15A NCAC 02D .0963 FIBERGLASS BOAT MANUFACTURING MATERIALS

(a) For the purpose of this Rule, the following definitions apply:

(1) "Closed molding" means any fabrication techniques in which 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.

(2) "Monomer" means a volatile organic compound that partly combines with itself, or other similar compounds, by a cross-linking reaction to become a part of the cured resin.

(3) "Open molding" means the open mold which is first spray-coated with a clear or pigmented polyester resin known as a gel coat. The gel coat will become the outer surface of the finished part.

(b) This Rule applies to a facility that manufactures hulls or decks of boats and related parts, builds molds to make fiberglass boat hulls or decks and related parts from fiberglass, or makes polyester resin putties for assembling fiberglass parts; and whose volatile organic compounds emissions exceed the threshold established in Paragraph (b) of Rule .0902 of this Section from sources for the following operations:

(1) open molding and gel coat operations (including pigmented gel coat, clear gel coat, production resin, tooling gel coat, and tooling resin);

(2) resins and gel coat mixing operations; and

(3) resins and gel coat application equipment cleaning operations.

(c) The following activities are exempted from the provisions of this Rule:

(1) surface coatings applied to fiberglass boats;

(2) surface coatings for fiberglass and metal recreational boats (pleasure craft); and

(3) industrial adhesives used in the assembly of fiberglass boats.

(d) Volatile organic compounds content limits in resin and gel coat that are used for any molding operations listed in Paragraph (b) of this Rule and closed molding operations that do not meet the definition of monomer established in Subparagraph (a)(2) of this Rule, such as vacuum bagging operations, shall not exceed monomer volatile organic compounds limits established in Table 1:

Table 1 Organic Hazardous Air Pollutants Content Requirements for Open Molding Resin and Gel Coat Operations (40 CFR 63, Subpart VVVV.)

Material	Application Method	Limit of Weighted-Average Monomer VOC Content (weight percent)
Production resin	Atomized (spray)	28
Production resin	Nonatomized	35
Pigmented gel coat	Any method	33
Clear gel coat	Any method	48
Tooling resin	Atomized	30
Tooling resin	Nonatomized	39
Tooling gel coat	Any method	40

The average monomer volatile organic compounds contents listed in the Table 1 shall be determined by using Equation 1:

$$\text{Weighted Average Monomer VOC Content} = \frac{\sum_{i=1}^{n} (M_i \, VOC_i)}{\sum_{i=1}^{n} (M_i)}$$

Where: M_i = mass of open molding resin or gel coat i used in the past 12 month in an operation, megagrams.

VOC_i = monomer volatile organic compounds content, by weight percent, of open molding resin or gel coat i used in the past 12 month in an operation.

$_n$ = number of different open molding resins or gel coats used in the past 12 month in an operation.

(e) Molding monomer and non-monomer volatile organic compounds limits established in Paragraph (d) of this Rule are not applicable to:

(1) production resins (including skin coat resins) that meet specifications for use in military vessels or are approved by the U.S. Coast Guard for the use in the construction of lifeboats, rescue boats, and other

life saving appliances approved under 46 CFR Subchapter Q, or the construction of small passenger vessels regulated by 46 CFR Subchapter T. Production resins that meet these criteria shall be applied with nonatomizing resin application equipment;

(2) production and tooling resins; and pigmented, clear, and tooling gel coat used for part or mold repair and touch up. Total resin and gel coat materials that meet these criteria shall not exceed one percent by weight of all resin and gel coat used at a facility on a 12-month rolling-average basis; or

(3) pure, 100-percent vinylester resin used for skin coats that are applied with nonatomizing resin application equipment and with the total amount of the resin materials not exceeding five percent by weight of all resin used at a factory on 12-month rolling-average basis.

(f) Any molding resin and gel coat operations listed in Paragraph (b) of this Rule, that a facility chooses to include into average emissions among different operations to meet numerical monomer volatile organic compounds emission rate limits rather than to comply with the emission limits established in Paragraph (d) of this Rule shall use:

(1) Equation 2 to estimate a facility-specific monomer volatile organic compounds mass emission limit (12-month rolling average). Estimations of emissions average shall be determined on 12-month rolling average basis at the end of every month (12 times per year).

