

ADOPTION NOTICE

SAE-AMS-C-83445, "COATING SYSTEM, POLYURETHANE, NONYELLOWING, WHITE, RAIN EROSION RESISTANT THERMALLY REFLECTIVE", was adopted on 24-SEP-99 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: ASC/ENOI, Building 560, 2530 Loop Road West, Wright-Patterson AFB, OH 45433-7101. Copies of this document may be purchased from the Society of Automotive Engineers 400 Commonwealth Drive Warrendale, Pennsylvania, United States, 15096-0001. <http://www.sae.org/>

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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

Coating System, Polyurethane, Nonyellowing, White, Rain Erosion Resistant, Thermally Reflective

1. SCOPE:

1.1 Form:

This specification covers the requirements for one type of thermally reflective non-yellowing white rain erosion resistant polyurethane coating system. This specification has been prepared as a direct replacement for the Military specification MIL-C-83445A (USAF) Notice 3.

1.2 Application:

These products have been used typically for protecting glass fabric reinforced plastic laminates and other plastic parts used for exterior surfaces of aircraft and missiles, but usage is not limited to such applications. (See 8.1)

1.3 Classification:

The coating systems shall be of the following classes:

Class 1 - General Use

Class 2 - Limited Use

1.4 Safety-Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 4420 Aromatics in Finished Gasoline by Gas Chromatography

2.2 U.S. Government Publications:

Available from DODSSP Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

PPP-P-1892 Paint, Varnish, Lacquer, and Related Materials, Packaging, Packing and Marking of

TT-S-735 Standard Test Fluids; Hydrocarbons

MIL-PRF-5425 Plastic Sheet, Acrylic, Heat Resistant

MIL-R-7705

MIL-A-8625 Anodic Coatings, for Aluminum and Aluminum Alloys

MIL-PRF-25134 Remover, Paint and Lacquer, Solvent Type

MIL-P-25421 Plastic Materials, Glass Fiber Based-Epoxy Resin Low Pressure Laminated

Federal Test Method Std. 141 Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling and Testing

3. REQUIREMENTS:

3.1 Qualification:

3.1.1 The coating materials furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids.

3.2 Materials:

3.2.1 The coating materials shall be either an aliphatic or cycloaliphatic isocyanate polyurethane prepolymer and shall be a chemically curing composition of such ingredients to produce high quality non-yellowing rain erosion resistant coatings. The mix ratio of components, if applicable, shall be as specified by the manufacturer.

3.2.2 The materials shall have no adverse effect on the health of personnel when used for their intended purposes with adequate environmental controls and safety equipment. Questions pertinent to this effect shall be referred by the procuring activity to the appropriate department medical service who will act as an advisor to the procuring agency.

3.3 Components:

3.3.1 Class 1: Unless otherwise specified, the Class 1 coating system shall consist of the following: primer plus activator; non-yellowing aliphatic or cycloaliphatic isocyanate polyurethane prepolymer solution, which may be moisture curable and accelerated by a catalyst, or may be reacted with a curing agent; and a diluent solvent to be used in the application of the coating. Class 1 coatings shall be applied by brush or spray techniques. The solvents contained in Class 1 coatings are photochemically reactive. (See 8.4)

3.3.2 Class 2: Unless otherwise specified the Class 2 coating system shall consist of the following: primer plus activator; aliphatic or cycloaliphatic isocyanate base polyurethane prepolymer which may be moisture curable and accelerated by a catalyst or may be reacted with a curing agent; and a diluent solvent to be used in the application of the coating. Class 2 coatings shall be applied by brushing or spray techniques. All solvents and diluents contained in and furnished with the Class 2 coating shall be nonphotochemically reactive. (See 8.5)

3.3.3 Solvent: The diluting and spraying solvents for Class 2 coatings shall be nonphotochemically reactive and shall be compatible with the coating materials. (See 8.4)

3.3.4 Nonphotochemically reactive solvent: The nonphotochemically reactive solvent ingredient of Class 2 materials shall not exceed any one of the following percentage composition limitations with reference to the total volume of the solvent when tested as specified in 4.7.3.

