# Eastern Kern Air Pollution Control District

# Rule 410.8
# AEROSPACE ASSEMBLY AND COATING OPERATIONS

## FINAL STAFF REPORT

## March 13, 2014

*Prepared by*

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## I. BOARD ADOPTION

Rule 410.8, Aerospace Assembly and Coating Operations was adopted by the Eastern Kern Air Pollution Control District (District)'s Governing Board on March 13, 2014 at its regular Board meeting in Rosamond California.

Rule 410.8 became effective and enforceable upon adoption. A copy of the Rule has been submitted to the California Air Resources Board (ARB) for their review and then to be forwarded to the U.S. Environmental Protection Agency (EPA) for inclusion into the State Implementation Plan (SIP).

## II. INTRODUCTION

Rule 410.8 limits volatile organic compound (VOC) emissions from aerospace coatings and adhesives, and from cleaning, stripping, storing, and disposal of organic solvents and waste solvent materials associated with the use of aerospace coatings and adhesives. The Rule also provides administrative requirements for recording and measuring VOC emissions.

On November 6, 2013 the District held a public rule development workshop at the Mojave Veteran's Building in Mojave, CA. At this workshop District staff presented proposed Draft Rule 410.8, Aerospace Assembly and Coating Operations. The District submitted copies of the proposed rule to ARB and EPA for an initial review prior to the workshop. A 30-day public review and comment period followed the workshop.

District received comments and suggested changes from EPA, ARB, and industry. District considered all comments and suggested changes

Appendix A is a copy of Adopted Rule 410.8, Aerospace Assembly and Coating Operations.

Appendix B is the District's Response to Comments following the November 6, 2013 public workshop held at the Mojave Veteran's Center in Mojave, CA.

## III. RACT BACKGROUND

The Clean Air Act (CAA) as amended in 1990 requires that State implementation plans (SIP's) for certain ozone nonattainment areas be revised to require implementation of Reasonably Available Control Technology (RACT) to limit VOC emissions. The U.S. Environmental Protection Agency (EPA) defines RACT as *the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility*. Section 183(b)(3) of the CAA required the EPA Administrator to issue a Control Techniques Guideline (CTG)

that presents feasible RACT control measures for VOC emissions from coatings and solvents used in the aerospace industry.

The CTG is intended to provide State and local air pollution control authorities with an information base for proceeding with analyses of RACT for their own regulations. The CTG contains a review of current knowledge and data concerning the technology, impacts, and costs associated with various emission control techniques. Where applicable, the EPA recommends that States adopt requirements consistent with the presumptive RACT.

However, these measures are only a recommendation; States may develop their own RACT requirements that consider economic and technical circumstances. No Federal law or regulation precludes States from requiring more stringent controls than those recommended as RACT.

## IV. RULE DEVELOPMENT

Rule 410.8 encompasses aerospace activities that involve any assembly, component manufacturing, refinishing, repair, maintenance, service operations of commercial and military airplanes, satellites, space shuttles, rockets, balloons, dirigibles, helicopters and missiles. Among the aerospace materials currently used in practice are coatings, adhesives, sealants, lubricants, strippers, cleaning solvents, maskants and associated primers. These materials are unique to the aerospace industry because they have complex multiple resin/solvent chemistries. When combined with the use of various metals, metal alloys, and composites formed with compound curves, precision machining and millings, and laminations, the aerospace materials are designed to withstand extreme environmental changes in pressure, temperature, flexure, loading, and humidity. It is imperative that the performance of these materials ensures the overall safety and reliability of the aerospace component.

The aerospace industry has focused on developing and identifying compliant materials with future VOC content limits for several categories of materials. In general, Rule 410.8 has similar applicability to the Maximum Achievable Control Technology (MACT) Standard for Aerospace Manufacturing and Rework Facilities (40 CFR 63 Subpart GG, commencing with §63.741). Materials regulated by this rule include primers, coatings, adhesives, sealants, maskants, lubricants, and others. Many of these materials are covered under the EPA's Control Techniques Guideline (CTG) entitled "*Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations*" (December 1997, EPA-453/R-97-004).

Some sources that will be subject to the requirements of Rule 410.8 also fall under jurisdiction of the Antelope Valley Air Quality Management District (AVAQMD). Staff reviewed AVAQMD's aerospace assembly and coating operations rule (Rule 1124), San Joaquin Air Pollution Control District (SJVAPCD) aerospace assembly and coating operations rule (Rule 4605), and

South Coast Air Quality Management District (SCAQMD) aerospace assembly and component manufacturing operations rule (Rule 1124) in order to develop an aerospace assembly rule that maintains consistency with these districts. Rule 410.8 follows VOC content limits of AVAQMD Rule 1124, Amended 8/20/2013, in order to create less burden on sources split between the District and AVAQMD.

## V. APPLICABILITY

Requirements of Rule 410.8 are applicable to all manufacturing facilities that produce an aerospace vehicle or component and all facilities that rework or repair such aerospace products. An Aerospace vehicle or component is defined as, but not limited to: *any fabricated part, processed part, assembly of parts, or completed unit of any aircraft including, but not limited to, airplanes, helicopters, missiles, rockets, and space vehicles*.

Aerospace facilities may be divided into four market segments: commercial original equipment manufacturers (OEM), commercial rework facilities, military OEM's, and military rework facilities. The commercial OEM segment of the market includes the manufacture of commercial aircraft as well as the production of business and private aircraft. The military OEM segment of the market includes military installations and defense contractors that manufacture aircraft, missiles, rockets, satellites, and spacecraft. Rework facilities, both commercial and military, may rework many of the above end products. In addition to manufacturing and rework facilities, some shops may specialize in providing a service, such as chemical milling, rather than actually producing a component or assembly.

In general, aerospace manufacturing and rework facilities are covered by the Standard Industrial Classification (SIC) codes listed in Table 1 below. Facilities classified under other SIC codes may be subject to Rule 410.8 if the facility meets the definition of a major source and the definition of an aerospace manufacturing or rework facility.

**TABLE 1**
**AEROSPACE MANUFACTURING SIC CODES**

| SIC Code | Description |
|---|---|
| 3720 | Aircraft and Parts |
| 3721 | Aircraft |
| 3724 | Aircraft Engines and Engine Parts |
| 3728 | Aircraft Parts and Equipment |
| 3760 | Guided Missiles, Space Vehicles, and Parts |
| 3761 | Guided Missiles and Space Vehicles |
| 3764 | Space Propulsion Units and Parts |
| 3769 | Space Vehicle Equipment |
| 4512 | Air Transportation, Scheduled |
| 4581 | Airports, Flying Fields, and Services |
| 9711 | National Security |

## VI. REQUIREMENTS

Section V of Rule 410.8 contains the compliance requirements associated with aerospace assembly and coating operations, which include:

- Table of Standards - VOC Content Limits
- Coating Application Equipment Cleaning
- Coating Strippers
- Storage and Disposal of VOC Containing Materials
- Application Equipment Requirements
- VOC Emission Control System
- Prohibition of Solicitation
- Sell-Through/Existing Stock of Coatings
- Specialized Military Coating Operations VOC Requirements

**Table of Standards**

With the exception of the exemptions listed is Section IV of Rule 410.8, an operator shall not apply to any aerospace component, any coating, aerosol, or adhesive with a VOC content, less water and exempt compounds, as applied, in excess of the limits listed in the Table of Standards for Aerospace Component Products Containing VOCs (Table of Standards).

**TABLE OF STANDARDS**
**VOC CONTENT LIMITS FOR AEROSPACE COMPONENT COATING PRODUCTS**
**Content expressed in Grams per Liter**
**Less Water and Exempt Compounds**

