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## Title 40 – Protection of Environment

### Chapter I – Environmental Protection Agency

#### Subchapter C – Air Programs

#### Part 60 – Standards of Performance for New Stationary Sources

**Authority:** 42 U.S.C. 7401 *et seq.*

**Source:** 36 FR 24877, Dec. 23, 1971, unless otherwise noted.

#### Subpart VVV Standards of Performance for Polymeric Coating of Supporting Substrates Facilities

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#### Subpart VVV—Standards of Performance for Polymeric Coating of Supporting Substrates Facilities

**Source:** 54 FR 37551, Sept. 11, 1989, unless otherwise noted.

#### § 60.740 Applicability and designation of affected facility.

- (a) The affected facility to which the provisions of this subpart apply is each coating operation and any onsite coating mix preparation equipment used to prepare coatings for the polymeric coating of supporting substrates.
- (b) Any affected facility for which the amount of VOC used is less than 95 Mg per 12-month period is subject only to the requirements of §§ 60.744(b), 60.747(b), and 60.747(c). If the amount of VOC used is 95 Mg or greater per 12-month period, the facility is subject to all the requirements of this subpart. Once a facility has become subject to the requirements of this subpart, it will remain subject to those requirements regardless of changes in annual VOC use.
- (c) This subpart applies to any affected facility for which construction, modification, or reconstruction begins after April 30, 1987, except for the facilities specified in paragraph (d) of this section.
- (d) This subpart does not apply to the following:

- (1) Coating mix preparation equipment used to manufacture coatings at one plant for shipment to another plant for use in an affected facility (coating operation) or for sale to another company for use in an affected facility (coating operation);
- (2) Coating mix preparation equipment or coating operations during those times they are used to prepare or apply waterborne coatings so long as the VOC content of the coating does not exceed 9 percent by weight of the volatile fraction;
- (3) Web coating operations that print an image on the surface of the substrate or any coating applied on the same printing line that applies the image.

## § 60.741 Definitions, symbols, and cross-reference tables.

- (a) All terms used in this subpart not defined below have the meaning given to them in the Act and in subpart A of this part.

**Coating applicator** means any apparatus used to apply a coating to a continuous substrate.

**Coating mix preparation equipment** means all mixing vessels in which solvent and other materials are blended to prepare polymeric coatings.

**Coating operation** means any coating applicator(s), flashoff area(s), and drying oven(s) located between a substrate unwind station and a rewind station that coats a continuous web to produce a substrate with a polymeric coating. Should the coating process not employ a rewind station, the end of the coating operation is after the last drying oven in the process.

**Common emission control device** means a device controlling emissions from an affected coating operation as well as from any other emission source.

**Concurrent** means the period of time in which construction of an emission control device serving an affected facility is commenced or completed, beginning 6 months prior to the date that construction of the affected facility commences and ending 2 years after the date that construction of the affected facility is completed.

**Control device** means any apparatus that reduces the quantity of a pollutant emitted to the air.

**Cover** means, with respect to coating mix preparation equipment, a device that fits over the equipment opening to prevent emissions of volatile organic compounds (VOC) from escaping.

**Drying oven** means a chamber within which heat is used to dry a surface coating; drying may be the only process or one of multiple processes performed in the chamber.

**Equivalent diameter** means four times the area of an opening divided by its perimeter.

**Flashoff area** means the portion of a coating operation between the coating applicator and the drying oven where VOC begins to evaporate from the coated substrate.

**Natural draft opening** means any opening in a room, building, or total enclosure that remains open during operation of the facility and that is not connected to a duct in which a fan is installed. The rate and direction of the natural draft across such an opening is a consequence of the difference in pressures on either side of the wall or barrier containing the opening.

**Nominal 1-month period** means a calendar month or, if established prior to the performance test in a statement submitted with notification of anticipated startup pursuant to 40 CFR 60.7(a)(2), a similar monthly time period (e.g., 30-day month or accounting month).

**Onsite coating mix preparation equipment** means those pieces of coating mix preparation equipment located at the same plant as the coating operation they serve.

**Polymeric coating of supporting substrates** means a web coating process that applies elastomers, polymers, or prepolymers to a supporting web other than paper, plastic film, metallic foil, or metal coil.

**Substrate** means the surface to which a coating is applied.

**Temporary enclosure** means a total enclosure that is constructed for the sole purpose of measuring the fugitive VOC emissions from an affected facility.

**Total enclosure** means a structure that is constructed around a source of emissions and operated so that all VOC emissions are collected and exhausted through a stack or duct. With a total enclosure, there will be no fugitive emissions, only stack emissions. The drying oven itself may be part of the total enclosure.

**Vapor capture system** means any device or combination of devices designed to contain, collect, and route solvent vapors released from the coating mix preparation equipment or coating operation.

**VOC in the applied coating** means the product of Method 24 VOC analyses or formulation data (if those data are demonstrated to be equivalent to Method 24 results) and the total volume of coating fed to the coating applicator.

**VOC used** means the amount of VOC delivered to the coating mix preparation equipment of the affected facility (including any contained in premixed coatings or other coating ingredients prepared off the plant site) for the formulation of polymeric coatings to be applied to supporting substrates at the coating operation, plus any solvent added after initial formulation is complete (e.g., dilution solvent added at the coating operation). If premixed coatings that require no mixing at the plant site are used, "VOC used" means the amount of VOC delivered to the coating applicator(s) of the affected facility.

**Volatile organic compounds or VOC** means any organic compounds that participate in atmospheric photochemical reactions; or that are measured by a reference method, an equivalent method, an alternative method, or that are determined by procedures specified under any subpart.

