

.26-1 Control of Volatile Organic Compound Emissions from Fiberglass Boat Manufacturing.

A. Applicability.

(1) This regulation applies to any fiberglass boat manufacturing facility where the total actual VOC emissions, before add-on controls, from all fiberglass boat manufacturing is 15 pounds or more per day as determined on a monthly average.

(2) VOC emissions from polyester resins, tooling resins and gel coats, ancillary parts production, touch-up, clean-up, and repair are to be included in determining VOC emissions pursuant to §(A)(1) of this regulation.

B. Definitions. In this regulation, the following terms have the meanings indicated:

(1) Atomized Resin Application.

(a) "Atomized resin application" means a 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.

(b) "Atomized resin application" includes, but is not limited to, resin spray guns and resin chopper spray guns.

(2) Clear Gel Coat.

(a) "Clear gel coat" means a gel coat that is clear or translucent such that underlying colors are visible.

(b) "Clear gel coat" does not include tooling gel coats used to build or repair molds.

(3) Closed Molding.

(a) "Closed molding" means any molding process that has the following characteristics:

(i) Pressure is used to distribute the resin through the reinforcing fabric placed between two mold surfaces to either saturate the fabric or fill the mold cavity; and

(ii) Clamping pressure, fluid pressure, atmospheric pressure, or vacuum pressure are applied either alone or in combination.

(b) "Closed molding" includes, but is not limited to, compression molding with sheet molding compound, infusion molding, resin injection molding (RIM), vacuum assisted resin transfer molding (VARTM), resin transfer molding (RTM), and vacuum assisted compression molding.

(c) "Closed molding" does not include:

(i) Processes in which a closed mold is used only to compact saturated fabric or remove air or excess resin from the fabric (such as in vacuum bagging); or

(ii) Open molding steps such as application of a gel coat or skin coat layer by conventional open molding prior to a closed molding process.

(4) "Fiberglass boat" means any type of vessel, other than a seaplane, that can be used for transportation on the water, in which either the hull or deck is built from a composite material consisting of a polyester resin or other thermosetting resin matrix reinforced with fiberglass (glass fibers), inert filler or other reinforcing materials such as fibers of carbon or aramid.

(5) Fiberglass Boat Manufacturing Facility.

(a) "Fiberglass boat manufacturing facility" means a facility that manufactures hulls or decks of fiberglass boats, assembles fiberglass boats from premanufactured hulls and decks, or builds molds to make hulls or decks of fiberglass boats.

(b) "Fiberglass boat manufacturing facility" does not include a facility which:

(i) Manufactures ancillary parts for fiberglass boats (such as hatches, seats, or lockers) or boat trailers; and

(ii) Does not manufacture hulls or decks of fiberglass boats, assemble fiberglass boats from premanufactured hulls and decks, or build molds for fiberglass boat hulls or decks.

(6) "Filled resin" means a resin to which an inert material has been added to change viscosity, density, shrinkage, or other physical properties.

(7) "Gel coat" means a thermosetting resin surface coating containing styrene (Chemical Abstract Service (CAS No. 100-42-5) or methyl methacrylate (CAS No. 80-62-6) that:

(a) Provides a cosmetic enhancement or improves resistance to degradation from exposure to the elements;

(b) Does not contain any reinforcing fibers; and

(c) Is applied directly to mold surfaces or to a finished laminate.

(8) "Mold" means the cavity or surface into or on which gel coat, resin, and fibers are placed and from which finished fiberglass parts take their form.

(9) "Monomer" means a low molecular weight organic compound that reacts with itself or other similar compounds to produce a polymer such as a polyester or vinylester resin.

(10) Nonatomized Resin Application.

(a) "Nonatomized 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.

(b) "Nonatomized resin application" includes, but is not limited to, flowcoaters, chopper flowcoaters, pressure fed resin rollers, resin impregnators, and hand application by paint brush or paint roller.

