

RULE 410.8 Aerospace Assembly and Coating Operations - Adopted 3/13/14 (Amended 11/3/22)

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.
- A. 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.
- B. Adhesive: A substance that is used to bond one surface to another.
- C. Adhesive Bonding Primer: A coating applied in a very thin film to aerospace adhesive bond detail components for corrosion inhibition and adhesion.
- D. Aerosol Coating: A mixture of pigments, resins, and liquid and gaseous solvents and propellants packaged in a disposable container for hand-held application.
- E. 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.
- F. 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.
- G. Antichafe Coating: A coating applied to areas of moving aerospace components which may rub during normal operation.

- H. 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.
- I. Anti-Wicking Wire Coating: The outer coating of a wire which prevents fluid wicking into the insulation of the wire.
- J. Air Pollution Control Officer (APCO): Eastern Kern Air Pollution Control District Air Pollution Control Officer, or his designee.
- K. ARB: California Air Resources Board.
- L. ASTM: American Society for Testing and Materials.
- M. Barrier Coating: A coating applied in a thin film to fasteners to inhibit dissimilar metal corrosion and to prevent galling.
- N. 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.
- O. Bonding Maskant: A temporary coating used to protect selected areas of aerospace parts from strong acid or alkaline solutions during processing for bonding.
- 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. Chemical Milling Maskant: a coating that is applied directly to aluminum components to protect surface areas when chemical milling the component with a Type I or II etchant. Type I chemical milling maskants are used with a Type I etchant and Type II chemical milling maskants are used with a Type II etchant. This definition does not include bonding maskants, critical use and line sealer maskants, and seal coat maskants. Additionally, maskants that must be used with a combination of Type I or II etchants and any of the above types of maskants (i.e., bonding, critical use and line sealer, and seal coat) are not included. Maskants that are defined as specialty coatings are not included in this definition.

- U. Chemical Processing Maskant: coating applied directly to an Aerospace Component to protect surface areas when anodizing, aging, bonding, plating, etching, and/or performing other chemical surface operations on the component.
- V. Clear Topcoat: A clear or semi-transparent coating applied over a primer for purposes such as appearance, identification, or protection.
- W. 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.
- X. Coating Operation: the use of a spray booth, tank, or other enclosure, or any area, such as a hangar, for the application of aerospace materials.
- Y. 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.
- Z. Commercial Interior Adhesive: Materials used in the bonding of passenger cabin interior components. These components must meet the FAA fireworthiness requirements.
- AA. Compatible Substrate Primer: Includes two categories- compatible epoxy primer and adhesive primer. Compatible epoxy primer is primer that is compatible with the filled elastomeric coating and is epoxy based. The compatible substrate primer is an epoxy-polyamide primer used to promote adhesion of elastomeric coatings such as impact-resistant coatings. Adhesive primer is a coating that (1) inhibits corrosion and serves as a primer applied to bare metal surfaces or prior to adhesive application, or (2) is applied to surfaces that can be expected to contain fuel. Fuel tank coatings are excluded from this category.
- BB. 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

- CC. Conformal Coating: A coating applied to electrical conductors and circuit boards to protect them against electrical discharge damage and/or corrosion.
- DD. Critical Use and Line Sealer Maskant: A temporary coating, not covered under other maskant categories, used to protect selected areas of aerospace parts from strong acid or alkaline solutions such as those used in anodizing, plating, chemical milling and processing of magnesium, titanium, high-strength steel, high-precision aluminum chemical milling of deep cuts, and aluminum chemical milling of complex shapes. Materials used for repairs or to bridge gaps left by scribing operations (i.e. line sealer) are also included in this category.
- EE. Cryogenic Flexible Primer: A primer designed to provide corrosion resistance, flexibility, and adhesion of subsequent coating systems when exposed to loads up to and surpassing the yield point of the substrate at cryogenic temperatures (−275 °F and below).
- FF. Cryoprotective Coating: A coating that insulates cryogenic or subcooled surfaces to limit propellant boil-off, maintain structural integrity of metallic structures during ascent or re-entry, and prevent ice formation.
- GG. Corrosion Prevention Compound System: A coating system that provides corrosion protection by displacing water and penetrating mating surfaces, forming a protective barrier between the metal surface and moisture. Coatings containing oils or waxes are excluded from this category.
- HH. Cyanoacrylate Adhesive: A fast-setting, single component adhesive that cures at room temperature. Also known as “super glue.”
- II. 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.
- JJ. Dip Coating: The process in which a substrate is immersed in a solution (or dispersion) containing the coating and then withdrawn.
- KK. 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.
- LL. Electric-or Radiation Effect Coating: A coating or coating system engineered to interact, through absorption or reflection, with specific regions of the electromagnetic energy spectrum, such as the ultraviolet, visible, infrared, or microwave regions. Uses include, but are not limited to, lightning strike protection, electromagnetic pulse (EMP) protection, and radar avoidance. Coatings that have been designated as "classified" by the Department of Defense are exempt.

