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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE

AMS 3259

Issued NOV 1996

SEALING COMPOUND, POLYTHIOETHER Nonchromated, Corrosion Inhibiting for Intermittent Use to 360 °F (182 °C)

1. SCOPE:

1.1 Form:

This specification covers a polythioether sealing compound with nonchromated corrosion inhibitors supplied as a two-component system which cures at room temperature.

1.2 Application:

The compound has been used typically for faying surface sealing and for wet-installation of fasteners in aircraft structural joints, but usage is not limited to such applications. This compound is also suitable for fillet sealing and overcoating fasteners in nonfuel areas. The sealing compounds are usable from -65 to +320 °F (-54 to +160 °C) with short term (six hour) exposures up to 360 °F (182 °C).

1.3 Classification:

The sealing compound covered by this specification is classified by method of application and application time as follows:

Class A - Suitable brush application, available with the following application times:
(Not Applicable)

Class B - Suitable for application by extrusion gun or spatula, available with the following application times:

B-1/2

B-2

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1.3 (Continued):

Class C - Suitable for application by extrusion gun, spatula, brush or roller. Used for fay surface sealing only. Available with the following application times:

C-12
C-24
C-48

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.

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 SAE Publications:

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

AMS 2400 Cadmium Plating
AMS 2471 Anodic Treatment of Aluminum Alloys, Sulfuric Acid Process, Undyed Coating
AMS 2629 Fluid, Jet Reference
AMS 2825 Material Safety Data Sheets
AMS 3020 Oil, Reference, for "L" Stock Rubber Testing
AMS 3021 Fluid, Reference for Testing Diester (Polyol) Resistant Material
AMS 3100 Adhesion Promoter for Polysulfide 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 4037 Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024-T3 Sheet/-T351 Plate), Solution Heat Treated
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
AMS 4049 Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075-T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated
AMS 4901 Titanium, Sheet, Strip and Plate, Annealed, 70,000 psi (485 MPa) Yield Strength
AMS 4911 Titanium Alloy, Sheet, Strip and Plate, 6Al - 4V Annealed
MAM 4911 Titanium Alloy, Sheet, Strip and Plate, 6Al - 4V Annealed

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2.1 (Continued):

- AMS 5516 Steel, Corrosion Resistant, Sheet, Strip, and Plate, 18Cr - 9.0Ni, Solution Heat Treated
- AS7001 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Description
- AS7002 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Rules for Implementation
- AS7003 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Operation
- AS7200/1 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Audit and Inspection Procedures and Checklists for the Sealant Manufacturers Accreditation Program
- AS7201 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Requirements for Accreditation of Pass-Thru Distributors
- AS7202 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Requirements for Accreditation of Value Added Distributors

2.2 ASTM Publications:

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

- ASTM B 117 Salt Spray (Fog) Testing
- ASTM D 412 Rubber Properties Vulcanized Rubber and Thermoplastic Rubber and Thermoplastic Elastomers in Tension
- ASTM D 792 Specific Gravity (Relative Density) and Density of Plastics by Displacement
- ASTM D 2240 Rubber Property - Durometer Hardness

2.3 U.S. Government Publications:

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

- TT-N-97 Naphtha, Aromatic
- CCC-C-419 Cloth, Duck, Cotton, Unbleached, Plied Yarns, Army and Numbered
- PPP-B-636 Box, Shipping, Fiberboard
- PPP-C-96 Can, Metal, 28 Gage and Lighter
- PPP-P-704 Pail, Metal (Shipping, Steel, 1 Through 12 Gallons)
- PPP-D-729 Drums, Shipping and Storage, Steel, 55 Gallon (208 Liters)
- FED-STD-141 Paint, Varnish, Lacquer and Related Materials, Inspection, Sampling and Testing
- FED-STD-601 Rubber Sampling and Testing
- MIL-S-5002 Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapons Systems
- MIL-S-7839 Screw Structural, Aircraft
- MIL-C-5541 Chemical Conversion Coatings on Aluminum Alloys
- MIL-A-9962 Abrasive Mats, Non-woven, Non-metallic

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2.3 (Continued):

MIL-P-23377	Primer Coatings: Epoxy, High Solids
MIL-C-27725	Coating, Corrosion Preventive, for Aircraft Integral Fuel Tanks
MIL-C-38334	Corrosion Removing Compound, Prepaint, for Aircraft Aluminum Surfaces
MIL-C-38736	Cleaning Compound, Solvent Mixtures (Metric)
MIL-C-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-C-85582	Primer Coatings: Epoxy Waterborne
MIL-S-38714	Sealant Cartridge for Two-Component Materials
MIL-L-81352	Lacquer, Acrylic (For Naval Weapons Systems)
MIL-T-9046	Titanium and Titanium Alloy, Sheet, Strip and Plate
MIL-C-85285	Coating, Polyurethane, High Solids
MS24694	Screw, Machine, Flat Countersunk Head, 100 Deg, Cross Recessed, URIC-3A and UNF-3A

2.4 AIA Publications:

Available from National Standards Association, Inc., 1321 14th Street NW, Washington, DC 20005.

