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**REGULATION 8
ORGANIC COMPOUNDS
RULE 50
POLYESTER RESIN OPERATIONS**

(Adopted December 5, 1990)

8-50-100 GENERAL

8-50-101 Description: The purpose of this Rule is to limit organic compound emissions from the manufacturing, fabrication, rework, repair, and touch-up of composite products made of polyester resin and gel coat.

8-50-110 Deleted December 2, 2009

8-50-200 DEFINITIONS

8-50-201 Air Assisted Airless Spray: Equipment used to apply materials by means of fluid pressure to atomize coating and air pressure at between 0.1 and 10 psig of air pressure in order to adjust the spray pattern.

(Amended, Renumbered December 2, 2009)

8-50-202 Airless Spray: Equipment used to apply materials by use of fluid pressure without atomizing air, including heated airless spray.

(Renumbered December 2, 2009)

8-50-203 Approved Emission Control System: A system for reducing emissions of VOC to the atmosphere, consisting of a control device and a collection system that achieves the overall abatement efficiency specified in Section 8-50-303 at all times during operation of the equipment.

(Adopted 6/15/94; Amended and Renumbered 12/2/09)

8-50-204 Boat Manufacturing: The manufacturing of boat hulls or decks from fiberglass, or the construction of boats from pre-manufactured hulls or decks, or the fabrication of molds to manufacture fiberglass hulls or decks. For the purposes of this rule, a polyester resin operation that manufactures only boat parts, such as hatches, seats, or lockers, or boat trailers, or a polyester resin facility that repairs boats and boat parts, is not considered a boat manufacturing facility.

(Adopted December 2, 2009)

8-50-205 Catalyzing Agent: A substance added to a resin to initiate or increase the rate of a chemical reaction such as polymerization. Catalyzing agents include, but are not limited to, peroxide initiators, amines, amides, and anhydrides.

(Amended, Renumbered December 2, 2009)

8-50-206 Cleaning Products: Materials used to clean hands, tools, molds, application equipment, work area, and other process-related equipment in connection with polyester resin operations.

(Amended, Renumbered December 2, 2009)

8-50-207 Closed-mold System: A system of forming composite products from by placing composite materials in a confining cavity and applying pressure and/or heat to shape the product. Compression molds, liquid-injection molds, pultrusion (when using closed resin baths, preform, or direct die injection), Resin Transfer Molding and vacuum infusion molding are examples of closed-mold systems.

(Amended, Renumbered December 2, 2009)

8-50-208 Composite Materials: Individual components that, combined, make up the composite product. Composite materials include resins, gel coats, molding compounds, thinners, catalyzing agents, binders, fillers, reinforcement fibers, other reinforcement materials, and any other material added to enhance the properties of the composite product.

(Adopted December 2, 2009)

8-50-209 Composite Products: For the purposes of this Rule, composite products are products that are fabricated from polyester resins and composite materials.

(Adopted December 2, 2009)