- a. A combination of hydrocarbons, alcohols, aldehydes, esters, ethers or ketones having an olefinic or cycloolefinic type unsaturation: 5%.
- b. A combination of aromatic compounds with 8 or more carbon atoms to the molecule, except ethylbenzene: 8%.
- c. A combination of ethylbenzene, ketones, having branched hydrocarbon structures, trichloroethylene or toluene: 20%.

3.4 Qualitative requirements:

The quantitative requirements of the coatings shall be as specified in Table 1.

TABLE 1 - Quantative Requirements, Class 1 and Class 2 Coatings

Material	Nonvolatile Solids Content, Percent by Weight, min	Density, Kg/L (lb/gal), min	Viscosity, Centipoises	Flash Point °C (°F), min
Primer (Mixed components, if applicable)	10.0	0.839 (7.0)	50 to 250	21 (70)
Class 1 and 2 aliphatic and cycloaliphatic polyurethane prepolymer	45	0.959 (8.0)	100 to 800	10 (50)

- 3.4.1 Free aliphatic isocyanates: The free aliphatic isocyanate content of either the mixed components or single component moisture cure coating systems shall be not greater than 1%. When the prepolymer contains an aliphatic isocyanate, the free isocyanate content shall be determined by a test method approved by the issuing activity.
- 3.4.2 Free cycloaliphatic isocyanate: The free cycloaliphatic isocyanate content of either the mixed components or single component moisture cure coating systems shall not be greater than 1%. When the prepolymer contains cycloaliphatic methylene bis (4-cyclohexylene isocyanate), the free isocyanate content shall be determined in accordance with Appendix. When the prepolymer is based on any cycloaliphatic isocyanate other than methylene bis (4-cyclohexylene isocyanate), the issuing activity shall be consulted for appropriate analytical procedures for determination of free isocyanate.
- 3.5 Component requirements:
- 3.5.1 Mixing: Components of Class 1 and 2 shall be individually mixed in accordance with the manufacturer's instructions. The resulting individual mixtures shall be smooth, homogeneous materials free from lumps, gelling, seeding, separation or other objectionable characteristics.
- 3.5.2 Odor: The odor of the wet coatings shall not be obnoxious when tested as specified in 4.7.
- 3.5.3 Color: Class 1 and 2 base coatings and/or topcoatings shall be pigmented white. The color shall be sufficiently intense to completely hide the surface and provide the thermal reflectance properties specified herein.

- 3.5.4 Accelerated storage stability: Class 1 and 2 coating shall be subjected to 4 days of accelerated storage in accordance with 4.7.7. At the end of the 4-day storage period the component materials shall be free of lumps, skins and gels, and shall disperse readily to a smooth homogeneous mixture.
- 3.5.5 Storage stability: The previously unopened packaged components of Class 1 and 2 coatings components, including the primer and primer accelerator, shall meet all the requirements specified herein after a storage period of one year, provided that the daily mean temperature of the ambient conditions at the storage locations falls within the range of 70° to 100°F (21° to 38°C) (see 4.7.8).
- 3.5.6 Pot life: Class 1 and 2 base coating and topcoating solutions shall have a minimum pot life of 4 hours after catalyzation. At the end of the 4-hour period, the coatings shall show no signs of lumping, seeding, separation, or an increase in viscosity of more than 20% from the initial viscosity when tested in accordance with 4.7.9 and Table 1.
- 3.5.7 Application and drying time: The coatings shall be applied in accordance with the manufacturer's instructions to a total dry film thickness of 0.31 to 0.36 mm (0.012 to 0.014 inch) (12 to 14 mils). The total application time, including intervals between coatings shall not exceed 8 hours and the tack free drying time shall not exceed 10 hours after final application of the coatings when tested in accordance with 4.7.10.
- 3.5.7.1 Rate-of-cure: The rate-of-cure of the coatings shall have a maximum set-to-touch or recoat time of one hour. The manufacturer shall furnish instructions for catalyzing or accelerating the polyurethane base materials for a temperature range from 65° to 95°F (18° to 35°C) and a relative humidity range from 40% to 75% when tested in accordance with 4.7.10.
- 3.5.8 Curing time: Class 1 and 2 coatings shall be fully cured within 5 days and shall be free of pinholes, cracks, bubbles, or other film irregularities when tested in accordance with 4.7.11.
- 3.5.9 Peel strength: Class 1 and 2 coatings shall have a peel strength of not less than 1050 N/m (6 pounds per inch) when tested in accordance with 4.7.12.
- 3.5.10 Flexibility: A film of the coating shall show no cracking or loss of adhesion in the bend area when tested in accordance with 4.7.15.
- 3.5.11 Fluid immersion resistance: When tested as specified in 4.7, panels prepared in accordance with 4.6 and coated in accordance with 4.6.1 and exposed to fluids as specified below shall show no pigment leaching, loss of adhesion, blistering or discoloration. Panels shall be inspected immediately upon removal from the test fluid for any observable defects. The exposed panels shall then be cleaned and all specified tests performed within an hour after removal from the test fluids. Cleaning of the panels shall be by wiping with lint free paper toweling or with lint free cloth.
- Distilled water resistance. Distilled water at ambient conditions (24°C ± 1) for 24 hours.
 - Hydrocarbon resistance. TT-S-735 Type III for 1 hour at standard conditions.

