ATTACHMENT CTG

(Lockheed Martin Aeronautics Company: 1030400-014-AC)

The following is based on the U.S. EPA Guideline Series EPA-453/R-97-004 (CTG) titled "Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations" dated December 1997.

B.1. APPLICABILITY

(a) Provisions of this Rule

(1) Except as noted in (a)(2) and (a)(3), this rule applies to the manufacture or rework of commercial, civil, or military aerospace vehicles or components at facilities.

(2) This rule does not apply to the following activities where cleaning and coating of aerospace components and vehicles may take place:

- Research and development
- Quality Control
- Laboratory testing and
- Electronic parts and assemblies (except for cleaning and coating of completed assemblies)

(3) This rule does not apply to manufacturing or rework operations involving space vehicles or rework operations performed on antique aerospace vehicles or components.

This rule does not apply to items identified in ATTACHMENT MACT VOC under 40 CFR 63.741(e), (f), (h), and (j).

B.2. DEFINITIONS – For the purposes of this rule the definitions in Appendix A below shall apply.

B.3. REQUIREMENTS

(a) VOC content of coatings.

(1) A person shall not apply to aerospace vehicles or components any <u>specialty coatings</u>, including any VOC-containing materials added to the original coating supplied by the manufacturer, that contain VOC in excess of the limits specified in Table 1 below:

Table 1: Specialty Coatings VOC Content Limits*

Coating Type	**VOC Content Limit (lb/gal)**	**VOC Content Limit (g/l)**
Ablative Coating	5.0	600
Adhesion Promoter	7.4	890
Adhesive Bonding Primers:		
Cured at 250 °F or below	7.1	850
Cured above 250 °F	8.6	1030
Adhesives:		
Commercial Interior Adhesive	6.3	760
Cyanoacrylate Adhesive	8.5	1020
Fuel Tank Adhesive	5.2	620
Nonstructural Adhesive	3.0	360
Rocket Motor Bonding Adhesive	7.4	890
Rubber-based Adhesive	7.1	850
Structural Autoclavable Adhesive	0.5	60
Structural Nonautoclavable Adhesive	7.1	850
Antichafe Coating	5.5	660
Bearing Coating	5.2	620
Caulking and Smoothing Compounds	7.1	850
Chemical Agent-Resistant Coating	4.6	550
Clear Coating	6.0	720
Commercial Exterior Aerodynamic Structure Primer	5.4	650
Compatible Substrate Primer	6.5	780
Corrosion Prevention Compound	5.9	710
Cryogenic Flexible Primer	5.4	645
Cryoprotective Coating	5.0	600
Dry Lubricative Material	7.3	880
Electric or Radiation-Effect Coating	6.7	800
Electrostatic Discharge and Electromagnetic Interference (EMI) Coating	6.7	800
Elevated Temperature Skydrol Resistant Commercial Primer	6.2	740
Epoxy Polyamide Topcoat	5.5	660
Fire-Resistant (interior) Coating	6.7	800
Flexible Primer	5.3	640
Flight-Test Coatings:		
Missile or Single Use Aircraft	3.5	420
All Other	7.0	840
Fuel-Tank Coating	6.0	720
High-Temperature Coating	7.1	850
Insulation Covering	6.2	740
Intermediate Release Coating	6.3	750
Lacquer	6.9	830
Maskants:		
Bonding Maskant	10.3	1230

Coating Type	**VOC Content Limit (lb/gal)**	**VOC Content Limit (g/l)**
Critical Use and Line Sealer Maskant	8.5	1020
Seal Coat Maskant	10.3	1230
Metallized Epoxy Coating	6.2	740
Mold Release	6.5	780
Optical Anti-Reflective Coating	6.3	750
Part Marking Coating	7.1	850
Pretreatment Coating	6.5	780
Rain Erosion-Resistant Coating	7.1	850
Rocket Motor Nozzle Coating	5.5	660
Scale Inhibitor	7.3	880
Screen Print Ink	7.0	840
Sealants:		
Extrudable/Rollable/Brushable Sealant	2.3	280
Sprayable Sealant	5.0	600
Silicone Insulation Material	7.1	850
Solid Film Lubricant	7.3	880
Specialized Function Coating	7.4	890
Temporary Protective Coating	2.7	320
Thermal Control Coating	6.7	800
Wet Fastener Installation Coating	5.6	675
Wing Coating	7.1	850

* Coating limits expressed in terms of mass (lbs. or grams) of VOC per volume (gallons or liters) of coating less water and less exempt solvent.

