## **APPENDIX 183C**

AEROSPACE MANUFACTURING & REWORK FACILITIES (SURFACE COATING AND CLEANING) CONTROL TECHNIQUES GUIDELINE (CTG) DOCUMENT

CAA SECTION 183 FEDERAL OZONE MEASURES

#### **REGULATION STATUS**

On 27 Mar 98 (<u>63 FR 15006</u>) EPA announced availability of the final Control Techniques Guideline (CTG) document (<u>EPA-453/R-97-004</u>, <u>December 1997</u>) for Aerospace Manufacturing and Rework facilities.

#### SUMMARY OF THE PRESUMPTIVE RACT REQUIREMENTS

## Applicability

A CTG is not a rule but rather a control technology information document for States to use to develop their own VOC rules. This CTG presents reasonably available control technology (RACT) and best available control measure (BACM) options for controlling VOC emissions from aerospace manufacturing and rework operations. The CAA requires States to issue RACT standards in moderate, serious, or severe ozone nonattainment areas for affected sources that have the potential to emit greater than or equal to 25 tons per year of VOCs.

RACT is the lowest emission limitation that a particular source is capable of meeting by the application of a control technology that is reasonably available considering technological and economic feasibility. BACM is the most effective equipment, measures, processes, methods, systems or techniques, including chemical reformulation, product or feedstock substitution, repackaging, and directions for use, consumption, storage, or disposal.

The CTG is intended to provide State and local air pollution control authorities with an information base for proceeding with their own RACT analyses and ultimately issuing their own regulations.

The operations covered by the Aerospace CTG are not subject to another CTG. The operations and applications which are exempted under this CTG are not subject to another CTG.

#### Exemptions

These requirements do not apply to:

- 1. Manufacturing or rework operations involving space vehicles.
- 2. Rework operations performed on antique aerospace vehicles or components.
- 3. The following activities where cleaning and coating of aerospace components and vehicles may take place:
  - research and development
  - quality control
  - laboratory testing
  - electronic parts and assemblies (except for cleaning and coating of completed assemblies).

#### AEROSPACE MANUFACTURING AND REWORK FACILITIES CTG

There are also numerous exemptions within each affected operation described below.

#### Integration with the NESHAP

The Aerospace Manufacturing and Rework Operations NESHAP focuses on reduction of HAP emissions. However, the control techniques required by the NESHAP also result in reductions of VOC emissions. The control techniques required by the NESHAP are very similar to those presented in the CTG.

The NESHAP sets limits for maximum HAP and VOC content for topcoats, primers, maskants, clean-up solvents, and cleaning operations. The CTG establishes presumptive RACT limits for VOCs.

Two major difference between the NESHAP and CTG are:

- 1. The CTG includes requirements for specialty coatings, the NESHAP does not.
- 2. The NESHAP includes requirements for depainting operations, the CTG does not.

The principal technique used to control VOC emissions from coating application and cleaning is product substitution, which eliminates or reduces the generation of emissions.

## **Key Definitions**

Appendix A of the CTG contains all relevant definitions including individual specialty coatings.

## **Coatings Operations**

## Compliant Coating Limits for Specialty Coatings

Use coatings with a VOC content less than or equal to that given in Table 1.

#### Exemptions

- 1. Touchup, aerosol, and DoD classified coatings;
- 2. Coatings used on space vehicles; and
- 3. Low volume users. A low volume user is when a facility applies less than 50 gallons per unique formulation per year. In addition, the cumulative total for all formulations applied at the facility must be less than 200 gallons annually.