- 3.5.12 Rain erosion resistance: Class 1 and 2 coatings shall have a minimum average erosion resistance of 100 minutes when tested as specified in 4.7.16.
- 3.5.13 Electrical transmission: Class 1 and 2 coatings shall have a minimum electrical transmission of 90% or 95%, when tested as specified in 4.7.18.
- 3.5.14 Thermal reflectivity: The coating shall be exposed to a total fluence of 60 at flux rate of 30 cal/cm²-sec without burning or charring when tested in accordance with 4.7.22. Discoloration is permitted.
- 3.5.15 Weather resistance: Class 1 and 2 coatings, when exposed to outdoor weathering for 6 months, shall show no film deterioration such as checking, chalking, cracking, embrittlement, loss of adhesion or loss of resiliency. After weathering, the coatings shall meet the erosion resistance requirements as specified in Table 2.

TABLE 2 - Rain Erosion Resistance and Electrical Transmission Requirements
Class 1 and Class 2 Coatings

Property	After Drying and Normal 5 Day Cure	After Normal Cure and Aging 7 Days at 95% RH and 38 °C ± 2 (100 °F ± 2)	After Normal Cure and Aging 24 Hours at 108 °C ± 2 (225 °F ± 5)	After Normal Cure and 6 Months Exterior Weathering
Rain erosion resistance (erosion through 0.31 to 0.36 mm (0.012 to 0.014 inch) of erosion coating at 805 km/h (500 mi/hour) and 25.4 mm/hour (1 inch/hour) rainfall, time in minutes, minimum)				
Class 1 and Class 2	100	100	100	100
Electrical transmission Class 1 <u>1/</u> and Class 2 <u>1/</u>	95	90	---	95
Uncoated control panel	87	84	---	87

1/ The percentage of electrical transmission of a panel coated with either a Class 1 or 2 coating is equal to 100 times the electrical transmission of the coated panel divided by the electrical transmission of the uncoated panel.

3.5.16 Strippability: Newly applied, fully cured and weathered Class 1 and Class 2 coatings shall be strippable when tested in accordance with 4.7.21.

3.5.17 Repairability: The cured coatings shall be repairable by the same procedure specified by the manufacturer for original application.

3.5.18 Age: The age of the coatings shall be not more than 12 months from the date of manufacture to the date of use.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for inspection:

The manufacturer of the coating material shall supply all samples and shall be responsible for required tests. Purchaser reserves the right to sample and perform any confirmatory testing deemed necessary to ensure that the coating material conforms to the requirements of this specification.

4.2 Classification of inspections:

The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 Qualification inspection:

Qualification tests shall consist of all of the tests specified in 4.7 except the test for inspection of filled containers.

4.3.1 Qualification samples: Unless otherwise specified, qualification test samples shall consist of the following materials and test panels:

a. Materials

Primer for (Class 1 and 2)	0.5 L (1 pint) (for each class)
Primer activator	Quantity specified by manufacturer
Polyurethane prepolymer solutions	3.8 L (1 gallon) (for each class)
Catalyst	Quantity specified by manufacturer
Diluent	1.9 L (2 quarts) minimum (for each class). Solvent must be urethane grade.