(2) The following coating applications are exempt from the VOC content limits listed in paragraph (b.3.)(a)(1):

(i) Touchup, aerosol, and Department of Defense (DoD) "classified" coatings.
(ii) Coating of space vehicles.
(iii) Facilities that use separate formulations in volume of less than 50 gallons per calendar year subject to a maximum exemption of 200 gallons total for such formulations applied during the calendar year.

(3) Primers, Topcoats, Chemical Milling Maskants. The broad categories of primers, topcoats (including self-priming topcoats), and chemical milling maskants (Type I/II) are not specialty coatings as listed in Table 1 above and are regulated in ATTACHMENT MACT VOC. The requirements do not apply to facilities that use separate formulations of primers, topcoats, and chemical milling maskants (Type I/II) in volumes of less than 50 gallons per calendar year, subject to a maximum exemption of 200 gallons total for such formulations applied during the calendar year.

(b) Application Equipment.

(1) A person shall use one or more of the following application techniques in applying any primer or topcoat to aerospace vehicles or components:

- Flow/curtain coat;
- Dip coat;
- Roll coating;
- Brush coating;
- cotton-tipped swab application;
- electrodeposition coating;
- High volume low pressure (HVLP) spraying;
- Electrostatic spray; or
- Other coating application methods that achieve emission reductions equivalent to HVLP or electrostatic spray application methods.

(2) The following situations are exempt from application equipment requirements listed paragraph (B.3.)(b)(1):

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

(3) The application techniques, listed in paragraph (B.3.)(b)(1), are regulated in ATTACHMENT MACT VOC.

(c) Solvent Cleaning. The following requirements apply to solvent cleaning operations:

(1) Hand-wipe cleaning. Cleaning solvents used in hand-wipe cleaning operations shall:

(i) Meet one of the composition requirements in ATTACHMENT MACT VOC, 40 CFR 63.744, Table 1; or
(ii) Have a VOC composite vapor pressure less than or equal to 45 millimeters of mercury (mm Hg) at 20°C.

(2) The following cleaning operations are exempt from the requirements in paragraph (B.3.)(c)(1);

(i) Cleaning during the manufacture, assembly, installation, maintenance, or testing of components of breathing oxygen systems that are exposed to the breathing oxygen;
(ii) Cleaning during the manufacture, assembly, installation, maintenance, or testing of parts, subassemblies, or assemblies that are exposed to strong oxidizers or reducers (e.g., nitrogen tetroxide, liquid oxygen, hydrazine);
(iii) Cleaning and surface activation prior to adhesive bonding;
(iv) Cleaning of electronics parts and assemblies containing electronics parts;
(v) Cleaning of aircraft and ground support equipment fluid systems that are exposed to the fluid, including air-to-air heat exchangers and hydraulic fluid systems;
(vi) Cleaning of fuel cells, fuel tanks, and confined spaces;
(vii) Surface cleaning of solar cells, coated optics, and thermal control surfaces;
(viii) Cleaning during fabrication, assembly, installation, and maintenance of upholstery, curtains, carpet, and other textile materials used on the interior of aircraft;
(ix) Cleaning of metallic and nonmetallic materials used in honeycomb cores during the manufacture or maintenance of these cores, and cleaning of the completed cores used in the manufacture of aerospace vehicles or components;
(x) Cleaning of aircraft transparencies, polycarbonate, or glass substrates;
(xi) Cleaning and solvent usage associated with research and development, quality control, or laboratory testing;
(xii) Cleaning operations, using nonflammable liquids, conducted within 5 feet of energized electrical systems. Energized electrical systems means any AC or DC electrical circuit on an assembled aircraft once electrical power is connected, including interior passenger and cargo areas, wheel wells, and tail sections; and,
(xiii) Cleaning operations identified as essential uses under the Montreal Protocol for which the Administrator has allocated essential use allowances or exemptions in 40 CFR Section 82.4.

