2.118 Aerospace Manufacturing and Rework Facilities

2.118.1 Applicability and Designation of Affected Facility

The affected facility to which the provisions of this source category apply is any aerospace manufacturing and rework facility subject to the Georgia Rules and Regulations for Air Quality Control Chapter 391-3-1-.02(2)(kkk).

2.118.2 Definitions and Symbols

All symbols used in this source category not defined below are given the meaning in the Clean Air Act of 1970 (as amended) or the Georgia Air Quality Act (as amended) or in published regulations pertaining thereto.

B_w = the proportion of the coating which is water (fraction by volume)

C_a = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon)

C_b = the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon)

C_f = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon)

D_c = density of each coating, as received (kilograms per liter)

D_d = density of each diluent VOC-solvent (kilograms per liter)

D_r = density of VOC-solvent recovered by an emission control device (kilograms per liter)

E = VOC destruction efficiency of the control device (fraction)

F = the proportion of total VOCs emitted by an affected facility that enters the control device (fraction)

G = the volume-weighted average mass of VOCs in coatings consumed in an averaging period per unit volume of coating solids applied (kilograms per liter)

G_{c-w} = the volume-weighted average mass of VOCs consumed per unit volume of coating excluding water and exempt solvents (kilograms per liter)

L_c = the volume of each coating consumed, as received (liters)

L_{c-w} = the volume of each coating consumed less water and exempt solvents (liters)

L_d = the volume of VOC-solvent added to coating (liters)

L_r = the volume of VOC-solvent recovered by an emission control device (liters)

L_s = the volume of material solids consumed (liters)

M_d = the mass of diluent VOC-solvent consumed (kilograms)

M_o = the mass of VOCs in coating consumed, as received (kilograms)

M_r = the mass of VOCs recovered by an emission control device (kilograms)

N = the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of solids applied (kilograms per liter)

N_{c-w} = the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating less water and exempt solvents (kilograms per liter)

Q_a = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour)

Q_b = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour)

Q_f = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour)

R = the overall VOC emission reduction efficiency achieved for an affected facility (fraction)

T = the transfer efficiency (fraction)

V_s = the proportion of solids in each coating, as received (fraction by volume)

W_o = the proportion of VOCs in each coating, as received (fraction by weight)

2.118.3 Performance Tests and Compliance Provisions

(a) The provisions of paragraph 6 of Section 1.2 of this text do not apply to the required performance tests and the provisions of paragraph 8 of Section 1.2 of this text do not apply.

(b) The owner or operator of an affected facility shall conduct the initial performance test as required under Section 1.2 according to procedures in this section; and, thereafter, procedures in this section shall be used to conduct any required periodic performance tests to demonstrate compliance with the applicable Georgia Regulations for Air Quality Control.

(c) The owner or operator shall use the following procedures for determining volume-weighted average emissions of VOCs in kilograms per liter of coating solids applied (G).

(1) An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the applicable emission limit. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Method 24. The Director may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coating using Method 24. The owner or operator shall determine the volume of coating and the mass of VOC-solvent used for thinning purposes from company

records on the same basis as the averaging period. If a common coating distribution system serves more than one affected facility, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating and the surface area coated by each affected facility or by other procedures acceptable to the Director.

(i) Calculate the volume-weighted average of the total mass of VOCs consumed per unit volume of coating solids applied (G) during each averaging period specified by the Director for each affected facility, except as provided under paragraphs (c)(2) and (c)(3). Each calculation is considered a performance test. The volume-weighted average of the total mass of VOCs consumed per unit volume of coating solids applied (G) each averaging period will be determined by the following procedures.

(A) Calculate the mass of VOCs used (M_o+M_d) during each averaging period for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} +$$

($L_{dj}D_{dj}$ will be **0** if no VOC solvent is added to the coatings, as received.)

Where: **n** is the number of different coatings used during the averaging period and **m** is the number of different diluent VOC-solvents used during the averaging period.

(B) Calculate the total volume of coating solids used (L_s) in each averaging period for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

Where: **n** is the number of different coatings used during the averaging period.

Determine an appropriate transfer efficiency. Transfer efficiency values shall be determined by the Director on a case-by-case basis. An owner or operator must submit sufficient data for the Director to judge the accuracy of the transfer efficiency claims.

Where more than one application method is used within a single operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the Director and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n}\sum_{k=1}^{p} L_{cik} V_{sik} T_k}{L_s}$$

Where **n** is the number of coatings used and **p** is the number of application methods used.

(C) Calculate the volume-weighted average mass of VOCs consumed per unit volume of solids applied (G) during the averaging period for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

(ii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the averaging period for each affected facility by the following equation:

$$N = G$$

(2) An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOCs (e.g., incinerator) to comply with the applicable emission limit.

(i) Determine the overall VOC reduction efficiency (R) for the capture system and control device. For the initial performance test the overall VOC reduction efficiency (R) shall be determined as prescribed in (c)(2)(i) (A), (B), and (C) of this section. In subsequent averaging periods, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test providing control device and capture system operating conditions have not changed. The procedure in, (c)(2)(i) (A), (B), and (C), of this section, shall be repeated when directed by the Director or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(A) Determine the fraction (F) of total VOCs emitted by an affected facility that enters the control device using the following equation or as provided in Appendix G of this text:

Where:
n is the number of gas streams entering

$$F = \frac{\sum_{i=1}^{n} C_{bi} Q_{bi}}{\sum_{i=1}^{n} C_{bi} Q_{bi} + \sum_{j=1}^{m} C_{fj} Q_{fj}}$$

the control device and **m** is the number of gas streams emitted directly to the atmosphere.

