

VENTURA COUNTY AIR POLLUTION CONTROL DISTRICT

RULE 74.14 - POLYESTER RESIN MATERIAL OPERATIONS

(Adopted 11/24/87, revised 5/26/92)

A. Applicability

1. This rule is applicable to the manufacture of products from or the use of polyester resin material.
2. Any manufacturing process using polyester resin materials which is exempt from this rule pursuant to Section C.2, shall comply with the provisions of Rule 66.

B. Requirements

1. All polyester resin material shall comply with one or more of the following requirements:
 - a. For all formulations, the reactive organic compound (ROC) loss rate shall be less than or equal to 60 grams per square meter of exposed surface area during resin polymerization; or
 - b. For all formulations except specialty resins and gel coats, the monomer content of the material shall be no more than 35 percent by weight as applied and as determined by manufacturers specifications.

For all specialty resins, the monomer content of the material shall be no more than 50 percent by weight as applied and as determined by manufacturers specifications.

For all gel coats, the monomer content of the material shall be no more than 45 percent by weight as applied for pigmented gel coats and 50 percent by weight as applied for clear gel coats, as determined by manufacturers specifications; or
 - c. Application of the material shall occur using a closed-mold system.

Complying formulations shall not be thinned or diluted with any ROC or changed in any manner that may increase ROC emissions after testing, but prior to or during application.
2. Airless, air-assisted airless, electrostatic, or high volume-low pressure spray equipment shall be used in any spray application, except for touch-up or repair using a hand-held, air-atomized spray gun utilizing an attached resin container of no more than one quart capacity.

3. Cleaning material used on lines, rollers, brushes, spray equipment and personnel, and containing more than 1.7 pounds of ROC per gallon of material as applied, or where the initial boiling point is less than 190 degrees Celsius, shall be limited in use to less than fifteen (15) gallons per calendar week unless a reclamation system is used. Residues from on-site reclamation systems shall contain no more than 20 percent ROC by weight and shall be disposed of in a manner consistent with federal, state and local hazardous waste regulations.
4. In lieu of compliance with the provisions of Subsection B.1 and B.2, a person may elect to reduce reactive organic compound emissions from the application process by a total capture and control efficiency of at least 85 percent by weight, but no less than the percent reduction achievable through the application of Subsections B.1 and B.2. Control efficiency shall be continuously monitored across an emission control device, the results of which shall be averaged over a rolling 24 hour period. Touch-up or repair work shall not be excluded from this subsection.
5. All materials containing reactive organic compounds, used or unused, including but not limited to semi-solid or liquid polyester resin materials and solid or liquid cleaning materials, shall be stored in closed containers.

C. Exemptions

1. Any polyester resin material operation subject to the requirements of this Rule shall be exempt from the requirements of Rule 66, with the exception of Rule 66.A.7.
2. The provisions of Section B of this rule shall not apply to stationary sources using not more than 20 gallons per month of polyester resin material.

D. Recordkeeping

A person subject to the provisions of this Rule shall maintain the following records. Such records shall be made available to the APCO upon request and shall be maintained for not less than two years from the date of each entry. The records shall contain:

1. Weekly reports (initialed by operator) of the following information:
 - a. The manufacturer and product number of each polyester resin material and cleaning material used, and amount of cleaning material both used and reclaimed or recycled.
 - b. The application method for each polyester resin and cleaning material used.

2. The emission rate of each polyester resin material used, as either the ROC loss rate in grams per square meter (gm/m^2) or as monomer content in percent by weight, and the gel time. For cleaning material, the ROC content in pounds of ROC per gallon of material as applied. Documentation shall be available to support these records.
3. Daily reports of the continuous control efficiency monitoring information required in Subsection B.4, if applicable. Daily reports shall include the quantity and type of polyester resin material used.

A person operating under the provisions of Subsection C.2 of this rule shall, in lieu of Subsections 1, 2, and 3 above, maintain monthly records of the amount of polyester resin material used.

E. Test Methods

1. Compliance with Subsection B.1.a shall be determined by laboratory static test, as described in Attachment A. Test results shall be submitted to the APCO for approval in writing and a copy of the test results shall be retained at the worksite.
2. Compliance with the requirements of Subsections B.1.b shall be determined using ASTM method D2369-81. Material tested shall be non-catalyzed.
3. Capture efficiency determinations required in Subsection B.4 shall be based on criteria set forth by EPA in 55 Federal Register (FR) 26865, June 29, 1990.
4. Control efficiency determinations required in Subsection B.4 shall be made using EPA Method 25A. Gas flow rate measurements in pipes or small ducts shall be made using EPA Method 2A.
5. Compliance with the requirements of Subsection B.3 of this rule shall be determined as follows:
 - a. For pounds of ROC per gallon of material, EPA Method 24.
 - b. For initial boiling point, ASTM method D1078-86.
 - c. For ROC content in residue, ARB Method 401.
6. Exempt organic compounds shall be determined by using ASTM method D4457-85.

F. Violations

Failure to comply with any provision of this rule shall constitute a violation of this rule.