| VOC Content Category | VOC Limit |
|---|---|
| **I. PRIMERS** | |
| 1. General | 350 |
| 2. Adhesive Bonding Primers | |
| a. Commercial Aircraft | 250 |
| b. Military Aircraft | 805 |
| 3. Commercial Exterior Aerodynamic Structure Primer | 650 |
| 4. Compatible Substrate Primer | 780 |
| 5. Cryogenic Flexible Primer | 645 |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| 6. Elevated-Temperature Skydrol-Resistant Commercial Primer | 740 |
| 7. Flexible Primer | 640 |
| 8. Low-Solids Corrosion Resistant Primer | 350 |
| 9. Primer Compatible with Rain Erosion-Resistant Coating | 850 |
| | |
| **II. COATINGS** | |
| 1. Ablative Coating | 600 |
| 2. Adhesion Promoter Coating | 850 |
| 3. Antichafe Coating | 600 |
| 4. Bearing Coating | 620[1] |
| 5. Chemical Agent-Resistant Coating | 550[1] |
| 6. Conformal Coating | 750 |
| 7. Cryoprotective Coating | 600 |
| 8. Electric or Radiation-Effect Coating | 800 |
| 9. Electromagnetic Interference (EMI) Coating | 800[1] |
| 10. Fire-Resistant (Interior) Coating | |
| a. Civilian | 650 |
| b. Military | 800 |
| c. Space | 800 |
| 11. Flight-Test Coating | |
| a. Used on Missiles or Single Use Aircraft | 420 |
| b. All Other | 840 |
| 12. Fuel-Tank Coating | |
| a. General | 420 |
| b. Rapid Cure | 720 |
| 13. High-Temperature Coating | 850 |
| 14. Impact-Resistant Coating | 420 |
| 15. Intermediate Release Coating | 750[1] |
| 16. Lacquer Coating | 830 |
| 17. Metallized Epoxy Coating | 740[1] |
| 18. Mold Release Coatings | 780[1] |
| 19. Optical Anti-Reflection Coating | 700 |
| 20. Part Marking Coating | 850[1] |
| 21. Pretreatment Coating | 780 |
| 22. Rain Erosion-Resistant Coating | 800 |
| 23. Rocket Motor Nozzle Coating | 660[1] |
| 24. Scale Inhibitor Coating | 880 |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| 25. Space-Vehicle Coatings, Other: does not include Electric Discharge and EMI Protection Coating or Fire-Resistant (Interior) Coating | 1000 |
| 26. Specialized Function Coating | 890[1] |
| 27. Temporary Protective Coating | 250 |
| 28. Thermal Control Coating | 800[1] |
| 29. Topcoat | |
| a. Clear | 520 |
| b. Epoxy Polyamide | 660[1] |
| c. Other | 420 |
| 30. Unicoat Coating (Self Priming Topcoats) | 420 |
| 31. Wet Fastener Installation Coating | 675[1] |
| 32. Wing Coating | 750 |
| 33. Wire Coatings | |
| a. Electronic | 420 |
| b. Anti-Wicking | 420 |
| c. Pre-Bonding Etchant | 420 |
| d. Phosphate Ester Resistant Ink | 925 |
| | |
| **III. ADHESIVES** | |
| 1. Commercial Interior Adhesive | 760 |
| 2. Cyanoacrylate Adhesive | 1020 |
| 3. Fuel-Tank Adhesive | 620 |
| 4. Non-Structural Adhesive | 250 |
| 5. Rocket Motor Bonding Adhesive | 890 |
| 6. Rubber-Based Adhesive | 850 |
| 7. Space Vehicle Adhesive | 800 |
| 8. Structural Adhesive | |
| a. Autoclavable | 50 |
| b. High Temperature - Autoclavable | 650 |
| c. Non-Autoclavable | 850 |
| | |
| **IV. SEALANTS** | |
| 1. Rollable, Brushable or Extrudable Sealant | 280[2] |
| 2. Fastener Sealant | 675 |
| 3. Other | 600 |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| **V. MASKANTS** | |
| 1. Bonding Maskant | 1230 |
| 2. Critical Use and Line Sealer Maskant | 750 |
| 3. Chemical Milling Maskant | |
| a. For use with Type I Etchant | 250 |
| b. For use with Type II Etchant | 160 |
| c. For Chemical Processing<br>*Less water, Exempt Compounds and (PERC) | 250* |
| 4. Photolithographic Maskant | 850 |
| 5. Seal Coat Maskant | 1230 |
| | |
| **VI. LUBRICANTS** -- | |
| 1. Fastener Installation Lubricant<br>(applied at time of Aircraft/component assembly) | |
| a. Solid-Film Lubricant | 880 |
| b. Dry Lubricative Material | 675 |
| 2. Fastener Lubricative Coating<br>(applied at time of Fastener Manufacture) | |
| a. Solid-Film Lubricant | 250 |
| b. Dry Lubricative Material | 120 |
| c. Barrier Coating | 420 |
| 3. Non-Fastener Lubricative Coatings<br>(applied at time of non-Fastener Manufacture) | |
| a. Solid-Film Lubricant | 880 |
| b. Dry Lubricative Materials | 675 |
| | |
| **VII. OTHER** | |
| 1. Caulking and Smoothing Compound | 850 |
| 2. Corrosion Prevention Compound System | 710 |
| 3. Insulation Covering | 740 |
| 4. Screen Print Ink | 840 |
| 5. Silicone Insulation Material | 850 |

1 Coatings that have been designated as “classified” by the Department of Defense or coatings that are used on space vehicles are exempt from these coating limits.

2 Coatings that have been designated as “classified” by the Department of Defense or coatings that are used on space vehicles are exempt from the 280 g/l limit, but must comply with a 600 g/l limit.

### Coating Substitutions

Most aerospace coatings are solvent-borne, which contain a mixture of organic solvents, many of which are VOC's. The most common VOC solvents used in coatings are toluene, xylene, methyl ethyl ketone, and methyl isobutyl ketone. VOC content ranges differ for the various coating categories because each coating must meet individual performance standards particular to a specific design. The quality of the coating is critical to the airworthiness and safety of the final product. Aerospace vehicle manufacturing is strictly controlled by the Federal Aviation Administration, the Department of Defense, and specific customer requirements. Industry specifications for coatings are dictated by these requirements.

Waterborne and high solids materials are generally used for coating substitutions. Specialty coatings typically have relatively low usage, so reformulation to lower VOC contents does not produce significant air quality benefits nor is it economically feasible for paint suppliers. Paint suppliers and the aerospace industry generally have targeted high volume materials for reformulation efforts. Therefore, lower VOC formulations are not available for most of the low volume specialty coating categories.

### Equipment Changes

The principal technique used by the aerospace industry to control VOC emissions from coating application and cleaning is product substitution, which eliminates or reduces the generation of emissions. Emission reduction is obtained using less energy and producing less waste than using a control device to achieve the same emission reductions.

The aerospace industry has implemented several equipment changes that directly reduce the level of VOC emissions. While there are equipment changes that effect emissions from every process, the three changes predominantly used in the industry are high transfer efficiency spray guns, spray gun cleaners, and conventional high transfer efficiency methods.

## VII. EXEMPTIONS

Rule 410.8 details a number of VOC containing products that are exempt from the VOC content requirements listed in The Table of Standards. These exemptions include:

- Jet engine or rocket engine flushing operations using any solvent other than trichloroethylene are exempt from this rule.

- Coatings applied using non-refillable aerosol spray containers.

- Except for the provisions of Section VI, VOC limits for solvents and strippers listed in Section V shall not apply to space vehicle manufacturing.

- Touch-up coatings and stencil coatings;

- Rework operations performed on antique aerospace vehicles or associated components.

- Contain less than 20 grams of VOC per liter of coating less water and exempt compounds, or

- Coatings or refillable aerosols with separate formulations that are used in volumes of less than fifty (50) gallons in any calendar year provided that the total of such formulations applied annually by a facility is less than 200 gallons;

- Adhesives with separate formulations that are used in volumes of less than one half (0.5) gallon on any day or less than ten (10) gallons in any calendar year;

- Aerospace assembly and component coating facilities using not more than four (4) gallons of products containing VOCs per day. Solvent-containing materials used in operations subject to Rule 410.3, Organic Solvent Degreasing Operations shall not be included in this determination.

- Laboratories which apply coatings, solvents, and adhesives to test specimens for purpose of research, development, quality control, and testing for production-related operations.

- Coatings that have been designated as “classified” by the Department of Defense or used on space vehicles are exempt from the VOC content limits of the following categories as listed in the Table of Standards:

    - Ablative Coating, Bearing Coating, Caulking and Smoothing Compounds, Chemical Agent-Resistant Coating, Electromagnetic Interference Coating, Intermediate Release Coating, Lacquer, Metalized Epoxy Coating, Mold Release, Part Marking Coating, Rocket Motor Nozzle Coating, Silicone Insulation Material, Specialized Function Coating, Thermal Control Coating, Epoxy Polyamide, and Wet Fastener Installation Coating.

    - The Fastener Sealant category is exempt from the 600 g/l VOC limit but must still comply with the 675 g/l VOC limit.

    - The Sealant (Extrudable/Rollable/Brushable) category is exempt from the 280 g/l VOC limit but must still comply with the 600 g/l VOC limit.

## VIII. ADMINISTRATIVE REQUIREMENTS

Rule 410.8 has recordkeeping provisions that require an operator to maintain the coating manufacturer's specifications, either listed on the coating container, product data sheet, or Safety Data Sheet (SDS), available for review and shall maintain daily records which show the following information as applicable:

- Manufacturer name and type for each coating, solvent, thinner, reducer or stripper used;
- Mix ratio by volume of components added to the original material prior to application;
- Grams of VOC per liter of each coating, solvent, thinner, reducer, or stripper less water and exempt compounds, as applied;
- Volume and method of application of each coating, solvent, thinner, reducer, or stripper applied; and
- Vapor pressure of solvents used.

