

**RULE 349. POLYESTER RESIN OPERATIONS.** (Adopted 4/27/1993, revised [date of amended rule adoption])

**A. Applicability**

This rule shall apply to any person owning or operating any all-commercial and/or industrial polyester resin operations.

**B. Exemptions**

1. Section D.1, shall not apply to the addition or use of styrene, provided the volume of styrene used is less than 50 gallons per calendar year per stationary source. Any person claiming this exemption shall maintain monthly styrene usage records of the total volume (gallons) of styrene used per calendar year consistent with Sections F.6 and make them available to the District for review upon request. At a minimum, when using compliant materials, the records shall be kept on a monthly basis; and when using noncompliant materials, the records shall be kept on a daily basis.

**Comment [A160]:** The July 25 draft included a lead-in sentence. Workshop attendees and CAC members indicated on Aug. 10 that the wording was confusing. Hence, staff re-wrote the exemption section for improved clarity.

2. This rule shall not apply to any cleaning performed with a solvent (including emulsions) that contains two percent by weight or less of each of the following:

**Comment [A161]:** Monthly records will:  
1. Substantiate the exemption during the calendar year, and.  
2. Alert sources when they are encroaching on the 50 gal/year threshold.

a. Reactive organic compounds, and

b. Toxic air contaminants (as determined by generic solvent data, solvent manufacturer's composition data or by a gas chromatography test and a mass spectrometry test).

**Comment [A162]:** The daily recordkeeping provision was added for consistency with the EPA "Guidance Document for Correcting Common VOC & Other Rule Deficiencies."

c. Any person claiming this exemption shall maintain the records specified in Sections F.1.a and F.1.f in a manner consistent with Section F.7 and make them available for review.

**Comment [A163]:** Essentially the same as the Rule 321.B.1 exemption.

3. This rule shall not apply to polyester resin operations performed with polyester resin materials that contain no reactive organic compounds.

4. Section H shall not apply to any of the following:

a. Cleaning of semiconductor and microelectromechanical devices undergoing manufacturing processes involving thin film deposition, vacuum deposition, dry etching, or metal lift-off operations; including any maintenance activities associated with such operations; and

b. Cleaning of electronic components; and

c. Cleaning of encasements, including decoy shells or box casings, for electronic components that have a total surface area that is less than 2 square feet; and

d. Cleaning of parts, subassemblies, or assemblies that are exposed to strong oxidizers or reducers (e.g., nitrogen tetroxide, liquid oxygen, or hydrazine); and

e. Cleaning of transparencies, polycarbonate, or glass substrates; and

f. Cleaning of solar cells, coated optics, laser hardware, scientific instruments, high-precision optics, telescopes, avionic equipment, microscopes, and military fluid systems; and

g. Cleaning or stripping of coating overspray from personal protective equipment; and

h. Cleaning of space vehicles.

5. Section H shall not apply to polyester resin operations production or rework of the following products, provided the solvents used contain 200 grams of reactive organic compound per liter of material or less or have a reactive organic compound composite partial pressure of 45 millimeter of mercury at 20 degrees Celsius or less:

a. Satellites, satellite components, aerospace vehicles, aerospace vehicle components, aerospace vehicle payloads, or aerospace vehicle payload components.

6. Section H shall not apply to polyester resin operations production or rework of products used in any laboratory tests or analyses, including quality assurance or quality control applications, bench scale projects, or short-term (less than 2 years) research and development projects. To qualify for this exemption, the following records shall be maintained:

a. A list of all solvents used, which at a minimum includes the manufacturer's identification and the reactive organic compound content of each solvent.

b. For each short-term research and development project, the project description, date it commenced, and date it concluded.

c. Such records shall be retained in accordance with the provisions of Section F.7.

7. Section H shall not apply to cleaning or stripping of polyester resin material from personal protective equipment.

### C. Definitions

See Rule 102, Definitions, for definitions not limited to this rule. For the purposes of this rule, the following definitions shall apply:

**Comment [A164]:** Our protocol is to change the lead-in sentences in this manner.

**"Aerospace Vehicle or Component"** means any fabricated part, processed part, assembly of parts, or completed unit of any aircraft including but not limited to airplanes, helicopters, missiles, rockets, and space vehicles includes satellites.

**"Associated Solvent"** means any solvent used in a solvent cleaning machine or ~~is~~ for solvent cleaning operations subject to this rule performed in association with a polyester resin operation.

**Comment [A165]:** Staff revised the definition to avoid confusion when the "associated solvent" is exempt from the rule and to expand the definition to include solvents used in solvent cleaning machines.

**"Atomized Resin Application"** means any resin application technology in which the resin leaves the application equipment and breaks into droplets or an aerosol as it travels from the application equipment to the surface of the part. Atomized resin application includes, but is not limited to, resin spray guns and resin chopper spray guns.

**"Bench Scale Project"** means a project (other than at a research and development facility) that is operated on a small scale, such as one capable of being located on a laboratory bench top.

1. **"Catalyst"** ~~is a~~ means any substance added to the resin to initiate polymerization.

2. **"Cleaning Materials"** include but are not limited to, materials used for cleaning hands, tools, molds, application equipment, and work area.

**"Clear Gel Coat"** means any gel coat that is clear or translucent so that underlying colors are visible. Clear gel coat is used to manufacture parts for sale. Clear gel coat do not include tooling gel coat used to build or repair molds.

**"Compliant Material"** means any polyester resin material that complies with the 1) applicable monomer content limits in Section D.I.a, D.I.b, or D.I.c, or 2) the D.I.d emission limit of grams per square meter of

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exposed surface area during resin polymerization; or any solvent that complies with the reactive organic compound content limit in Section H.