- 8-50-210 Compression Molding:** A method of forming an object in which composite materials, such as molding compounds, are placed in an open, heated mold cavity. The mold is closed and pressure is applied to force the polyester resin into contact with all mold areas. Heat and pressure are maintained until the material has cured.
(Adopted December 2, 2009)
- 8-50-211 Corrosion-Resistant Resin:** A resin or composite material used to manufacture a product that is required to meet a corrosion resistant industry standard, as defined in 40 CFR 63.5935, or a food contact industry standard or used to manufacture a product with corrosion resistant end use applications involving continuous or temporary chemical exposure.
(Amended, Renumbered December 2, 2009)
- 8-50-212 Cross-linking:** The process of chemically linking two or more polymer chains to create a three-dimensional or network polymer.
(Amended, Renumbered December 2, 2009)
- 8-50-213 Electrostatic Air Spray:** Equipment used to apply materials by charging atomized coating particles that are deposited to a grounded substrate by electrostatic attraction.
(Amended, Renumbered December 2, 2009)
- 8-50-214 Filament Application:** A method of applying resin to an open mold that involves feeding reinforcement fibers through a resin bath and winding the resin-impregnated fibers on a rotating mandrel.
(Adopted December 2, 2009)
- 8-50-215 Filler:** A non-reactive constituent of a composite product. Fillers include hollow glass spheres, fibers, particulates, clays, silicates, talcs, carbonates, carbon black, chalk, titanium dioxide, graphite, molybdenum disulfide, PTFE, barium sulfate, aluminum, and copper, and may impart properties such as color, magnetic, smoothness, lubrication, thermal or electric properties.
(Adopted December 2, 2009)
- 8-50-216 Fire Retardant Resin:** Resin that is used to make composite products specifically designed to be a low flame spread/low smoke product, as defined in 40 CFR 63.5935.
(Adopted December 2, 2009)
- 8-50-217 Gel Coat:** A pigmented or clear resin material that functions as a surface coating to provide cosmetic enhancement or resistance to degradation, ultraviolet radiation, or water or chemical adsorption.
(Amended, Renumbered December 2, 2009)
- 8-50-218 High Strength Resin:** Resin used to manufacture composite products requiring a tensile strength of 10,000 psi or more for a minimal casting thickness of one-eighth inch.
(Adopted December 2, 2009)
- 8-50-219 High-Volume Low-Pressure (HVL) Spray:** Equipment used to apply materials by means of a gun that operates at between 0.1 and 10 psig of air pressure.
(Amended, Renumbered December 2, 2009)
- 8-50-220 Hopper Spray Gun:** Equipment which uses air pressure and an internal mix atomization process to apply a blend of thick, viscous, crushed or pulverized material mixed with resin or gel coat.
(Adopted December 2, 2009)
- 8-50-221 Inhibitor:** A substance used to slow down or prevent a chemical reaction, such as polymerization.
(Amended, Renumbered December 2, 2009)
- 8-50-222 Injection Molding:** A high-volume method of forming an object by forcing composite material from an external heated chamber through a sprue, runner, or gate into a cavity of a closed mold by means of a pressure gradient.
(Adopted December 2, 2009)
- 8-50-223 Key System Operating Parameter:** An emission control system operating parameter, such as temperature, flow rate or pressure, that ensures operation of the abatement equipment within manufacturer specifications and compliance with the standard in Section 8-50-303.
(Adopted 6/15/94; Renumbered 12/2/09)

- 8-50-224 Lamination Resin:** A resin used to fabricate a composite product made up of layers of reinforcement fibers and resins. Boats hulls, surfboards, and automotive panels are typically made of lamination resins.
(Adopted December 2, 2009)
- 8-50-225 Manual Application:** The application of resin to an open mold using a hand lay-up technique. Components of successive plies of resin-impregnated reinforcement fibers are applied using hand tools such as brushes and rollers.
(Adopted December 2, 2009)
- 8-50-226 Marble Resin:** Resin filled with additives to create a polymer matrix that is cast (poured) over a mold. This cultured marble process is used to fabricate composite products resembling natural stone such as marble, onyx, or granite.
(Adopted December 2, 2009)
- 8-50-227 Monomer:** A small molecule used as a cross-linking agent. Monomers partially combine with themselves or with other compounds chemically, to become part of a cured resin (polymer). Monomers include, but are not limited to, styrene and methyl methacrylate.
(Amended, Renumbered December 2, 2009)
- 8-50-228 Non-atomizing Mechanical Application:** An application technique, other than a manual application technique, to apply resins or gel coats to molds. Methods include flow coaters, pressure fed rollers, impingement spray, or any other mechanical techniques described in 40 CFR 63.5935.
(Adopted December 2, 2009)
- 8-50-229 Open-mold System:** A process of manufacturing composite products by applying composite materials in a one-sided cavity. The product being manufactured is exposed to the ambient air.
(Adopted December 2, 2009)
- 8-50-230 Overall Efficiency:** The efficiency of an approved emission control system, measured by the collection system's efficiency multiplied by the destruction efficiency of the control device, expressed as a percentage.
(Adopted December 2, 2009)
- 8-50-231 Polyester:** A synthetic, long-chain polymeric ester produced mainly by reaction of dibasic acids with dihydric alcohols.
(Amended, Renumbered December 2, 2009)
- 8-50-232 Polyester Resin:** A resin used to fabricate composite products. Polyester resins include but are not limited to, unsaturated polyester resins, such as orthophthalic, isophthalic, halogenated, dicyclopentadiene, bisphenol A and furans. For the purposes of this rule, vinyl ester resins are polyester resins.
(Amended, Renumbered December 2, 2009)
- 8-50-233 Polyester Resin Operations:** The fabrication, rework, repair, or touch-up of composite products for commercial, military, or industrial uses by mixing, pouring, manual application, molding, impregnating, injecting, forming, spraying, pultrusion, filament winding, centrifugally casting, or corn-forming with polyester resins.
(Amended, Renumbered December 2, 2009)
- 8-50-234 Polymer:** Chemical compounds that consist of a large number of repeating monomers.
(Amended, Renumbered December 2, 2009)
- 8-50-235 Polymerize:** Transformation from a liquid to a solid or semi-solid state to achieve desired product physical properties, including hardness.
(Renumbered December 2, 2009)
- 8-50-236 Primer Gel Coat:** A gel coat that functions as a primer for subsequent coating on the product after it is removed from the mold.
(Adopted December 2, 2009)
- 8-50-237 Pultrusion:** A continuous manufacturing process for composite products that have a uniform cross-sectional shape. Continuous strands of fiber-reinforcing material are pulled through a strand-tensioning device into a resin impregnation chamber or bath and then pulled through a shaping die.
(Adopted December 2, 2009)
- 8-50-238 Reinforcement Fiber:** A multifilament material of glass or other fibrous material, such as carbon, boron, metal, kevlar, and amid polymer, that is used to reinforce composite products.
(Amended, Renumbered December 2, 2009)