## TABLE 1: PRESUMPTIVE RACT LIMITS FOR SPECIALTY COATINGS

Coating Type	VOC Limit (g/L) <sup>a</sup>
Ablative Coating	600
Adhesion Promoter	890
Adhesive Bonding Primers: Cured above 250 F	1030
Adhesive Bonding Primers: Cured at 250 F or below	850

Coating Type	VOC Limit (g/L) <sup>a</sup>
Antichafe Coating	660
Bearing Coating	620
Bonding Maskant	1,230
Caulking and Smoothing Compounds	850
Chemical Agent-Resistant Coating	550
Clear Coating	720
Commercial Exterior Aerodynamic Structure Primer	650
Commercial Interior Adhesive	760
Compatible Substrate Primer	780
Corrosion Prevention Compound	710
Critical Use and Line Sealer Maskant	1,020
Cryogenic Flexible Primer	645
Cryoprotective Coating	600
Cyanoacrylate Adhesive	1,020
Dry Lubricative Material	880
Electric or Radiation-Effect Coating	800
Electrostatic Discharge and Electromagnetic Interference	800
(EMI) Coating	
Elevated-Temperature Skydrol-Resistant Commercial	740
Primer	
Epoxy Polyamide Topcoat	660
Extrudable/Rollable/Brushable Sealant	280
Fire-Resistant (interior) Coating	800
Flexible Primer	640
Flight-Test Coatings: All Other	840
Flight-Test Coatings: Missile or Single Use Aircraft	420
Fuel Tank Adhesive	620
Fuel-Tank Coating	720
High-Temperature Coating	850
Insulation Covering	740
Intermediate Release Coating	750
Lacquer	830
Metallized Epoxy Coating	740
Mold Release	780
Nonstructural Adhesive	360
Optical Anti-Reflective Coating	750
Part Marking Coating	850
Pretreatment Coating	780
Rain Erosion-Resistant Coating	850
Rocket Motor Bonding Adhesive	890
Rocket Motor Nozzle Coating	660
Rubber-based Adhesive	850

## TABLE 1: PRESUMPTIVE RACT LIMITS FOR SPECIALTY COATINGS

Coating Type	VOC Limit (g/L) <sup>a</sup>
Scale Inhibitor	880
Screen Print Ink	840
Seal Coat Maskant	1,230
Silicone Insulation Material	850
Solid Film Lubricant	880
Specialized Function Coating	890
Sprayable Sealant	600
Structural Autoclavable Adhesive	60
Structural Nonautoclavable Adhesive	850
Temporary Protective Coating	320
Thermal Control Coating	800
Wet Fastener Installation Coating	675
Wing Coating	850

## TABLE 1: PRESUMPTIVE RACT LIMITS FOR SPECIALTY COATINGS

<sup>a</sup> Limits are expressed in terms of mass (grams) of VOC per volume (liter) of coating less water and less exempt solvent. Limits represent the maximum VOC content limit as applied.

Compliant Coating Limits for Primers, Topcoats, and Chemical Milling Maskants

The VOC content RACT limits are the same as the MACT limits in the Aerospace NESHAP. **Table 2** shows the VOC content limits for compliant coatings. Refer to Appendix 112J and to the EPA document titled <u>Summary of Requirements for Implementing the NESHAP (EPA 456/R-97-006)</u> for more information on these MACT limits.

## **Exemptions**

Low volume users. A low volume user is when a facility applies less than 50 gallons per unique formulation of primer, topcoat, or chemical milling maskant (Type I/II) per year. In addition, the cumulative total for all formulations for the entire facility must be less than 200 gallons annually.

# TABLE 2: PRESUMPTIVE RACT/MACT LIMITS FORPRIMERS, TOPCOATS AND CHEMICAL MILLING MASKANTS

Coating Type	VOC Limit (g/L) <sup>a</sup>	
Primers	350	
Topcoats (Including Self-Priming Topcoats)	420	
General Aviation	540	
Type I Maskant	622	
Type II Maskant	160	
<sup>a</sup> Limits are expressed in terms of mass (grams) of VOC per volume (liter) of coating less water and less		

exempt solvent. Limits represent the maximum VOC content limit as applied.

## Control Equipment Alternative

In lieu of using compliant coatings, use an approved air pollution control system that has a combined VOC emissions capture and control efficiency of at least 81 percent by weight.

Submit a monitoring plan for the control device that specifies the applicable operating parameter value, or range of values, to ensure ongoing compliance. Calibrate, operate, and maintain the monitoring device in accordance with the manufacturer's specifications.