Equation 2:

Monomer VOC Limit= $46(M_R) + 159(M_{PG}) + 291(M_{CG}) + 54(M_{TR}) + 214(M_{TG})$

Where:

Monomer VOC Limit = total allowable monomer volatile organic compounds that can be emitted from the open molding operations included in the average, kilograms per 12-month period.

M_R = mass of production resin used in the past 12 month excluding any materials that are exempt, megagrams.

M_{PG} = mass of pigmented gel coat used in the past 12 month, excluding any materials that are exempt, megagrams.

M_{CG} = mass of clear gel coat used in the past 12 month, excluding any materials that are exempt, megagrams.

M_{TR}= mass of tooling resin coat used in the past 12 month, excluding any materials that are exempt, megagrams.

M_{TG} = mass of tooling gel coat used in the past 12 month, excluding any materials that are exempt, megagrams.

The numerical coefficients associated with each term on the right hand side of Equation 2 are the allowable monomer volatile organic compounds emission rate for that particular material in units of kilograms of VOC per megagrams of material used.

(2) Equation 3 to demonstrate that the monomer volatile organic compounds emissions from the operations included in the average do not exceed the emission limit calculated using Equation 2 from Subparagraph (f)(1) of this Rule for the same 12-month period. This demonstration shall be conducted at the end of the first 12-month averaging period and at the end of every subsequent month for only those operations and materials that included in the average.

Equation 3:

Monomer VOC emissions = $(PV_R)(M_R) + (PV_{PG})(M_{PG}) + (PV_{CG})(M_{CG}) + (PV_{TR})(M_{TR}) + (PV_{TG})(M_{TG})$

Where:

Monomer VOC emissions = monomer volatile organic compounds emissions calculated using the monomer volatile organic compounds emission equation for each operation included in the average, kilograms.

PV_R = weighted-average monomer volatile organic compounds emission rate for production resin used in the past 12 month, kilograms per megagram.

M_R = Mass of production resin used in the past 12 month, megagrams.

PV_{PG} = weighted-average monomer volatile organic compounds emission rate for pigmented gel coat used in the past 12 month, kilograms per megagram.

M_{PG} = mass of pigmented gel coat used in the past 12 month, megagrams.

PV_{CG} = weighted-average monomer volatile organic compounds emission rate for clear gel coat used in the past 12 month, kilograms per megagram.

M_{CG} = Mass of clear gel coat used in the past 12 month, megagrams.

PV_{TR} = Weighted-average monomer volatile organic compounds emission rate for tooling resin used in the past 12 month, kilograms per megagram.

M_{TR} = Mass of tooling resin used in the past 12 month, megagrams.
PV_{TG} = Weighted-average monomer volatile organic compounds emission rate for tooling gel coat used in the past 12 month, kilograms per megagram.
M_{TG} = Mass of tooling gel coat used in the past 12 month, megagrams.

(3) Equation 4 to compute the weighted-average monomer volatile organic compounds emission rate for the previous 12 month for each open molding resin and gel coat operation included in the average to apply the results in Equation 3.

Equation 4:

$$PV_{OP} = \frac{\sum_{i=1}^{n} (M_i\ PV_i)}{\sum_{i=1}^{n} (M_i)}$$

Where:
PV_{OP} = weighted-average monomer volatile organic compounds emission rate for each open molding operation (PV_R, PV_{PG}, PV_{CG}, PV_{TR}, and PV_{TG}) included in the average, kilograms of monomer volatile organic compounds per megagram of material applied.
M_i = mass or resin or gel coat i used within an operation in the past 12 month, megagrams.
n = number of different open molding resins and gel coats used within an operation in the past 12 month.
PV_i = the monomer volatile organic compounds emission rate for resin or gel coat i used within an operation in the past 12 month, kilograms of monomer volatile organic compounds per megagram of material applied. Equations in Table 2 shall be used to compute PV.

Table 2 Compliant Materials Monomer Volatile Organic Compounds Content for Open Molding Resin and Gel Coat.