(11) "Non-monomer" means any low molecular weight organic compound that does not react with itself or other similar compounds to produce a polymer and is assumed to be emitted fully as a VOC into the atmosphere.

(12) "Non-VOC cleanup material" means a material that:

(a) Is used to clean products, tools, process equipment, and other equipment used in the manufacture of fiberglass boats; and

(b) Either contains less than 5 percent VOC by weight or has a VOC composite vapor pressure of no more than 0.5 millimeters of mercury at 68 degrees Fahrenheit.

(13) Open Molding and Gel Coat Operations.

(a) "Open molding and gel coat operation" 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.

(b) "Open molding and gel coat operation" includes operations in which a vacuum bag or similar cover is used to compress an uncured laminate to remove air bubbles or excess resin, or to achieve a bond between a core material and a laminate.

(14) Pigmented Gel Coat.

(a) "Pigmented gel coat" means an opaque gel coat.

(b) "Pigmented gel coat" does not include tooling gel coats used to build or repair molds.

(15) Production Resin.

(a) "Production resin" means any resin used to manufacture parts for sale.

(b) "Production resin" does not include tooling resins used to build or repair molds, or assembly adhesives.

(16) "Pure, 100-percent, vinylester resin used for skin coats" means resins containing only vinylester resin and does not include any resin containing blends of vinylester and polyester resins.

(17) "Resin and gel coat mixing operation" means any operation in which a resin or gel coat is combined with additives that include, but are not limited to, fillers, promoters, or catalysts, and includes operations making putties or polyputties used to assemble parts of fiberglass boats and to fill gaps between parts.

(18) "Skin coat" means a layer of resin and fibers applied over a gel coat to protect the gel coat from being deformed by an additional laminate layer or layers.

(19) "Tooling" means the production of molding tools such as shapes, matrixes, molds, or other instruments and utensils that are used during manufacturing of fiberglass boats.

(20) "Tooling resin" means, for the purposes of §C(1) of this regulation, the resin used to build or repair molds (also known as tools) or prototypes (also known as plugs) from which molds will be made.

(21) "Tooling gel coat" means, for the purposes of §C(1) of this regulation, the gel coat used to build or repair molds (also known as tools) or prototypes (also known as plugs) from which molds will be made.

(22) "Total VOC Content (percent by weight)" means the sum of the monomer content (percent by weight) determined according to §D(1) of this regulation and of the weight percent of the non-monomer VOC determined by §D(3) of this regulation.

(23) Vacuum Bagging.

(a) "Vacuum bagging" means any molding technique in which the reinforcing fabric is saturated with resin and then covered with a flexible sheet that is sealed to the edge of the mold and where a vacuum is applied under the sheet to compress the laminate, remove excess resin, or remove trapped air from the laminate during curing.

(b) “Vacuum bagging” does not include closed molding.

(24) “Vinylester resin” means a thermosetting resin containing esters of acrylic or methacrylic acids and having double-bond and ester linkage sites only at the ends of the resin molecules.

C. Requirements.

(1) A person who owns or operates a fiberglass boat manufacturing facility subject to this regulation shall:

(a) Not cause or permit the discharge into the atmosphere of any VOC from resin and gel coat operations in excess of the following standards, except as provided in §C(3) of this regulation:

Operation	Application Method	Total Monomer Content (percent by weight)	Total VOC Content (percent by weight)
Production resin	Atomized resin application (spray)	28	33
Production resin	Nonatomized resin application	35	40
Pigmented gel coat	Atomized or nonatomized resin application	33	38
Clear gel coat	Atomized or nonatomized resin application	48	53
Tooling resin	Atomized resin application (spray)	30	35
Tooling resin	Nonatomized resin application	39	44
Tooling gel coat	Atomized or nonatomized resin application	40	45

(b) Notwithstanding §C(3)(a) and (b) of this regulation, use nonatomizing resin application equipment when applying production resins (including skin coat resins) pursuant to §C(3)(a) of this regulation, and pure, 100-percent vinylester resins pursuant to §C(3)(b) of this regulation.