**Comment [A166]:** This term is used in Sections 349.B.1, F.4, and F.6.

3. “Closed Mold System” is a means any method of forming objects from polyester resins by placing the polyester resin material in a confining mold cavity and applying pressure and/or heat.

“Control” means the reduction, by destruction or removal, of the amount of affected pollutants in a gas stream prior to discharge to the atmosphere.

4. “Control System” includes a control device and a collection system means any combination of pollutant capture system(s) and control device(s) used to reduce discharge to the atmosphere of reactive organic compound or toxic air contaminant emissions generated by a regulated operation.

5. “Cross-Linking” is the means any chemical process of chemically bonding two or more polymer chains together.

6. “Cure” means to polymerize, i.e., to transform from a liquid to a solid or semi-solid state to achieve desired product physical properties, including hardness.

7. “Fiberglass” is means a fiber made from glass and similar in appearance to wool or cotton fiber.

“Filler” means any finely divided inert (non-ROC) material that is added to the resin to enhance its mechanical properties and extend its volume. Fillers include, but are not limited to, silica, carbon black, talc, mica and calcium carbonate.

“Fire Retardant Resin” means any polyester resin material used to make products that are resistant to flame or fire.

“Fluid Impingement Technology” means any spray gun that produces an expanding nonmisting curtain of liquid by the impingement of low-pressure uninterrupted liquid streams.

8. “Gel Coat” is means a polyester resin topcoat that provides cosmetic enhancement and improves resistance to degradation from exposure to the environment.

9. Grams of ROC per liter of material is the weight of ROC per volume of material and can be calculated by the following equation:

**Comment [A167]:** This term has been slightly modified and moved to Rule 102.

$$\text{Grams of ROC per liter of material} = \frac{(W_s - W_w - W_{es})}{V_m}$$

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

“High-Strength Resin” means any polyester resin material with a casting tensile strength of 10,000 pounds per square inch or more, used to manufacture high performance products.

10. High Volume Low Pressure means spray equipment used to apply coatings by means of a high volume of air delivered at pressures between 0.1 and 10 psi air pressure.

**Comment [A168]:** Replaced by the term “high volume low pressure spraying equipment” and relocated it to Rule 102.

11. “Inhibitor” is a means any substance used to slow down or prevent a chemical reaction.

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“Lamination Resins” means any orthophthalate, isophthalate and dicyclopentadiene resins used in composite system consisting of layers of reinforcement fibers and resins.

“Liquid Leak” means any solvent or polyester resin material leak at a rate of more than three drops per minute or any visible liquid mist.

**Comment [A169]:** The term is no longer used in the rule. Hence, the definition should be deleted.

~~12. —“Low ROC Emissions Resin Systems” are polyester resin materials which contain vapor suppressants to reduce monomer evaporation loss.~~

“Maintenance Cleaning” means a solvent cleaning operation or activity carried out to keep clean general work areas where manufacturing or repair activity is performed, to clean tools, machinery, molds, forms, jigs, and equipment. This definition does not include the cleaning of adhesive, coating, or ink application equipment.

“Marble Resins” means any orthophthalate and modified acrylic isophthalate resins used for the fabrication of cast products.

“Mold” means any cavity or surface into or on which gel coat, resin, and fibers are placed and from which finished fiberglass parts take their form.

~~13. —“Monomer” is an means any organic compound that combines with itself, or other similar compounds to become a cured thermosetting resin (e.g., styrene).~~

**Comment [A170]:** Added for ease of understanding that **styrene** is a monomer.

“Non-Atomized Resin Application” means any application technology in which the resin is not broken into droplets or an aerosol as it travels from the application equipment to the surface of the part. Non-atomized resin application technology includes, but are not limited to, non-atomizing spray guns, flowcoaters, chopper flowcoaters, pressure fed resin rollers, resin impregnators, or fluid impingement technology.

“Noncompliant Material” means any polyester resin material that does not comply with the 1) applicable monomer content limits in Section D.1.a, D.1.b, or D.1.c, or 2) the D.1.d emission limit of grams per square meter of exposed surface area during resin polymerization; or any solvent that does not comply with the reactive organic compound content limit in Section H.

**Comment [A171]:** This term is used in Sections 349.B.1, F.4, and F.6.

“Open Molding Resin and Gel Coat Process” means any process in which the reinforcing fibers and resin are placed in the mold and are open to the surrounding air while the reinforcing fibers are saturated with resin. For the purpose of this rule, open molding includes operations in which a vacuum bag or similar cover is used to compress the uncured laminate to remove bubbles or excess resin, or to achieve a bond between core material and a laminate.

“Pigmented Gel Coat” means any opaque gel coat used to manufacture parts for sale. Pigmented gel coat does not include tooling gel coat used to build or repair molds.

14. —“Polyester” is a complex polymeric ester containing difunctional acids and alcohols dissolved in a monomer.

15. —“Polyester Resin Materials” include, but are 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 ROC-reactive organic compound containing materials in polyester resin operations.

16. —“Polyester Resin Operations” ~~are~~ means those methods used for the production or rework of products by mixing, pouring, hand lay-up, impregnating, injecting, forming, winding, spraying, and/or curing unsaturated polyester resin materials with fiberglass, fillers, or any other reinforcement materials and associated ~~cleanup solvent cleaning~~.

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17. —“**Polymer**” ~~is a~~ means any chemical compound comprised of a large number of chemical units and which is formed by the chemical linking of monomers.

