

AEROSPACE MATERIAL SPECIFICATION

Coating, Corrosion Preventative, Polyurethane For Aircraft Integral Fuel Tanks for Use to 250 °F (121 °C)

1. SCOPE:

1.1 Form:

This specification covers two types of polyurethane coatings.

1.2 Application:

The coating materials covered by this specification have typically been used for the protection of aircraft integral fuel tanks against corrosion from fuel contaminants, but usage is not limited to such applications. They are suitable for use in a service temperature range from -65 to +250 °F (-54 to +121 °C).

1.3 Classification:

The corrosion-preventative coatings covered by this specification shall be of the following types.

Type 1 A two component polyurethane coating with less than 420 g/l Volatile Organic Compound (V.O.C.) content.

Type 2 A two component polyurethane coating with less than 720 g/l V.O.C. content.

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 issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2471	Anodic Treatment of Aluminum Alloys, Sulfuric Acid Process, Undyed Coating
AMS 2629	Fluid, Jet Reference
AMS 2825	Material Safety Data Sheets
AMS 3166	Solvents, Cleaning, Cleaning Prior to Application of Sealing Compounds
AMS 3276	Sealing Compound, Integral Fuel Tanks and General Purpose, Intermittent Use to 360 °F (182 °C)
AMS 3819	Cloths, Cleaning, for Aircraft Primary and Secondary Structural Surfaces
AMS 4045	Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075; -T6 Sheet, -T651 Plate) Solution and Precipitation Heat Treated
AS5505	Requirements for Accreditation of Testing Laboratories for Organic Coatings
AS9100	Quality Systems - Aerospace - Model of Quality Assurance in Design, Development, Production, Installation and Servicing
PD 2000	Procedures for an Industry Qualified Product Management Process

2.2 ASTM Publications:

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

ASTM B 36	Brass Plate, Sheet, Strip and Rolled Bar
ASTM D 257	DC Resistance or Conductance of Insulating Materials
ASTM D 1200	Viscosity by Ford Viscosity Cup
ASTM D 1353	Nonvolatile Material in Volatile Solvents for Use in Paint, Varnish, Lacquer and Related Products
ASTM D 1475	Density of Liquid Coatings, Inks, and Related Products
ASTM D 1974	Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D 3960	Volatile Organic Compound (VOC) Content of Paint and Related Coatings

2.3 U.S. Government Publications:

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

PPP-C-96	Can, Metal, 28 Gage and Lighter
FED-STD-791	Lubricants, Liquid Fuels, and Related Products, Methods of Testing
MIL-C-5541	Chemical Films and Chemical Film Materials for Aluminum and Aluminum Alloys
MIL-PRF-23699	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code 0-156
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft
Bulletin No. 535	US Air Force Free Diisocyanate Test Method

2.4 ISO Publications:

Available from American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories (Dated Dec. 16, 1999)

3. TECHNICAL REQUIREMENTS:

3.1 Materials:

The basic ingredient shall be polyurethane type with curing agents, thinners, and additives suitable for various application methods including brushing, dipping, and spraying.

3.2 Properties:

The coating, when prepared in accordance with the manufacturer's instructions shall conform to the requirements shown in Table 1, determined in accordance with specified test methods in Table 1.

TABLE 1 - Application Properties

Paragraph	Property	Requirement Type 1	Requirement Type 2	Test Method
3.2.1	Surface appearance	Smooth, uniform, and free of film irregularities	Smooth, uniform, and free of film irregularities	4.6.5.1
3.2.2	Density, variation from acceptable preproduction sample, percent	±5	±5	4.6.5.2
3.2.3	Volatile Organic Compound Content (VOC) g/l, max	420	720	4.6.5.3
3.2.4	Viscosity, seconds			
	Initial	13 to 23	10 to 20	4.6.5.4
	After Application Life	≤35	≤20	4.6.5.4
3.2.5	Application life, hours, min	4	8	4.6.5.5
3.2.6	Drying time, hours max at standard conditions	2	2	4.6.5.6

3.2.7 Coating shall be fully cured within 21 days at standard conditions for Type 1 and within 14 days at standard conditions for Type 2, or within 1 day at standard conditions followed by 1 day maximum at 140 °F (60 °C) and 50 percent relative humidity when tested in accordance with 4.6.5.7.