**Waterborne coating** means a coating which contains more than 5 weight percent water in its volatile fraction.

**Web coating** means the coating of products, such as fabric, paper, plastic film, metallic foil, metal coil, cord, and yarn, that are flexible enough to be unrolled from a large roll; and coated as a continuous substrate by methods including, but not limited to, knife coating, roll coating, dip coating, impregnation, rotogravure, and extrusion.

(b) The nomenclature used in this subpart has the following meaning:

$A_k$  = the area of each natural draft opening (k) in a total enclosure, in square meters.

$C_{aj}$  = the concentration of VOC in each gas stream (j) exiting the emission control device, in parts per million by volume.

$C_{bi}$  = the concentration of VOC in each gas stream (i) entering the emission control device, in parts per million by volume.

$C_{di}$  = the concentration of VOC in each gas stream (i) entering the emission control device from the affected coating operation, in parts per million by volume.

$C_{fk}$  = the concentration of VOC in each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in parts per million by volume.

$C_{gv}$  = the concentration of VOC in the gas stream entering each individual carbon adsorber vessel (v), in parts per million by volume. For purposes of calculating the efficiency of the individual adsorber vessel,  $C_{gv}$  may be measured in the carbon adsorption system's common inlet duct prior to the branching of individual inlet ducts.

$C_{hv}$  = the concentration of VOC in the gas stream exiting each individual carbon adsorber vessel (v), in parts per million by volume.

E = the control device efficiency achieved for the duration of the emission test (expressed as a fraction).

F = the VOC emission capture efficiency of the vapor capture system achieved for the duration of the emission test (expressed as a fraction).

FV = the average inward face velocity across all natural draft openings in a total enclosure, in meters per hour.

$H_v$  = the individual carbon adsorber vessel (v) efficiency achieved for the duration of the emission test (expressed as a fraction).

$H_{sys}$  = the carbon adsorption system efficiency calculated when each adsorber vessel has an individual exhaust stack.

$M_{ci}$  = the total mass (kg) of each coating (i) applied to the substrate at an affected coating operation during a nominal 1-month period as determined from facility records.

$M_r$  = the total mass (kg) of VOC recovered for a nominal 1-month period.

$Q_{aj}$  = the volumetric flow rate of each gas stream (j) exiting the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

$Q_{bi}$  = the volumetric flow rate of each gas stream (i) entering the emission control device, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

$Q_{di}$  = the volumetric flow rate of each gas stream (i) entering the emission control device from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

$Q_{fk}$  = the volumetric flow rate of each uncontrolled gas stream (k) emitted directly to the atmosphere from the affected coating operation, in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

$Q_{gv}$  = the volumetric flow rate of the gas stream entering each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration. For purposes of calculating the efficiency of the individual adsorber vessel, the value of  $Q_{gv}$  can be assumed to equal the value of  $Q_{hv}$  measured for that adsorber vessel.

$Q_{hv}$  = the volumetric flow rate of the gas stream exiting each individual carbon adsorber vessel (v), in dry standard cubic meters per hour when Method 18 or 25 is used to measure VOC concentration or in standard cubic meters per hour (wet basis) when Method 25A is used to measure VOC concentration.

$Q_{ini}$  = the volumetric flow rate of each gas stream (i) entering the total enclosure through a forced makeup air duct, in standard cubic meters per hour (wet basis).

$Q_{outj}$  = the volumetric flow rate of each gas stream (j) exiting the total enclosure through an exhaust duct or hood, in standard cubic meters per hour (wet basis).

R = the overall VOC emission reduction achieved for the duration of the emission test (expressed as a fraction).

$RS_i$  = the total mass (kg) of VOC retained on the coated substrate after oven drying or contained in waste coating for a given combination of coating and substrate.

$W_{oi}$  = the weight fraction of VOC in each coating (i) applied at an affected coating operation during a nominal 1-month period as determined by Method 24.

(c) Tables 1a and 1b present a cross reference of the affected facility status and the relevant section(s) of the regulation.

**TABLE 1A—CROSS REFERENCE <sup>a b</sup>**

Status	Standard	Compliance provisions § 60.743
A. Coating operation: 1. If projected VOC use	§ 60.740(b): Monitor VOC use	Not

<sup>a</sup> This table is presented for the convenience of the user and is not intended to supersede the language of the regulation. For the details of the requirements, refer to the text of the regulation.

<sup>b</sup> Refer to table 1b to determine which subsections of §§ 60.744, 60.745, and 60.747 correspond to each compliance provision (§ 60.743).

Status	Standard	Compliance provisions § 60.743
is <95 Mg/yr		applicable.
2. If projected VOC use is ≥95 Mg/yr	<p>§ 60.742(b)(1): Reduce VOC emissions to the atmosphere from the coating operation by at least 90 percent; or</p> <p>§ 60.742(b)(2): Install, operate, and maintain a total enclosure around the coating operation and vent the captured VOC emissions from the total enclosure to a control device that is at least 95 percent efficient</p>	(a)(1), (a)(2), (a)(3), or (a)(4); (b), (e).
B. Coating mix preparation equipment:		
1. If projected VOC use is ≥95 Mg/yr but <130 Mg/yr	§ 60.742(c)(3): (i) Install, operate, and maintain a cover on each piece of affected equipment; or (ii) install, operate, and maintain a cover on each piece of affected equipment and vent VOC emissions to a VOC control device	(d), (e).
2. If projected VOC use is ≥130 Mg/yr but there is no concurrent construction of a control device	§ 60.742(c)(2): (i) Install, operate, and maintain a cover on each piece of affected equipment; or (ii) install, operate, and maintain a cover on each piece of affected equipment and vent VOC emissions to a VOC control device	(d).
3. If projected VOC use is ≥130 Mg/yr and there is concurrent construction of a	§ 60.742(c)(1): Install, operate, and maintain a cover on each piece of affected equipment and vent VOC emissions from the covered equipment to a 95 percent efficient control device while preparation of the coating is taking place within	(c), (e).