(c) Not cause or permit the discharge into the atmosphere of any VOC from any resin and gel coat mixing operation unless all mixing containers with a capacity equal to or greater than 208 liters (55 gallons), including those used for on-site mixing of putties and polyputties, have a cover with no visible gaps in place at all times except when material is being manually added to or removed from the container, or when mixing or pumping equipment is being placed in or removed from the container.

(d) Only use non-VOC cleanup materials.

(2) Alternative Compliance Option.

In lieu of meeting the standards of §C(1)(a) of this regulation, a person who owns or operates a fiberglass boat manufacturing facility subject to this regulation may cause or permit the discharge into the atmosphere of any VOC from filled resins provided that such emissions do not exceed the following non-monomer VOC content and as-applied monomer VOC emission rates calculated using the equation in §D(3) of this regulation:

Type of Filled Resin	Monomer Rate in kg Monomer VOC per Megagram of Filled Resin as Applied	Non-monomer VOC Content Limit of Unfilled Resin
Production	46	5%
Tooling	54	5%

(3) Exemptions. The standards in §C(1)(a) of this regulation do not apply to:

(a) Production resins (including skin coat resins) that meet specifications for use in military vessels or must be approved by the U.S. Coast Guard for use in the construction of lifeboats, rescue boats, and other life-saving appliances approved under 46 CFR Chapter I, Subchapter Q, or the construction of small passenger vessels as regulated by 46 CFR Chapter I, Subchapter T;

(b) Pure, 100-percent vinylester resins used for skin coats where the total quantity of such resins used is less than or equal to 5 percent by weight of all resin used at a fiberglass boat manufacturing facility on a 12-month rolling average basis, as reported in §E(5)—(7) of this regulation;

(c) Production and tooling resins, and pigmented, clear, and tooling gel coats, which are used for touch up and repair of parts or molds and which are used in quantities less than or equal to 1 percent by weight of all resin used at a fiberglass boat manufacturing facility on a 12-month rolling average basis, as reported in §E(1) of this regulation;

(d) Resins used in closed molding;

(e) Polyester resins used for tooling or touch-up and repair during a manufacturing process that is not fiberglass boat manufacturing;

(f) Coatings applied to fiberglass boats; and

(g) Adhesives used in the assembly of fiberglass boats.

D. Test Methods and Compliance Procedures.

(1) A person who owns or operates a fiberglass boat manufacturing facility subject to this regulation shall determine the monomer VOC content of any resin or gel coat applied at the facility using:

(a) South Coast Air Quality Management District (SCAQMD) Method 312-91, Determination of Percent Monomer in Polyester Resins, revised April 1996; or

(b) Manufacturer's formulation data.

(2) In the event of a conflict between the monomer VOC content of any resin or gel coat indicated by the manufacturer's formulation data and the results of a test using the method referenced in §D(1)(a) of this regulation, the test results shall be used for the purpose of determining compliance with this regulation.

(3) A person meeting the alternative emission rates in §C(2) of this regulation shall compute the as-applied monomer VOC emission rate for the filled production resin or tooling resin, in kilograms monomer VOC per megagram of filled material, using the following equation:

$$PV_F = PV_u \text{ times } \frac{(100 - \text{Filler pct})}{100}$$

Where

PV_F is the as-applied monomer VOC emission rate for the filled production resin or tooling resin, kilograms monomer VOC per megagram of filled material.

PV_u is the monomer VOC emission rate for the neat (unfilled) resin, before filler is added, as calculated using the formulas in the table in §D(4) of this regulation.

Filler pct is the weight-percent of filler in the as-applied filled resin system.