- 8-50-239 Repair:** A process that requires the addition of polyester resin or other composite material to portions of a previously-fabricated product in order to mend minor structural damage.
(Amended, Renumbered December 2, 2009)
- 8-50-240 Resin:** Any class of organic polymers of natural or synthetic origin used to encapsulate and bind together reinforcement fibers and/or fillers in the formulation of composite products.
(Amended, Renumbered December 2, 2009)
- 8-50-241 Resin Bath:** A tray or chamber that contains initiated resin for a pultrusion or impregnating process.
(Adopted December 2, 2009)
- 8-50-242 Solid Surface Resin:** A resin containing fillers and additives that is used to fabricate products that are non-porous and have a homogeneous composition throughout. Solid surface resins are used primarily in the cast polymer segment of the composite industry.
(Adopted December 2, 2009)
- 8-50-243 Specialty Gel Coat:** A gel coat that is used in conjunction with a composite product that is required to have fire retardant properties, is corrosion-resistant, is a high-strength resin, or is used in a tooling application.
(Adopted December 2, 2009)
- 8-50-244 Tooling Resin:** Resin used to produce a mold, or a gel coat to form a surface layer on a mold, for the fabrication of a composite product.
(Adopted December 2, 2009)
- 8-50-245 Touch-up:** The application of resin or gel coat to cover minor cosmetic imperfections that occur during fabrication or field installations.
(Amended, Renumbered December 2, 2009)
- 8-50-246 Tub/Shower Resin:** Resins used to fabricate tubs, showers, and bathware fixtures.
(Adopted December 2, 2009)
- 8-50-247 Vapor Suppressant:** A substance that is added to resin to minimize the outward diffusion of monomer vapor into the atmosphere.
(Amended, Renumbered December 2, 2009)
- 8-50-248 Vinyl Ester Resin:** Resins produced from the esterification of an epoxy with a monocarboxylic acid.
(Adopted December 2, 2009)
- 8-50-249 Volatile Organic Compound (VOC):** Any organic compound (excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate) that could be emitted during use, application, curing or drying of a cleaning product, gel coat, or polyester resin.
- 249.1 For purposes of calculating the VOC content of a polyester resin or gel coat, neither water nor any of the following non-precursor organic compounds:
acetone
parachlorobenzotrifluoride (PCBTF)
cyclic, branched or linear completely methylated siloxanes (VMS)
shall be considered to be part of the polyester resin or gel coat.
- 249.2 For the purposes of calculating the VOC content of a cleaning product subject to Section 8-50-305.4, water and any of the non-precursor organic compounds listed in subsection 8-50-249.1, shall neither be considered part of the volume of the cleaning product, nor shall be considered to be part of the VOC content of the cleaning product.
(Amended 12/20/95; 11/6/96; Amended, Renumbered 12/2/09)
- 8-50-300 STANDARDS**
- 8-50-301 Process Material Requirements:** Until October 1, 2010, a polyester resin operation shall use one or more of the following emission reducing methods except as provided in Section 8-50-304:
- 301.1 Use polyester resin material with a monomer content of no greater than 35 percent by weight.
- 301.2 Use a resin containing vapor suppressant, such that weight loss from VOC emissions do not exceed 60 grams per square meter of exposed surface area during resin polymerization.