<sup>a</sup> This table is presented for the convenience of the user and is not intended to supersede the language of the regulation. For the details of the requirements, refer to the text of the regulation.

<sup>b</sup> Refer to table 1b to determine which subsections of §§ 60.744, 60.745, and 60.747 correspond to each compliance provision (§ 60.743).

Status	Standard	Compliance provisions § 60.743
control device	the vessel	

<sup>a</sup> This table is presented for the convenience of the user and is not intended to supersede the language of the regulation. For the details of the requirements, refer to the text of the regulation.

<sup>b</sup> Refer to table 1b to determine which subsections of §§ 60.744, 60.745, and 60.747 correspond to each compliance provision (§ 60.743).

**TABLE 1B—CROSS REFERENCE**

Compliance provisions—§ 60.743	Test methods—§ 60.745	Category/equipment <sup>a</sup>	Monitoring requirements—§ 60.744	Reporting and recordkeeping requirements—§ 60.747
A. Coating operation:				
(a)(1)—Gaseous emission test for coating operations not using carbon adsorption beds with individual exhausts	(b)-(g)	General, CA, CO, TI, CI, PE, TE	(a), (i), (j), (k), (c)(1), (d), (e), (f), (g)	(a), (d)(7), (f), (g), (h), (d)(1)(i), (d)(2)(i), (d)(3), (d)(4), (d)(5), (d)(6).
(a)(2)—Gaseous emission test for coating operations using carbon adsorption beds with individual exhausts	(b)-(g)	General, CA, PE, TE	(a), (i), (j), (k), (c)(2), (g)	(a), (d)(7), (f), (g), (h), (d)(1)(ii), (d)(2)(ii), (d)(6).
(a)(3)—Monthly liquid material balance—can be used only when a VOC recovery device controls only those emissions from one affected coating operation	(a)	VOC recovery	(i), (k)	(e), (f), (g), (h).
(a)(4)—Short-term (3 to 7 day) liquid material balance—may be used as an alternative to (a)(3)	(a)	General, CA, CO, PE, TE	(a), (i), (j), (k), (c)(1), (c)(2), (d), (g)	(a), (d)(7), (f), (g), (h), (d)(1), (d)(2), (d)(3), (d)(6).
(b)—Alternative standard for coating operation—demonstrate use of approved total enclosure and emissions vented to a 95	(b)-(g)	General, CA, CO, TI, CI, PE, TE	(a), (i), (j), (k), (c)(1), (c)(2), (d), (e), (f), (h)	(a), (d)(7), (f), (g), (h), (d)(1), (d)(2), (d)(3), (d)(4), (d)(5),

<sup>a</sup> CA = carbon adsorber; CO = condenser; TI = thermal incinerator; CI = catalytic incinerator; PE = partial enclosure; TE = total enclosure.

Compliance provisions—§ 60.743	Test methods—§ 60.745	Category/ equipment <sup>a</sup>	Monitoring requirements—§ 60.744	Reporting and recordkeeping requirements—§ 60.747
<p>percent efficient control device</p> <p>B. Coating mix preparation equipment:</p> <p>(c)—Standard for equipment servicing a coating operation with concurrent construction of a control device that uses at least 130 Mg/yr of VOC—demonstrate that covers meeting specifications are installed and used properly; procedures detailing proper use are posted; the mix equipment is vented to a 95 percent efficient control device</p> <p>(d)—Standard for equipment servicing a coating operation that does not have concurrent construction of a control device but uses at least 130 Mg/yr of VOC or for equipment servicing a coating operation that uses &lt;130 Mg/yr but ≥95 Mg/yr of VOC—demonstrate that covers meeting specifications are installed and used properly; procedures detailing proper use are posted; the mix equipment is vented to a control device (optional)</p>	<p>(b)-(g)</p> <p>No other requirements apply</p>	<p>General, CA, TI, CI</p>	<p>(a), (i), (j), (k), (c)(1), (c)(2), (e), (f)</p>	<p>(d)(6).</p> <p>(a), (d)(7), (f), (g), (h), (d)(1), (d)(2), (d)(4), (d)(5).</p>

<sup>a</sup> CA = carbon adsorber; CO = condenser; TI = thermal incinerator; CI = catalytic incinerator; PE = partial enclosure; TE = total enclosure.

**§ 60.742 Standards for volatile organic compounds.**

- (a) Each owner or operator of an affected facility that is subject to the requirements of this subpart shall comply with the emissions limitations set forth in this section on and after the date on which the initial performance test required by § 60.8 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated or 180 days after initial startup, whichever date comes first.
- (b) For the coating operation, each owner or operator of an affected facility shall either:



- (1) Reduce VOC emissions to the atmosphere from the coating operation by at least 90 percent (“emission reduction” standard); or
  - (2) Install, operate, and maintain a total enclosure around the coating operation and vent the captured VOC emissions from the total enclosure to a control device that is at least 95 percent efficient (alternative standard).
- (c) For the onsite coating mix preparation equipment of an affected facility, the owner or operator shall comply with the following requirements, as applicable:
- (1) For an affected facility that has concurrent construction of a control device and uses at least 130 Mg of VOC per 12-month period, the owner or operator shall install, operate, and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions from the covered mix equipment to a 95 percent efficient control device while preparation of the coating is taking place within the vessel.
  - (2) For an affected facility that does not have concurrent construction of a control device but uses at least 130 Mg of VOC per 12-month period, the owner or operator shall either:
    - (i) Install, operate, and maintain a cover on each piece of affected coating mix preparation equipment; or
    - (ii) Install, operate, and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions to a VOC control device.
  - (3) For an affected facility that uses at least 95 Mg but less than 130 Mg of VOC per 12-month period, the owner or operator shall either:
    - (i) Install, operate, and maintain a cover on each piece of affected coating mix preparation equipment; or
    - (ii) Install, operate, and maintain a cover on each piece of affected coating mix preparation equipment and vent VOC emissions to a VOC control device.