## Coating Application Equipment

Use one or more of the following application techniques:

- 1. flow/curtain coat;
- 2. dip coat;
- 3. roll coating;
- 4. brush coating;
- 5. cotton-tipped swab application;
- 6. electrodeposition coating;
- 7. high volume low pressure (HVLP) spraying;
- 8. electrostatic spray; or
- 9. other coating application methods that achieve emission reductions equivalent to HVLP or electrostatic spray application methods.

## **Exemptions**

- 1. Any situation that normally requires the use of an airbrush or an extension on the spray gun to properly reach limited access spaces;
- 2. The application of specialty coatings;
- 3. The application of coatings that contain fillers that adversely affect atomization with HVLP spray guns and that the permitting agency has determined cannot be applied by any of the specified application methods;
- 4. The application of coatings that normally have a dried film thickness of less than 0.0013 centimeter (0.0005 in.) and that the permitting agency has determined cannot be applied by any of the specified application methods;
- 5. The use of airbrush application methods for stenciling, lettering, and other identification markings;
- 6. The use of hand-held spray can application methods; and
- 7. Touch-up and repair operations.

## **Cleaning Operations**

RACT for solvent cleaning operations is not the same as MACT. However, MACT and RACT for solvent cleaning are both based on work practices and cleaning solvent composition.

## Housekeeping

Store all fresh and used cleaning solvents, except semiaqueous cleaning solvents, used in solvent cleaning operations in containers and keep closed at all times except when filling or emptying. It is recommended that cloth and paper, or other absorbent applicators, moistened with cleaning solvents be stored in closed containers. Handling and transfer procedures must be implemented to minimize spills during filling and transferring the cleaning solvent to or from enclosed systems, vats, waste containers, and other cleaning operation equipment that hold or store fresh or used cleaning solvents.

#### Exemptions

- 1. Aqueous cleaning solvents.
- 2. Cotton-tipped swabs used for very small cleaning operations.

## Hand-Wipe Cleaning

Use cleaning solvents which are aqueous (80% water as applied) or have a VOC composite vapor pressure less than or equal to 45 millimeters of mercury (mm Hg) at 20 C.

#### **Exemptions**

- 1. Cleaning during the manufacture, assembly, installation, maintenance, or testing of components of breathing oxygen systems that are exposed to the breathing oxygen;
- 2. Cleaning during the manufacture, assembly, installation, maintenance, or testing of parts, subassemblies, or assemblies that are exposed to strong oxidizers or reducers (e.g., nitrogen tetroxide, liquid oxygen, hydrazine);
- 3. Cleaning and surface activation prior to adhesive bonding;
- 4. Cleaning of electronics and assemblies containing electronics;
- 5. Cleaning of aircraft and ground support equipment fluid systems that are exposed to the fluid, including air-to-air heat exchangers and hydraulic fluid systems;
- 6. Cleaning of fuel cells, fuel tanks, and confined spaces;
- 7. Surface cleaning of solar cells, coated optics, and thermal control surfaces;
- 8. Cleaning during fabrication, assembly, installation, and maintenance of upholstery, curtains, carpet, and other textile materials used on the interior of the aircraft;

- 9. Cleaning of metallic and nonmetallic materials used in honeycomb cores during the manufacture or maintenance of these cores, and cleaning of the completed cores used in the manufacture of aerospace vehicles or components;
- 10. Cleaning of aircraft transparencies, polycarbonates, or glass substrates;
- 11. Cleaning and cleaning solvent usage associated with research and development, quality control, or laboratory testing;
- 12. Cleaning operations, using nonflammable liquids, conducted within 5 feet of energized electrical systems. Energized electrical systems means any AC or DC electrical circuit on an assembled aircraft once electrical power is connected, including interior passenger and cargo areas, wheel wells, and tail sections; and
- 13. Cleaning operations identified as essential uses under the Montreal Protocol for which the EPA has allocated essential use allowances or exemptions in 40 CFR § 82.4.

#### Flush Cleaning

Empty used cleaning solvent (except for semiaqueous cleaning solvents) into an enclosed container or collection system or capture the solvent with wipers (absorbent applicators) and disposed of properly.