3.2.8 Resistance to Water: The cured coatings shall show no blistering, softening, leaching, or corrosion extending more than 1/8 inch (3.2 mm) beyond the scribe mark or in from the edge of the panel, loss of adhesion, or other visible deleterious effect when tested as specified in 4.6.5.8.

3.2.9 Resistance to Salt Water and Fuel: The cured coatings shall show no blistering, softening, leaching, shrinkage, corrosion extending more than 1/8 inch (3.12 mm) beyond the scribe mark or in from the edge of the panel, loss of adhesion, or other visible deleterious effect when tested as specified in 4.6.5.9.

3.2.10 Resistance to Engine Oil: The cured coatings shall show no blistering, softening, leaching, shrinkage, loss of adhesion, or other visible deleterious effect when tested as specified in 4.6.5.10.

3.2.11 Resistance to Hydraulic Fluid: The cured coatings shall show no blistering, softening, leaching, shrinkage, loss of adhesion, or other visible deleterious effect when tested as specified in 4.6.5.11.

- 3.2.12 Fuel Contamination: The nonvolatile extractable materials contributed by the cured coatings in contact with the jet reference fluid shall not be more than 20 mg per 100 ml when tested as specified in 4.6.5.12. Not more than a slight discoloration or tarnish shall be present on a freshly polished copper strip.
- 3.2.13 Low-Temperature Flexibility: The cured coatings shall withstand the low-temperature test specified in 4.6.5.13 without cracking, checking, crazing, or loss of adhesion.
- 3.2.14 Peel Strength, Sealing Compound to Coating Material: Sealing compound conforming to AMS 3276, Class B-2, applied to the cured coating material shall have a peel strength of not less than 20 pounds force per inch (3503 N/m) when tested as specified in 4.6.5.14. There shall be no adhesive failure between the coating and the sealing compound except for bubbles and knife cuts.
- 3.2.15 Adhesion, Coating Material to Sealing Compound: The coating material applied to sealing compound conforming to AMS 3276, Class B-2, shall not cause cracks in the sealing compound when tested as specified in 4.6.5.15. Cracks in the cured coating shall be permissible, but the cured coating shall not flake from the sealant.
- 3.2.16 Repairability: The cured coating shall show no blistering or loss of adhesion when tested as specified in 4.6.5.16.
- 3.2.17 Accelerated Storage Stability: After storing as specified in 4.6.5.17, coating material shall be capable of meeting the initial viscosity requirements and the requirements for application life specified in Table 1.
- 3.2.18 Free Diisocyanate: The free diisocyanate content of the polyurethane shall not be greater than 1.0 percent when tested as specified in 4.6.5.18.
- 3.2.19 Hydrolytic Stability: The cured coatings shall be tack free, when tested as specified in 4.6.5.19.
- 3.2.20 Resistance to Iron Chloride: The cured coatings shall show no blistering or softening, and the panels shall show no corrosion when tested as specified in 4.6.5.20.1. After immersion, the cured coatings shall have a resistance of at least 5.0 megohms per mil of thickness when tested as specified in 4.6.5.20.2.
- 3.2.21 Resistance to Simulated Microbial By-Products: The cured coatings shall show no blistering, softening, or shrinkage when tested as specified in 4.6.5.21. There shall be not more than 5 percent loss of coating when subjected to the tape test. Removal of coating immediately adjacent to the scribe and obviously caused by coating cracking during scribing shall not be cause for rejection.

3.3 Quality:

The coatings, as received by purchaser, shall be uniform in quality and condition, as free from foreign materials as commercially practicable and free from imperfections detrimental to the usage of the compound. There shall be no separation of ingredients that cannot be readily dispersed by hand mixing.

3.4 Qualification:

- 3.4.1 All products sold to this specification shall be listed, or approved for listing, on the qualified products list, PRI QPL AMS-C-27725. To qualify, the product shall meet the tests specified in 4.3.2.
- 3.4.2 Qualification testing, review of test results, approval, reapproval and recertification of qualification for QPL listing shall be in accordance with PD 2000.
- 3.4.3 Recertification of qualification is required every three years. Recertification consists of a letter certifying that there have been no changes in the material ingredients, manufacturing processes, or site of production since qualification and that the product meets all of the requirements of this specification. In addition a test report shall be provided from a lab of the manufacturer's choosing, showing compliance with all of the qualification tests.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Quality System of Manufacturer:

Before submitting a product for qualification to this specification for the purpose of being listed on the PRI QPL, the manufacturer must have a quality system in place which holds a third party accreditation to AS9100.