4.3.1 (Continued):

b. Test panels

Uncoated airfoils (see 4.7.16)	18 (for each class)
Coated void-free laminate panels (see 4.7.18)	2 (for each class)
Uncoated void-free control panels (see 4.7.18)	1
Coated void-free panels (see 4.7.22)	1 (for each class)

The samples shall be plainly identified and forwarded to the qualifying activity or as otherwise directed in the letter of authorization from the qualifying activity (see 6.3). The identification shall include the manufacturer's production code or compound number.

4.3.2 Test report: Qualification samples shall be accompanied by a certified test report showing results of all tests required by this specification except the test for inspection of filled containers.

4.3.3 Instruction sheet: The manufacturer shall forward three copies of the instruction sheet detailing mixing, thinning, application and curing procedures for his material with all qualification samples submitted for approval. Qualification approval of the manufacturer's coating system shall also constitute approval of the applicable instruction sheets. The instruction sheets shall not be changed in any way without specific approval of the qualifying activity.

4.4 Quality conformance inspection:

Quality conformance inspection for acceptance of individual lots shall consist of sampling and tests as specified herein.

4.4.1 Sampling:

4.4.1.1 Lot: A lot shall consist of all coating materials of the same type and class manufactured at one time and offered for delivery at one time.

4.4.1.2 Samples: One gallon samples shall be selected from each lot and subjected to the following tests:

- a. Nonvolatile (solids) content (see 4.7)
- b. Viscosity (see Table 1)
- c. Condition in container (see 4.7.6)
- d. Accelerated storage (see 4.7.7)
- e. Peel strength (see 4.7.12)

4.5 Test conditions:

Standard laboratory test conditions shall be $24^{\circ}\text{C} \pm 2$ with a relative humidity of $50\% \pm 2$. All component materials shall be conditioned for at least 24 hours at this temperature and relative humidity before being tested or used in the preparation of test panels. Except as otherwise specified herein, all physical tests on the coating materials or test films thereof shall be made under these conditions in an atmosphere that is dust free.

4.6 Test panels:

Unless otherwise specified, test panels shall be flat, glass fiber base laminate conforming to any type and fabric number of MIL-P-25421. Except as otherwise specified, panels shall be $75 \times 200 \times 3.2$ mm ($3 \times 8 \times 0.125$ inches). The glass laminate panels shall be of low void content, dense and representative of high quality plastic laminate structures. They shall be lightly sanded with 320 grit abrasive paper to remove the glossy finish and wiped clean with a solvent such as xylene or methyl isobutyl ketone before applying primer or coating materials.

4.6.1 Coating of panels: Except as otherwise specified herein, test panels shall be coated as follows:

Class 1 and 2 - 0.025 to 0.05 mm (0.001 to 0.002 inch) (1 to 2 mils) of primer and 0.31 to 0.36 mm (0.012 to 0.014 inch) (12 to 14 mils) of rain erosion resistant coating applied in accordance with manufacturers instructions.

4.7 Test methods:

Test methods shall be as specified in Table 3 and 4.7.1 through 4.7.22.

TABLE 3 - Test Methods

Characteristic	Requirement Reference	Test Method (FTMS No. 141)
Nonvolatile (solids) content	Table 1	4041 or 4042
Flash point	Table 1	4291
Density	Table 1	4148
Viscosity	Table 1	4287
Odor	3.5.2	4401