“**Primer Gel Coat**” ~~A~~ means any gel coat used to coat the surface of composite parts prior to top-coat painting in the automotive, aerospace, marine and home building industries.

~~“Reactive Organic Compound” as defined in Rule 102, Definitions.~~

18. —“**Repair**” ~~is 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 minor structural damage~~ means the process of returning a damaged object or an object not operating properly to good condition.

19. —“**Resin**” ~~is~~ means 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.

“**Solid Surface Resins**” means any resin used without gel coats to fabricate homogenous solid surface products.

“**Solvent**” means any liquid containing any reactive organic compound or any toxic air contaminant, which is used as a diluent, thinner, dissolver, viscosity reducer, cleaning agent, drying agent, preservative, or other similar uses.

“**Solvent Cleaning**” means any activity, operation, or process (including, but not limited to, surface preparation, cleanup, or wipe cleaning) performed outside of a solvent cleaning machine, that uses solvent to remove uncured adhesives, uncured coatings, uncured inks, uncured polyester resin material, uncured sealant, or other contaminants, including, but not limited to, dirt, soil, oil, lubricants, coolants, moisture, fingerprints, and grease, from parts, products, tools, machinery, application equipment, and general work areas. Cleaning spray equipment used for the application of coating, adhesive, ink, polyester resin material, or sealant is also considered to be solvent cleaning irrespective of the spray material being cured.

**Comment [A172]:** Solvent and solvent cleaning are the same definitions found in Rule 321. Solvent includes any liquid containing any toxic air contaminant.

“**Solvent Cleaning Machine**” means any device or piece of equipment that uses solvent liquid or vapor to remove soils, moisture, or other contaminants from the surfaces of materials. Types of solvent cleaning machines include, but are not limited to, batch cold, batch vapor, in-line cold, in-line vapor, remote reservoir, and gas-path solvent cleaners. Buckets, pails, and beakers with capacities of 3.785 liters (1.00 gallon) or less are not considered solvent cleaning machines. However, the use of such a container or similar containers (e.g., hand-held spray bottles) with a liquid solvent for cleaning is considered to be solvent cleaning. Any device or piece of equipment used exclusively for stripping shall not be considered to be a solvent cleaning machine.

**Comment [A173]:** Solvent, solvent cleaning, and solvent cleaning machine are the same definitions found in Rule 321. Solvent includes any liquid containing any toxic air contaminant.

“**Space Vehicle**” means any man-made device, either manned or unmanned, designed for operation beyond earth's atmosphere. This definition includes integral equipment such as models, mock-ups, prototypes, molds, jigs, tooling, hardware jackets, and test coupons. Also included is auxiliary equipment associated with test, transport, and storage, which through contamination can compromise the space vehicle performance.

“**Specialty Gel Coat**” means any gel coat which is used in conjunction with fire retardant, corrosion resistant, or high-strength materials.

20. —“**Specialty Resin**” ~~is~~ means 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, acidic, agents, or flame.

~~“Stationary Source” as defined in Rule 102, Definitions.~~

“**Tooling Resin**” means any resins used to build or repair molds (also known as tools) or prototypes (also known as plugs) from which the molds will be made.

“Tooling Gel Coat” means any gel coat used to build or repair molds (also known as tools) or prototypes (also known as plugs) from which the molds will be made.

~~21. —“Touch Up is that portion of the fabrication process that is necessary to cover minor imperfections.~~

“Tub/Shower Resin” means any dicyclopentadiene resin, along with orthophthalate and isophthalate resins, used to fabricate bathware products.

~~22. —“Vapor Suppressant” is a means any substance added to resin to minimize the outward diffusion of monomer vapor into the atmosphere.~~

~~23. —“Waste Materials” include, but are not limited to any paper or cloth used for cleaning operations, waste resins, and any spent cleaning materials.~~

**D. Requirements**

1. Process and Control

~~Any No~~ person shall ~~operating~~operate a polyester resin operation ~~unless the operation shall~~ comply ~~complies~~ with one or more of the following, as applicable.

- a. Before [24 months after the date of amended rule adoption], Use-use polyester resin material with monomer content of no more than 35 percent by weight as applied and as determined by the manufacturer's specification. This requirement shall not apply to gel coats, provided the monomer content does not exceed 45 percent by weight for pigmented gel coats and does not exceed 50 percent by weight for clear gel coats. On and after [24 months after the date of amended rule adoption], use materials that comply with the limits in Table 349-1; or,
- b. Before [24 months after the date of amended rule adoption], Use-use specialty resin with a monomer content of no more than 50 percent by weight as applied and as determined by the manufacturer's specification. On and after [24 months after the date of amended rule adoption], use materials that comply with the limits in Table 349-1; or,
- c. On and after [24 months after the date of amended rule adoption], use polyester resin material that comply with the limits shown in Table 349-1 below when using the open molding resin and gel coat process; or

**Comment [A174]:** The Air Resources Board suggested we lower the monomer content limits and emission limit for vapor suppressed resins. They also suggested we increase the add-on control equipment efficiency to 90%. The District is proposing a 24-month phase-in period for these new requirements.