301.3 Use a closed-mold system.

Effective October 1, 2010, an owner or operator shall use one or more of the following VOC emission reduction methods:

301.4 A closed-mold system,

301.5 A resin containing vapor suppressant, that prevents weight loss from VOC emissions to no more than 50 grams per square meter of exposed surface area during resin polymerization; or,

301.6 Except as provided in Section 8-50-301.7, a polyester resin or gel coat in an open mold with a monomer content no greater than the applicable limit specified in Table 1.

TABLE 1	
Gel Coats and Resins	Monomer Percentage by Weight
Gel Coats	
Clear Gel Coats	
Marble Resin Gel Coats	42%
Boat Manufacturing Gel Coats	48%
All Other Clear Gel Coats	44%
Pigmented Gel Coats	
White and Off-White Gel Coats	30%
Non-White Boat Manufacturing Gel Coats	33%
Other Non-White Gel Coats	37%
Primer Gel Coats	28%
Specialty Gel Coats	48%
Resins	
Marble Resins	10% with fillers or 32% without fillers*
Solid Surface Resins	17%
Tub/Shower Resins	24% with fillers or 35% without fillers*
Boat Manufacturing (atomized)	28%
Boat Manufacturing (non-atomized)	35%
Lamination Resins	31% with fillers or 35% without fillers*
Fire Retardant Resins	38%
Corrosion Resistant, High Strength and Tooling Resins	
Non-atomizing Mechanical Application	46%**
Filament Application	42%**
Manual Application	40%**
Other Resins	35%

Monomer percent by weight includes the addition of any VOC-containing materials.

* An owner or operator of a polyester resin operation may meet the monomer content limits by adding filler to a resin to reduce the monomer content to the applicable limit or by using resin with a monomer content that complies with the applicable limit without the addition of fillers.

**If the owner or operator manufactures a composite product by using more than one technology to apply corrosion-resistant, high strength or tooling resins, the highest permissible resin monomer content is the applicable limit.

301.7 Resins and gel coats used to touch up, repair or install a composite product, may have a monomer content limit up to 10% more than the applicable limit set forth in Table 1 provided the resins or gel coats are applied by hand-held atomized spray technologies that operate with a container that is part of the gun with a maximum capacity of 1 quart.

(Amended December 2, 2009)

8-50-302 Application Requirements: A polyester resin operation shall only apply resins and gel coats to open molds by one or more of the following techniques:

302.1 Until October 1, 2011:

- 1.1 Atomized spray techniques: Airless Spray, Air-assisted Airless Spray, Electrostatic Air Spray, High-Volume, Low-pressure Spray;
- 1.2 Non-atomizing mechanical application techniques;
- 1.3 Hopper guns;
- 1.4 Non-spray techniques: Filament Application, Pressure-fed Roller, Resin Impregnation;
- 1.5 Manual application techniques.

302.2 Effective October 1, 2011, an owner or operator may only apply a resin by the techniques listed in Sections 1.2 through 1.5, above.

302.3 An owner or operator may use a resin to touch up, repair or install a composite product using any of the above application techniques.

(Amended December 2, 2009)

8-50-303 Approved Emission Control System Requirements: The requirements of Sections 8-50-301 and 302 shall not apply to polyester resin operations controlled by an emission control system that is installed and properly operated, meets the requirements of Regulation 2, Rule 1, and has an overall efficiency of at least 85 percent overall on a mass basis.

