

5.1.1.5 Only airless, air-assisted airless, high volume-low pressure, or electrostatic spray equipment shall be used for the application of polyester resin materials in spraying operations.

5.2 Cleaning Material Requirements:

5.2.1 Where the use of cleaning materials containing more than 1.7 pounds of VOC per gallon of material as applied and as determined by section [6.1.6](#) of this rule or having a initial boiling point less than 190 oC, as determined by section [6.1.4](#) of this rule, exceeds four (4) gallons per day, a cleaning material reclamation system shall be used. Such a reclamation system shall operate with at least 80 percent efficiency. Solvent residues for on-site reclamation systems shall not contain more than 20 percent VOC by weight as determined by section [6.1.5](#) of this rule.

5.3 Storage and Disposal Requirements:

5.3.1 Closed containers shall be used for the storage of all uncured polyester resin materials, cleaning materials, and any unused VOC containing materials except when being accessed for use.

- 5.3.2 Self-closing containers shall be used in such a manner that effectively controls VOC emissions to the atmosphere for the disposal of all uncured polyester resin materials, cleaning materials, waste materials, and any unused VOC containing materials.
- 5.4 Compliance Dates:
 - 5.4.1 Any person subject to the requirements of this Rule shall be in compliance with all provisions within twelve months from date of adoption.
 - 5.4.2 Facilities operating prior to the date of adoption of this Rule which elect to install and operate an emission control system pursuant to the requirements of section [5.1.1.4](#) shall have the control system installed and operating within 18 months from date of adoption of this Rule.
- 6 Monitoring And Recordkeeping:
 - 6.1 Test Methods: The analysis of cleaning materials, polyester resin materials, and control/collection efficiency shall be determined by the appropriate test methods as follows:
 - 6.1.1 South Coast AQMD Method 309, "Static Volatile Emissions" shall be used to determine weight loss of volatile organic compound from vapor suppressed resins.
 - 6.1.2 EPA Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer".
 - 6.1.3 EPA Method 18, "Measurement of Gaseous Organic Compound Emissions by Gas Chromatography".
 - 6.1.4 ASTM D1078-86, "Distillation Range of Volatile Organic Liquids".
 - 6.1.5 California Air Resources Board Method 401, "Gravimetric Purge and Trap".
 - 6.1.6 EPA Method 24, "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings".
 - 6.1.7 40 CFR 52.741, Appendix B, "VOM Measurement Techniques for Capture Efficiency".
 - 6.2 Recordkeeping: Any person subject to this rule shall comply with the following requirements:
 - 6.2.1 A person shall maintain, or have available, a current list of polyester resins and cleaning materials in use which provides all of the data necessary to evaluate compliance, including the following information:
 - 6.2.1.1 Polyester resin, catalyst, and cleaning materials used;
 - 6.2.1.2 The weight percent of monomer in each of the polyester resin materials, and the grams of VOC per liter for the cleaning materials.
 - 6.2.1.3 For approved vapor suppressed resins, the weight loss (grams per square meter) during resin polymerization, the monomer percentage, and the gel time for each resin.
 - 6.2.1.4 The amount of each of the polyester resin materials and cleaning materials used during each day of operations.

- 6.2.1.5 The volume of polyester resin materials and cleaning materials used for touch-up and repair during each day of operation.
- 6.2.1.6 Records of hours of operation and key operating parameters for any emissions control system.
- 6.2.2 All records required by this rule shall be retained and made available for inspection by the Air Pollution Control Officer for the previous 24 month period.

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