- 4.7.1 Toxicological data and formulations: The supplier shall furnish the toxicological data and formulations required to evaluate the safety of the material for the proposed use.
- 4.7.2 Urethane-base prepolymers (free diisocyanate content): The free diisocyanate content of Class 1 and 2 coatings shall be determined in accordance with Appendix or as otherwise directed by the qualifying activity.
- 4.7.3 Nonphotochemically reactive solvent: The nonphotochemically reactive volatile content shall be determined by the use of a gas chromatograph or other suitable device in accordance with ASTM D 4420.
- 4.7.4 Mixing: A 1 liter or 1-quart sample of each of the pigmented base resins of Class 1 and 2 coatings shall be vigorously mixed by hand. The complete mixing shall be accomplished in a maximum of 5 minutes. After the mixture appears homogeneous or at the end of the 5-minute period, whichever occurs first, the material shall be allowed to stand for 1 minute, then poured slowly into another container. The coating shall be observed during pouring and the residue remaining in the mixing container visually observed for conformance to 3.5.1. When a catalyst is added to the coatings the mixture shall be agitated on a commercial type paint shaker instead of by hand for a minimum of 5 minutes prior to application.
- 4.7.5 Color: The amount of white pigment shall be such that as the coating is applied the surface becomes increasingly white with each successive coat. When the specified coating thickness has been obtained, the color shall be sufficiently intense to completely hide the surface and provide the thermal reflectivity as specified herein.
- 4.7.6 Condition in container: Component materials of each container shall be tested in accordance with Federal Test Method Standard No. 141, Method 3011.
- 4.7.7 Accelerated storage: The component materials for Class 1 and 2 coating systems shall be stored (uncatalyzed) at a temperature of $120^{\circ}\text{F} \pm 2$ ($49^{\circ}\text{C} \pm 2$) for 4 days. After this storage period, the materials shall be examined for conformance to 3.5.4.
- 4.7.8 Storage stability: The component materials for Class 1 and 2 coating systems shall be aged for 12 months. After this storage period, full closed containers of the primer and rain erosion resistant coatings shall be capable of meeting the requirements of this specification.
- 4.7.9 Pot life: A 1-quart sample of the Class 1 and 2 coatings shall be mixed as specified in 4.7.4 and stored in closed containers for 4 hours at standard conditions. At the end of the storage period, the coatings shall be visually examined and a viscosity measurement made as specified in 4.7.

- 4.7.10 Drying (tack-free) time: Class 1 and 2 coatings shall be applied in accordance with the manufacturer's instructions to two test panels as specified in 4.6. At the end of the rated tack-free time (not to exceed 10 hours), a polyethylene film 25 mm (1 inch) wide, 150 mm (6 inches) long, and 0.10 mm \pm 0.05 (0.004 inch \pm 0.002 inch) thick shall be pressed with a 28 g (1-ounce) weight (approximately 12.9 cm² (2 square inches)) onto each of the coated test panels. The polyethylene film shall then be progressively withdrawn at right angles to the surface of the coating. The time at which there is no evidence of removal of the coating by adherence to the polyethylene film shall be considered the tack-free time.
- 4.7.11 Curing time: Class 1 and 2 coatings shall be applied in accordance with the manufacturer's instructions and cured for 5 days at 24°C and 50% relative humidity to determine conformance to 3.5.8.
- 4.7.12 Peel strength: Three panels as specified in 4.6 shall be coated with primer on one half of one side. 0.31 to 0.36 mm (0.012 to 0.014 inch) of rain erosion resistant coating is then applied to the entire side of each panel and air-dried to standard conditions for 5 days. At the end of the 5-day period, two 25 mm (1-inch) wide strips shall be cut, lengthwise, through the coating to the panel and extended the full length of the panel. A 25 mm (1-inch) coating strip over the unprimed area shall be peeled back to the primer and clamped in one jaw of a suitable tension testing machine and the matching end of the test panel clamped in the other jaw to provide a 180-degree pull. The jaw separation rate shall be 50 mm (2 inches) per minute. The results shall be the numerical average of the peak loads. If the coating separates cohesively and does not separate from the panel surface, the peel strength shall be reported as greater than the measured value.
- 4.7.13 Water resistance: Three coated panels of each class of coating shall be prepared as specified in 4.6.1 and cured as specified in 4.7.11. The panels shall then be immersed in distilled water for 24 hours at standard conditions. At the end of the 24 hours immersion period, the specimens shall be removed from the water and visually examined for conformance to 3.5.11. The specimens shall then be subjected to the peel strength test to determine conformance to 3.5.9.
- 4.7.14 Aromatic fuel resistance: Three coated panels of each class of coating shall be prepared as specified in 4.6.1 and cured as specified in 4.7.11. The panels shall then be immersed in hydrocarbon test fluid conforming to TT-S-735 Type III at standard conditions for 1 hour. At the end of the 1 hour period, the specimens shall be removed from the fluid and visually examined for conformance to 3.5.11. The specimens shall then be subjected to the peel strength test to determine conformance to 3.5.9.
- 4.7.15 Flexibility: Three 75 x 100 x 0.51 mm (3 x 4 x 0.020 inch) 2024-O aluminum test panels, anodized according to MIL-A-8625, Type II shall be coated with 0.31 to 0.36 mm (0.012 to 0.014 inch) (12 to 14 mils) of the erosion resistant coating and cured as specified in 4.7.11. The coated panels shall then be conditioned for 1 hour at -65°F and while at that temperature bent 180° over a 6.35 mm (0.25 in) cylindrical mandrel in accordance with method 6221 of Federal Test Method Standard No. 141. The panels shall be visually examined immediately after bending for evidence of failure, then conditioned at 24°C \pm 1 (75°F \pm 2) and again examined for conformance to 3.5.10.