For this material	and this application method	Use this formula to calculate the monomer VOC emission rate
1. Production resin, tooling resin	a. Atomized	$0.014 \times (\text{Resin VOC\%})^{2.425}$
	b. Atomized, plus vacuum bagging with roll-out	$0.01185 \times (\text{Resin VOC\%})^{2.425}$
	c. Atomized, plus vacuum bagging without roll-out	$0.00945 \times (\text{Resin VOC\%})^{2.425}$
	d. Nonatomized	$0.014 \times (\text{Resin VOC\%})^{2.275}$
	e. Nonatomized, plus vacuum bagging with roll-out	$0.0110 \times (\text{Resin VOC\%})^{2.275}$
	f. Nonatomized, plus vacuum bagging without roll-out	$0.0076 \times (\text{Resin VOC\%})^{2.275}$
2. Pigmented gel coat, clear gel coat, tooling gel coat	All methods	$0.445 \times (\text{Gel coat VOC\%})^{1.675}$

(g) If the owner or operator of any facility with molding resin and gel coat operations listed in Paragraph (b) of this Rule, chooses to use of higher-monomer volatile organic compounds materials rather than to comply with the emission limits established in Paragraph (d) of this Rule he shall:

(1) install control equipment to meet the emission limit determined by Equation 2 in Subparagraph (f)(1) of this Rule, applying the mass of each material used during the control device performance test in Equation 2 to determine the emission limit (in kilogram of monomer VOC) that is applicable during the test, instead of using the mass of each material as it established in Subparagraph (f)(1) of this Rule;

(2) monitor and record relevant control device and capture system operating parameters during the control device performance test to use the recorded values to establish operating limits for those parameters; and

(3) monitor the operating parameters for the control device and emissions capture system and maintain the parameters within the established limits.

(h) Any molding resin and gel coat operations that use a filled production resin or filled tooling resin shall calculate the emission rate for the filled production resin or filled tooling resin on as applied basis using Equation 5. If the filled resin:

(1) is used as a production resin then the value of PV_F calculated by Equation 5 shall not exceed 46 kilograms of monomer VOC per megagram of filled resin applied;

(2) is used as a tooling resin then the value of PV_F calculated by Equation 5 shall not exceed 54 kilograms of monomer VOC per megagram of filled resin applied; and

(3) is included in the emissions averaging procedure then the facility shall use the value of PV_F calculated by Equation 5 for the value PV_i in Equation 4 in Subparagraph (f)(3) of this Rule.

Equation 5:

$$PV_F = \frac{PV_U \times (100 - \%Filler)}{100}$$

Where: PV_F = The as-applied monomer volatile organic compounds emission rate for the filled production resin or tooling resin, kilograms monomer VOC per megagram of filled material.

PV_U = The monomer volatile organic compounds emission rate for the neat (unfilled) resin before filler is added, as calculated using the formulas in Table 2 of Subparagraph (f)(3) of this Rule.

%Filler = The weight-percent of filler in the as-applied filled resin system.

(i) All resins and gel coats included in volatile organic compounds limits described in Paragraphs (d) through (h) shall meet non-monomer volatile organic compounds content limit of five percent.

(j) If the non-monomer volatile organic compounds content of a resin or gel coat exceeds five percent, then the excess non-monomer volatile organic compounds over five percent shall be counted toward the monomer volatile organic compounds content.

(k) SCAQMD Method 312-91, Determination of Percent Monomer in Polyester Resins, revised April 1996 shall be used to determine the monomer volatile organic compounds content of resin and gel coat materials unless the facility maintains records to document the volatile organic compounds content of resin and gel coat materials from the manufacturer.

(l) All resin and gel coat mixing containers with a capacity equal to or greater than 55 gallons, including those used for on-site mixing of putties and polyputties, shall have a cover with no visible gaps in place at all times except the following operations:

(1) when material is being manually added to or removed from a container; or

(2) when mixing or pumping equipment is being placed or removed from a container.

(m) Volatile organic compounds cleaning solvents for routine application equipment cleaning shall contain no more than five percent volatile organic compounds by weight, or have a composite vapor pressure of no more than 0.50 mm Hg at 68 degrees Fahrenheit.

(n) Only non-volatile organic compounds solvents shall be used to remove cured resin and gel coat from application equipment.

(o) The owner or operator of any facility subject to this Rule shall comply with the Rules .0903 and .0958 of this Section.

History Note: *Authority G.S. 143-215.3(a)(1); 143-215.107(a)(5);*
Eff. September 1, 2010.