(3) Flush cleaning. For cleaning solvents used in the flush cleaning of parts, assemblies, and coating unit components, the used cleaning solvent (excluding those in which ATTACHMENT MACT VOC, 40 CFR 63.744, Table 1 or semi-aqueous cleaning solvents are used) must be emptied into an enclosed container or collection system that is kept closed when not in use or captured with wipers provided they comply with the housekeeping requirements of (B.3.)(c)(5). Aqueous cleaning solvents are exempt from these requirements.

(4) Spray gun cleaning. All spray guns must be cleaned by on or more of the following methods:

(i) Enclosed spray gun cleaning system provided that it is kept closed when not in use and leaks are repaired within 14 days from when the leak is first discovered. If the leak is not repaired by the 15th day after detection, the solvent shall be removed and the enclosed cleaner shall be shut down until the leak is repaired or its use in permanently discontinued,
(ii) Unatomized discharge of solvent into a waste container that is kept closed when not in use,
(iii) Disassembly of the spray gun and cleaning in a vat that is kept closed when not in use, or,
(iv) Atomized spray into a waste container that is fitted with a device designed to capture atomized solvent emissions.

(5) Housekeeping. All fresh and used cleaning solvents, except semi-aqueous cleaning solvents, used in solvent cleaning operations shall be stored in containers that shall be kept closed at all times except when filling or emptying. It is required that cloth and paper, or other absorbent applicators, moistened with cleaning solvents be stored in closed containers. Cotton-tipped swabs used for very small cleaning operations are exempt. In addition, the owner or operator must implement handling and transfer procedures to minimize spills during filling and transferring the cleaning solvent to or from enclosed systems, vats, waste containers, and other cleaning operation equipment that hold or store fresh or used cleaning solvents. The above requirements are known collectively as housekeeping measures. Aqueous cleaning solvents are exempt from these requirements.

Solvents listed in ATTACHMENT MACT VOC, 40 CFR 63.744,Table 1 are exempt from the above requirements.

(d) Control Equipment and Monitoring

(1) **NOT APPLICABLE**, SINCE THE FACILITY DOES NOT HAVE AIR POLLUTION CONTROL EQUIPMENT.
(2) **NOT APPLICABLE**, SINCE THE FACILITY DOES NOT HAVE AIR POLLUTION CONTROL EQUIPMENT.
(3) Each owner or operator using an enclosed spray gun cleaner shall visually inspect the seals and all other potential sources of leaks at least once per month. Each inspection shall occur while the spray gun cleaner is in operation.

B.4. RECORDKEEPING REQUIREMENTS

(a) Each owner or operator using coatings listed in (B.3.)(a) shall:

(1) Maintain a current list of coatings in use with category and VOC content as applied.

(2) Record coating usage on a monthly basis.

If the permittee elects to demonstrate compliance with the specialty coating VOC content limits through averaging, record the monthly volume-weighted average VOC content as applied for the specific specialty coating category. Averaging between specialty coating categories is not permitted.

(b) Each owner or operator using cleaning solvents required in (B.3.)(c) shall;

(1) For aqueous and semi-aqueous hand-wipe cleaning solvents, maintain a list of materials used with corresponding water contents.

(2) For vapor pressure compliant hand-wipe cleaning solvents:

(i) Maintain a current list of cleaning solvents in use with their respective vapor pressures or, for blended solvents, VOC composite vapor pressures.
(ii) Record cleaning solvent usage on a monthly basis.

(3) For cleaning solvents with a vapor pressure greater than 45 mm Hg used in exempt hand-wipe cleaning operations;

(i) Maintain a list of exempt hand-wipe cleaning processes.
(ii) Record cleaning solvent usage on a monthly basis.