An operator shall also maintain records to support that the following coatings have been specified for their intended application:

- Adhesion promoter.
- Antichafe coating.
- Electric/radiation effect.
- Fuel tank adhesive.
- High temperature coating.
- Impact resistant coating.
- Optical anti-reflective coating.
- Rain erosion resistant wing coating.

Records required by the Rule shall be retained for a minimum of five (5) years and made available on site during normal business hours to the APCO, ARB, or EPA upon request.

**Test Methods**

Rule 410.8 contains a number of specific test methods that must be followed in order to ensure compliance with the rule (See Section VI.B. of Appendix A).

## IX. RULE CONSISTENCY ANALYSIS

Pursuant to Section 40727.2 of the California Health and Safety Code, prior to adopting, amending, or repealing a rule or regulation, the District is required to perform a written analysis that identifies and compares the air pollution control elements of Rule 410.8 with the corresponding elements of existing or proposed District and EPA rules, regulations, and guidelines that apply to the same source category. Rule elements that were analyzed are emission limits or control efficiency, operating parameters and work practices, monitoring and testing, and recordkeeping and reporting requirements.

**Results of Consistency Analysis**

**District Rules**

Facilities subject to Rule 410.8 could also be subject to the following rules:

Rule 410, Organic Solvents

Rule 410.2, Disposal and Evaporation of Solvents

Rule 410.3, Organic Solvent Degreasing Operations

Rule 410.4, Metal, Plastic, and Pleasure Craft Parts and Products Coating Operations

Rule 410.4A, Motor Vehicle and Mobile Equipment Refinishing Operations

Rule 410.7, Graphic Arts

Rule 411, Storage of Organic Liquids

Rule 422, New and Modified Stationary Source Review Rule

Rule 423, National Emissions Standards for Hazardous Air Pollutants

Some of the requirements of rules 410, 410.2, and 410.3 may conflict with provisions of Rule 410.8. Rules 410, 410.2, and 410.3 will be concurrently revised to include a provision that will exempt any source operation that is subject to, or specifically exempted by Rule 410.8.

Rules 410.4, 410.4A, 410.7, 411, 422, and 423 are not in conflict with, nor are they inconsistent with the requirements of Rule 410.8.

**EPA Rules and Regulations**

**A. EPA-Control Technique Guidelines (CTG)**

1. CTG EPA-453/R-97-004 1997/12 applies to *Surface Coating Operations at Aerospace Manufacturing and Rework Operations* located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas. Rule 410.8 is more stringent than the CTG limits for 34 categories and as stringent as the CTG in the 19 remaining categories. As such, District staff concludes that District Rule 410.8 is more stringent than the CTG.

2. CTG EPA-450/2-77-022 1977/11 applies to *VOC Emissions from Solvent Metal Cleaning* operations located in marginal, moderate, serious or severe ozone nonattainment areas that have the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

   This CTG applies to the use of the following degreasing equipment: cold cleaners, open top vapor degreasers, and conveyorized degreasers. The CTG identifies design and work practice standards for cold cleaners, open top vapor degreasers, and conveyorized degreasers, for example: cover the solvent tank, have a facility for waste solvent and draining cleaned parts, permanent labels on operating parts, close degreaser when not in use, drain parts until dripping ceases, no excessive splashing if solvent is sprayed. The CTG also identifies add-on controls such as refrigeration chillers and carbon control.

   Rule 410.8 identifies solvent VOC content limits or a control system with efficiencies of at least 90% capture and 95% control, and that would not allow more emissions than if compliant materials were utilized. The general solvent limit is 200 g/L; the coating stripper solvent limit is currently 300 g/L. Since the CTG does not identify control requirements any more stringent than Rule 410.8, District staff considers Rule 410.8 at least as stringent as the CTG.

**B. EPA - Alternative Control Technology (ACT)**

Currently no EPA ACT guidance document for aerospace coating operations.

**C. Standards of Performance for New Stationary Sources (NSPS)**

Currently no NSPS guidance document for aerospace coating operations.

### D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 423 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

*40 CFR 63 Subpart GG (National Emission Standards for HAPs: Aerospace Manufacturing and Rework Facilities)* Requirements in this subpart are not directly comparable to Rule 410.8 VOC limits. The NESHAP HAP emission limits which are expressed in terms of percent HAP, HAP emission concentration, and mass (kg) of HAP per mass (kg) of solids are not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus Rule 410.8 VOC limits.

## X. VOC REDUCTIONS

ARB emissions inventory shows state-wide VOC emissions of 0.02 tons of VOC per day for this industry. Rule 410.8 provides a variety of VOC limits on primers, coatings, adhesives, sealants, maskants and lubricants used in the manufacturer and remanufacture of aerospace assembly and components. These are the primary control requirements in the rule (see Section V of Rule 410.8). Although Rule 410.8 only applies to a small number of sources located within the District, some degree of VOC emissions reductions will be accomplished and contribute to the District's goal of achieving attainment.

## XI. ECONOMIC IMPACTS

Pursuant to California Health & Safety Code (CH&SC) §40920.6(a), the District is required to analyze the cost effectiveness of new rules or rule amendments that implement Best Available Retrofit Control Technology (BARCT) or all feasible measures. Rule 410.8 employs federal RACT requirements but not BARCT or all feasible measures, and is therefore not subject to the cost effectiveness analysis mandate.

## XII. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and ARB policy require an evaluation of the potential adverse environmental impacts of proposed projects. The intent of Rule 410.8 is to protect public health by reducing the public's exposure to potentially harmful VOC emissions. An additional consideration is the impact that the rule may have on the environment. District has determined that no significant adverse environmental impacts should occur as a result of adopting Rule 410.8.

Pursuant to the Section 15061, Subsections (2) & (3) of the CEQA Guidelines, staff will prepared and file a Notice of Exemption for this project upon adoption.

## XIII. SOCIOECONOMIC IMPACTS

CHSC Section 40728.5 exempts districts with a population of less than 500,000 persons from the requirement to assess the socioeconomic impacts of adopted rules. Eastern Kern County population is below 500,000 persons.

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# APPENDIX A

## RULE 410.8

## AEROSPACE ASSEMBLY AND COATING OPERATIONS

**RULE 410.8 Aerospace Assembly and Coating Operations** - Adopted 3/13/2014

## I. Purpose

The purpose of this rule is to limit volatile organic compound (VOC) emissions from aerospace coatings and adhesives, and from cleaning, stripping, storing, and disposal of organic solvents and waste solvent materials associated with the use of aerospace coatings and adhesives. This rule also provides administrative requirements for recording and measuring VOC emissions.

## II. Applicability

Except as provided in Section IV, the provisions of this rule are applicable to the manufacturing, assembling, coating, masking, bonding, paint stripping, surface cleaning, service, and maintenance of aerospace components, and the cleanup of equipment, storage, and disposal of solvents and waste solvent materials associated with these operations.

## III. Definitions

A. Ablative Coating: A coating that chars when exposed to open flame or extreme temperatures, as would occur during the failure of an engine casing or during aerodynamic heating. The ablative char surface serves as an insulative barrier, protecting adjacent components from heat or open flame.

B. Adhesion Promoter: A coating applied to a substrate in a monomolecular thickness to promote wetting and form a chemical bond with the subsequently applied material.

C. Adhesive: A substance that is used to bond one surface to another.

D. Adhesive Bonding Primer: A coating applied in a very thin film to aerospace adhesive bond detail components for corrosion inhibition and adhesion.

E. Aerosol Coating: A mixture of pigments, resins, and liquid and gaseous solvents and propellants packaged in a disposable container for hand-held application.

F. Aerospace Component: Any raw material, partial or completed fabricated part, assembly of parts, or completed unit of any aircraft, helicopter, missile, or space vehicle, including integral equipment such as models, mock-ups, prototypes, molds, jigs, tooling, hardware jackets, and test coupons.

G. Aerospace Material: Any coating, primer, adhesive, sealant, maskant, lubricant, stripper or hand-wipe cleaning or clean-up solvent used during the manufacturing, assembly, refinishing, maintenance or service of an aerospace component. Preservative oils and compounds, form release agents not containing solids, greases, and waxes are not aerospace materials for the purpose of this rule.

H. Antichafe Coating: A coating applied to areas of moving aerospace components which may rub during normal operation.

I. Antique Aerospace Vehicle or Component: An aircraft or component thereof that was built at least 30 years ago. An antique aerospace vehicle would not routinely be in commercial or military service in the capacity for which it was designed.

J. Anti-Wicking Wire Coating: The outer coating of a wire which prevents fluid wicking into the insulation of the wire.

K. Air Pollution Control Officer (APCO): Eastern Kern Air Pollution Control District Air Pollution Control Officer, or his designee.