4.2 Responsibility for Inspection:

The manufacturer of the product shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the specified requirements.

4.3 Classification of Tests:

4.3.1 Acceptance Tests: Tests for the following requirements are acceptance tests and shall be performed on each batch.

Surface Appearances (3.2.1)

Density (3.2.2)

Volatile content (3.2.3)

Viscosity (3.2.4)

Application life (3.2.5)

Drying time (3.2.6)

Free diisocyanate (3.2.18)

A batch shall be defined as the quantity of material run through a mixer/reactor at one time.

4.3.2 Qualification Tests: All technical requirements are qualification tests and shall be performed prior to the initial shipment of coating to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.5.2, and when purchaser deems confirmatory testing to be required. All qualification testing is to be carried out by a laboratory which is independent of the manufacturer and is accredited per ISO 17025 and AS5505.

4.4 Sampling and Testing:

Shall be as follows:

4.4.1 For Acceptance Tests: Sufficient coating compound shall be taken at random from each batch to perform all the required tests. A batch shall be the quantity of material run through a mill or mixer at one time. The number of determinations for each required test shall be as specified in the applicable test procedure or, if not specified herein, not less than three, except that multiple testing is not required for viscosity, application life, drying time, and cure time.

4.4.1.1 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.4.1.

4.4.2 For Qualification Tests: Samples shall consist of approximately 2 gallons (7.6 L) of material. The material shall be furnished in containers of the type to be used in filling contract orders. Samples shall be identified as follows and forwarded to the activity responsible for testing, as designated in the letter of authorization form the activity responsible for qualification:

COATING, CORROSION PREVENTATIVE, POLYURETHANE

For Aircraft Integral Fuel Tanks for Use to 250 °F (121 °C)

AMS-C-27725 TYPE (1 or 2)

MANUFACTURER'S IDENTIFICATION

NAME OF MANUFACTURER

LOT NUMBER

DATE OF MANUFACTURE

SUBMITTED BY (NAME) (DATE) FOR QUALIFICATION TESTS IN ACCORDANCE WITH

AMS-C-27725A UNDER AUTHORIZATION

(REFERENCE AUTHORIZING LETTER)

4.5 Approval and Reapproval:

4.5.1 Coating supplied to this specification shall be listed, or approved for listing, on the qualified products list, PRI AMS-C-27725.

4.5.2 Manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production coating which are essentially the same as those used on the approved (qualified) sample. If necessary to make any change in product formulation, raw materials, basic methods of processing, or plant site, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample coating. Production coating made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5.3 The manufacturer shall submit a statement of any proposed changes per 4.5.2 to PRI for review by the applicable SAE G-8 Qualified Products Group. The QPG may elect to reapprove without testing, or they may require partial or full requalification testing to be performed before the manufacturer may ship product with the PRI AMS-C-27725 seal.

4.6 Test Methods:

Testing shall be as follows:

4.6.1 Standard Conditions:

4.6.1.1 Test Conditions: Standard laboratory conditions shall be 77 °F ± 2 (25 °C ± 1) and 50 ± 5% relative humidity. Except as otherwise specified herein, all test specimens shall be cured under these conditions.

4.6.1.2 Standard Tolerances: Unless otherwise specified herein, Table 2 shows standard tolerances applied throughout test methods.

TABLE 2 - Standard Tolerances

Measurement Units	Tolerance
Temperatures	± 2 °F (± 1 °C)
Days	± 2 hours
Hours	± 5 minutes
Minutes	± 10 seconds
Inches (mm)	± 0.010 inch (0.25 mm)

4.6.2 Preparation of Test Panels:

4.6.2.1 Description of Panels: Panels required for testing of the coating materials shall be identified as follows:

- a) Class A: Bare aluminum alloy (7075) conforming to AMS 4045, temper T6, with chemical treatment in accordance with MIL-C-5541.
- b) Class B: Bare aluminum alloy (7075) conforming to AMS 4045, temper T6, sulfuric acid anodized in accordance with AMS 2471.
- c) Panel size and quantities shall be as shown in Table 3.