- MM. Electrodeposition: A dip coating application method where the paint solids are given an electrical charge which is then attracted to a substrate.
- NN. Electromagnetic Interference (EMI) Coating: A coating applied to space vehicles, missiles, aircraft radomes, and helicopter blades to disperse static energy or reduce electromagnetic interference.
- OO. Electronic Wire Coating: The outer electrical insulation coating applied to tape insulation of a wire specifically formulated to smooth and fill edges.
- PP. 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.
- QQ. Elevated-Temperature Skydrol-Resistant Commercial Primer: A primer applied primarily to commercial aircraft (or commercial aircraft adapted for military use) that must withstand immersion in phosphate-ester (PE) hydraulic fluid (Skydrol 500b or equivalent) at the elevated temperature of 150 °F for 1,000 hours.
- RR. EPA: United States Environmental Protection Agency.
- SS. 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.
- TT. Epoxy Polyamide: A tough chemically resistant polyamide-cured epoxy coating that provides long-term protection for alloys exposed to hot corrosive environments.
- UU. Fastener Sealant: A sealant applied to a device used to join two or more parts together.
- VV. Fire Resistant Coating - (interior): A cabin interior coating that passes Federal Aviation Administration standards using the Ohio State University Heat Release, Fire and Burn Tests for civilian aircraft; or is used on parts subject to the flammability requirements of MIL-STD-1630A and MIL-A-87721 for military aircraft; or is used on parts subject to the flammability requirements of SE-R-0006 and SSP 30233 for space vehicles.
- WW. Flexible Primer: A primer that meets flexibility requirements such as those needed for adhesive bond primed fastener heads or on surfaces expected to contain fuel. The flexible coating is required because it provides a compatible, flexible substrate over bonded sheet rubber and rubber-type coatings as well as a flexible bridge between the fasteners, skin, and skin-to-skin joints on outer aircraft skins. This flexible bridge allows more topcoat flexibility around fasteners and decreases the chance of the topcoat cracking around the fasteners. The result is better corrosion resistance.
- XX. 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.

YY. 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.

ZZ. 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.

AAA. 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.

BBB. 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)

CCC. 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)

DDD. 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.

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

- FFF. 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.
- GGG. 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.
- HHH. Insulation Covering: Material that is applied to foam insulation to protect the insulation from mechanical or environmental damage.
- III. 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.
- JJJ. 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.
- KKK. Liquid Leak: A visible solvent leak from a container at a rate of more than three drops per minute or a visible liquid mist.
- LLL. 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 $350^{\circ}\text{F} \pm 10^{\circ}\text{F}$.
- MMM. Metalizing Epoxy Coating: A coating that contains relatively large quantities of metallic pigmentation for appearance and/or added protection.
- NNN. Mold Release: A coating applied to a mold surface to prevent the molded piece from sticking to the mold as it is removed.
- OOO. Non-Absorbent Container: A container made of non-porous material that does not allow the migration of solvents through it.
- PPP. Non-Leaking Container: A container without liquid leak.
- QQQ. Non-Structural Adhesive: An adhesive that bonds non-load carrying aircraft components in non-critical applications.
- RRR. Normal Business Hours: Monday through Friday, 8:00 am to 5:00 pm.
- SSS. 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.
- TTT. Organic Solvent: The same as "Solvent."

- UUU. Organic Solvent Cleaning: As defined in Rule 410.3, Organic Solvent Degreasing Operations.
- VVV. Part Marking Coating: Coatings or inks used to make identifying markings on materials, components, or assemblies. These markings may be permanent or temporary.
- WWW. 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.
- XXX. Photolithographic Maskant: coating applied by Photoresist Operation(s) directly to printed circuit boards, and ceramic and similar substrates to protect surface areas from Chemical Milling or Chemical Processing.
- YYY. Photoresist Operation: A process for the application or development of photoresist masking solution on a substrate, including preparation, soft bake, develop, hard bake, and stripping, and can be generally subdivided as follows:
- a. Negative Photoresist Operation is a process where the maskant hardens when exposed to light and the unhardened maskant is stripped, exposing the substrate surface for Chemical Milling or Chemical Processing.
 - b. Positive Photoresist Operation is a process where the maskant softens when exposed to light and the softened maskant is stripped, exposing the substrate surface for Chemical Milling or Chemical Processing.
- ZZZ. Prebonding Etchant: An acid or basic substance that is used to increase the strength of an adhesive bond by chemically altering the substrate surface morphology to increase the bonding surface area of aerospace wire Coatings to the underlying insulation layer.
- AAAA. 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.
- BBBB. 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.
- CCCC. Rain Erosion Resistant Coating: A coating that protects leading edges, flaps, stabilizers, and engine inlet lips against erosion caused by rain during flight.
- DDDD. Remanufactured Aircraft Part: An aerospace component that is built as a spare part or replacement part subject to an existing commercial aircraft specification.
- EEEE. Rocket Motor Bonding Adhesive: Adhesive used in rocket motor bonding applications.