4.7.16 Rain erosion resistance:

4.7.16.1 Test panels: Eighteen airfoil shaped panels shall be used for testing each class coating. The specimens shall be in accordance with Figure 1 and shall be of low void content, dense and representative of high quality plastic laminate structures. A 0.31 to 0.36 mm (0.012 to 0.014 inch) (12 to 14 mils) thick coating shall be applied to the airfoil shapes in accordance with 4.6.1, cured as specified in 4.7.11 and tested as follows: six of the airfoil shapes shall be tested immediately, six panels shall be subjected to outdoor weathering as specified in 4.7.19; and six panels shall be aged for 24 hours in a circulating air oven $108^{\circ}\text{C} \pm 2$ ($225^{\circ}\text{F} \pm 5$).

4.7.16.2 Test procedures: Six coated airfoil shapes, exposed as specified in 4.7.16.1, shall be mounted on a suitable diameter 2-bladed propeller (0.0025 chord) in such a manner that 1 end of each panel extends to near the tip of each 0° pitch propeller blade. The propeller should be mounted horizontally and driven by a variable speed motor designed to permit testing at the center of the specimens at selected speeds. A suitable water ring, mounted above the rotating blade, shall be used to simulate a natural rainfall of 1 inch per hour at a 2 millimeter droplet size. The test shall be run at 500 miles per hour and shall conform to Table 2. Failure is determined as the average time at which six specimens have eroded through to the substrate.

4.7.17 Sequence of testing: The sequence of testing the panels shall be as follows:

- a. All panels shall be cured as specified in 4.7.11.
- b. The uncoated control panel and 2 coated panels shall be tested as specified in 4.7.18 and 4.7.19 immediately after curing.
- c. The panels specified in b. Above shall be exposed to the temperature of $38^{\circ}\text{C} \pm 2$ ($100^{\circ}\text{F} \pm 5$) and a relative humidity of 95% for 7 days then tested as specified in 4.7.18.
- d. The control panel and 2 coated panels shall be subjected to outdoor weathering as specified in 4.7.20. The 2 panels shall then be tested as specified in 4.7.18.

4.7.18 Electrical transmission:

4.7.18.1 Test panels: Except for size, 5 test panels as specified in 4.6 and coated on 1 side only as specified in 4.6.1, shall be tested for conformance to Table 2. The panels shall be 61.0 x 61.0 cm by 0.127 to 0.140 cm (24 x 24 x 0.050 to 0.055 in) thick. Two of the panels are for Class 1 coating, 2 for Class 2 coating and 1 panel shall remain uncoated for use as a control panel.

4.7.18.2 Transmission test equipment: Test equipment performance requirements for flat panel samples shall meet the transmission efficiency test of MIL-R-7705.

4.7.18.3 Test procedures: The electrical transmission test procedure for flat panel samples shall be in accordance with MIL-R-7705 and as specified herein.