L. ARB: California Air Resources Board.

M. ASTM: American Society for Testing and Materials.

N. Barrier Coating: A coating applied in a thin film to fasteners to inhibit dissimilar metal corrosion and to prevent galling.

O. Bearing Coating: A coating applied to an antifriction bearing, a bearing housing, or the area adjacent to such a bearing in order to facilitate bearing function or to protect the base material from excessive wear. A material shall not be classified as a bearing coating if it can also be classified as a dry lubricative material or a solid film lubricant.

P. Brush Coating: Manual application of coatings using brushes and rollers.

Q. Caulking and Smoothing Compounds: Semi-solid materials which are applied by hand application methods and are used to aerodynamically smooth exterior vehicle surfaces or fill cavities such as bolt hole accesses. A material shall not be classified as a caulking and smoothing compound if it can also be classified as a sealant.

R. Chemical Agent-Resistant Coating (CARC): An exterior topcoat designed to withstand exposure to chemical warfare agents or the decontaminants used on these agents.

S. Chemical Milling: The removal of metal by chemical action of acids or alkalis.

T. Clear Topcoat: A clear or semi-transparent coating applied over a primer for purposes such as appearance, identification, or protection.

U. Coating: A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealers, and stains excluding preservative oils and compounds, form release agents not containing solids, greases, and waxes.

V. Commercial Exterior Aerodynamic Structure Primer: A primer utilized for the purpose of extended corrosion protection, which is only used on the exterior of passenger and cargo doors, supporting door structures, aerodynamic components, and structures of commercial aircraft which protrude from the fuselage, such as wings and attached components, control surfaces, horizontal stabilizer, vertical fins, wing-to-body fairings, antennae, landing gear and landing gear doors.

W. Composite Partial Pressure: The sum of the partial pressures of the VOC compounds in a solvent. The VOC composite partial pressure is calculated as follows:

$$PP_c = \frac{\sum_{i=1}^{n} \frac{(W_i)(VP_i)}{MW_i}}{\frac{W_w}{MW_w} + \sum_{e=1}^{k} \frac{W_e}{MW_e} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

Where:

$W_i$ = Weight of the "i"th VOC compound, in grams
$W_w$ = Weight of water, in grams
$W_e$ = Weight of exempt compound, in grams
$MW_i$ = Molecular weight of the "i"th VOC compound, in grams per gram-mole
$MW_w$ = Molecular weight of water, in grams per gram-mole
$MW_e$ = Molecular weight of the "e"th exempt compound, in grams per gram-mole
$PP_c$ = VOC composite partial pressure at 20°C (68°F), in mm Hg
$VP_i$ = Vapor pressure of the "i"th VOC compound at 20°C (68°F), in mm Hg

X. Conformal Coating: A coating applied to electrical conductors and circuit boards to protect them against electrical discharge damage and/or corrosion.

Y. Decorative Laminate Primer: An adhesive bonding primer which is applied to a substrate to enhance adhesion between the decorative laminate and the subsequently applied substrate, and is cured at a maximum temperature of 250°F.

Z. Dip Coating: The process in which a substrate is immersed in a solution (or dispersion) containing the coating and then withdrawn.

AA. Dry Lubricative Coating: A coating consisting of lauric acid, cetyl alcohol, waxes, or other non-cross linked or resin-bound materials which act as a dry lubricant or protective coat.

BB. Electric-Effect Coating: An electrically-conductive coating.

CC. Electrodeposition: A dip coating application method where the paint solids are given an electrical charge which is then attracted to a substrate.

DD. Electromagnetic Interference (EMI) Coating: A coating applied to space vehicles, missiles, aircraft radomes, and helicopter blades to disperse static energy or reduce electromagnetic interference.

EE. Electronic Wire Coating: The outer electrical insulation coating applied to tape insulation of a wire specifically formulated to smooth and fill edges.

FF. Electrostatic Application: A sufficient charging or atomized paint droplets to cause deposition principally by electrostatic attraction. This application shall be operated at a minimum 60 KV power.

GG. EPA: United States Environmental Protection Agency.

HH. Epoxy Based Fuel Tank Coating: A coating which contains epoxy resin that is applied to integral fuel tank components of aircraft to protect the fuel tank from corrosion and the by-products of bacterial growth.

II. Epoxy Polyamide: A tough chemically resistant polyamide-cured epoxy coating that provides long-term protection for alloys exposed to hot corrosive environments.

JJ. Fastener Sealant: A sealant applied to a device used to join two or more parts together.

KK. Fire Resistant Coating - Civilian (interior): A cabin interior coating that passes Federal Aviation Administration standards using the Ohio State University Heat Release, Fire and Burn Tests.

LL. Flight Test Coating: A coating applied to an aircraft prior to flight testing to protect the aircraft from corrosion and to provide required marking during flight test evaluation.

MM. Flow Coating: A coating application system with no air supplied to the nozzle and where paint flows over the part and the excess coating drains back into a collection system.

NN. Fuel Tank Adhesive: An adhesive used to bond components continuously exposed to fuel and which must be compatible with and used with fuel tank coatings.

OO. Fuel Tank Coating: A coating applied to the interior of a fuel tank or areas of an aircraft that are continuously wetted by fuel to protect it from corrosion and/or bacterial growth.

PP. Grams of VOC per Liter of Coating, Less Water and Exempt Compounds: The weight of VOC content per combined volume of VOC and coating solids and can be calculated by the following equation:

$$\text{Grams of VOC per liter of coating, less water and exempt compounds} = \frac{Ws - Ww - Wec}{Vm - Vw - Vec}$$

Where:

| | | |
|---|---|---|
| Ws | = | weight of volatile compounds (grams) |
| Ww | = | weight of water (grams) |
| Wec | = | weight of exempt compounds (grams) |
| Vm | = | volume of material (liters) |
| Vw | = | volume of water (liters) |
| Vec | = | volume of exempt compounds (liters) |

QQ. Grams of VOC per Liter of Material: The weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:
Ws = weight of volatile compounds (grams)
Ww = weight of water (grams)
Wec = weight of exempt compounds (grams)
Vm = volume of material (liters)

RR. Hand Application Methods: The application of coatings, sealants, or adhesives by non-mechanical hand-held equipment including but not limited to paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, non-refillable aerosol cans, rags, and sponges.

SS. High Temperature Coating: A coating that is certified to withstand temperatures of more than 350°F.

TT. High-Volume, Low-Pressure (HVLP) Spray Equipment: Spray equipment permanently labeled as such and which is designed and operated between 0.1 and 10 pounds per square inch, gauge, (psig) air atomizing pressure measured dynamically at the center of the air cap and at the air horns and with liquid supply pressure less than 50 psig.

UU. Impact Resistant Coating: A flexible coating that protects aerospace components, such as aircraft landing gear, landing gear compartments, and other surfaces subject to abrasive impacts from runway debris.

VV. Intermediate Release Coating: A thin coating applied beneath topcoats to assist in removing the topcoat in depainting operations and generally to allow the use of less hazardous depainting methods.

WW. Lacquer: A clear or pigmented coating formulated with a nitrocellulose or synthetic resin to dry by evaporation without a chemical reaction. Lacquers are resoluble in their original solvent.

XX. Liquid Leak: A visible solvent leak from a container at a rate of more than three drops per minute or a visible liquid mist.

YY. Long Term Adhesive Bonding Primer (Metal to Structural Core Bonding): An adhesive bonding primer that has met the aircraft manufacturers' required performance characteristics following 6000 hours testing. Used for metal to structural core bonding and with an adhesive that is specified to be cured at 350°F ± 10°F.

ZZ. Maskant for Chemical Milling: A coating applied directly to an aerospace component to protect surface areas when chemical milling such component.

AAA. Metalizing Epoxy Coating: A coating that contains relatively large quantities of metallic pigmentation for appearance and/or added protection.

BBB. Mold Release: A coating applied to a mold surface to prevent the molded piece from sticking to the mold as it is removed.

CCC. Non-Absorbent Container: A container made of non-porous material that does not allow the migration of solvents through it.

DDD. Non-Leaking Container: A container without liquid leak.

EEE. Non-Structural Adhesive: An adhesive that bonds non-load carrying aircraft component in non-critical applications.

FFF. Normal Business Hours: Monday through Friday, 8:00 am to 5:00 pm.

GGG. Optical Anti-Reflective Coating: A coating with a low reflectance in the infrared and visible wavelength range and is used for anti-reflection on or near optical and laser hardware.

HHH. Organic Solvent: The same as "Solvent."

III. Organic Solvent Cleaning: As defined in Rule 410.3, Organic Solvent Degreasing Operations.

JJJ. Part Marking Coating: Coatings or inks used to make identifying markings on materials, components, or assemblies. These markings may be permanent or temporary.