Table 349-1: Monomer Content Limits for Polyester Resin Materials

<u>Polyester Resin Material</u>	<u>As-Applied Monomer Content Limits (Percentage, by Weight)</u>
<u>Clear Gel Coat</u>	
<u>For Marble Resins</u>	<u>40%</u>
<u>All Other Resins</u>	<u>44%</u>
<u>Pigmented Gel Coat</u>	
<u>White and Off White</u>	<u>30%</u>
<u>Non-White</u>	<u>37%</u>
<u>Primer</u>	<u>28%</u>
<u>Specialty Gel Coat</u>	<u>28%</u>
<u>Tooling Gel Coat</u>	<u>40%</u>
<u>General Purpose Resin</u>	
<u>Lamination Resins</u>	<u>31% or 35%, as supplied, with no fillers</u>

<u>Polyester Resin Material</u>	<u>As-Applied Monomer Content Limits (Percentage, by Weight)</u>
<u>Marble or Cultured Resins</u>	<u>10% or 32%, as supplied, with no fillers</u>
<u>Solid Surface Resins</u>	<u>17%</u>
<u>Tub/Shower Resins</u>	<u>24% or 35%, as supplied, with no fillers</u>
<u>Specialty Resin</u>	
<u>Corrosion Resistant Resin</u>	<u>48%</u>
<u>Fire Retardant Resin</u>	<u>38%</u>
<u>High Strength Resin</u>	<u>40%</u>
<u>Tooling Resin</u>	
<u>Atomized (spray)</u>	<u>30%</u>
<u>Non-atomized</u>	<u>39%</u>
<u>All Other Resin</u>	<u>35%</u>

- d. ~~Before [24 months after the date of amended rule adoption], Use~~ use a resin containing a vapor suppressant, such that ~~the~~ weight loss from ~~ROC-reactive organic compound~~ emissions does not exceed 60 grams per square meter of exposed surface area during resin polymerization. ~~On and after [24 months after the date of amended rule adoption], the vapor suppressed resin limit shall be use a resin containing a vapor suppressant, such that the weight loss from reactive organic compound emissions does not exceed 50 grams per square meter of exposed surface area during resin polymerization. The “grams per square meter of exposed surface area during resin polymerization” shall be as-~~ determined by ~~the test method specified in Section E.42;~~ or,
- ~~e.~~ Use a closed mold system; or,
- ~~e~~f. Install and operate an add-on ~~emission control system, which is designed and operated in a manner that reduce uncontrolled emissions by at least 85 percent, provided all of the applicable requirements below are met. Any person installing such control system shall obtain an Authority to Construct from the District prior to installation.~~
- i. ~~Before [24 months after the date of amended rule adoption], the overall efficiency (the capture efficiency multiplied by the control device efficiency) of the total system shall be at least 85 percent, by weight. On and after [24 months after the date of amended rule adoption] the overall efficiency shall be at least 90 percent, by weight. Alternatively, the control device reactive organic compound exhaust concentration shall not exceed 10 parts per million by volume as propane or other limit approved by the Environmental Protection Agency, the Air Resources Board, and the Control Officer.~~
- ii. ~~Combustion temperature shall be continuously monitored when operating a thermal incinerator.~~
- iii. ~~Inlet and exhaust gas temperatures shall be continuously monitored when operating a catalytic incinerator.~~
- iv. ~~Control device efficiency shall be continuously monitored when operating a carbon adsorber or a control device other than a thermal or catalytic incinerator.~~
- v. ~~Compliance through the use of an emission control system shall not result in affected pollutant emissions in excess of the affected pollutant emissions that would result from compliance with Sections D.1.a - D.1.d or H.~~

**Comment [A175]:** Subsections i - iv mirror Rule 353.I provisions.

**Comment [A176]:** Similar to Rule 321.N.6. (Reactive organic compound changed to affected pollutant to include TACs.)

2. Spray Application Methods

~~Any~~ No person ~~operating shall apply a polyester resin operation shall, when applying polyester resin materials by in a spraying operation; unless the application is performed with equipment operating according to the manufacturers operating guidelines. use only~~ In addition, the application method employed shall be one of the following:

- a. ~~\_\_\_\_\_ a~~ Airless, or
- b. ~~\_\_\_\_\_ a~~ Air-assisted airless, or
- c. ~~\_\_\_\_\_ h~~ High volume-low pressure spraying equipment, or
- d. ~~\_\_\_\_\_ e~~ Electrostatic spray equipment, or
- e. ~~\_\_\_\_\_ Any other spray application method as approved by the Control Officer, the Air Resources Board, and the Environmental Protection Agency, and operated in accordance with the manufacturer's recommendations.~~

3. ~~Storage and Disposal~~ General Operating

~~A person operating a polyester resin operation shall use closed containers to store all polyester resin materials, cleaning materials, and any unused ROC containing materials except when accessed for use. Any person who owns or operates any polyester resin operation equipment or uses any associated solvent subject to this rule shall meet the following requirements:~~

- a. ~~All polyester resin materials and cleaning materials, used or unused, shall be stored and disposed of in nonabsorbent and nonleaking containers equipped with tight-fitting covers. All covers shall be in place unless adding material to or removing material from the containers, the containers are empty, or doing maintenance/inspection of the containers. After distillation recovery of solvent, waste solvent residues shall not contain more than 20 percent of reactive organic compound by weight as determined by the test method specified in Section E.8.~~
- b. ~~All application equipment, ventilation system, and emission control equipment shall be installed, operated, and maintained consistent with the manufacturer's specifications.~~
- c. ~~Waste solvent, waste solvent residues, and any other waste material that contains reactive organic compounds shall be disposed of by one of the following methods: All containers holding polyester resin materials and cleaning materials shall be free of liquid leaks. All application equipment, solvent distillation units, and gun washers shall not have any liquid leaks, visible tears, holes, or cracks. Any such liquid leak, visible tear, hole, or crack is a violation of this rule.~~  
~~Any liquid leak, visible tear, hole, or crack that is detected shall be repaired within one day from discovery, or the equipment shall be drained of all polyester resin materials or cleaning materials, consistent with Section D.3.a provisions, and shut down until replaced or repaired. Application equipment, solvent distillation units, and gun washers shall not be operated when leaking.~~
  - i. ~~A commercial waste solvent reclamation service licensed by the State of California.~~
  - ii. ~~At a facility that is federally or state licensed to treat, store or dispose of such waste.~~

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iii. Recycling in conformance with Section 25143.2 of the California Health and Safety Code.