(c) **NOT APPLICABLE**, SINCE THE FACILITY DOES NOT HAVE AIR POLLUTION CONTROL EQUIPMENT.

(d) Except for Specialty Coatings, any source that complies with the recordkeeping requirements in ATTACHMENT MACT VOC (Aerospace NESHAP, 40 CFR 63.752), is deemed to be in compliance with the requirements of this paragraph (B.4.).

B.5. TEST METHODS

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

(b) Cleaning Solvents.

(1) For aqueous and semi-aqueous cleaning solvents manufacturers' supplied data shall be used to determine the water content.

For those solvents regulated under ATTACHMECT MACT VOC, 40 CFR 63.744, Table 1, the manufacturer's supplied data sheet shall be used to determine the water content.

(2) For hand-wipe cleaning solvents required in paragraph (B.3.)(c)(1), manufacturers' supplied or standard engineering reference texts or other equivalent methods shall be used to determine the vapor pressure or VOC composite vapor pressure for blended cleaning solvents.

(c) Control Equipment. **NOT APPLICABLE**, SINCE THE FACILITY DOES NOT HAVE AIR POLLUTION CONTROL EQUIPMENT.

(d) Except for Specialty Coatings, any source which complies with the test method requirements in ATTACHMENT MACT VOC (Aerospace NESHAP, 40 CFR 63.750), is deemed to be in compliance with the requirements of this paragraph (B.5.).

APPENDIX A. DEFINITIONS

Terms used in this ATTACHMENT CTG are defined in the Clean Air Act (Act), or in this section as follows:

Ablative coating means 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 the heat or open flame.

Adhesion promoter means a very thin coating applied to a substrate to promote wetting and form a chemical bond with the subsequently applied material.
Adhesive bonding primer means a primer applied in a thin film to aerospace components for the purpose of corrosion inhibition and increased adhesive bond strength by attachment. There are two categories of adhesive bonding primers: primers with a design cure at 250EF or below and primers with a design cure above 250EF.

Aerosol coating means a hand-held, pressurized, nonrefillable container that expels an adhesive or a coating in a finely divided spray when a valve on the container is depressed.

Aerospace vehicle or component means any fabricated part, processed part, assembly of parts, or completed unit, with the exception of electronic components, of any aircraft including but not limited to airplanes, helicopters, missiles, rockets, and space vehicles.

Aircraft fluid systems means those systems that handle hydraulic fluids, fuel, cooling fluids, or oils.

Aircraft transparency means the aircraft windshield, canopy, passenger windows, lenses, and other components, which are constructed of transparent materials.

Antichafe coating means a coating applied to areas of moving aerospace components that may rub during normal operations or installation.

Antique aerospace vehicle or component means 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.

Aqueous cleaning solvent means a solvent in which water is at least 80 percent of the solvent as applied.

Bearing coating means 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 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.

Bonding maskant means a temporary coating used to protect selected areas of aerospace parts from strong acid or alkaline solutions during processing for bonding.

Caulking and smoothing compounds means 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.

Chemical agent-resistant coating (CARC) means an exterior topcoat designed to withstand exposure to chemical warfare agents or the decontaminants used on these agents.

Chemical milling maskant means 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 under this definition.

Cleaning operation means collectively spray gun, hand-wipe, and flush cleaning operations.

Cleaning solvent means a liquid material used for hand-wipe, spray gun, or flush cleaning. This definition does not include solutions that contain no VOC.

Clear coating means a transparent coating usually applied over a colored opaque coating, metallic substrate, or placard to give improved gloss and protection to the color coat. In some cases, a clearcoat refers to any transparent coating without regard to substrate.

Closed-cycle depainting system means a dust free, automated process that removes permanent coating in small sections at a time, and maintains a continuous vacuum around the area(s) being depainted to capture emissions.
Coating means a material that is applied to the surface of an aerospace vehicle or component to form a decorative, protective, or functional solid film, or the solid film itself.