Note: F may also be determined by the ratio of the mass of VOC entering the control device (as carbon) to the mass of VOC (as carbon) in all coatings and diluent solvents used by the affected facility. Case-by-case procedures must be developed if this method is selected.

(B) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

Where:

n is the number of gas streams entering the control device, and

m is the number of gas streams leaving the control device and entering the atmosphere.

(C) Determine the overall reduction efficiency (R) using the following equation:

$$R = EF$$

(ii) Calculate the volume-weighted average of the total mass of VOCs per unit volume of coating solids (G) during each averaging period for each affected facility using equations in paragraphs (c)(1)(i) (A), (B), and (C) of this section.

(iii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each averaging period by the following equation:

$$N = G(1\_R)$$

(3) An owner or operator shall use the following procedure for any affected facility which uses a control device that recovers the VOCs (e.g., carbon adsorption) to comply with the applicable emission limit. **Note:** If the owner or operator can demonstrate to the satisfaction of the Director that the procedures of paragraph (c)(3)(i), (ii), (iii) are impractical due to the length of the averaging period, then the procedure of paragraph (c)(2) may be used.

(i) Calculate the total mass of VOCs consumed (M_o+M_d) and the volume-weighted average of the total mass of VOCs per unit volume of solids applied (G) during each averaging period for each affected facility using equations in paragraph (c)(1)(i) (A), (B), and (C) of this section.

(ii) Calculate the total mass of VOCs recovered (M_r) during each averaging period using the following equation:

$$M_r = L_r D_r$$

(iii) Calculate overall reduction efficiency of the control device (R) for each averaging period for each affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

(iv) Calculate the volume-weighted average mass of VOCs emitted to the atmosphere (N) for each averaging period for each affected facility using equation in paragraph (c)(2)(iii) of this section.

(d) The owner or operator shall use the following procedures for determining volume-weighted average emissions of VOCs in units of pounds VOC per gallon of coating excluding water and exempt solvents.

(1) An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the applicable emission limit. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Method 24. The Director may require the owner or operator who uses formulation data supplied by the manufacturer of the material used to determine the VOC content of the coating using Method 24. The owner or operator shall determine the volume of coating and the mass of VOC-solvent used for thinning purposes from appropriate records on the same basis as the averaging period. If a common coating distribution system serves more than one affected facility, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating and the surface area coated by each affected facility or by other procedures acceptable to the Director.

(i) Calculate the volume-weighted average of the total mass of VOCs consumed per unit volume of coating excluding water and exempt solvents during each averaging period for each affected facility, except as provided under paragraph (d)(2). Each calculation is considered a performance test. The volume-weighted average of the total mass of VOCs consumed per unit volume of coating excluding water for each averaging period will be determined by the following procedures.

(A) Calculate the mass of VOCs used (M_o+M_d) during each calendar

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

day for each affected facility by the following equation: ($L_{dj}D_{dj}$ will be **0** if no VOC is added to the materials, as received.)

Where **n** is the number of different coatings used during the averaging period and **m** is the number of different diluent VOC-solvents used during the averaging period.

(B) Calculate the total volume of coating used excluding water and exempt solvents, $L_{c\text{-}w}$, in each averaging period for each affected facility by the following equation:

$$L_{cw} = \sum_{i=1}^{n} L_{ci} (1 - B_{wi})$$

(C) Calculate the volume-weighted average emissions of VOCs per

volume of coating less water and exempt solvents as follows:

Metric Units--

English Units--

$$G_{cw} = \frac{M_o + M_d}{L_{cw}}$$

$$G_{cw}(english) = G_{cw}(metric) \times 1.717$$

(2) Follow the procedure of paragraph (c)(2) and (c)(3) of this section for any affected facility which uses a control device which either destroys (e.g., incinerator) or recovers (e.g., carbon adsorption) the VOC to comply with the applicable emission limit, except substitute $G_{c\text{-}w}$ as calculated in paragraph (d)(1) for G wherever it occurs.

2.118.4 Monitoring of Emissions and Operations

(a) The owner or operator of an affected facility which uses a capture system and an incinerator to comply with the emission limits shall install, calibrate, maintain, and operate temperature measurement devices according to the following procedures:

(1) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(2) Each temperature measurement device shall be installed, calibrated, and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of 0.75 percent of the temperature being measured expressed in degrees Celsius or $\pm 2.5^{\circ}C$.

(3) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) The owner or operator of an affected facility which uses a capture system and a solvent recovery system to comply with the emission limits shall install the equipment necessary to determine the total volume of VOC-solvent recovered for each averaging period.

2.118.5 Test Methods and Procedures

(a) The test methods in Appendix A to this part, except as provided under Section 1.2, shall be used to determine compliance with the applicable standards as follows:

(1) Method 24, or manufacturer's formulations data, for use in the determination of VOC content of each coating as applied to the surface of the metal parts. In case of an inconsistency between the Method 24 results and the formulation data, the Method 24 results will govern.

(2) Method 25 for the measurement of VOC concentration.

(3) Method 1 for sample and velocity traverses.

(4) Method 2 for velocity and volumetric flow rate.

(5) Method 3 for gas analysis.

(6) Method 4 for stack gas moisture.

(b) For Method 24, the coating sample must be at least a 1 liter sample in a 1 liter container taken at a point where the sample will be representative of the material as applied.

(c) For Method 25, the minimum sampling time for each of the 3 runs is 60 minutes and the minimum sample volume is 0.003 dry standard cubic meters, except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Director.

(d) The Director will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Director that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

(e) The protocols and methods of Appendix G shall be used to determine the capture efficiency.