- FFFF. Rocket Motor Nozzle Coating: A catalyzed epoxy coating system used in elevated temperature applications on rocket motor nozzles.
- GGGG. Roll Coating: Application of coatings from a paint trough to a flat surface by mechanical series of rollers.
- HHHH. Rollable, Brushable, or Extrudable Sealant: A single or multi-component polymeric material used to seal many types of joints, gaps, removable panels, and windows where moderate movement is expected. Such material may be applied by rolling brushing extruding or daubing.
- III. Scale Inhibitor: A coating that is applied to the surface of a part prior to thermal processing to inhibit the formation of tenacious scale.
- JJJ. SCAQMD: South Coast Air Quality Management District.
- KKKK. Screen Print Ink: An ink used in screen printing processes during fabrication of decorative laminates and decals.
- LLLL. 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.
- MMMM. Seal Coat Maskant: An overcoat applied over a maskant to improve abrasion and chemical resistance during production operations.
- NNNN. 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”.
- OOOO. 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.
- PPPP. 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.
- QQQQ. Solvent: As defined in Rule 410.3, Organic Solvent Degreasing Operations.
- RRRR. Sonic and Acoustic Applications: The use of aerospace materials on aerospace components that are subject to mechanical vibration or sound wave cavitation.
- SSSS. Space Vehicle: A vehicle designed to travel and operate beyond the earth's atmosphere.

- TTTT. Space Vehicle Coating: A coating applied to a vehicle designed to travel and operate beyond earth's atmosphere, including but not limited to, rocket or satellite coatings.
- UUUU. 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.
- VVVV. 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.
- WWWW. Stencil Coating: An ink or coating that is rolled, sprayed with an airbrush or touch-up gun, or brushed while using a template to add identifying letters and or numbers to Aerospace Components.
- XXXX. 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.
- YYYY. Structural Adhesive - Autoclavable: An adhesive used to bond load-carrying aircraft components and is cured by heat and pressure in an autoclave.
- ZZZZ. Structural Adhesive, High Temperature – Autoclavable: An Adhesive used to bond load-carrying Aircraft Components which is cured by heat and pressure in an autoclave, and can withstand service temperatures above 450° F (232° C).
- AAAAA. 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.
- BBBBB. Surface Cleaning: Any method of cleaning outside of a degreaser, including, but not limited to, wipe cleaning and equipment flushing.
- CCCCC. Temporary Protective Coating: A coating applied to an aerospace component to protect it from mechanical and environmental damage during manufacturing or shipping.
- DDDDD. Thermal Control Coating: A coating formulated with specific thermal conductive or radiative properties to permit temperature control of the substrate.
- EEEEE. Topcoat: A coating applied over a primer for purposes such as appearance, identification, or protection.
- FFFFF. Touch-Up Operation: The incidental application of Aerospace Materials to repair minor surface damage , cover minor surface imperfections in the coating finish, or to achieve complete coverage. This definition includes out-of-sequence or out-of-cycle coating.

- GGGGG. 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.
- HHHHH. 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.
- IIII. Volatile Organic Compounds (VOCs): The definition contained in 40 CFR 51.100 shall apply, and is hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR §51.100 and any definition specified above, the definition specified above shall control.
- JJJJ. 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.
- KKKKK. Wet Fastener Installation Coating: A primer or sealant applied by dipping, brushing, or daubing to fasteners that are installed before the coating is cured.
- LLLLL. 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 three (3) 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 a 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 a 600 g/l VOC limit.

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

1. Prior to January 1, 2024, 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. On and after January 1, 2024, coatings or refillable 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.
3. Adhesives with separate formulations that are used in volumes of less than ten (10) gallons in any calendar year;
4. Touch-up operations and stencil coatings, provided the touch-up operations and stencil coatings do not exceed 25 ft² per aircraft (An area larger than this may be approved by APCO as applicable for specific repair operations that occur infrequently); or
5. Rework operations performed on antique aerospace vehicles or associated components.
6. Recoating of assembled aircraft at rework facilities if original coating formulations are used.

Any operator seeking to claim the exemption in Section IV.G.1 or IV.G.2 shall notify the APCO in writing that substitute compliant coatings are not available from suppliers, or that a performance specification prevents the use of a compliant coating for the category.. Coatings designated as “classified” by the Department of Defense, coatings used on space vehicles, stencil coatings, and touch-up operations shall not be included in the volume of coatings used under this exemption.