- d. All covers, valves, drain plugs, and other closure devices designed to reduce polyester resin material and cleaning material evaporation shall not be removed or opened except to process work or to perform monitoring, inspections, maintenance, or repairs that require the removal of the covers or other closure devices.
- e. Any spills of polyester resin materials or cleaning materials shall be wiped up immediately and the used absorbent material (e.g., cloth, paper, sand, sawdust, etc.) shall be stored in closed containers that are handled in accordance with Section D.3.a.
- f. The handling and transfer of ~~coatings~~ polyester resin materials and cleaning solvents to or from enclosed systems, vats, waste containers, and other cleaning operation equipment that hold or store fresh or spent coatings and cleaning solvents shall be conducted in such a manner to minimize spills.
- g. Containers used to store ~~coating~~ polyester resin material, solvent, or any waste material that contains reactive organic compounds subject to this rule shall be marked or clearly labeled indicating the name of the material they contain.

**Comment [A177]:** The housekeeping provisions are similar to requirements found in Rule 321.D.

E. **Compliance Provisions and Test Methods**

1. Compliance with Section D.1.a or D.1.b Polyester resin material monomer contents shall be ~~determined~~ measured using ASTM ~~method~~ D2369-8495, "Standard Test Method for Volatile Content of Coatings." ASTM International. Material tested shall be non-catalyzed.
2. Compliance with Section D.1.e The weight loss from reactive organic compound emissions shall be ~~determined~~ measured by laboratory static tests, "Static Method for Determination of Volatile Emissions from Polyester and Vinyl Ester Resins," as described in Attachment A.
3. ~~Capture efficiency determinations~~ The capture efficiency for reactive organic compound emissions required in Section D.1.d shall be based on criteria set forth by EPA in 40 CFR 52.744, ~~determined~~ by verifying the use of a Permanent Total Enclosure and 100 percent capture efficiency as defined by Environmental Protection Agency Method 204, "Criteria for and Verification of a Permanent or Temporary Total Enclosure." Alternatively, if an Environmental Protection Agency Method 204 defined Permanent Total Enclosure is not employed, capture efficiency shall be determined using a minimum of three sampling runs subject to data quality criteria presented in the Environmental Protection Agency technical guidance document "Guidelines for Determining Capture Efficiency, January 9, 1995." Individual capture efficiency test runs subject to the Environmental Protection Agency technical guidelines shall be determined by:
  - a. The Temporary Total Enclosure approach of Environmental Protection Agency Methods 204 through 204F; or
  - b. The South Coast Air Quality Management District "Protocol for Determination of Volatile Organic Compounds (VOC) Capture Efficiency," May 1995.
4. ~~Control efficiency determinations~~ The control device efficiency for reactive organic compound emissions required in Section D.1.d shall be made using EPA Method 25 or 25A. Gas flow rate measurements in pipes or small ducts shall be made using EPA Method 2A, ~~determined~~ by Environmental Protection Agency Methods 25, 25A, the South Coast Air Quality Management District Method 25.1, "Determination of Total Gaseous Non-Methane Organic Emissions as Carbon," February 1991, or the South Coast Air Quality Management District Method 25.3, "Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions

**Comment [A178]:** EPA recommended that the District model the provisions on SC Rule 1122(h)(7)(A) text.

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from Clean Fueled Combustion Sources,” March 2000, as applicable. Environmental Protection Agency Test Method 18 or Air Resources Board Method 422, “Exempt Halogenated VOCs in Gases,” September 12, 1990, shall be used to determine emissions of exempt compounds.

**Comment [A179]:** EPA suggested that this provision mirror the SC Rule 1122(h)(7)(B) text.

5. Solvent reactive organic compound content shall be measured by the Environmental Protection Agency Reference Method 24, its constituent methods, or an equivalent method approved by the Environmental Protection Agency, the Air Resources Board, and the Control Officer. The determination of exempt compounds shall be performed in accordance with ASTM D 4457-1991, “Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph,” ASTM International. Alternatively, determination of exempt compounds may be performed in accordance with the South Coast Air Quality Management District Method 303-91, “Determination of Exempt Compounds,” August 1996. The reactive organic compound content of materials containing 50 grams of reactive organic compound per liter or less shall be determined by the South Coast Air Quality Management District Method 313-91, “Determination of Volatile Organic Compounds by Gas Chromatography-Mass Spectrometry,” June 1993, or any other test methods approved by the Environmental Protection Agency, the Air Resources Board, and the Control Officer.

**Comment [A180]:** EPA recommended referring to SC Method 313 for determining ROC content of materials containing < 50 g/l.

6. The capture efficiency for toxic air contaminant emissions that are not reactive organic compounds shall be determined by using the methods described in Section E.3 modified in a manner approved by the Control Officer to quantify the mass of liquid or gaseous reactive organic compounds and/or toxic air contaminants.