Coating operation means using a spray booth, tank, or other enclosure or any area, such as a hangar, for applying a single type of coating (e.g., primer); using the same spray booth for applying another type of coating (e.g., topcoat) constitutes a separate coating operation for which compliance determinations are performed separately.

Coating unit means a series of one or more coating applicators and any associated drying area and/or oven wherein a coating is applied, dried, and/or cured. A coating unit ends at the point where the coating is dried or cured, or prior to any subsequent application of a different coating. It is not necessary to have an oven or flashoff area to be included in this definition.

Commercial exterior aerodynamic structure primer means a primer used on aerodynamic components and structures that protrude from the fuselage, such as wings and attached components, control surfaces, horizontal stabilizers, vertical fins, wing-to-body fairings, antennae, and landing gear and doors, for the purpose of extended corrosion protection and enhanced adhesion.

Commercial interior adhesive means materials used in the bonding of passenger cabin interior components. These components must meet the FAA fireworthiness requirements.

Compatible substrate primer means either compatible epoxy primer or 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.

Confined space means a space that (1) is large enough and so configured that an employee can bodily enter and perform assigned work; (2) has limited or restricted means for entry or exit (for example, fuel tanks, fuel vessels, and other spaces that have limited means of entry); and (3) is not suitable for continuous employee occupancy.

Corrosion prevention system means 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.

Critical use and line sealer maskant means 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, or 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.

Cryogenic flexible primer means 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).

Cryoprotective coating means a coating that insulates cryogenic or subcooled surfaces to limit propellant boil-off, maintain structural integrity of metallic structures during ascent or reentry, and prevent ice formation.

Cyanoacrylate adhesive means a fast-setting, single component adhesive that cures at room temperature. Also known as "super glue."

Dry lubricative material means a coating consisting of lauric acid, cetyl alcohol, waxes, or other noncross linked or resin-bound materials that act as a dry lubricant.

Electric or radiation-effect coating means 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.

Electrostatic discharge and electromagnetic interference (EMI) coating means a coating applied to space vehicles, missiles, aircraft radomes, and helicopter blades to disperse static energy or reduce electromagnetic interference.

Elevated-temperature Skydrol-resistant commercial primer means 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.

Epoxy polyamide topcoat means a coating used where harder films are required or in some areas where engraving is accomplished in camouflage colors.

Exempt solvent means a specified organic compound that has been determined by the EPA to have negligible photochemical reactivity and is listed in 40 CFR 51.100.

Fire-resistant (interior) coating means for civilian aircraft, fire-resistant interior coatings are used on passenger cabin interior parts that are subject to the FAA fireworthiness requirements. For military aircraft, fire-resistant interior coatings are used on parts that are subject to the flammability requirements of MIL-STD-1630A and MIL-A-87721. For space applications, these

coatings are used on parts that are subject to the flammability requirements of SE-R-0006 and SSP 30233.

Flexible primer means 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.

Flight test coating means a coating applied to aircraft other than missiles or single-use aircraft prior to flight testing to protect the aircraft from corrosion and to provide required marking during flight test evaluation.

Flush cleaning means removal of contaminants such as dirt, grease, oil, and coatings from an aerospace vehicle or component or coating equipment by passing solvent over, into, or through the item being cleaned. The solvent may simply be poured into the item being cleaned and then drained, or assisted by air or hydraulic pressure, or by pumping. Hand-wipe cleaning operations where wiping, scrubbing, mopping, or other hand actions are used are not included.

Fuel tank adhesive means an adhesive used to bond components exposed to fuel and must be compatible with fuel tank coatings.

Fuel tank coating means a coating applied to fuel tank components for the purpose of corrosion and/or bacterial growth inhibition and to assure sealant adhesion in extreme environmental conditions.