### § 60.743 Compliance provisions.

- (a) To demonstrate compliance with the emission reduction standard for coating operations specified in § 60.742(b)(1), the owner or operator of the affected facility shall use one of the following methods.
- (1) ***Gaseous emission test for coating operations not using carbon adsorption beds with individual exhausts.*** This method is applicable when the emissions from any affected coating operation are controlled by a control device other than a fixed-bed carbon adsorption system with individual exhaust stacks for each adsorber vessel. The owner or operator using this method shall comply with the following procedures:
    - (i) Construct the vapor capture system and control device so that all gaseous volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.745(b) through (g);
    - (ii) Determine capture efficiency from the coating operation by capturing, venting, and measuring all VOC emissions from the coating operation. During a performance test, the owner or operator of an affected coating operation located in an area with other sources of VOC shall isolate the coating operation emissions from all other sources of VOC by one of the following methods:

- (A) Build a temporary enclosure, as defined in § 60.741(a) and conforming to the requirements of § 60.743(b)(1), around the affected coating operation. The temporary enclosure must be constructed and ventilated (through stacks suitable for testing) so that it has minimal impact on performance of the capture system; or
  - (B) Shut down all other sources of VOC and continue to exhaust fugitive emissions from the affected coating operation through any building ventilation system and other room exhausts such as those on drying ovens. All such ventilation air must be vented through stacks suitable for testing because the VOC content in each must be determined.
- (iii) Operate the emission control device with all emission sources connected and operating.
  - (iv) Determine the efficiency (E) of the control device by Equation 1:

$$E = \frac{\sum_{i=1}^n Q_{bi} C_{bi} - \sum_{j=1}^n Q_{aj} C_{aj}}{\sum_{i=1}^n Q_{bi} C_{bi}} \quad \text{(Equation 1)}$$

- (v) Determine the efficiency (F) of the vapor capture system by Equation 2:

$$F = \frac{\sum_{i=1}^n Q_{di} C_{di}}{\sum_{i=1}^n Q_{di} C_{di} + \sum_{k=1}^p Q_{fk} C_{fk}} \quad \text{(Equation 2)}$$

- (vi) For each affected coating operation subject to § 60.742(b)(1) (emission reduction standard for coating operations), compliance is demonstrated if the product of (E)x(F) is equal to or greater than 0.90.
- (2) ***Gaseous emission test for coating operations using carbon adsorption beds with individual exhausts.*** This method is applicable when emissions from any affected coating operation are controlled by a fixed-bed carbon adsorption system with individual exhaust stacks for each adsorber vessel. The owner or operator using this method shall comply with the following procedures:
- (i) Construct the vapor capture system and control device so that each volumetric flow rate and the total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.745 (b) through (g);
  - (ii) Assure that all VOC emissions from the coating operation are segregated from other VOC sources and that the emissions can be captured for measurement, as described in § 60.743(a)(1)(ii) (A) and (B);
  - (iii) Operate the emission control device with all emission sources connected and operating;

- (iv) Determine the efficiency ( $H_v$ ) of each individual adsorber vessel ( $v$ ) using Equation 3:

$$H_v = \frac{Q_{gv} C_{gv} - Q_{hv} C_{hv}}{Q_{gv} C_{gv}} \quad (\text{Equation 3})$$

- (v) Determine the efficiency of the carbon adsorption system ( $H_{sys}$ ) by computing the average efficiency of the adsorber vessels as weighted by the volumetric flow rate ( $Q_{hv}$ ) of each individual adsorber vessel ( $v$ ) using Equation 4:

$$H_{sys} = \frac{\sum_{v=1}^g H_v Q_{hv}}{\sum_{v=1}^g Q_{hv}} \quad (\text{Equation 4})$$

- (vi) Determine the efficiency ( $F$ ) of the vapor capture system using Equation (2).
- (vii) For each affected coating operation subject to § 60.742(b)(1) (emission reduction standard for coating operations), compliance is demonstrated if the product of ( $H_{sys}$ )x( $F$ ) is equal to or greater than 0.90.

(3) **Monthly liquid material balance.** This method can be used only when a VOC recovery device controls only those emissions from one affected coating operation. It may not be used if the VOC recovery device controls emissions from any other VOC emission sources. When demonstrating compliance by this method, § 60.8(f) (Performance Tests) of this part does not apply. The owner or operator using this method shall comply with the following procedures to determine the VOC emission reduction for each nominal 1-month period:

- (i) Measure the amount of coating applied at the coating applicator. This quantity shall be determined at a time and location in the process after all ingredients (including any dilution solvent) have been added to the coating, or appropriate adjustments shall be made to account for any ingredients added after the amount of coating has been determined;
- (ii) Determine the VOC content of all coatings applied using the test method specified in § 60.745(a). This value shall be determined at a time and location in the process after all ingredients (including any dilution solvent) have been added to the coating, or appropriate adjustments shall be made to account for any ingredients added after the VOC content in the coating has been determined;
- (iii) Install, calibrate, maintain, and operate, according to the manufacturer's specifications, a device that indicates the cumulative amount of VOC recovered by the control device over each nominal 1-month period. The device shall be certified by the manufacturer to be accurate to within  $\pm 2.0$  percent;
- (iv) Measure the amount of VOC recovered; and

- (v) Calculate the overall VOC emission reduction (R) for each and every nominal 1-month period using Equation 5. Emissions during startups and shutdowns are to be included when determining R because startups and shutdowns are part of normal operation for this source category.

$$R = \frac{M_r}{\sum_{i=1}^n [W_{oi} M_{ci} - RS_i]} \quad \text{(Equation 5)}$$

If the value of R is equal to or greater than 0.90, compliance with § 60.742(b)(1) is demonstrated.