TABLE 3 - Panel Size Requirements

	Quantity Required	Quantity Required
	Panel Class A	Panel Class B
Size 1 0.040 x 2.75 x 6 inches (1 x 70 x 150 mm)	13	11
Size 2 0.040 x 2.75 x 12 inches (1 x 70 x 300 mm)	4	4
Size 3 0.025 x 1 x 5 inches (0.64 x 25.4 x 127 mm)	1	

Test panels shall be cut to the required dimensions prior to chemical treatment.

4.6.2.2 Cleaning: Unless otherwise specified herein, all test panels shall be cleaned by scrubbing and rinsing with AMS 3166. After rinsing, and while still wet, the panels shall be wiped dry with a clean AMS 3819 Grade A cloth and allowed to air-dry 30 minutes at standard conditions in an uncontaminated atmosphere.

4.6.3 Preparation of Test Specimens:

4.6.3.1 Preparation of Coating Materials: The coating materials shall be prepared according to manufacturers instructions.

4.6.3.2 Application of Coating Materials: Unless otherwise specified herein, the test panels shall be spray-coated to produce a film thickness of 0.0008 to 0.0012 inch (20 to 30 μm) when cured. Coatings may be on one side of the panel only. Unless otherwise specified in the procurement documents, the coated panel shall be cured for 21 days (Type 1) or 14 days (Type 2) at standard conditions by suspending or placing in a vertical position.

4.6.3.3 Preparation of Sealing Compound: Not less than 175 grams of sealing compound conforming to AMS 3276, Class B-2, shall be mixed thoroughly within a period of 5 minutes.

4.6.3.4 Application of Sealing Compound: Unless otherwise specified herein, sealing compound shall be applied to test panels and cured for 7 days standard conditions. Cured thickness of the sealing compound shall be 1/8 to 1/4 inch (3.2 by 6.4 mm).

4.6.4 Testing Fluids: Fuel used for immersion tests shall be Jet reference fluid conforming to AMS 2629, Type 1.

4.6.5 Test Procedures:

4.6.5.1 Application and Surface Appearance: Test panels prepared in accordance with 4.6.3.2 shall be examined for smoothness and uniformity and shall be free of bubbles, pinholes, cracks, and other film irregularities.

4.6.5.2 Density: This test shall be conducted in accordance with ASTM D 1475.

4.6.5.3 Volatile Organic Compound Content (V.O.C.): The test shall be conducted in accordance with ASTM D 3960.

4.6.5.4 Viscosity: The viscosity test shall be conducted in accordance with ASTM D 1200, using No. 4 Ford viscosity cup.

4.6.5.5 Application Life: A round, wide mouth, 1-pint (1/2-L), metal container with a press lid shall be filled to within 1 inch (25 mm) of the top with coating material. The container of mixed Type 1 coating shall be allowed to remain uncovered and undisturbed for not less than 4 hours at standard conditions. The container of mixed Type 2 coating shall be allowed to remain uncovered and undisturbed for not less than 8 hours at standard conditions. The aged coating material shall be examined for appearance, noting skinning and gelling, and for conformance to application life (Table 1). The coating shall then be tested for viscosity (4.6.5.4), drying time (4.6.5.6), cure time (4.6.5.7), resistance to water (4.6.5.8), resistance to salt water and fuel (4.6.5.9). For acceptance testing of application life, the viscosity test (4.6.5.4) is the only test required.