#### Exemptions

Aqueous cleaning solvents.

#### Spray Gun Cleaning

Use one or more of the following methods:

- 1. Use an enclosed spray gun cleaning system that is kept closed when not in use. Repair leaks from enclosed spray gun cleaners within 14 days from when the leak is first discovered. If the leak is not repaired by the 15th day after detection, remove the cleaning solvent until the leak is repaired or its use is permanently discontinued. Visually inspect the seals and all other potential sources of leaks at least once per month while in operation.
- 2. Discharge unatomized cleaning solvent into a waste container that is kept closed when not in use;
- 3. Disassemble the spray gun and clean in a vat. The vat must be kept closed when not in use.
- 4. Discharge atomized spray cleaning solvent into a waste container that is fitted with a device designed to capture atomized emissions.

## **Recordkeeping Requirements**

Except for specialty coatings, any source that complies with the recordkeeping requirements of the Aerospace NESHAP is in compliance with the recordkeeping requirements of the CTG.

## Specialty Coatings

- 1. Maintain a current list of coatings in use with category and VOC content as applied.
- 2. Record coating usage on an annual basis.

## **Cleaning Solvents**

- 1. For aqueous and semiaqueous hand-wipe cleaning solvents, maintain a list of materials used with corresponding water contents.
- 2. For vapor pressure compliant hand-wipe cleaning solvents:
  - a. Maintain a current list of cleaning solvents in use with their respective vapor pressures or, for blended solvents, VOC composite vapor pressures.
  - b. Record cleaning solvent usage on an annual basis.
- 3. For cleaning solvents with a vapor pressure greater than 45 mm Hg used in exempt hand-wipe cleaning operations:
  - a. Maintain a list of exempt hand-wipe cleaning processes.
  - b. Record cleaning solvent usage on an annual basis.

## Control Equipment

Record monitoring parameters as specified in the monitoring plan, if applicable.

## **Test Methods**

Except for specialty coatings, any source which complies with the test method requirements of the Aerospace NESHAP, 40 CFR 63.750, is in compliance with the test method requirements of the CTG.

## Coatings

- 1. For water-borne (water-reducible) coatings, manufacturer's supplied data alone can be used to determine the VOC content of each formulation.
- 2. For coatings which are not waterborne, determine the VOC content of each formulation (less water and less exempt solvents) as applied using manufacturer's supplied data or Method 24 of 40 CFR part 60, Appendix A. If there is a discrepancy between the manufacturer's formulation data and the results of the Method 24 analysis, compliance shall be based on the results from the Method 24 analysis.

## Cleaning solvents

- 1. For aqueous and semiaqueous cleaning solvents use manufacturers' supplied data to determine the water content.
- 2. For hand-wipe cleaning solvents use manufacturers' supplied data or standard engineering reference texts or other equivalent methods to determine the vapor pressure or VOC composite vapor pressure for blended cleaning solvents.

## Control Equipment

Measure VOC emissions using EPA Methods 18, 25, and/or 25A (40 CFR 60, Appendix A).

#### **Compliance Deadlines**

The compliance deadlines will vary depending on when State and local agencies issue rules implementing these requirements in their moderate, serious, or severe ozone nonattainment areas.

## MILITARY SOURCES

Once implemented by the States, this CTG will affect military installations that are located in ozone nonattainment areas. Any aerospace vehicles or components stationed, maintained, or reworked on these installations may become affected by the control techniques presented in the CTG.

Although most military facilities can achieve compliance by using compliant coatings and approved solvents, the recordkeeping and reporting requirements will still be burdensome.

This CTG essentially extends the requirements of the Aerospace NESHAP (which applies to major HAP sources only) to ozone nonattainment areas. The most significant differences between the NESHAP and the CTG is that the CTG regulates specialty coatings and does not regulate depainting operations.

## CONTACTS

EPA:EPA Regional Offices or Barbara Driscoll, (919) 541-0164

Military: <u>HAP Subcommittee Contacts</u>

## AEROSPACE MANUFACTURING AND REWORK FACILITIES CTG

This Page Left Blank Intentionally.