- H. The provisions of Section V.B.2.e shall not apply to the following coating application equipment cleaning operations:
1. Cleaning of application equipment used to apply coatings on satellites and Electric or Radiation Effect Coatings; or
 2. Cleaning of application equipment used to apply solvent-based fluoropolymer coatings, provided the solvent used for such cleaning contains no more than 900 g/l of VOC
 3. The provisions of Section V.E. shall not apply to:
 4. The application of coatings that contain less than 20 grams of VOC per liter of coating less water and exempt compounds; or
 5. Touch-up operations and stencil coatings.

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	
	Before 11/03/2024	On and After 11/03/2024
I. PRIMERS		
1. General	350	
2. Adhesive Bonding Primers		
a. Commercial Aircraft	250	
b. Military Aircraft	805	
3. Commercial Exterior Aerodynamic Structure Primer	650	350
4. Compatible Substrate Primer	780	350
5. Cryogenic Flexible Primer	645	350
6. Elevated-Temperature Skydrol-Resistant Commercial Primer	740	350
7. Flexible Primer	640	350
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	420
4. Bearing Coating	620 ¹	
5. Chemical Agent-Resistant Coating	550 ¹	500 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. Other	840	600
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	700 ¹
18. Mold Release Coatings	780 ¹	762 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	420
b. Epoxy Polyamide	660 ¹	
c. Other	420	

30. Unicoat Coating (Self Priming Topcoats)	420	
31. Wet Fastener Installation Coating	6751	
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	600 ³
3. Other	600	
V. MASKANTS		
1. Bonding Maskant	1230	600
2. Critical Use and Line Sealer Maskant	750	650
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	850
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> <p>3. Coatings that have been designated as “classified” by the Department of Defense or coatings that are used on space vehicles are exempt from the 600 g/l limit, but must comply with a 675 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.
 - e. On and after November 3, 2024, solvents used to clean application equipment outside of an enclosed cleaning system shall not exceed a VOC content of 25 g/l or a VOC composite partial pressure of 45 mm Hg @ 68 °F
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.GGG.
4. Spray gun: If a spray gun is used, the end user must demonstrate that the gun meets the HVLP definition in Section III.GGG. 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.
6. 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

1. 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:
 - a. The VOC emission control system shall be approved by the APCO.
 - b. The VOC emission control system shall comply with the requirements of Sections V.F.1.c. through V.F.1.e. during periods of emission-producing activities.
 - c. The VOC emission control system collection device shall have a control efficiency of at least 95 percent, by weight, or the output of the control device shall be less than 50 PPM, calculated as carbon with no dilution.
 - d. The VOC emission control system can demonstrate a capture efficiency of at least 90 percent by weight,

- e. 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.
- 2. Owners/operators of a permitted aerospace coating operation with a potential to emit greater than 4.56 tons per year (9,125 pounds per year) of uncontrolled VOC shall be required to install a VOC emission control system meeting the requirements of Sections V.F.1.a, c, and d of this Rule.
- 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 or Technical Manuals, 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.
- J. Rule 410 Applicability: Any material, operation, or facility which is exempt from all or a portion of this rule shall comply with the provisions of Rule 410.

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 or radiation effect;
 - d. Fuel tank adhesive;
 - e. High temperature coating;
 - f. Impact resistant coating;
 - g. Optical anti-reflective coating;
 - h. Rain erosion resistant 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. Other ARB, EPA, and ASTM methods verifying VOC emission control may be authorized by the Control Officer as applicable.
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.

C. Emission Control Plan

An owner/operator of a permitted aerospace coating operation subject to this Rule shall submit to the Control Officer an Emission Control Plan, including:

1. A list of each individual permitted aerospace coating operation and whether the permit restricts VOC emissions from the operation to less than 4.56 tons per year (9,125 pounds per year) of VOC;
2. For each permitted operation with an emission limit greater than 4.56 tons per year, provide annual VOC emissions from the operation for each of the preceding 3 calendar years and indicate whether the operation is served by a VOC control device;

3. For operations without a VOC emissions control device with annual emissions greater than 4.56 tons per year, include a description of actions to be taken to meet the requirements of Subsection V.F.2. Such plan shall include any type of emissions control equipment to be applied to each operation and estimated construction schedule.

VII. Compliance Schedule

- A. An owner/operator of any unit subject to Section V shall comply with the following schedule:
 1. By November 3, 2023, submit to the Control Officer an Emission Control Plan pursuant to Section VI.C, including a complete application for an Authority to Construct, if necessary.
 2. By November 4, 2026, demonstrate full compliance with Section V.F.2 of this Rule.

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