- 4.6.5.6 Drying Time: Two Class A panels, Size 1, shall be coated to the thickness specified in 4.6.3.2. The coated panels shall then be suspended from a suitable fixture at standard conditions for 2 hours. The coating shall be considered tack-free when slight finger pressure will not leave a mark. The surface shall not be tacky. These panels upon further conditioning, shall be used for testing cure time as specified in 4.6.5.7.
- 4.6.5.7 Cure Time: Coated panels shall be selected from the drying time test 4.6.5.6. One panel shall be allowed to cure for 21 days (Type 1) or 14 days (Type 2) at standard conditions. The other panel shall be cured 1 day at standard conditions followed by 1 day at $140\text{ }^{\circ}\text{F} \pm 2$ ($60\text{ }^{\circ}\text{C} \pm 1$) and not less than 50 percent relative humidity. The coating shall be considered cured when the substrate is not exposed after 50 double strokes of moderate pressure with a cotton gauze pad wet with methyl ethyl ketone.
- 4.6.5.8 Resistance to Water: One panel each of Class A and Class B, Size 1 shall be coated and cured as specified in 4.6.3.2. The coated panels shall be scored through to the metal diagonally from one corner to the opposite corner. The coated panels shall be immersed vertically for 30 days in a covered glass vessel containing distilled water with 3 inches (76.2 mm) of the panels exposed to the water and remainder exposed to the air-vapor-mixture. The vessel shall be placed in an oven at $140\text{ }^{\circ}\text{F} \pm 2$ ($60\text{ }^{\circ}\text{C} \pm 1$). Immediately upon removal from the water, the panels shall be examined for conformance to the requirements specified in 3.2.8.
- 4.6.5.9 Resistance to Salt Water and Fuel: Four panels each of Class A and Class B, Size 2, shall be coated and cured as specified in 4.6.3.2. Two coated panels each of Class A and Class B shall be scored 0.03 inches (0.75 mm) minimum width through to the metal diagonally from one corner to the opposite corner. The remaining coated panels shall be left unscored. The coated panels shall be immersed vertically in a covered glass vessel containing a two-layer liquid consisting of 3.0 percent aqueous sodium chloride solution and jet reference fluid, and the remainder to the air-vapor mixture. The vessel shall be placed in an oven at $140\text{ }^{\circ}\text{F} \pm 2$ ($60\text{ }^{\circ}\text{C} \pm 1$). After 7 days immersion, the unscored panels shall be removed from the test fluid for use as specified in 4.6.5.14. At the end of 30 days, the scored panels shall be removed from the test fluid and immediately examined for conformance to the requirements specified in 3.2.9.
- 4.6.5.10 Resistance to Engine Oil: One panel each of Class A and Class B, Size 1, shall be coated and cured as specified in 4.6.3.2. Coated test panels shall be scored 0.03 inches (0.75 mm) minimum width through to the metal diagonally from one corner to the opposite corner. The coated panels shall be immersed completely and vertically for 14 days in a covered glass vessel containing engine oil conforming to MIL-PRF-23699. The temperature during the test shall be $250\text{ }^{\circ}\text{F} \pm 5$ ($121\text{ }^{\circ}\text{C} \pm 2$). Immediately upon removal from the oil, the panels shall be examined for conformance to the requirements specified in 3.2.10.

- 4.6.5.11 Resistance to Hydraulic Fluid: One panel each of Class A and Class B, Size 3, shall be coated and cured as specified in 4.6.3.2. Coated test panels shall be scored 0.03 inches (0.75 mm) minimum width through to the metal diagonally from one corner to the opposite corner. The coated panels shall be immersed vertically for 14 days in a covered glass vessel containing hydraulic fluid conforming to MIL-PRF-83282. The temperature during the tests shall be $180\text{ }^{\circ}\text{F} \pm 5$ ($82\text{ }^{\circ}\text{C} \pm 2$). Immediately upon removal from the fluid, the panels shall be examined for conformance to the requirements specified in 3.2.11.
- 4.6.5.12 Fuel Contamination: One Class A panel, Size 3, shall be coated on both sides, cured as specified in 4.6.3.2 and immersed in a flask containing 250 ml of jet reference fluid specified in 4.6.4 for 48 hours at standard conditions. The contaminated fuel shall be decanted off and the nonvolatile material determined by ASTM D 1353 at a temperature of 320 to 329 °F (160 to 165 °C), except that the total evaporation time shall be 45 minutes. A corrosion test for free sulfur shall be run in accordance with method 5313 of FED-STD-791, except that a nonleaded copper strip conforming to ASTM B 36 shall be suspended in the contaminated fluid during the 48-hour extraction period previously outlined.
- 4.6.5.13 Low-Temperature Flexibility: Two panels each of Class A and Class B, Size 1, shall be coated and cured as specified in 4.6.3.2 except that the coating thickness shall be not less than 0.0008 inches (20 μm) nor more than 0.0012 inches (30 μm). The coated panels shall then be immediately placed in a low-temperature flexibility fixture (Figure 1) consisting of a clamp support that will grip both sides of both six inch (152 mm) edges of the panels for a distance of three inches (76 mm) from one end without touching the sealant. The fixture shall be capable of flexing the panel through a 30-degree arc (15 degrees each side of the center) at a constant speed of one cycle per five seconds. The temperature shall be reduced to $-65\text{ }^{\circ}\text{F}$ ($-54\text{ }^{\circ}\text{C}$), stabilized at this temperature for at least two hours, and the panels flexed through 130 consecutive cycles. The panels then shall be removed and examined for conformance to the requirements specified in 3.2.13.
- 4.6.5.14 Peel Strength Sealing Compound to Coating Materials: Two panels each of Class A and Class B panels removed from the two-layer salt water-fuel test fluid in 4.6.5.9, shall be cleaned with a cleaning material specified by the manufacturer of the coating being tested. Test panels shall be dried 30 minutes minimum at standard conditions (or use the manufacturer's recommendation, if applicable). The center four inches (102 mm) of the panel shall be coated with an approximately 1/8-inch (3.2 mm) thickness of sealing compound conforming to AMS 3276, Class B-2. After the sealing compound has immobilized, one end of a 2.75 by 12 inch (69.8 by 305 mm) strip of wire screen (20 to 40 (850 to 425 mm) mesh aluminum or Monel wire fabric) or cotton duck cloth shall be impregnated with the sealing compound, so that approximately 5 inches (127 mm) at one end is completely covered on both sides. The sealant coated end of the fabric shall be placed on the sealant coated panel, and smoothed down on the layer of sealing compound, taking care not to trap air beneath the fabric. An additional coating of sealing compound shall be applied over the fabric approximately 0.031 inch (0.79 mm) thick. Cure the sealant as specified in 4.6.3.4. After the sealing compound cure period, the panels shall be replaced in the same two-layer salt water-fuel test fluid and allowed to remain for 7 days at a temperature of $140\text{ }^{\circ}\text{F} \pm 2$ ($60\text{ }^{\circ}\text{C} \pm 1$). The test panels shall be removed