- (A) The value of  $RS_i$  is zero unless the owner or operator submits the following information to the Administrator for approval of a measured value of  $RS_i$  that is greater than zero but less than or equal to 6 percent by weight of the liquid VOC applied:
- (1) Measurement techniques; and
  - (2) Documentation that the measured value of  $RS_i$  exceeds zero but is less than or equal to 6 percent by weight of the liquid VOC applied.
- (B) For those facilities not subject to paragraph (a)(3)(v)(A) of this section, the value of  $RS_i$  is zero unless the owner or operator submits the following information to the Administrator for approval of a measured value of  $RS_i$  that is greater than 6 percent by weight of the liquid VOC applied.
- (1) Measurement techniques;
  - (2) Documentation that the measured value of  $RS_i$  exceeds 6 percent by weight of the liquid VOC applied; and
  - (3) Either documentation of customer specifications requiring higher values or documentation that the desired properties of the product make it necessary for  $RS_i$  to exceed 6 percent by weight of the liquid VOC applied and that such properties cannot be achieved by other means.
- (C) The measurement techniques of paragraphs (a)(3)(v)(A)(1) and (a)(3)(v)(B)(1) of this section shall be submitted to the Administrator for approval with the notification of anticipated startup required under § 60.7(a)(2).
- (vi) The point at which  $M_r$  is to be measured shall be established when the compliance procedures are approved. The presumptive point of measurement shall be prior to separation/ purification; a point after separation/purification may be adopted for enhanced convenience or accuracy.
- (4) **Short-term liquid material balance.** This method may be used as an alternative to the monthly liquid material balance described in paragraph (a)(3) of this section. The owner or operator using this method shall comply with the following procedures to determine VOC emission reduction for a 3- to 7-day period and shall continuously monitor VOC emissions as specified in § 60.744.
- (i) Use the procedures described in paragraphs (a)(3) (i) through (vi) of this section to determine the overall emission reduction, R. Compliance is demonstrated if the value of R is equal to or greater than 0.90.

- (ii) The number of days for the performance test (3 to 7) is to be based on the affected facility's representative performance consistent with the requirements of § 60.8(c). Data demonstrating that the chosen test period is representative shall be submitted to the Administrator for approval with the notification of anticipated startup required under § 60.7(a)(2).
- (b) Each owner or operator of an affected coating operation subject to the standard specified in § 60.742(b)(2) (alternative standard for coating operations) shall:
  - (1) Demonstrate that a total enclosure is installed. The total enclosure shall either be approved by the Administrator in accordance with the provisions of § 60.746, or meet the requirements in paragraphs (b)(1) (i) through (vi) of this section, as follows:
    - (i) The only openings in the enclosure are forced makeup air and exhaust ducts and natural draft openings such as those through which raw materials enter and exist the coating operation;
    - (ii) Total area of all natural draft openings does not exceed 5 percent of the total surface area of the total enclosure's walls, floor, and ceiling;
    - (iii) All access doors and windows are closed during normal operation of the enclosed coating operation, except for brief, occasional openings to accommodate process equipment adjustments. If such openings are frequent, or if the access door or window remains open for a significant amount of time during the process operation, it must be considered a natural draft opening. Access doors used routinely by workers to enter and exit the enclosed area shall be equipped with automatic closure devices;
    - (iv) Average inward face velocity (FV) across all natural draft openings is a minimum of 3,600 meters per hour as determined by the following procedures:
      - (A) Construct all forced makeup air ducts and all exhaust ducts so that the volumetric flow rate in each can be accurately determined by the test methods and procedures specified in § 60.745 (c) and (d). Volumetric flow rates shall be calculated without the adjustment normally made for moisture content; and
      - (B) Determine FV by Equation 6:

$$FV = \frac{\sum_{j=1}^n Q_{out\ j} - \sum_{i=1}^p Q_{in\ i}}{\sum_{k=1}^q A_k} \quad \text{(Equation 6)}$$

- (v) The air passing through all natural draft openings flows into the enclosure continuously. If FV is less than or equal to 9,000 meters per hour, the continuous inward airflow shall be verified by continuous observation using smoke tubes, streamers, tracer gases, or other means approved by the Administrator over the period that the volumetric flow rate tests required to determine FV are carried out. If FV is greater than 9,000 meters per hour, the direction of airflow through the natural draft openings shall be presumed to be inward at all times without verification.