KKK. Phosphate Ester Resistant Wire Ink Coating: A coating that is used for surface identification, mark on aerospace wire or cable, and inhibits the corrosion caused by contact with phosphate ester type hydraulic fluids.

LLL. Pretreatment Coating: A coating which contains no more than 12 percent solids by weight and at least one-half (0.5) percent acid by weight and is applied directly to metal surfaces to provide surface etching, corrosion resistance, adhesion, and ease of stripping.

MMM. Primer: A coating applied directly to an aerospace component for purposes of corrosion prevention, protection from the environment, functional fluid resistance, and adhesion of subsequent coatings, adhesives, or sealants.

NNN. Radiation-Effect Coating: A coating which helps in the prevention of radar detection.

OOO. Rain Erosion Resistant Coating: A coating that protects leading edges, flaps, stabilizers, and engine inlet lips against erosion caused by rain during flight.

PPP. Remanufactured Aircraft Part: An aerospace component that is built as a spare part or replacement part subject to an existing commercial aircraft specification.

QQQ. Rocket Motor Nozzle Coating: A catalyzed epoxy coating system used in elevated temperature applications on rocket motor nozzles.

RRR. Roll Coating: Application of coatings from a paint trough to a flat surface by mechanical series of rollers.

SSS. Scale Inhibitor: A coating that is applied to the surface of a part prior to thermal processing to inhibit the formation of tenacious scale.

TTT. SCAQMD: South Coast Air Quality Management District.

UUU. Screen Print Ink: An ink used in screen printing processes during fabrication of decorative laminates and decals.

VVV. Sealant: A viscous semisolid material that is applied with a syringe, caulking gun, or spatula to fill voids in order to seal out water, fuel, other liquids and solids, and in some cases air movement.

WWW. Silicone Insulation Material: An insulating material applied to exterior metal surfaces for protection from high temperatures caused by atmospheric friction or engine exhaust. These materials differ from ablative coatings in that they are not “sacrificial”.

XXX. Short Term Adhesive Bonding Primer: An adhesive bonding primer that has met the manufacturers’ required performance characteristics following 1000 hours testing. Used for metal to metal and metal to structural core bonding with an adhesive which is specified to be cured at a temperature of 350°F ± 10°F.

YYY. Solid Film Lubricant: A very thin coating consisting of a binder system containing as its chief pigment material one (1) or more of the following: molybdenum disulfide, graphite, polytetrafluoroethylene (PTFE) or other solids that act as a dry lubricant between closely-fitting surfaces.

ZZZ. Solvent: As defined in Rule 410.3, Organic Solvent Degreasing Operations.

AAAA. Sonic and Acoustic Applications: The use of aerospace materials on aerospace components that are subject to mechanical vibration or sound wave cavitation.

BBBB. Space Vehicle Coating: A coating applied to a vehicle designed to travel and operate beyond earth's atmosphere.

CCCC. Specialty Coating: A coating that, even though it meets the definition of a primer, topcoat, or self-priming topcoat, has additional performance criteria beyond those of primers, topcoats, and self-priming topcoats for specific applications. These performance criteria may include, but are not limited to, temperature or fire resistance, substrate compatibility, antireflection, temporary protection or marking, sealing, adhesively joining substrates, or enhanced corrosion protection.

DDDD. Specialized Function Coating: A coating that fulfills specific engineering requirements that are limited in application and characterized by low volume usage. This category excludes coatings covered in other Specialty Coating categories.

EEEE. Stripper: A volatile liquid applied to remove a maskant for chemical processing, cured or dried paint, cured or dried paint residue, or temporary protective coating.

FFFF. Structural Adhesive - Autoclavable: An adhesive used to bond load-carrying aircraft components and is cured by heat and pressure in an autoclave.

GGGG. Structural Adhesive - Nonautoclavable: An adhesive cured under ambient conditions and is used to bond load-carrying aircraft components or other critical functions, such as nonstructural bonding near engines.

HHHH. Surface Cleaning: Any method of cleaning outside of a degreaser, including, but not limited to, wipe cleaning and equipment flushing.

IIII. Temporary Protective Coating: A coating applied to an aerospace component to protect it from mechanical and environmental damage during manufacturing or shipping.

JJJJ. Thermal Control Coating: A coating formulated with specific thermal conductive or radiative properties to permit temperature control of the substrate.

KKKK. Topcoat: A coating applied over a primer for purposes such as appearance, identification, or protection.

LLLL. Touch-Up Operation: The application of Aerospace Materials to repair minor surface damage and imperfections after the main coating process.

MMMM. Transfer Efficiency: The ratio of the weight or volume of coating solids adhering to the part being coated to the weight or volume of coating solids used in the application process expressed as a percentage.

NNNN. Unicoat: A coating that is applied directly to an aerospace component for purposes of corrosion protection, environmental protection, and functional fluid resistance that is not subsequently topcoated. A unicoat is used in lieu of the application of a primer and a topcoat.

OOOO. Volatile Organic Compounds (VOCs): As defined in Rule 102, Definitions.

QQQQ. Waste Solvent Material: Any solvent which may contain dirt, oil, metal particles, sludge, or waste products; or wiping material containing VOCs including, but not limited to, paper, cloth, sponge, rag, or cotton swab used in organic solvent cleaning.

RRRR. Wet Fastener Installation Coating: A primer or sealant applied by dipping, brushing, or daubing to fasteners that are installed before the coating is cured.

SSSS. Wing Coating: A coating that is corrosion resistant and is resilient enough to withstand the flexing of wings.

## IV. Exemptions

A. Jet engine or rocket engine flushing operations using any solvent other than trichloroethylene are exempt from this rule.

B. Coatings applied using non-refillable aerosol spray containers.

C. Except for the provisions of Section VI, VOC limits for solvents and strippers listed in Section V shall not apply to space vehicle manufacturing.

D. Except for the recordkeeping provisions of Sections VI.A.1 and VI.A.4, the requirements of Section V shall not apply to aerospace assembly and component coating facilities using not more than four (4) gallons of products containing VOCs per day. Solvent-containing materials used in operations subject to Rule 410.3, Organic Solvent Degreasing Operations shall not be included in this determination.

E. Except for the provisions of Section VI, Section V shall not apply to laboratories which apply coatings, solvents, and adhesives to test specimens for purpose of research, development, quality control, and testing for production-related operations. Any person claiming this exemption shall provide operational records, data, and calculations as determined by the APCO to be necessary to substantiate this claim.

F. Coatings that have been designated as "classified" by the Department of Defense or used on space vehicles are exempt from the VOC content limits of the following categories as listed in the Table of Standards:

1. Ablative Coating, Bearing Coating, Caulking and Smoothing Compounds, Chemical Agent-Resistant Coating, Electromagnetic Interference Coating, Intermediate Release Coating, Lacquer, Metalized Epoxy Coating, Mold Release, Part Marking Coating, Rocket Motor Nozzle Coating, Silicone Insulation Material, Specialized Function Coating, Thermal Control Coating, Epoxy Polyamide, and Wet Fastener Installation Coating;

2. The Fastener Sealant category is exempt from the 600 g/l VOC limit but must still comply with the 675 g/l VOC limit;

3. The Sealant (Extrudable/Rollable/Brushable) category is exempt from the 280 g/l VOC limit but must still comply with the 600 g/l VOC limit.

G. Provisions of Section V.A. shall not apply to:

1. Coatings or refillable aerosols with separate formulations that are used in volumes of less than fifty (50) gallons in any calendar year provided that the total of such formulations applied annually by a facility is less than 200 gallons;

2. Adhesives with separate formulations that are used in volumes of less than one half (0.5) gallon on any day or less than ten (10) gallons in any calendar year;

3. Touch-up coatings and stencil coatings; or

4. Rework operations performed on antique aerospace vehicles or associated components.

Any operator seeking to claim the exemption in Section IV.F shall notify the APCO in writing that substitute compliant coatings are not available.

H. The provisions of Section V.E. shall not apply to the application of coatings that contain less than 20 grams of VOC per liter of coating less water and exempt compounds.

## V. Requirements

A. Aerospace Coatings and Adhesives: An operator shall not apply to any aerospace component, any coating, aerosol, or adhesive with a VOC content, less water and exempt compounds, as applied, in excess of the limits listed in the Table of Standards for Aerospace Component Products Containing VOCs.