4.6.5.14 (Continued):

and two 1-inch (25 mm) section shall be cut through the strip and sealing compound on each panel to provide two strips for the peel test. The specimens shall be stripped back at an angle of 180° to the metal panel in a suitable tensile testing machine having a jaw separation rate of 2 inches (51 mm) per minute. Three cuts approximately 1 inch (25 mm) apart shall be made perpendicular to the direction of pull through the sealing compound and coating to the panel in an attempt to promote adhesive failure. The results shall be the numerical average of the peak loads. The peel strength shall be measured within 1 hour after removal from the test fluid for conformance to 3.2.14. Failure of the sealant compound to the fabric shall not be included in peel strength values.

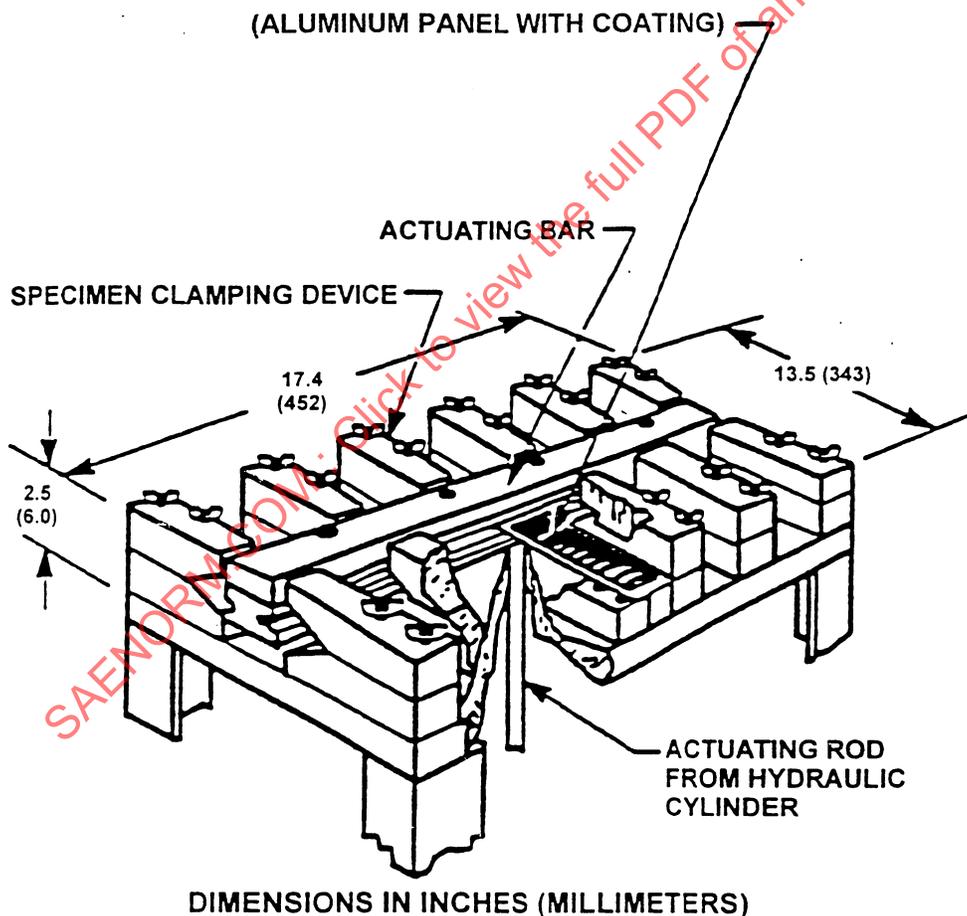


FIGURE 1 - Low-Temperature Flexibility Fixture

- 4.6.5.15 Adhesion, Coating to Sealing Compound: Four panels each of Class A and Class B, Size 1, shall be coated with sealing compound conforming to AMS 3276, Class B-2, 1/8 inch (3.2 mm) thick, and cured as specified in 4.6.3.4. On two panels each of Class A and Class B, a coat of the coating material shall be 0.0012 inch (30 μm) maximum, applied over the sealing compound and cured as specified in 4.6.3.2 except that the coating thickness shall be not less than 0.0008 inch (20 μm). The remaining two panels shall be left uncoated to provide control panels. All the panels shall be tested for flexibility (4.6.5.13) at -65 ± 2 °F (-54 ± 1 °C) and examined for conformance to requirements specified in 3.2.15.
- 4.6.5.16 Repairability: One panel each of Class A and Class B, Size 1, shall be coated and cured as specified in 4.6.3.2. The coated panels shall be immersed vertically for 7 days in a covered glass vessel containing jet reference fluid with 3 inches (76 mm) of the panels exposed to the jet reference fluid and the remainder exposed to the air-vapor mixture. The temperature during the test shall be 140 ± 2 °F (60 ± 1 °C). After immersion for 7 days, the panels shall be removed from the test fluid and air-dried for 24 hours at 140 ± 2 °F (60 ± 1 °C) in a forced draft oven. The panels then shall be cleaned with the