- (vi) All sources of emissions within the enclosure shall be a minimum of four equivalent diameters away from each natural draft opening.
  - (2) Determine the control device efficiency using Equation (1) or Equations (3) and (4), as applicable, and the test methods and procedures specified in § 60.745 (b) through (g).
  - (3) Compliance is demonstrated if the installation of a total enclosure is demonstrated and the value of E determined from Equation (1) or the value of  $H_{sys}$  determined from Equations (3) and (4), as applicable, is equal to or greater than 0.95.
- (c) To demonstrate compliance with § 60.742(c)(1) (standard for coating mix preparation equipment servicing a coating operation with concurrent construction of a control device that uses at least 130 Mg per year of VOC), each owner or operator of affected coating mix preparation equipment shall demonstrate that:
- (1) Covers meeting the following specifications have been installed and are being used properly:
    - (i) Cover shall be closed at all times except when adding ingredients, withdrawing samples, transferring the contents, or making visual inspection when such activities cannot be carried out with cover in place. Such activities shall be carried out through ports of the minimum practical size;
    - (ii) Cover shall extend at least 2 centimeters beyond the outer rim of the opening or shall be attached to the rim;
    - (iii) Cover shall be of such design and construction that contact is maintained between cover and rim along the entire perimeter;
    - (iv) Any breach in the cover (such as a slit for insertion of a mixer shaft or port for addition of ingredients) shall be covered consistent with paragraphs (c)(1) (i), (ii), and (iii) of this section when not actively in use. An opening sufficient to allow safe clearance for a mixer shaft is acceptable during those periods when the shaft is in place; and
    - (v) A polyethylene or nonpermanent cover may be used provided it meets the requirements of paragraphs (c)(1) (ii), (iii), and (iv) of this section. Such a cover shall not be reused after once being removed.
  - (2) Procedures detailing the proper use of covers, as specified in paragraph (c)(1)(i) of this section, have been posted in all areas where affected coatings mix preparation equipment is used;
  - (3) The coating mix preparation equipment is vented to a control device while preparation of the coating is taking place within the vessel; and
  - (4) The control device efficiency (E or  $H_{sys}$ , as applicable) determined using Equation (1) or Equations (3) and (4), respectively, and the test methods and procedures specified in § 60.745 (b) through (g) is equal to or greater than 0.95.
- (d) To demonstrate compliance with § 60.742(c)(2) (standard for coating mix preparation equipment servicing a coating operation that does not have concurrent construction of a control device but uses at least 130 Mg of VOC per year) or § 60.742(c)(3) (standard for coating mix preparation equipment servicing a coating operation that uses at least 95 Mg but less than 130 Mg of VOC per year), each owner or operator of affected coating mix preparation equipment shall demonstrate upon inspection that:

- (1) Covers satisfying the specifications in paragraphs (c)(1)(i) through (v) of this section have been installed and are being properly operated and maintained; and
  - (2) Procedures detailing the proper use of covers, as specified in paragraph (c)(1)(i) of this section, have been posted in all areas where affected coating mix preparation equipment is used.
  - (3) Owners or operators meeting the standard specified in § 60.742 (c)(2)(ii) or (c)(3)(ii) shall also demonstrate that the coating mix preparation equipment is vented to a control device.
- (e) If a control device other than a carbon adsorber, condenser, or incinerator is used to control emissions from an affected facility, the necessary operating specifications for that device must be approved by the Administrator. An example of such a device is a flare.

### § 60.744 Monitoring requirements.

- (a) Each owner or operator of an affected facility shall install and calibrate all monitoring devices required under the provisions of this section according to the manufacturer's specifications, prior to the initial performance test in locations such that representative values of the monitored parameters will be obtained. The parameters to be monitored shall be continuously measured and recorded during each performance test.
- (b) Each owner or operator of an affected facility that uses less than 95 Mg of VOC per year and each owner or operator of an affected facility subject to the provisions specified in § 60.742(c)(3) shall:
  - (1) Make semiannual estimates of the projected annual amount of VOC to be used for the manufacture of polymeric coated substrate at the affected coating operation in that year; and
  - (2) Maintain records of actual VOC use.
- (c) Each owner or operator of an affected facility controlled by a carbon adsorption system and demonstrating compliance by the procedures described in § 60.743 (a)(1), (2), (b), or (c) (which include control device efficiency determinations) or § 60.743(a)(4) (short-term liquid material balance) shall carry out the monitoring provisions of paragraph (c)(1) or (2) of this section, as appropriate.
  - (1) For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in either the control device outlet gas stream or in both the control device inlet and outlet gas streams. The outlet gas stream shall be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in § 60.747(d)(1)(i). The inlet and outlet gas streams shall be monitored if the percent control device efficiency is used as the basis for reporting, as described in § 60.747(d)(2)(i).
  - (2) For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the concentration level of organic compounds in the outlet gas stream for a minimum of one complete adsorption cycle per day for each adsorber vessel. The owner or operator may also monitor and record the concentration level of organic compounds in the common carbon adsorption system inlet gas stream or in each individual carbon adsorber vessel inlet stream. The outlet gas streams shall be monitored if the percent increase in the concentration level of organic compounds is used as the basis for reporting, as described in § 60.747(d)(1)(ii). In this case, the owner or operator shall compute daily a 3-day rolling average concentration level of organics in the outlet gas stream from each individual adsorber vessel. The inlet and outlet gas

streams shall be monitored if the percent control device efficiency is used as the basis for reporting, as described in § 60.747(d)(2)(ii). In this case, the owner or operator shall compute daily a 3-day rolling average efficiency for each individual adsorber vessel.