**Comment [A181]:** Similar to the Rule 321.P.3 requirements.

7. The control device efficiency for toxic air contaminant emissions that are not reactive organic compounds shall be determined using:

- a. an Environmental Protection Agency approved test method or methods, or
- b. in the case where there is no Environmental Protection Agency approved test method, a Control Officer approved detection method applicable for each target toxics specie.
- c. the Control Officer may require more than one test method on any emission control device where necessary to demonstrate that the overall efficiency is at least 85 percent by weight in reducing emissions of reactive organic compounds and/or toxic air contaminants. Any technique to convert “parts per million by volume” test method results to either 1) “parts per million by weight,” or 2) “mass emission rates” (e.g., pounds per hour) shall first be approved by the Control Officer and, if such approval is not provided, then the technique shall not be used to show compliance with this rule.

**Comment [A182]:** Essentially the same as Rule 321.P.4 provisions.

8. Solvent waste residue reactive organic compound content shall be determined by using Environmental Protection Agency Test Method 25D or an equivalent method approved by the Environmental Protection Agency, the Air Resources Board, and the Control Officer. Reserved Emissions of reactive organic compounds from the exhaust of an emission control system shall be measured by the Environmental Protection Agency Method 25, in combination with Environmental Protection Agency Method 18 or the California Air Resources Board Method 422, “Exempt Halogenated VOCs in Gases,” September 12, 1990 (to determine emissions of exempt compounds).

9. When more than one test method or set of test methods are specified for any testing, a test result showing an exceedance of any limit of this rule shall constitute a rule violation.

**Comment [A183]:** Added per the EPA recommendation in the Technical Support Document for SJV Rule 4605 (June 2009).

10. The Environmental Protection Agency test methods in effect on [date of amended rule adoption] shall be the test methods used to meet the requirements of this rule.

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**F. Recordkeeping**

Any person subject to this rule shall comply with the following requirements: Any owner or operator of any stationary source comprised of more than one facility may comply with the following requirements on a facility basis.

1. A person shall maintain a current list file of resins and cleaning all reactive organic compound-containing materials in use at the stationary source subject to this rule. which The file shall provide all of the data necessary to evaluate compliance and shall include, including the following information, as applicable:
  - a. the type of resin, catalyst, and cleaning materials used (e.g., brand name, stock identification number);
  - b. the weight percent of ROC in each of the polyester resin materials, and the grams of ROC per liter for the cleaning materials; if applying polyester resin materials in spraying operations, indicate the spray application method used (e.g., airless, air-assisted airless, etc.);
  - c. 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;
  - d. if mixing solvents, specific solvent mixing data (e.g., component volumes or weights) of each component for each batch sufficient to determine the mixture's reactive organic compound content;
  - e. the actual as applied reactive organic compound content of the solvent used and, when not using the a closed mold system, the corresponding monomer content limits from Sections D.1.a, b, or c, and the actual as applied monomer contents; or if complying using a vapor suppressant, the actual as applied polyester or vinyl ester resin weight loss rate of the materials used; and
  - f. current polyester resin material and solvent manufacturer specification sheets, Material Safety Data Sheets, product data sheets, or air quality data sheets, which list the reactive organic compound content of each material in use at the stationary source subject to this rule. Compliance with this provision may be done by ensuring the manufacturer's specifications are listed on the product container.
2. Maintain records for each reactive organic compound-containing material purchased for use at the stationary source. The records shall include, but not be limited to, the following:
  - a. material name and manufacturer identification (e.g., brand name, stock identification number); and
  - b. material type (e.g., air dried or baked enamel, powder coating, extreme performance coating, polyester resin material type as specified in Table 349-1, cleanup solvent, etc.);
  - c. volume of material purchased;
  - d. date of purchase; and
  - e. receipts of each purchase.
3. Maintain records of the disposal method of disposal each time waste solvent, or waste solvent residue, or other waste material that contain reactive organic compounds is removed from the stationary source for disposal.

**Comment [A184]:** The District added this in response to an Industry comment received during the Aug. 10, 2011 workshop.

**Comment [A185]:** Our protocol is to specify requirements are on a stationary source basis.

**Comment [A186]:** Essentially the same text found in Rule 353.O.1.

**Comment [A187]:** This data is now required by §F.1.e.

**Comment [A188]:** Similar to the recordkeeping provisions in PARs 330, 337, and 353.

**Comment [A189]:** Added in response to a comment by VAFB.

4. For each material listed in response to Section F.1.a, maintain, at a minimum, on a monthly basis for compliant material and on a daily basis for noncompliant material, a record of the following:

- a. volume used (gallons per day, gallons per month);
- b. polyester resin material as-applied weight percent of monomer ~~or~~ and the cleaning material reactive organic compound content (grams per liter or pounds per gallon); and
- c. polyester resin material reactive organic compound emission factors (lb/lb or lb/gal); and
- d. resulting reactive organic compound emissions (pounds per day, pounds per month).

For permitted stationary sources, all records required by this Subsection and Subsection F.1 shall be summarized for each calendar year and submitted to the District by March 1 of the following year. The annual report shall include the name and address of the Permittee, and the Permit to Operate number that the polyester resin operations are subject to (if permitted), and/or a statement that the annual report includes non-compliant polyester resin material usage information.

25. ~~Any person using add-on~~ For any stationary source that uses emission control equipment to meet the requirements of this rule shall maintain daily records of key operating parameters, values and maintenance procedures that verify demonstrate that the control equipment was operating properly for each day of operation continuous operation and compliance of the emission control system during periods of emission producing activities shall be maintained. These parameters shall include, but not be limited to:

- a. Hours of operation;
- b. All maintenance work that requires the emission control system to be shut down; and
- c. All information needed to demonstrate continuous compliance with Section D.1.f, such as temperatures, pressures, and/or flow rates.