cleaner specified in 4.6.2.2. A second coat of the coating material shall be applied and cured as specified in 4.6.3.2. The test panels shall be replaced in the same test fluid and allowed to remain for 7 days at a temperature of 140 ± 2 °F (60 ± 1 °C). The test panels shall be removed and examined for conformance to the requirements specified in 3.2.16.
- 4.6.5.17 Accelerated Storage Stability: Approximately 1 gallon (4 L) of the coating material in the containers, of the kind to be used in filling contract orders, shall be stored unopened for 14 days at 120 ± 2 °F (49 ± 1 °C) and then cooled at standard conditions for 24 hours. The aged material shall be used to determine conformance to the requirements specified in 3.2.17.
- 4.6.5.18 Free Diisocyanate: The test for the amount of free diisocyanate in the coatings shall be conducted in accordance with U.S. Air Force Specification Bulletin 535. The amount shall be as specified in 3.2.18.
- 4.6.5.19 Hydrolytic Stability: One test panel each Class A and Class B, Size 1 shall be coated and cured as specified in 4.6.3.2. The cured specimens shall be exposed for 120 days in an environment of 160 °F (71 °C) and $95\% \pm 5$ relative humidity. To do this, pour a 22% by weight glycerin in distilled water solution into a desiccator until the liquid level is 1 inch (25 mm) below the desiccator plate. Suspend the coated specimens in the desiccator so that the flat surfaces are fully exposed. Apply vacuum grease to the lid and slide the lid in place. Loosely stopper the hole in the lid. Place the desiccator in a circulating air oven set at 160 °F (71 °C). When the temperature inside the desiccator reaches 160 °F (71 °C) tightly stopper the hole to prevent water evaporation. Change the glycerin solution every 30 days or when it becomes cloudy. After 120 days remove the desiccator from the oven and allow it to cool, frequently loosening the stopper. Remove the specimens from the desiccator and hold them at standard conditions (4.6.1.1) for 14 days. The test panels shall be removed and examined for conformance to 3.2.19. The coating shall be considered tack free when the finger with slight pressure will not leave a mark. The surface shall not feel tacky.