- 4.7.18.4 Microwave power frequency: The cured panels shall be subjected to one way microwave power measurements at incidence angles from -30° to $+30^{\circ}$, using paralleled and perpendicular polarization of the incident energy. The microwave power transmission test shall be conducted at a frequency of 9.375 gigahertz (GHZ).
- 4.7.18.5 Sample test plane: The test sample shall be clamped perpendicular to and at the approximate midpoint between the horns. The center of the sample will be coincident with the centerline of the horn.
- 4.7.18.6 Sample supporting structure: The sample supporting structure for holding the test sample in a perpendicular position between the horns shall be a wood clamp extending across the entire length of the bottom edge of the sample. The clamp shall not cover more than a one-inch border of the panel edge. The wood clamp shall be covered with absorbing material if it causes interference.
- 4.7.18.7 Angular displacement turn table: The test sample shall be mounted on a turn table with provisions for moving the panel through 0° to 70° and for lateral movement of a minimum of one inch reproducibly. Readings shall be taken in maximum increments of 10° and each 0.1 inch setting for angles up to 30° .
- 4.7.19 Weather resistance: The panels shall be as specified in 4.6 except the size shall be 24 inches by 24 inches by 0.050 to 0.055 inch thick. Panels shall be exposed to outdoor weathering for 6 months and tested in accordance with Federal Test Method Standard No. 141, method 6160 at an approximate 45° south latitude.
- 4.7.20 Pot life: The base resin of Class 1 and 2 coatings shall be mixed with the catalyst or activator at standard conditions. The coatings shall have a minimum usable pot life of 4 hours when stored in a closed container. At the end of the 4-hour storage period, the coatings shall conform to 3.5.6.
- 4.7.21 Strippability: Two panels, one for each class, shall be as specified in 4.6 except the panel size shall be 24 inches by 24 inches by 0.050 to 0.055 inch thick. The panels shall be conditioned in the sequence specified in 4.7.17b and 4.7.17d. The stripper shall conform to MIL-R-25134. Apply the stripper to the panels with a brush. After the stripper has been in contact with the coating systems for 20 minutes, remove the residue with clean water by holding the panel under a tap water source. Inspect the panel for complete removal of the coatings, including primer, to determine conformance to 3.5.16.
- 4.7.22 Thermal flash resistance: Test panels 100 x 115 x 3.2 mm (4 x 4.5 x 0.125 inch) as specified in 4.6 shall be coated with the paint system. The coating shall be cured at standard conditions for five days prior to testing. When tested as follows the coating shall meet the requirements of 3.5.14. The coating shall be exposed to a quartz lamp radiation source with a spectral quality representative of 2200°K (3500°C) black body radiation. Operational characteristics of the apparatus shall consist of a pre-set irradiance level, precise regulation including a sensing radiometer and a pressurized lamp housing to avoid overheating and contamination by pyrolysis gases.

4.7.23 Packaging, packing, and marking: The coatings shall be inspected for compliance with section 5.

5. PACKAGING:

5.1 Packaging, packing, and marking:

The coatings shall be packaged, packed, and marked in accordance with PPP-P-1892 and as specified herein. Preservation and packaging shall be level A or C, as specified (see 8.2); packing shall be level A, B, or C as specified (see 8.2).

5.1.1 Packaging: The coatings shall be packaged in 1-gallon or 5-gallon containers. The components of the type 1 coating shall be packaged in separate companion containers; the primer in one and the primer activator in the other; the rain erosion resistant coating in one container and the catalyst in the other. The quantity of rain erosion resistant coating furnished shall be 1 full gallon (3.8 L) plus catalyst or 1 full 5-gallon (19 L) container plus catalyst. The quantity of primer shall be sufficient to primer coat an area equivalent to the area coverage of the base coating.

5.1.2 Packing: Packing for Class 1 and 2 coatings shall be 1 container each of primer, primer activator, rain erosion resistant coating, catalyst and thinner or solvent. The thinner for the 1-gallon size coatings shall be packed in the same unit.

5.1.3 Marking: In addition to the marking specified in PPP-P-1892, each container of the coating shall show the following precautionary marking; DO NOT STORE AT TEMPERATURES ABOVE 38°C (100°F). Each 1-gallon can and 5-gallon container shall be labeled as specified in 5.1.3.1.

5.1.3.1 Labeling: The following labeling in compliance with the provisions of the Federal Hazardous Substances Labeling Act shall appear on all containers:

CAUTION: THIS COATING MATERIAL IS FLAMMABLE AND SHALL NOT BE USED IN CONFINED AREAS WHERE THERE ARE OPEN FLAMES, ARCING EQUIPMENT, HOT SURFACES OR WHERE SMOKING IS PERMITTED.

CAUTION: USE ONLY WITH ADEQUATE VENTILATION. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. DON'T GET IN EYES, ON SKIN, ON CLOTHING. IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES: FOR EYES, GET MEDICAL ATTENTION.

5.1.4 Mixing and application instructions: The supplier shall include mixing and application instructions with each package of the coatings.

6. ACKNOWLEDGMENT:

A supplier shall mention this specification number in all quotations and when acknowledging purchase orders.