(Amended 6/15/94; 12/2/09)

8-50-304 Corrosion-Resistant Materials: Until October 1, 2010, polyester resin operations using corrosion-resistant materials to manufacture products for corrosive or fire retardant service shall use a polyester resin material with a monomer content of no greater than 50 percent by weight. Effective October 1, 2010, the applicable limit in Section 8-50-301, Table 1 applies.

(Amended December 2, 2009)

8-50-305 Surface Preparation and Cleaning Products: The requirements of this section shall apply to any polyester resin operation using for surface preparation and the cleaning of application equipment, machinery, tools, parts, products, and general working areas.

305.1 Polyester resin operations shall store all resin materials, gel coats, catalyzing agents, resin thinners, cleaning products and any unused VOC-containing materials in closed containers which may only be opened to access their contents.

305.2 Polyester resin operations shall use self-closing containers for the disposal of all VOC containing composite materials, cleaning products, VOC-containing waste, and any other unused VOC containing materials in such a manner as to effectively control VOC emissions to the atmosphere.

305.3 Polyester resin operations shall not use cleaning products to clean spray equipment including spray lines unless equipment for collecting the cleaning product material and minimizing their evaporation to the atmosphere is used.

305.4 Effective October 1, 2010, polyester resin operations shall use cleaning products that contain no greater than 25 grams of VOC per liter of material.

305.5 Notwithstanding the provisions of Regulation 8, Rule 16, polyester resin operations may use acetone in a cold cleaner provided the following provisions are complied with:

- 5.1 The cold cleaner and any emission control device associated with the cold cleaner shall be operated and maintained in proper working order.
- 5.2 The cold cleaner shall be equipped with a self-closing cover, with no visible gaps, that minimizes evaporation.
- 5.3 The cover must remain closed except when putting parts into or taking parts out of the cleaner.
- 5.4 All liquid solvent shall be drained back into the container when removing parts.
- 5.5 The cold cleaner may be used to soak parts, but parts must be wiped, brushed or otherwise worked on outside of the cleaner.
- 5.6 Leaks shall be repaired before the end of the work day or the cold cleaner shall be drained and shut down until the leak is repaired.
- 5.7 The cold cleaner shall not be heated.
- 5.8 Solvent, including waste solvent, shall not be stored or disposed of in a manner that will cause or allow evaporation into the atmosphere.
- 5.9 Cleaning of porous or absorbent materials in cold cleaners is prohibited.
- 5.10 A permanent label listing the applicable operating requirements contained in this section, shall be posted in a conspicuous location near the cold cleaner.

(Amended December 2, 2009)

8-50-306 Equipment Requirements: All resin baths and wet baths shall be covered to reduce organic compound emissions. Pultrusion operations shall be covered, except as allowed by 40 CFR 63.5830.

(Amended December 2, 2009)

8-50-307 Gel Coat Requirement: Until October 1, 2010, an owner or operator of a polyester resin operation shall not use a gel coat that contains more than 250 grams of volatile compounds per liter of coating applied.

(Amended December 2, 2009)

8-50-308 Prohibition of Specification Requirement: No person shall solicit, require or specify use of a composite material if such use results in a violation of any of the provisions of this rule. The prohibition of the section shall apply to all oral and written contracts under the terms of which any use of any composite material that is subject to the provisions of this rule is to be used.

(Adopted December 2, 2009)

8-50-309 Compliance Statement Requirement: The manufacturer of any VOC-containing composite material sold or used in this District shall supply a designation of the percent monomer content by weight or the percent VOC content, as applicable, on data sheets, specification sheets or compliance certifications.

(Adopted December 2, 2009)

8-50-500 MONITORING AND RECORDS

8-50-501 Recordkeeping Requirements: Polyester resin operations, including touch ups, repairs, and installations performed in the field, shall comply with the following recordkeeping requirements:

- 501.1 Maintain a current list of gel coats, resins, resin thinners, catalyzing agents, and cleaning products used.
- 501.2 Maintain a current list of:
 - a. the monomer content percent by weight for each polyester resin and gel coat used;
 - b. the VOC content in grams per liter for each cleaning product and VOC-containing material added to a polyester resin and gel coat; and,
 - c. manufacturer's specifications on each type of application equipment used.