Grams of VOC per liter of coating (less water and less exempt solvent) means the weight of VOC per combined volume of total volatiles and coating solids, less water and exempt compounds, and can be calculated by the following equation:

$$\text{Grams of VOC per liter of coating (less water and less exempt solvent)} = \frac{Ws - Ww - Wes}{Vs - Vw - Ves}$$

Ws = weight of total volatiles in grams
Ww = weight of water in grams
Wes = weight of exempt compounds in grams
Vs = volume of coating in liters
Vw = volume of water in liters
Ves = volume of exempt compounds in liters

Hand-wipe cleaning operation means removing contaminants such as dirt, grease, oil, and coatings from an aerospace vehicle or component by physically rubbing it with a material such as a rag, paper, or cotton swab that has been moistened with a cleaning solvent.

High temperature coating means a coating designed to withstand temperatures of more than 350° F.

High volume low pressure (HVLP) spray equipment means spray equipment that is used to apply coating by means of a spray gun that operates at 10.0 psig of atomizing air pressure or less at the air cap.

Insulation covering means material that is applied to foam insulation to protect the insulation from mechanical or environmental damage.

Intermediate release coating means 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.

Lacquer means 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.

Leak means any visible leakage, including misting and clouding.

Limited access space means internal surfaces or passages of an aerospace vehicle or component that cannot be reached without the aid of an airbrush or a spray gun extension for the application of coatings.

Metalized epoxy coating means a coating that contains relatively large quantities of metallic pigmentation for appearance and/or added protection.

Mold release means a coating applied to a mold surface to prevent the molded piece from sticking to the mold as it is removed.
Nonstructural adhesive means an adhesive that bonds nonload bearing aerospace components in noncritical applications and is not covered in any other specialty adhesive categories.

Operating parameter value means a minimum or maximum value established for a control equipment or process parameter that, if achieved by itself or in combination with one or more other operating parameter values, determines that an owner or operator has continued to comply with an applicable emission limitation.

Optical antireflection coating means a coating with a low reflectance in the infrared and visible wavelength ranges that is used for antireflection on or near optical and laser hardware.

Part marking coating means coatings or inks used to make identifying markings on materials, components, and/or assemblies. These markings may be either permanent or temporary.

Pretreatment coating means an organic coating that contains at least 0.5 percent acids by weight and is applied directly to metal or composite surfaces to provide surface etching, corrosion resistance, adhesion, and ease of stripping.

Primer means the first layer and any subsequent layers of identically formulated coating applied to the surface of an aerospace vehicle or component. Primers are typically used for corrosion prevention, protection from the environment, functional fluid resistance, and adhesion of subsequent coatings. Primers that are defined as specialty coatings are not included under this definition.

Radome means the nonmetallic protective housing for. electromagnetic transmitters and receivers (e.g., radar, electronic countermeasures, etc.).

Rain erosion-resistant coating means a coating or coating system used to protect the leading edges of parts such as flaps, stabilizers, radomes, engine inlet nacelles, etc. against erosion caused by rain impact during flight.

Research and development means an operation whose primary purpose is for research and development of new processes and products and that is conducted under the close supervision of technically trained personnel and is not involved in the manufacture of final or intermediate products for commercial purposes, except in a de minimis manner.

Rocket motor bonding adhesive means an adhesive used in rocket motor bonding applications.

Rocket motor nozzle coating means a catalyzed epoxy coating system used in elevated temperature applications on rocket motor nozzles.

Rubber-based adhesive means a quick setting contact cement that provide a strong, yet flexible bond between two mating surfaces that may be of dissimilar materials.

Scale inhibitor means a coating that is applied to the surface of a part prior to thermal processing to inhibit the formation of scale.

Screen print ink means an ink used in screen printing processes during fabrication of decorative laminates and decals.

Sealant means a material used to prevent the intrusion of water, fuel, air, or other liquids or solids from certain areas of aerospace vehicles or components. There are two categories of sealants: extrudable/rollable/brushable sealants and sprayable sealants.

Seal coat maskant means an overcoat applied over a maskant to improve abrasion and chemical resistance during production operations.

Self-priming topcoat means a topcoat that is applied directly to an uncoated aerospace vehicle or component for purposes of corrosion prevention, environmental protection, and functional fluid resistance. More than one layer of identical coating formulation may be applied to the vehicle or component.