**TABLE OF STANDARDS**
**VOC CONTENT LIMITS FOR AEROSPACE COMPONENT COATING PRODUCTS**
**Content expressed in Grams per Liter**
**Less Water and Exempt Compounds**

| VOC Content Category | VOC Limit |
|---|---|
| **I. PRIMERS** | |
| 1. General | 350 |
| 2. Adhesive Bonding Primers | |
| a. Commercial Aircraft | 250 |
| b. Military Aircraft | 805 |
| 3. Commercial Exterior Aerodynamic Structure Primer | 650 |
| 4. Compatible Substrate Primer | 780 |
| 5. Cryogenic Flexible Primer | 645 |
| 6. Elevated-Temperature Skydrol-Resistant Commercial Primer | 740 |
| 7. Flexible Primer | 640 |
| 8. Low-Solids Corrosion Resistant Primer | 350 |
| 9. Primer Compatible with Rain Erosion-Resistant Coating | 850 |
| | |
| **II. COATINGS** | |
| 1. Ablative Coating | 600 |
| 2. Adhesion Promoter Coating | 850 |
| 3. Antichafe Coating | 600 |
| 4. Bearing Coating | 620[1] |
| 5. Chemical Agent-Resistant Coating | 550[1] |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| 6. Conformal Coating | 750 |
| 7. Cryoprotective Coating | 600 |
| 8. Electric or Radiation-Effect Coating | 800 |
| 9. Electromagnetic Interference (EMI) Coating | 800[1] |
| 10. Fire-Resistant (Interior) Coating | |
| a. Civilian | 650 |
| b. Military | 800 |
| c. Space | 800 |
| 11. Flight-Test Coating | |
| a. Used on Missiles or Single Use Aircraft | 420 |
| b. All Other | 840 |
| 12. Fuel-Tank Coating | |
| a. General | 420 |
| b. Rapid Cure | 720 |
| 13. High-Temperature Coating | 850 |
| 14. Impact-Resistant Coating | 420 |
| 15. Intermediate Release Coating | 750[1] |
| 16. Lacquer Coating | 830 |
| 17. Metallized Epoxy Coating | 740[1] |
| 18. Mold Release Coatings | 780[1] |
| 19. Optical Anti-Reflection Coating | 700 |
| 20. Part Marking Coating | 850[1] |
| 21. Pretreatment Coating | 780 |
| 22. Rain Erosion-Resistant Coating | 800 |
| 23. Rocket Motor Nozzle Coating | 660[1] |
| 24. Scale Inhibitor Coating | 880 |
| 25. Space-Vehicle Coatings, Other: does not include Electric Discharge and EMI Protection Coating or Fire-Resistant (Interior) Coating | 1000 |
| 26. Specialized Function Coating | 890[1] |
| 27. Temporary Protective Coating | 250 |
| 28. Thermal Control Coating | 800[1] |
| 29. Topcoat | |
| a. Clear | 520 |
| b. Epoxy Polyamide | 660[1] |
| c. Other | 420 |
| 30. Unicoat Coating (Self Priming Topcoats) | 420 |
| 31. Wet Fastener Installation Coating | 675[1] |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| 32. Wing Coating | 750 |
| 33. Wire Coatings | |
| a. Electronic | 420 |
| b. Anti-Wicking | 420 |
| c. Pre-Bonding Etchant | 420 |
| d. Phosphate Ester Resistant Ink | 925 |
| | |
| **III. ADHESIVES** | |
| 1. Commercial Interior Adhesive | 760 |
| 2. Cyanoacrylate Adhesive | 1020 |
| 3. Fuel-Tank Adhesive | 620 |
| 4. Non-Structural Adhesive | 250 |
| 5. Rocket Motor Bonding Adhesive | 890 |
| 6. Rubber-Based Adhesive | 850 |
| 7. Space Vehicle Adhesive | 800 |
| 8. Structural Adhesive | |
| a. Autoclavable | 50 |
| b. High Temperature - Autoclavable | 650 |
| c. Non-Autoclavable | 850 |
| | |
| **IV. SEALANTS** | |
| 1. Rollable, Brushable or Extrudable Sealant | 280[2] |
| 2. Fastener Sealant | 675 |
| 3. Other | 600 |
| | |
| **V. MASKANTS** | |
| 1. Bonding Maskant | 1230 |
| 2. Critical Use and Line Sealer Maskant | 750 |
| 3. Chemical Milling Maskant | |
| a. For use with Type I Etchant | 250 |
| b. For use with Type II Etchant | 160 |
| c. For Chemical Processing<br>*Less water, Exempt Compounds and (PERC) | 250* |
| 4. Photolithographic Maskant | 850 |
| 5. Seal Coat Maskant | 1230 |

**TABLE OF STANDARDS Continued**

| VOC Content Category | VOC Limit |
|---|---|
| **VI. LUBRICANTS** -- | |
| 1. Fastener Installation Lubricant (applied at time of Aircraft/component assembly) | |
| a. Solid-Film Lubricant | 880 |
| b. Dry Lubricative Material | 675 |
| 2. Fastener Lubricative Coating (applied at time of Fastener Manufacture) | |
| a. Solid-Film Lubricant | 250 |
| b. Dry Lubricative Material | 120 |
| c. Barrier Coating | 420 |
| 3. Non-Fastener Lubricative Coatings (applied at time of non-Fastener Manufacture) | |
| a. Solid-Film Lubricant | 880 |
| b. Dry Lubricative Materials | 675 |
| | |
| **VII. OTHER** | |
| 1. Caulking and Smoothing Compound | 850 |
| 2. Corrosion Prevention Compound System | 710 |
| 3. Insulation Covering | 740 |
| 4. Screen Print Ink | 840 |
| 5. Silicone Insulation Material | 850 |

1 Coatings that have been designated as "classified" by the Department of Defense or coatings that are used on space vehicles are exempt from these coating limits.

2 Coatings that have been designated as "classified" by the Department of Defense or coatings that are used on space vehicles are exempt from the 280 g/l limit, but must comply with a 600 g/l limit.

B. Evaporative Loss Minimization

1. Surface Cleaning: No operator shall use a solvent for surface cleaning, clean-up, or jet engine or rocket engine gas path cleaning or flushing. Not exempt under Section IV of this rule, excluding stripping coatings or cleaning coating application equipment, unless:

   a. The solvent contains less than 200 grams of VOC per liter (1.67 lb/gal) of material, as applied; or

   b. The VOC composite vapor pressure of the solvent is less than or equal to 45 mm Hg (0.87 psia) at a temperature of 68°F.

2. Coating Application Equipment Cleaning

   An operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless one of the following methods is used:

   a. An enclosed system or equipment proven to be equally effective at controlling emissions is used for cleaning. The enclosed system must totally enclose spray guns, cups, nozzles, bowls, and other parts during washing, rinsing and draining procedures; be used according to the manufacturer's recommendations; and remain closed when not in use;

   b. Unatomized discharge of cleaning solvent into a waste container that is kept closed when not in use;

   c. Disassembled spray gun that is cleaned in a vat and kept closed when not in use; or

   d. Atomized spray into a waste container that is fitted with a device designed to capture atomized cleaning solvent emissions.

3. In lieu of compliance with Sections V.B.1. or V.B.2. an operator may control VOC emissions from surface cleaning operations or from cleaning coating application equipment with a VOC emission control system that meets the requirements of Section V.F.

C. Coating Strippers

1. No operator shall use or specify for use within the District a coating stripper unless it contains less than 300 grams of VOC per liter (2.5 lb/gal), as applied, or has a VOC composite vapor pressure of 9.5 mm Hg (0.18 psia) or less at 68°F.

2. In lieu of compliance with Section V.C.1, an operator may control emissions from coating stripper operations with a VOC emission control system that meets the requirements of Section V.F.

D. Storage and Disposal of VOC Containing Materials: An operator shall store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed nonabsorbent and non-leaking containers. Storage containers shall remain closed at all times except when depositing or removing the contents or when empty.

E. Application Equipment Requirements: No operator shall apply any coating subject to the provisions of this rule unless one (1) of the following application methods is used:

1. Brush, dip, flow, or roll coating conducted in accordance with manufacturer's recommendations;

2. Electrostatic or Electrodeposition application conducted in accordance with manufacturer's recommendations;

3. HVLP spray equipment operated in accordance with manufacturer's recommendations:

   a. HVLP spray equipment manufactured prior to January 1, 1996, the end user shall demonstrate that the gun meets HVLP spray equipment standards. Satisfactory proof will be either in the form of manufacturer's published technical material or by a demonstration using a certified air pressure tip gauge, measuring the air atomizing pressure dynamically at the center of the air cap and at the air horns.

   b. A person shall not sell or offer for sale for use within the District any HVLP spray equipment without a permanent marking denoting the maximum inlet air pressure in psig at which the gun will operate within the parameters specified in Section III.TT.

4. Spray gun: If a spray gun is used, the end user must demonstrate that the gun meets the HVLP definition in Section III.TT. in design and use. A satisfactory demonstration must be based on the manufacturer's published technical material on the design of the gun and by a demonstration of the operation of the gun using an air pressure tip gauge from the manufacturer of the gun.