6. Any person claiming an exemption under Section B.1 shall maintain, at a minimum, monthly records for compliant material and daily records for noncompliant material of styrene volumes used in gallons per day and/or gallons per month to support the claim of exemption.

37. Such records shall be retained for the previous 24 month period and be available to the District upon request. Any records required to be maintained pursuant to this rule shall be kept on site for at least 2 years unless a longer retention period is otherwise required by state or federal regulation(s). Such records shall be kept on site and be readily available for expeditious inspection and review by the District.

8. If an operator or District staff discovers a liquid leak in a container holding polyester resin material or solvent, or a liquid leak, visible tear, hole, or crack in application equipment, a solvent distillation unit, or in a gun washer, the operator shall record:

- a. the date of discovery;
- b. the corrective action taken; and
- c. the date of repair or equipment replacement.

**Comment [A190]:** Revised to show "Section F.1.a" to exclude MSDSs per clarification request received during the August 10, 2011 workshop.

**Comment [A191]:** The daily recordkeeping provision was added for consistency with the EPA "Guidance Document for Correcting Common VOC & Other Rule Deficiencies."

**Comment [A192]:** Moved the annual reporting requirements to Section I per industry suggestion.

**Comment [A193]:** Subsections a - c are from Rule 321.R.1.c.

**Comment [A194]:** The daily recordkeeping provision was added for consistency with the EPA "Guidance Document for Correcting Common VOC & Other Rule Deficiencies."

**Comment [A195]:** During the CAC meeting on August 10, a concern about the need to maintain records for 5 years was raised. Staff discovered that EPA had modified its 5 year recordkeeping policy. Hence, per the EPA "Guidance Document for Correcting Common VOC & Other Rule Deficiencies," 2 years record retention is acceptable for sources not subject to Title V permitting or a MACT standard.

## G. Compliance Schedule

~~A person who is subject to the requirements of this determination shall be in compliance by April 27, 1994. Except as otherwise specified, the provisions of this rule are effective on [date of amended rule adoption].~~

Any person who owns or operates any polyester resin operation equipment subject to this rule shall meet the following compliance schedule:

1. By [30 days from the date of amended rule adoption], comply with Section D.3, General Operating.
2. By [six months from the date of amended rule adoption], comply with the recordkeeping provisions in the following Sections:
  - a. F.1.d - mixing volumes.
  - b. F.1.e - solvent reactive organic compound content data, polyester resin material monomer contents (when not using a closed mold system), and/or actual weight loss rate data (when using a vapor suppressant).
  - c. F.1.f - manufacturer specification sheets, Material Safety Data Sheets, air quality data sheets, or manufacturer specification listings on product container.
  - d. F.2 - purchase records.
  - e. F.3 - waste disposal records, and
  - f. F.4 - polyester resin material reactive organic compound emission factor records and daily records for noncompliant materials.
3. By [12 months from the date of amended rule adoption], comply with the Section H and Section J requirements.
4. By [24 months from the date of amended rule adoption], comply with any applicable Section D provisions that have a phased-in effective date.
5. By [date of amended rule adoption], comply with all other provisions of this rule.

**Comment [A196]:** The compliance schedule provision was expanded in response to a request from Industry.

## H. Requirements – Solvent Cleaning

Section H requirements apply to any person performing solvent cleaning associated with polyester resin operations, including, but not limited to, use of wipe cleaning cloths, hand-held spray bottles, squirt bottles, aerosol products, and the cleaning of application equipment. The following requirements become effective [one year from the date of amended rule adoption] and are in addition to the general operating requirements specified in Section D.3.

1. **Solvent Requirements.** Except when using an emission control system that meets the requirements of Section D.1.e, no person shall use any solvent to perform solvent cleaning which exceeds the applicable grams of reactive organic compound per liter of material limit specified in Table 349-2.

**Comment [A197]:** Section H stems from similar solvent cleaning provisions in Rule 321.M.

**Comment [A198]:** Both ARB and EPA recommend a 25 g/l limit on the solvent's ROC content.

**Table 349-2: Reactive Organic Compound Content Limits for Solvent Cleaning**

SOLVENT CLEANING ACTIVITY	ROC Limit, grams of ROC per liter of material (pounds of ROC per gallon)
(a) <u>Product Cleaning During Manufacturing Process or Surface Preparation for Coating Application</u>	25 (0.21)
(b) <u>Repair and Maintenance Cleaning</u>	25 (0.21)
(c) <u>Cleaning of Polyester Resin Application Equipment</u>	25 (0.21)

**I. Reporting Requirements**

Submittal of an annual report to the District is required if a person holds a permit for equipment subject to the requirements of this rule. The annual report shall be due March 1 and it shall contain the following information for the previous calendar year:

1. monthly records required by Section F.4.
2. annual totals (gallons) based on each of the polyester resin materials' and cleaning materials' monthly data.
3. if claiming the Rule 349.B.1 exemption, monthly totals of styrene (gallons) used per Section F.6 and the yearly total amount (gallons) of styrene used, and
4. name and address of the company or agency and the Permit to Operate number that the polyester resin operation is subject to.

**Comment [A199]:** The annual report provision was relocated from Section F.5 to a stand-alone section per an Industry suggestion.

**J. Requirements - Solvent Cleaning Machine**

Any person who owns, operates, or uses any solvent cleaning machine shall comply with the applicable provisions of Rule 321, Solvent Cleaning Machines and Solvent Cleaning.

**Comment [A200]:** Added to clarify that Rule 321 provisions apply to solvent cleaning machines when used in conjunction with polyester resin operations.