Semiaqueous cleaning solvent means a solution in which water is a primary ingredient (>60 percent of the solvent solution as applied must be water).

Silicone insulation material means 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."

Solids mean the nonvolatile portion of the coating that after drying makes up the dry film.

Solid film lubricant means a very thin coating consisting of a binder system containing as its chief pigment material one or more of the following: molybdenum, graphite, polytetrafluoroethylene (PTFE), or other solids that act as a dry lubricant between faying (i.e., closely or tightly fitting) surfaces.

Space vehicle means a man-made device, either manned or unmanned, designed for operation beyond earth's atmosphere. This definition includes integral equipment such as models, mock-ups, prototypes, molds, jigs, tooling, hardware jackets, and test coupons. Also included is auxiliary equipment associated with test, transport, and storage, that through contamination can compromise the space vehicle performance.

Specialty coating means 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.

Specialized function coating means a coating that fulfills extremely specific engineering requirements that are limited in application and are characterized by low volume usage. This category excludes coatings covered in other Specialty Coating categories.

Spray gun means a device that atomizes a coating or other material and projects the particulates or other material onto a substrate.

Structural autoclavable adhesive means an adhesive used to bond load-carrying aerospace components that is cured by heat and pressure in an autoclave.

Structural nonautoclavable adhesive means an adhesive cured under ambient conditions that is used to bond load-carrying aerospace components or other critical functions, such as nonstructural bonding in the proximity of engines.

Surface preparation means the removal of contaminants from the surface of an aerospace vehicle or component or the activation or reactivation of the surface in preparation for the application of a coating.

Temporary protective coating means a coating applied to provide scratch or corrosion protection during manufacturing, storage, or transportation. Two types include peelable protective coatings and alkaline removable coatings. These materials are not intended to protect against strong acid

or alkaline solutions. Coatings that provide this type of protection from chemical processing are not included in this category.

Thermal control coating means a coating formulated with specific thermal conductive or radiative properties to permit temperature control of the substrate.

Topcoat means a coating that is applied over a primer on an aerospace vehicle or component for appearance, identification, camouflage, or protection. Topcoats that are defined as specialty coatings are not included under this definition.

Touch-up and repair coating means a coating used to cover minor coating imperfections appearing after the main coating operation.

Touch-up and repair operation means that portion of the coating operation that is the incidental application of coating used to cover minor imperfections in the coating finish or to achieve complete coverage. This definition includes out-of-sequence or out-of-cycle coating.

Volatile organic compound (VOC) means any compound defined as VOC in 40 CFR 51.100. This includes any organic compound other than those determined by the EPA to be an exempt solvent. For purposes of determining compliance with emission limits, VOC will be measured by the approved test methods. Where such a method also inadvertently measures compounds that are exempt solvent, an owner or operator may exclude these exempt solvents when determining compliance with an emission standard.

VOC composite vapor pressure means the sum of the partial pressures of the compounds defined as VOC's and is determined by the following calculation:

$$PP_c = \sum_{i=1}^{n} \frac{\frac{W_i}{MW_i} xVP_i}{\frac{W_w}{MW_w} + \frac{\sum_{i=1}^{n} W_e}{MW_e} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

Wi = Weight of the "i"th VOC compound, grams.
Ww = Weight of water, grams.
We = Weight of nonwater, non-VOC compound, grams.
MWi = Molecular weight of the "i"th VOC compound, g/g-mole.
MWw = Molecular weight of water, g/g-mole.
MWe = Molecular weight of exempt compound, g/g-mole.
PPc = VOC composite partial pressure at 20° C, mm Hg.
VPi = Vapor pressure of the "i"th VOC compound at 20° C, mm Hg.

Waterborne (water-reducible) coating means a coating which contains more than 5 percent water by weight as applied in its volatile fraction.

Wet fastener installation coating means a primer or sealant applied by dipping, brushing, or daubing to fasteners that are installed before the coating is cured.

Wing coating means a corrosion-resistant topcoat that is resilient enough to withstand the flexing of the wings.