5. Any alternative coating application method which has been demonstrated to achieve at least 65 percent transfer efficiency or the equivalent efficiency of HVLP spray equipment and approved, in writing, by APCO.

8. In lieu of compliance with Sections V.E.1. through V.E.5., an operator may control VOC emissions from application equipment with a VOC emission control system that meets the requirements of Section V.F.

F. <u>VOC Emission Control System</u>

As an alternative to meeting the requirements of Sections V.A., V.B., V.C., or V.E., an operator may install a VOC emission control system provided that the VOC emission control system meets all of the following requirements:

1. The VOC emission control system shall be approved by the APCO.

2. The VOC emission control system shall comply with the requirements of Sections V.F.3. through V.F.5. during periods of emission-producing activities.

3. The VOC emission control system collection device shall have a control efficiency of at least 95 percent, by weight.

4. The VOC emission control system can demonstrate a capture efficiency of at least 90 percent by weight.

5. In no case shall compliance through the use of a VOC emission control system result in VOC emissions in excess of the VOC emissions which would result from compliance with applicable provisions of Sections V.A., V.B., V.C., or V.E.

6. The minimum required overall capture and control efficiency of an emission control system at which an equivalent or greater level of VOC reduction will be achieved shall be calculated by using the following equation:

$$CE = \left[ 1 - \left( \frac{VOC_{LWc}}{VOC_{LWn,Max}} x \frac{1-(VOC_{LWn,Max} / D_{n,Max})}{1-(VOC_{LWc} / D_c)} \right) \right] x\ 100$$

Where:

CE = Minimum Required Overall Capture and Control Efficiency, percent

$VOC_{LWc}$ = VOC Limit, less water and exempt compounds

$VOC_{LWn,Max}$ = Maximum VOC content of noncompliant coating used in conjunction with a control device, less water and exempt compounds

$D_{n,Max}$ = Density of solvent, reducer, or thinner contained in the noncompliant coating, containing the maximum VOC content of the multi-component coating

$D_c$ = Density of corresponding solvent, reducer, or thinner used in the compliant coating system.

G. Prohibition of Solicitation: No person shall solicit, specify, or require an operator to use any coating, solvent, spray equipment, or VOC emission control system that does not meet the limits or requirements of this rule.

H. Sell-Through/Existing Stock of Coatings: A coating manufactured prior to amendment date of this rule, that complied with the VOC Content limit(s) in effect at that time, may be sold, supplied, or offered for sale for 12 months after rule adoption date. Such a coating may be applied at any time, both before and after adoption date, provided manufacture Date-Code and VOC Content is clearly printed on coating container.

I. Specialized Military Coating Operations VOC Requirements: APCO may approve alternative VOC or vapor pressure limits for coatings, adhesives or solvents that are specified in specialized military Technical Orders, for which no viable substitutions are available. The owner/operator must submit a written request to the APCO, and present documentation and sufficient justification regarding the operation and materials.

## VI. Administrative Requirements

### A. Recordkeeping

1. An operator subject to the requirements of this rule shall have coating manufacturer's specifications, either listed on the coating container, product data sheet, or on Safety Data Sheet (SDS), available for review and shall maintain daily records which show the following information as applicable:

    a. Manufacturer name and type for each coating, solvent, thinner, reducer or stripper used;

    b. Mix ratio by volume of components added to the original material prior to application;

    c. Grams of VOC per liter of each coating, solvent, thinner, reducer, or stripper less water and exempt compounds, as applied;

    d. Volume and method of application of each coating, solvent, thinner, reducer, or stripper applied; and

    e. Vapor pressure of solvents used.

2. An operator shall maintain records to support that the following coatings have been specified for their intended application:

    a. Adhesion promoter;
    b. Antichafe coating;
    c. Electric/radiation effect;
    d. Fuel tank adhesive;
    e. High temperature coating;
    f. Impact resistant coating;
    g. Optical anti-reflective coating;
    h. Rain erosion resistant wing coating.

3. An operator using a VOC emission control system pursuant to Section V.F. as a means of complying with this Rule, shall maintain daily records of key system operating parameters and maintenance procedures, which will demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities. Key system operating parameters are those necessary to ensure compliance with VOC limits. The parameters may include, but are not limited to, temperatures, pressures, and flow rates.

4. Records required by this Rule shall be retained for a minimum of five (5) years and made available on site during normal business hours to the APCO, ARB, or EPA upon request.

B. Test Methods

1. Coating and solvent VOC content shall be determined using EPA Method 24 or its constituent methods. The VOC content of coatings containing exempt halogenated VOCs shall be determined by using ARB Method 432, "Determination of Dichloromethane and 1,1,1- Trichloroethane in Paints and Coatings" (September 12, 1998). or SCAQMD Method 303 (Determination of Exempt Compounds).

2. The solid content of pretreatment coatings shall be determined using EPA Method 24. The acid content of pretreatment coatings shall be determined using ASTM Method D1613 06 (Standard Test for Acidity of Volatile Solvents and Chemical Intermediates used in Paint, Varnish, Lacquer and Related Products).

3. The test method for determining the fire resistance of an interior coating shall be Federal Aviation Administration-required Ohio State University Heat Release, Fire and Burn Tests.

4. The VOC composite vapor pressure of a blended solvent shall be determined by quantifying the amount of each organic compound in the blend using gas chromatographic analysis SCAQMD Test Method 308-91 "Quantitation of Compounds by Gas Chromatography" (February 1993) and by calculating the VOC composite vapor pressure of the solvent by summing the product of the vapor pressure of each pure component and its molar fraction. For the purpose of this calculation, the blend shall be assumed to be an ideal solution where Raoult's Law applies. The vapor pressure of each pure component shall be obtained from published reference manuals or handbooks.

5. VOC emissions from enclosed systems used to clean coating application equipment shall be determined by the manufacturer using the SCAQMD General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems.

6. The control efficiency of a VOC emission control system's control device(s) shall be determined using EPA Methods 2, 2A, 2C, or 2D for measuring flow rates and EPA Methods 25, 25A, or 25B for measuring the total gaseous organic concentrations at the inlet and outlet of the control device. EPA Method 18 or ARB Method 422, "Determination of Volatile Organic Compounds in Emissions from Stationary Sources" (September 12, 1990) shall be used to determine the emissions of exempt compounds.

7. The capture efficiency of a VOC emission control system's collection device(s) shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Methods 204-204F, as applicable, or any other method approved by EPA, ARB, or APCO.

8. When more than one test method or set of test methods are specified for any emissions testing, a violation of any test established in Section VI.B. shall constitute a violation of the Rule.

# APPENDIX B

## RULE 410.8

## AEROSPACE ASSEMBLY AND COATING OPERATIONS

## RESPONSE TO COMMENTS

On November 6, 2013 the District held a public rule development workshop at the Mojave Veteran's Building in Mojave, CA to present proposed Draft Rule 410.8, Aerospace Assembly and Coating Operations. The District submitted copies of the proposed Draft Rule to the Air Resources Board (ARB) and the Region IX office of the U.S. Environmental Protection Agency (EPA) in October, 2013 for an initial 30-day review.

Upon completion of review EPA offered comments and suggested changes to District staff regarding proposed Draft Rule 410.8. ARB did not provide comments or suggested changes but responded to the District that they would wait to review the rule upon submission of the final draft.

Industry representatives present at the 11/6/2013 workshop asked various questions regarding the proposed Draft Rule and submitted written comments within 30-days following the workshop. Appendix B addresses comments, questions, and suggested changes regarding proposed Draft Rule 410.8.

Appendix B is separated into two sections based on EPA comments and suggested changes and industry/public comments and questions.

# I. EPA COMMENTS

The following changes were made to the 8/8/2013 proposed version of Draft Rule 410.8 in response to EPA comments.

1. EPA commented: *410.8, Aerospace Assembly and Coating Operations: This new rule closely resembles SJVAPCD's Rule 4605 with only minor exceptions. We recommend you review EPA's 2011 TSD regarding Rule 4605 to include the EPA's recommendations. In addition, we have the following recommendations:*

   District staff reviewed EPA's 2011 TSD and did not find any major descrepency between currently adopted version of SJVAPCD Rule 4605 and that of proposed Draft Rule 410.8.

**Section V, Requirements**

1. EPA commented: *A. Table of Standards - VCAPCD Rule 74.13, Aerospace Assembly and Component Manufacturing Operations has a VOC limit of 420 g/l for Rain Erosion Resistant Coating and for Wing Coating. Consider lowering the limits for these coatings.*

   District: For inter-district rule consistency the VOC limit was left as-is because that is the limit SJVAPCD and AVAQMD have in their aerospace rules.