- (d) Each owner or operator of an affected facility controlled by a condensation system and demonstrating compliance by the test methods described in § 60.743 (a)(1), (2), (b), or (c) (which include control device efficiency determinations) or § 60.743(a)(4) (short-term liquid material balance) shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the temperature of the condenser exhaust stream.
- (e) Each owner or operator of an affected facility controlled by a thermal incinerator and demonstrating compliance by the test methods described in § 60.743 (a)(1), (2), (b), or (c) (which include control device efficiency determinations) shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the combustion temperature of the incinerator. The monitoring device shall have an accuracy within  $\pm 1$  percent of the temperature being measured in Celsius degrees.
- (f) Each owner or operator of an affected facility controlled by a catalytic incinerator and demonstrating compliance by the test methods described in § 60.743 (a)(1), (2), (b), or (c) (which include control device efficiency determinations) shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed. The monitoring device shall have an accuracy within  $\pm 1$  percent of the temperature being measured in Celsius degrees.
- (g) Each owner or operator of an affected facility who demonstrates compliance by the test methods described in § 60.743(a)(1) or (2) (which include vapor capture system efficiency determinations) or § 60.743(a)(4) (short-term liquid material balance) shall submit a monitoring plan for the vapor capture system to the Administrator for approval with the notification of anticipated startup required under § 60.7(a)(2) of the General Provisions. This plan shall identify the parameter to be monitored as an indicator of vapor capture system performance (e.g., the amperage to the exhaust fans or duct flow rates) and the method for monitoring the chosen parameter. The owner or operator shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a monitoring device that continuously indicates and records the value of the chosen parameter.
- (h) Each owner or operator of an affected facility who demonstrates compliance as described in § 60.743(b) shall follow the procedures described in paragraph (g) of this section to establish a monitoring system for the total enclosure.
- (i) Each owner or operator of an affected facility shall record time periods of mixing or coating operations when the emission control device is malfunctioning or not in use.
- (j) Each owner or operator of an affected facility shall record time periods of mixing or coating operations when each monitoring device is malfunctioning or not in use.
- (k) Records of the measurements and calculations required in §§ 60.743 and 60.744 must be retained for at least 2 years following the date of the measurements and calculations.

### § 60.745 Test methods and procedures.

Methods in appendix A of this part, except as provided under § 60.8(b), shall be used to determine compliance as follows:



- (a) Method 24 is used to determine the VOC content in coatings. If it is demonstrated to the satisfaction of the Administrator that coating formulation data are equivalent to Method 24 results, formulation data may be used. In the event of any inconsistency between a Method 24 test and a facility's formulation data, the Method 24 test will govern. For Method 24, the coating sample must be a 1-liter sample collected in a 1-liter container at a point in the process where the sample will be representative of the coating applied to the substrate (i.e., the sample shall include any dilution solvent or other VOC added during the manufacturing process). The container must be tightly sealed immediately after the sample is collected. Any solvent or other VOC added after the sample is taken must be measured and accounted for in the calculations that use Method 24 results.
- (b) Method 25 shall be used to determine VOC concentrations from incinerator gas streams. Alternative Methods (18 or 25A), may be used as explained in the applicability section of Method 25 in cases where use of Method 25 is demonstrated to be technically infeasible. The owner or operator shall submit notice of the intended test method to the Administrator for approval along with the notification of the performance test required under § 60.8(d) of the General Provisions. Except as indicated in paragraphs (b)(1) and (b)(2) of this section, the test shall consist of three separate runs, each lasting a minimum of 30 minutes.
  - (1) When the method is to be used in the determination of the efficiency of a fixed-bed carbon adsorption system with a common exhaust stack for all the individual adsorber vessels pursuant to § 60.743 (a)(1), (b), or (c), the test shall consist of three separate runs, each coinciding with one or more complete system rotations through the adsorption cycles of all the individual adsorber vessels.
  - (2) When the method is to be used in the determination of the efficiency of a fixed-bed carbon adsorption system with individual exhaust stacks for each adsorber vessel pursuant to § 60.743 (a)(2), (b), or (c), each adsorber vessel shall be tested individually. Each test shall consist of three separate runs, each coinciding with one or more complete adsorption cycles.
- (c) Method 1 or 1A is used for sample and velocity traverses;
- (d) Method 2, 2A, 2C, or 2D is used for velocity and volumetric flow rates;
- (e) Method 3 is used for gas analysis;
- (f) Method 4 is used for stack gas moisture;
- (g) Methods 2, 2A, 2C, or 2D; 3; and 4 shall be performed, as applicable, at least twice during each test run.

#### **§ 60.746 Permission to use alternative means of emission limitation.**

- (a) If, in the Administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions of VOC from any emission point subject to § 60.742(c) at least equivalent to that required by § 60.742(b)(2) or § 60.742(c), respectively, the Administrator will publish in the FEDERAL REGISTER a notice permitting the use of the alternative means. The Administrator may condition permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emission reduction as specified in § 60.742(b)(2) or § 60.742(c), respectively.
- (b) Any notice under paragraph (a) of this section shall be published only after public notice and an opportunity for a public hearing.
- (c) Any person seeking permission under this section shall submit to the Administrator either results from an emission test that accurately collects and measures all VOC emissions from a given control device or an engineering evaluation that accurately determines such emissions.