(4) The monomer VOC emission rate for the neat (unfilled) resin, before filler is added, PV_u , shall be calculated using the formulas in the following table:

Monomer VOC Emission Rate Formulas for Open Molding and Gel Coat Operations		
Material	Application Method	Formula to Calculate the Monomer VOC Emission Rate ¹
Production resin or tooling resin	Atomized resin application	$0.014 \times (\text{Resin VOC}\%)^{2.425}$
	Atomized resin application, plus vacuum bagging with roll-out	$0.01185 \times (\text{Resin VOC}\%)^{2.425}$
	Atomized resin application, plus vacuum bagging without roll-out	$0.00945 \times (\text{Resin VOC}\%)^{2.425}$
	Nonatomized resin application	$0.014 \times (\text{Resin VOC}\%)^{2.425}$
	Nonatomized resin application plus vacuum bagging with roll-out	$0.0110 \times (\text{Resin VOC}\%)^{2.275}$
	Nonatomized resin application plus vacuum bagging without roll-out	$0.0076 \times (\text{Resin VOC}\%)^{2.275}$
Pigmented gel coat, clear gel coat, tooling gel coat	All methods	$0.445 \times (\text{Gel coat VOC}\%)^{1.675}$

¹ Where the resin VOC% is the monomer VOC content as supplied, expressed as a weight-percent value between 0 and 100 percent.

(5) A person meeting the alternative emission rates in §C(2) of this regulation shall demonstrate the as-applied non-monomer VOC content of resins and gel coats using the test method prescribed in COMAR 26.11.19.02D(1), and for this purpose, resins and gel coats shall be considered coatings .

(6) For the purpose of demonstrating that a cleanup material is a non-VOC cleanup material, a person shall:

(a) Perform a test using the method prescribed in COMAR 26.11.19.02D(1), where the cleanup material shall be considered a coating; and

(b) Determine the composite vapor pressure of organic-compounds in a cleanup material using the calculation prescribed in COMAR 26.11.19.02E(3).

E. Record Keeping. A person who owns or operates a fiberglass boat manufacturing facility subject to this regulation shall maintain for not less than 3 years, and shall make available to the Department upon request, records that provide the following information:

(1) A description of each polyester or vinylester resin material used including:

(a) The manufacturer's name;

(b) The type (e.g. production resin, production gel coat, tooling resin, tooling gel coat);

(c) The amount of each of the polyester or vinylester resin materials used;

(d) The weight (in percent) of monomer for each polyester resin materials and filler or fillers used;

(e) The weight percent of VOC that is not monomer or the total weight percent of the VOC content; and

(f) The type of application method used with each resin;

(2) On a quarterly basis, the total weight and the monomer content and VOC content of each polyester and vinylester resin material;

(3) On a quarterly basis, the total weight and the monomer content and VOC content of each polyester and vinylester resin material used under the exemption of §C(3)(a), of this regulation, including a description or identification (military specifications, 46 CFR Subchapter Q, or 46 CFR subchapter T) of the exemption;

(4) On a monthly basis, the total weight, monomer content, and VOC content of each polyester and vinylester resin material used for closed molding under the exemption of §C(3)(d) of this regulation;

(5) On a monthly basis, the total weight, monomer content, and VOC content of each pure, 100-percent vinylester resin used under the exemption of §C(3)(b) of this regulation;

(6) On a monthly basis, the total weight of all resins used;

(7) On a monthly basis, the total weight of pure, 100-percent vinylester resins used under the exemption of §C(3)(b) of this regulation over the preceding 12 months divided by total weight of all resins used over the preceding 12 months;

(8) On a daily basis, the total weight, monomer content, and VOC content of each resin used for touch up and repair of parts or molds under the exemption of §C(3)(c) of this regulation;

(9) For filled resins for which compliance is demonstrated under alternative compliance option of §C(2) of this regulation:

(a) The total weight and non-monomer VOC content of each polyester and vinylester resin material used; and

(b) The monomer emission rate computed in accordance with §D(3) of this regulation in kg monomer VOC per megagram of filled resin as applied.

(10) On a monthly basis, the total clean-up materials used.