**Section VI, Administrative Requirements**

1. EPA commented: *B. Testing 1. Add title for ARB Method 432 (date of September 12, 1989 is optional).*

   District revised per suggestion.

2. EPA commented: *4. SCAQMD Test Method 308 should be indicated as "308-91" (date February 1993 is optional).*

   District revised per suggestion.

3. EPA commented: *6. Add title for ARB Method 422 (date of September 12, 1990 is optional).*

## II. INDUSTRY/PUBLIC COMMENTS

The following comments were made by industry representatives at, and following the 11/6/2013 workshop in Mojave, CA.

**American Coatings Association**
American Coatings Association (ACA) submitted the following written comments regarding Rule 410.8 on 12/6/2013.

*ACA supports the Boeing Company comments on the proposed Draft Rule 410.8 (Aerospace Assembly and Coatings Operations).*

**Boeing**
Boeing submitted the following written comments regarding Rule 410.8 on 12/6/2013.

**Section III, Definitions**

1. Boeing commented: *The definition of "Aerospace Component" should include molds, jigs, tooling, hardware jackets, and test coupons. The USEPA Control Techniques Guideline (CTG) for Aerospace Manufacturing and Rework Operations state that, "A … State …may broaden the applicability by revising the "aerospace vehicle or component" definition to include models … and production equipment such as molds, jigs, and tooling". Also, the South Coast AQMD included the expanded definition within their Rule 1124, Aerospace Assembly and Component Manufacturing Operations. These types of production equipment are subject to requirements for dissipating of electrostatic discharges and the same harsh environments as aerospace components, including hydraulic fluids, fuels and cleaning solvents, and it is critical that the components be coated with materials meeting the same exacting specifications. Indeed, if these are not*

*included in the definition of aerospace component, they may become subject to other inappropriate or unattainable regulatory limits (e.g. the Miscellaneous Metal Parts NESHAP). Based on this information, the definition of Aerospace Component should be modified to read:*

*F. Aerospace Component: Any raw material, partial or completed fabricated part, assembly of parts, or completed unit of any aircraft, helicopter, missile, or space vehicle, including mockups and prototypes. models, mock-ups, prototypes, molds, jigs, tooling, hardware jackets, and test coupons.*

District revised per suggestion.

**Section V, Requirements**

1. Boeing commented: *At least four VOC limits being proposed in PR 410.8 deviate significantly from the presumptive RACT found in the CTG. Commercial Exterior Aerodynamic Structure Primers are being proposed at 350 g/L instead of 650 g/L as listed in the CTG. Other Flight Test Coatings are being proposed at 600 g/L instead of 840 g/L as listed in the CTG. Space Vehicle Rollable, Brushable or Extrudable Sealants Sealants are being proposed at 600 g/L while being excluded from the CTG. Finally, Space Vehicle Fastener Sealants are being proposed at 675 g/L while also being excluded from the CTG. It should be noted that other Air Districts in California don't specifically list either sealant category for space vehicles, but regulate these materials under the category of Other space vehicle coatings. We appreciate your goal of regulatory uniformity across Kern County, but believe that you should not deviate from the CTG unless you are required to by state or federal law. Recently, the Antelope Valley AQMD amended its RACT rule for aerospace operations (R 1124) to include coating categories that were not included in the previous version of the rule. They chose to adopt the CTG limits. USEPA commented that AVAQMD should adopt more stringent VOC limits where other air districts had done so. AVAQMD responded that they are not required to use the more stringent VOC limits adopted by the SCAQMD or SJVUAPCD because both of those air districts are extreme nonattainment for ozone and require additional control measures to meet national ambient air quality standards for ozone. Because the lower limits are not RACT limits, AVAQMD concluded that they were not required to adopt them. We concur with there assessment and request that EKAPCD adopt the CTG limits for the four categories listed above.*

   District revised Table of Standards to match VOC Content limits of AVAQMD Rule 1124 approved 8/20/13. District decided to follow AVAQMD's VOC limits to maintain rule consistency between AV and EK because sources are shared between both districts (See Table of Standards located in Section V for complete details).

2. Boeing commented: *Finally, for the cleaning of coating application equipment, the CTG allows the use of additional methods beyond the use of enclosed cleaning systems. For the same reasons stated above, Boeing believes that Eastern Kern should adopt the CTG requirements listed below. A revised section (V)(B)(2) should read:*

   2. Coating Application Equipment Cleaning
      An operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless one of the following methods is used:

      a. An enclosed system or equipment proven to be equally effective at controlling emissions is used for cleaning. The enclosed system must: totally enclose spray guns, cups, nozzles, bowls, and other parts during washing, rinsing and draining procedures; be used according to the manufacturer's recommendations; and remain closed when not in use;

      b. Unatomized discharge of cleaning solvent into a waste container that is kept closed when not in use; or,

      c. Disassembly of the spray gun and cleaning in a vat that is kept closed when not in use

   District revised per suggestion.

**Edwards Air Force Base**

Edwards Air force Base (Edwards) submitted the following written comments regarding Rule 410.8 on 12/6/2013.

**Section III, Definitions**

1. Edwards commented: *We suggest EKAPCD modify the definition of "Specialized Function Coating" in Proposed Rule 410.8 III. BBBB to be consistent with the definition of a "Specialty Coating" which is defined in 40 CFR 63, Subpart GG as "a coating that, even though it meets the definition of a primer, topcoat, or self-priming topcoat, has additional performance criteria beyond those of primers, topcoats, and self-priming topcoats for specific applications. These performance criteria may include, but are not limited to, temperature or fire resistance, substrate compatibility, antireflection, temporary protection*

   District: Definition for Specialty Coating added (see Section III.CCCC of Appendix A).

**Section IV, Exemptions**

1. Edwards commented: *Proposed Rule 410.8 IV. (Exemptions) B. refers to "Coatings applied using non-refillable aerosol spray containers." Proposed Rule 410.8 IV. G states that Provisions of Section V.A. shall not apply to an aerospace assembly and component coating stationary source: 1. Coatings or aerosols with separate formulations that are used in volumes of less than twenty (20) gallons in any calendar year provided that the total of such formulations applied annually by a facility is less than 200 gallons." We request EKAPCD change the 20 gallon per year limit to 50 gallon per year of a single formulation. This is consistent with other California districts as well as 40 CFR 63, Subpart GG low volume determination; provides streamlined recordkeeping; does not result in any annual emission increases; and is applied within other districts in California.*

   District: revised exemption to follow 40 CFR 63, Subpart GG., which states: *The requirements for primers, topcoats, and chemical milling maskants in §63.745 and §63.747 do not apply to the use of low-volume coatings in these categories for which the annual total of each separate formulation used at a facility does not exceed 189 l (50 gal), and the combined annual total of all such primers, topcoats, and chemical milling maskants used at a facility does not exceed 757 l (200 gal).* (See Section IV.G.1. of Appendix A).

2. Edwards commented: *Our understanding from the 6 November 2013 workshop is that aerosol coatings are exempt from Proposed Rule 410.8 and that they should not be included in the 200 gallons per year totals.*

   District: Coatings applied using non-refillable aerosol spray containers are exempt (See Section IV.B. of Appendix A).

3. Edwards commented: *Please consider an exemption for museum and display aircraft from the requirements of this rule. Suggested language" Activities associated with the rework of antique aerospace vehicles or components are exempt from this rule." This exemption is consistent with the Aerospace NESHAP [40 CFR 63, Subpart GG §63.741 (j)].*

   District revised per suggestion (see Sections IV.G.4. and III.I. of Appendix A).

**Section V, Requirements**

1. Edwards commented: *Since many of Edwards AFB's coating operations are driven by USAF Technical Orders (TOs), and some must adhere to extremely specialized aerospace coating requirements, we request that the following paragraph be added to the rule under Section V. Requirements:*

*New Section*

*"G. VOC Requirements for Specialized Military Coating Operations*

*On a case-by-case basis, the APCO may approve alternative VOC and/or vapor pressure limits for coatings, adhesives or solvents that are specified in specialized military Technical Orders, for which no viable substitutions are available. The owner/operator must submit a written request to the APCO, and present documentation and sufficient justification regarding the operation and materials."*

District revised per suggestion.

2. Edwards commented: *Section V.A. – Dry Lubricative Coating. We are requesting a change in the VOC limits to 250 g/l for Fasteners and 880 g/l for Nonfasteners. Please refer to the San Diego Air Pollution Control District Rule 67.9 as an example.*

   District: Some sources within the District are shared with AVAQMD. In an effort to maintain inter-district rule consistency, the Table of Standards has been updated to match the VOC content limits of AVAQMD Rule 1124, Amended 8/20/2013.

3. Edwards commented: *We request EKAPCD revise the sell-through date to 12 months after effective date of the rule.*

   District revised per suggestion.

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