## § 60.747 Reporting and recordkeeping requirements.

- (a) For each affected facility subject to the requirements of § 60.742(b) and (c), the owner or operator shall submit the performance test data and results to the Administrator as specified in § 60.8(a) of this part. In addition, the average values of the monitored parameters measured at least every 15 minutes and averaged over the period of the performance test shall be submitted with the results of all performance tests.
- (b) Each owner or operator of an affected facility subject to the provisions specified in § 60.742(c)(3) and claiming to use less than 130 Mg of VOC in the first year of operation and each owner or operator of an affected facility claiming to use less than 95 Mg of VOC in the first year of operation shall submit to the Administrator, with the notification of anticipated startup required under § 60.7(a)(2) of the General Provisions, a material flow chart indicating projected VOC use. The owner or operator shall also submit actual VOC use records at the end of the initial year.
- (c) Each owner or operator of an affected facility subject to the provisions of § 60.742(c)(3) and initially using less than 130 Mg of VOC per year and each owner or operator of an affected facility initially using less than 95 Mg of VOC per year shall:
  - (1) Record semiannual estimates of projected VOC use and actual 12-month VOC use;
  - (2) Report the first semiannual estimate in which projected annual VOC use exceeds the applicable cutoff; and
  - (3) Report the first 12-month period in which the actual VOC use exceeds the applicable cutoff.
- (d) Each owner or operator of an affected facility demonstrating compliance by the methods described in § 60.743(a)(1), (2), (4), (b), or (c) shall maintain records and submit quarterly reports to the Administrator documenting the following:
  - (1) For those affected facilities monitoring only the carbon adsorption system outlet concentration levels of organic compounds, the periods (during actual coating operations) specified in paragraph (d)(1)(i) or (ii) of this section, as applicable.
    - (i) For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of three consecutive system rotations through the adsorption cycles of all the individual adsorber vessels during which the average value of the concentration level of organic compounds in the common outlet gas stream is more than 20 percent greater than the average value measured during the most recent performance test that demonstrated compliance.
    - (ii) For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3-day rolling averages for each adsorber vessel when the concentration level of organic compounds in the individual outlet gas stream is more than 20 percent greater than the average value for that adsorber vessel measured during the most recent performance test that demonstrated compliance.
  - (2) For those affected facilities monitoring both the carbon adsorption system inlet and outlet concentration levels of organic compounds, the periods (during actual coating operations), specified in paragraph (d)(2)(i) or (ii) of this section, as applicable.

- (i) For carbon adsorption systems with a common exhaust stack for all the individual adsorber vessels, all periods of three consecutive adsorption cycles of all the individual adsorber vessels during which the average carbon adsorption system efficiency falls below the applicable level as follows:
  - (A) For those affected facilities demonstrating compliance by the performance test method described in § 60.743(a)(1), the value of E determined using Equation (1) during the most recent performance test that demonstrated compliance.
  - (B) For those affected facilities demonstrating compliance by the performance test described in § 60.743(a)(4), the average value of the system efficiency measured with the monitor during the most recent performance test that demonstrated compliance.
  - (C) For those affected facilities demonstrating compliance pursuant to § 60.743(b) or (c), 0.95.
- (ii) For carbon adsorption systems with individual exhaust stacks for each adsorber vessel, all 3-day rolling averages for each adsorber vessel during which the average carbon adsorber vessel efficiency falls below the applicable level as follows:
  - (A) For those affected facilities demonstrating compliance by the performance test method described in § 60.743(a)(2), (b), or (c), the value of  $H_v$  determined using Equation (3) during the most recent performance test that demonstrated compliance.
  - (B) For those affected facilities demonstrating compliance by the performance test described in § 60.743(a)(4), the average efficiency for that adsorber vessel measured with the monitor during the most recent performance test that demonstrated compliance.
- (3) For those affected facilities monitoring condenser exhaust gas temperature, all 3-hour periods (during actual coating operations) during which the average exhaust temperature is 5 or more Celsius degrees above the average temperature measured during the most recent performance test that demonstrated compliance;
- (4) For those affected facilities monitoring thermal incinerator combustion gas temperature, all 3-hour periods (during actual coating operations) during which the average combustion temperature of the device is more than 28 Celsius degrees below the average combustion temperature of the device during the most recent performance test that demonstrated compliance;
- (5) For those affected facilities monitoring catalytic incinerator catalyst bed temperature, all 3-hour periods (during actual coating operations) during which the average gas temperature immediately before the catalyst bed is more than 28 Celsius degrees below the average gas temperature during the most recent performance test that demonstrated compliance and all 3-hour periods (during actual coating operations) during which the average gas temperature difference across the catalyst bed is less than 80 percent of the average gas temperature difference during the most recent performance test that demonstrated compliance;
- (6) For each affected facility monitoring a total enclosure pursuant to § 60.744(h) or vapor capture system pursuant to § 60.744(g), all 3-hour periods (during actual coating operations) during which the average total enclosure or vapor capture system monitor readings vary by 5 percent or more from the average value measured during the most recent performance test that demonstrated compliance.

- (7) Each owner or operator of an affected coating operation not required to submit reports under paragraphs (d)(1) through (6) of this section because no reportable periods have occurred shall submit semiannual statements clarifying this fact.
- (e) Each owner or operator of an affected coating operation, demonstrating compliance by the test methods described in § 60.743(a)(3) (liquid-liquid material balance) shall submit the following:
  - (1) For months of compliance, semiannual reports to the Administrator stating that the affected coating operation was in compliance for each 1-month period; and
  - (2) For months of noncompliance, quarterly reports to the Administrator documenting the 1-month amount of VOC contained in the coatings, the 1-month amount of VOC recovered, and the percent emission reduction for each month.
- (f) Each owner or operator of an affected coating operation, either by itself or with associated coating mix preparation equipment, shall submit the following with the reports required under paragraphs (d) and (e) of this section:
  - (1) All periods during actual mixing or coating operations when a required monitoring device (if any) was malfunctioning or not operating; and
  - (2) All periods during actual mixing or coating operations when the control device was malfunctioning or not operating.
- (g) The reports required under paragraphs (b), (c), (d), and (e) of this section shall be postmarked within 30 days of the end of the reporting period.
- (h) Records required in § 60.747 must be retained for at least 2 years.
- (i) The requirements of this section remain in force until and unless EPA, in delegating enforcement authority to a State under section 111(c) of the Act, approves reporting requirements or an alternative means of compliance surveillance adopted by such States. In this event, affected sources within the State will be relieved of the obligation to comply with this subsection, provided that they comply with the requirements established by the State.

### § 60.748 Delegation of authority.

- (a) In delegating implementation and enforcement authority to a State under section 111(c) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.
- (b) Authorities that will not be delegated to States: §§ 60.743(a)(3)(v) (A) and (B); 60.743(e); 60.745(a); 60.746.