- 501.3 For all vapor suppressed resins, maintain a current list of certifications from the manufacturers that the resins are vapor-suppressed to meet the applicable standards in this rule.
- 501.4 Maintain records that specify on a daily basis:
- the type and amount of each of the polyester resin, gel coat, and cleaning products used. If VOC-containing materials (such as resin thinners) are added to a polyester resin or gel coat, the amount of materials added shall be recorded,
 - the volume of resin and cleaning materials used for touch-up and repair.
- Alternatively, records may be kept on a monthly basis provided the polyester resin operation is not subject to a daily limit in any District rule or permit. Any violation shall be deemed to have occurred on each operating day of the month.
- 501.5 The owner or operator shall retain all records and lists required by this Section and shall make them available for inspection by the APCO upon request, for the previous 36-month period.

(Amended December 2, 2009)

8-50-502 Approved Emission Control System, Recordkeeping Requirements: Any owner or operator subject to Section 8-50-303 shall:

- 502.1 Record on a daily basis the type and amount of all resins, gel coats and cleaning products used.
- 502.2 Record key system operating parameters, as defined in Section 8-50-224, on a daily basis.
- 502.3 Retain and have such records available for inspection by the APCO for the previous 36-month period.

(Adopted 6/15/94; Amended 12/2/09)

8-50-503 Emission Control System Monitoring: Any owner or operator who uses an emission control system which is subject to the provisions of Section 8-50-303 shall install readily visible parametric monitoring devices to monitor the operating parameters of an emission control system at all times during operation.

(Adopted December 2, 2009)

8-50-600 MANUAL OF PROCEDURES

8-50-601 Analysis of Samples: Samples from polyester resin operations shall be analyzed as follows:

- 601.1 Samples of gel coat as specified in Sections 8-50-307 shall be analyzed as prescribed in the Manual of Procedures, Volume III, Method 26.
- 601.2 Samples of cleaning products as specified in Section 8-50-305.4 shall be analyzed as prescribed in the Manual of Procedures, Volume III, Method 31 or by South Coast Air Quality Management District Laboratory Method 313-91.
- 601.3 Samples of polyester resin material as specified in Sections 8-50-301 and 304 shall be analyzed as prescribed in the Manual of Procedures, Volume III, Method 23: Determination of Volatile Emissions From Polyester Resins, or Method 39: Determination of Styrene Monomer Content of Polyester Resin Material, or by South Coast Air Quality Management District Laboratory Method 312-91.
- 601.4 Samples containing parachlorobenzotrifluorides shall be analyzed as prescribed in the Manual of Procedures (MOP), Vol. III, Method 41. Samples containing volatile methylsiloxanes shall be analyzed as prescribed in the MOP, Vol. III, Method 43. The quantity of methyl acetate, acetone, parachlorobenzotrifluoride shall be determined by using ASTM Method D6133-02: "Standard Test Method for Acetone, *p*-Chlorobenzotrifluoride, Methyl Acetate or *t*-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection Into a Gas Chromatograph."

(Amended 11/6/96; 12/2/09)

8-50-602 Determination of Emissions, Operations with a Control Device: Emissions of volatile organic compounds and monomers from polyester resin operations controlled by an emission control system shall be determined as follows:

602.1 Capture efficiency shall be determined as specified in 40 CFR 51, Appendix M, Test Methods 204 – 204F, as applicable.

602.2 Control device destruction efficiency shall be determined as specified in the Manual of Procedures, Volume IV, ST-7 or EPA Method 25 or 25A.

602.3 For the determination of control device destruction efficiency, any non-precursor organic compound specified in Section 8-50-220 shall be included as a volatile organic compound.

602.4 The overall efficiency of an emission control system, expressed as a percentage, shall be calculated according to the following equation:

$$OE = [CE \times DE]/100$$

Where:

OE = Overall efficiency

CE = Capture efficiency

DE = Control device destruction efficiency

602.5 VOC or monomer emissions, as measured by any of the reference test methods, may be used as evidence of exceedances of standards of this rule.

(Amended 6/15/94; 11/6/96; 12/2/09)