

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:

$$\text{Grams of VOC per liter of coating, less water and exempt compounds} = \frac{W_s - W_w - W_{ec}}{V_m - V_w - V_{ec}}$$

Where:

- W_s = weight of volatile compounds (grams)
 W_w = weight of water (grams)
 W_{ec} = weight of exempt compounds (grams)
 V_m = volume of material (liters)
 V_w = volume of water (liters)
 V_{ec} = 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:

$$\text{Grams of VOC per liter of material} = \frac{W_s - W_w - W_{ec}}{V_m}$$

Where:

W_s = weight of volatile compounds (grams)

W_w = weight of water (grams)

W_{ec} = weight of exempt compounds (grams)

V_m = 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 repainting operations and generally to allow the use of less hazardous repainting 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 resolvable 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 *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
<p>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.</p> <p>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.</p>	

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. VOC Emission Control System

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:

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

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.