ATTACHMENT A

STATIC METHOD FOR DETERMINATION OF VOLATILE EMISSIONS FROM  
POLYESTER AND VINYL ESTER RESINS

1. PURPOSE

- 1.1 This test is designed for the determination of volatile organic compound emissions of polyester and vinyl ester resins as received from the manufacturer, according to requirements of California's South Coast Air Quality Management District (~~SCAQMD~~) ~~proposed Rule 1162 amendment published July 17, 1990~~ Method 309-91, Determination of Static Volatile Emissions, revised February 1993.
- 1.2 This test allows fabricators using polyester and vinyl ester resins to monitor volatile organic compound emissions (principally styrene monomer) from resins used in the fabrication process. The results are to be reported as volatile organic compound losses in grams per square meter ( $\text{gm}/\text{m}^2$ ).

**Comment [A201]:** Attachment A changes align the procedures to this text method.

2. METHOD

The weight of a one gallon can lid filled with 100 ~~gm-grams~~ of resin is accurately measured over a period of time. The measurement is made on resin catalyzed with peroxide initiators to determine weight losses attributed to monomer and other volatile organic compound emissions.

3. EQUIPMENT REQUIREMENTS

- 3.1 Controlled environment at 25.0 ~~C-degrees Celsius~~ and humidity of 50% ~~R-H percent relative humidity~~. If controlled environment is not available, report condition under which measurements are made.
- 3.2 **Balance** with an accuracy of 0.01 ~~gm-gram~~.
- 3.3 **Draft free enclosure** for balance. This can be achieved by placing the balance in a four sided enclosure that extends a minimum of eight inches above the top of the balance.
- 3.4 **Gallon can lid** with deep form sufficient to contain 100 ~~gm-grams~~ of resin, having a normal diameter of 14.5 ~~cm-centimeters~~.
- 3.5 **Certified or calibrated thermometer** capable of measurements accurate to 1 degree ~~C-Celsius~~.
- 3.6 **Constant temperature** bath controlled at 25 ~~C-degrees Celsius~~ to adjust resin temperature to 25 ~~C-degrees Celsius~~.
- 3.7 **Timer** - capable of recording time to 0.1 ~~minute~~.
- 3.8 **Paper clip** - bent to approximately 90 ~~degree~~ angle.
- 3.9 **Syringe or pipette** accurate to 0.1 ~~ml-milliliter~~ for peroxide catalyst addition.

[Draft of March 27, 2012]

#### 4. PROCEDURE

- 4.1 Weigh out 200 ~~gm~~ grams of prepromoted resin into a suitable dry and clean container. Wax cups should not be used for this test.
- 4.2 Cover container and place in constant temperature bath and adjust resin temperature to 25°C ~~degrees Celsius~~.
- 4.3 Place balance in draft free enclosure.
- 4.4 Clean gallon lid with solvent, wipe dry and air dry and measure diameter to the nearest 0.1 ~~cm~~ centimeter.
- 4.5 Place gallon can lid on an inverted paper or plastic cup mounted on the balance pan. Position bent paper clip in the center of the gallon can lid. Record TARE WEIGHT to 0.01 ~~gm~~ gram.
- 4.6 Take container with resin from water bath and add appropriate volumetric or weight measure of catalyst using syringe or pipette. Start timer. ~~(continued)~~
- 4.7 Using stirring rod or thermometer, mix in catalyst for one minute.
- 4.8 Pour 100.0 ~~+/- plus or minus~~ 0.5 ~~gm~~ gram of catalyzed resin into can lid and record weight to ~~+/- plus or minus~~ 0.01 ~~gm~~ gram. This is the INITIAL WEIGHT.
- 4.9 Using paper clip, determine when resin has hardened sufficiently to allow resin or lid to be lifted ~~or the gel to be torn~~.
- 4.10 Record this as gel time.
- 4.11 Allow resin to harden in can lid and reweigh every 15 minutes until concurrent weighing agrees to within 0.05 ~~gm~~ gram. Record this as FINAL WEIGHT to ~~+/- plus or minus~~ 0.01 ~~gm~~ gram.
- 4.12 Procedure should be repeated until duplicate samples agree to the nearest 5 ~~gm per m<sup>2</sup>~~ grams per meter<sup>2</sup>.

#### 5. CALCULATION

- 5.1 Volatile Organic Compound Emissions per Square Meter

$$\text{Area of Gallon Can Lid in m}^2 \equiv \frac{(d/2)^2 \times 3.14}{10,000 \text{ cm}^2 / \text{m}^2}$$

$$\text{Area of Sample in Square Meter} = (d/2)^2 \times 3.14$$

Where:  $d$  = diameter of the gallon can lid in centimeters (cm)  
 $3.14$  = value of Pi  
 $\text{cm}^2$  = square centimeters  
 $\text{m}^2$  = square meters

Volatile Organic Compound Losses, Grams per Square Meter  $\equiv$   
 $\frac{\text{INITIAL WEIGHT} - \text{FINAL WEIGHT}}{\text{Area of Sample-Gallon Can Lid in Square Meters}}$

[Draft of March 27, 2012]



5.2 Percent Volatile Organic Compound Emission =  $\frac{\text{INITIAL WEIGHT} - \text{FINAL WEIGHT}}{\text{INITIAL WEIGHT} - \text{TARE WEIGHT}} \times 100$

## 6. REPORTING REQUIREMENTS

- 6.1 Ambient temperature and humidity.
- 6.2 Resin identification and batch number.
- 6.3 Initiator system and amounts used.
- 6.4 Volatile organic compound losses as grams per square meter.
- 6.5 Percent volatile organic compound emission.
- 6.6 Gel time under conditions of test.