G. Definitions

1. "Closed-mold System": A method of forming objects from polyester resins that involves placing the polyester resin material in a confining mold cavity and applying pressure and/or heat.
2. "Cure": To transform or polymerize material from a liquid state to a solid or semi-solid state in which the desired physical properties, including hardness, are achieved.
3. "Electrostatic": A sufficient charging of atomized droplets to cause deposition principally by electrostatic attraction. This application method shall operate at a minimum of 60 kilovolts.
4. "Exempt Organic Compounds": As defined in Rule 2.
5. "Gel Coat": A polyester resin material, either pigmented or clear, used to provide laminated surfaces with exterior cosmetic enhancement and improved resistance to degradation from exposure to the elements.
6. "Pounds of ROC per Gallon of Material": The weight of ROC per volume of material, as calculated by the equation,

$$\text{Pounds of ROC per Gallon of Material} = (W_s - W_w - W_{es}) / V_m$$

Where

W_s = weight of volatile compounds in pounds

W_w = weight of water in pounds

W_{es} = weight of exempt organic compounds in pounds

V_m = volume of total material in gallons

7. "High Volume-Low Pressure (HVLP)": Spray equipment which uses a high volume of air delivered at pressures between 0.1 and 10 psig and which operates at a maximum fluid delivery pressure of 100 psig.
8. "Monomer": An organic compound that combines with itself or other similar compounds to become a cured thermoset resin.
9. "Polyester Resin Material": 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 material containing ROC and used in a polyester resin manufacturing process. Inert filler and cleaning material is specifically excluded from this definition.

10. "Reclamation System": Equipment capable of reclaiming spent solvent for re-use. Reclamation systems may be operated on-site or by an off-site commercial reclamation facility.
11. "Repair": That portion of the fabrication process that requires the addition of polyester resin materials to portions of a previously fabricated product in order to mend damage immediately following normal fabrication operations.
12. "ROC": Reactive Organic Compound, as defined in Rule 2.
13. "Specialty Polyester Resin Material": Halogenated, furan, bisphenol A, vinyl ester, or isophthalic resins used to make products for corrosive, fire retardant, high strength, or mold making services.
14. "Touch-up": That portion of the fabrication process that is necessary to cover minor imperfections.

ATTACHMENT A

LABORATORY STATIC TEST FOR POLYESTER RESIN MATERIAL

1. PRINCIPLE

A weighed amount of polyester resin material is reacted with methyl ethyl ketone peroxide (MEKP) catalyst to form a 14.5 cm diameter casting. The ROC loss rate is determined at room temperature ($77 \pm 3^{\circ}\text{F}$) and 50% room humidity over a specified time period.

This method is applicable only to polyester resin materials and does not simulate spray booth operations.

2. APPARATUS

- a. Analytical balance, top loading, capable of measuring within 0.01 gram.
- b. Gallon can lid or equivalent. The lid should be 14.5 cm inside diameter (165.13 sq cm). Different size lids should be measured prior to testing.
- c. Paper clip, bent 90 degrees.
- d. Clock or timer capable of reporting time to a precision of 0.01 minute.
- e. Constant temperature and humidity room, as described above. Room must also be free of drafts. If a constant temperature room is not available, measure temperature and humidity prior to each weight measurement or test procedure.

3. DETERMINATION OF ROC LOSS

NOTE: The mixing should be done in a hood or in a well ventilated area.

- a. Place the bent paper clip on a gallon can lid, or equivalent.
- b. Tare weigh to ± 0.01 grams (g) the gallon can lid and clip. Record the weight as W_1 .
- c. Catalyze 200 grams of polyester resin material with the recommended type and amount of catalyst and promoter. Ensure that the resin temperature is 77 degrees at catalyzation.
- d. Add 100 g (± 0.05 g) of catalyzed polyester resin material to the gallon can lid. Record the weight of the lid plus the polyester resin material to ± 0.01 g as W_2 . Start timer.

- e. At five (5) minute intervals, record the gross weight loss to ± 0.01 g as W_t and check the catalyzed resin for gel point. Gelling has occurred when the resin tears or the can lid raises when the paper clip is lifted. Record gel time to the nearest one (1) minute.
- f. To include both gel and cure of the resin rate loss calculations, it is recommended that weight measurements continue at fifteen (15) minute intervals for sixty (60) minutes after the gel point.

At sixty (60) minutes after the gel point (or constant weight), record the final weight of the lid plus the polyester resin material to ± 0.01 g as W_f .

4. CALCULATIONS

- a. To determine the % final ROC loss:

$$\% \text{ ROC loss} = \frac{W_2 - W_f}{W_2 - W_1} \times 100$$

- b. To determine ROC loss per square meter:

$$\text{Loss} = (W_2 - W_f) \times 60.56$$

$$\text{where } 60.56 = 1/A$$

A = the area of the gallon can lid in sq meter.

$$A = ((d/2)^2) \times (3.14159) / (10,000 \text{ cm}^2/\text{m}^2)$$

where d is in centimeters

W_1 = Tare weight of the gallon can lid (plus paper clip if used)

W_2 = Initial weight = W_1 plus the polyester resin material and catalyst (if used)

W_t = Sample weight after (t) minutes have elapsed

W_f = Sample weight at final measurement

5. REPORTING

- a. Product tested and catalyst system.
- b. Room temperature and relative humidity (for each reading if necessary).
- c. All recorded weights (W_1 , W_2 , W_t , W_f), gel time, and amount of catalyst used.

- d. ROC loss in grams/square meter, including calculations. Exclude the weight of any inert filler material from recorded weights prior to calculations.