NAS 679 Nut, Self Locking, Hexagon Head, Titanium, .190 to .500

3. TECHNICAL REQUIREMENTS:

3.1 Materials:

The basic ingredient shall be polythioether type synthetic rubber with additive(s) for corrosion inhibition. The sealing compound shall cure by the addition of a curing agent to the base compound, and shall not depend on solvent evaporation for curing. The material shall contain no lead or chromium compounds. The curing agent shall possess sufficient color contrast to the base compound to permit easy identification of an unmixed or incompletely mixed sealing compound. Neither the base compound nor the cured sealant shall be red or pink in color. The base compound and the curing agent shall be of uniform blend and shall be free of skins, lumps, and gelled or coarse particles.

3.2 Properties:

The sealing compound, when mixed in accordance with the manufacturer's instructions and cured as specified in 4.5.2.7, shall conform to the following requirements, determined in accordance with specified test methods in Table 1.

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TABLE 1 - Properties

Paragraph	Property	Requirement	Test Method
3.2.1	Specific Gravity of Base Compound, max	1.50	ASTM D 792, Method A-1
3.2.2	Nonvolatile Content, min		4.5.3
	Class B	96%	
	Class C	95%	
3.2.3	Viscosity of Base Compound		4.5.4
	Class B	9000 to 18000 poises (900 to 1800 Pa·S)	
	Class C	1500 to 4000 poises (150 to 400 Pa·S)	
3.2.4	Viscosity of Accelerator	700 to 1600 poises (70 to 160 Pa·S)	4.5.5
3.2.5	Flow (Class B only)	0.1 to 0.75 inch (2.5 to 19.1 mm)	4.5.6
3.2.6	Application Time, min		4.5.7
3.2.6.1	Class B - From the beginning of mixing, not less than 15 grams per minute shall be extruded		
	B-1/2	1/2 hour	
	B-2	2 hours	
3.2.6.2	Class C - From the beginning of mixing, not less than 30 grams per minute shall be extruded		
	C-12	12 hours	
	C-24	24 hours	
	C-48	48 hours	
3.2.7	Assembly Time, min		
	Class C-12	24 hours	4.5.8
	Class C-24	80 hours	
	Class C-48	168 hours	

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TABLE 1 (Continued)

Paragraph	Property	Requirement	Test Method
3.2.8	Tack-free Time (Measured from the beginning of mixing) Max		4.5.9
	Class B-1/2	2 hours	
	Class B-2	12 hours	
	Class C-12	7 days	
	Class C-24	10 days	
	Class C-48	14 days	
3.2.9	Standard Cure Time, Max (30 Shore A, Min)		4.5.10
	Class B-1/2	4 hours	
	Class B-2	24 hours	
	Class C-12	8 days	
	Class C-24	21 days	
	Class C-48	35 days	
3.2.10	Peel Adhesion, min (All Classes)	20 pounds force/inch (3502 N/m) 100% cohesive failure	4.5.11
3.2.11	Tensile Strength/Elongation (Class B and C), min Standard Cure	200 psi (1.4 MPa) 200%	4.5.12
	12 days at 140 °F (60 °C) In AMS 2629, Type I	200 psi (1.4 MPa) 200%	
	12 days at 140 °F (60 °C) in AMS 2629 Type I, plus 24 hours at 120 °F (49 °C) plus standard heat cycle as in 4.5.1.3	200 psi (1.4 MPa) 100%	
	Standard Heat Cycle as in 4.5.1.3	200 psi (1.4 MPa) 100%	
	72 hours in AMS 3021 at Room Temperature	200 psi (1.4 MPa) 200%	
	72 hours in AMS 3020 at Room Temperature	200 psi (1.4 MPa) 200%	

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TABLE 1 (Continued)

Paragraph	Property	Requirement	Test Method
3.2.12	Shear Strength (Class C), min	150 psi (1034 kPa) 100% cohesive failure	4.5.13
3.2.13	Low-Temperature Flexibility	No visual evidence of cracking, checking, or loss of adhesion	4.5.14
3.2.14	Long Term Storage		4.5.15
3.2.14.1	Application Time	Same as 3.2.6	
3.2.14.2	Tack Free Time	Same as 3.2.8	
3.2.14.3	Cure Time	Same as 3.2.9	
3.2.15	Repairability	10 pounds force/inch (1751 N/m) 100% cohesive failure	4.5.16
3.2.16	Paintability	No separation from sealant	4.5.17
3.2.17	Shaving and Sanding	No rolling or tearing of the sealant smooth finish	4.5.18
3.2.18	Corrosion Test		4.5.19
	Galvanic Cell	No visible evidence of corrosion	
	Aluminum/Titanium Couple	No visible evidence of corrosion	
	Aluminum-Cadmium Plated Steel Couple	No visible evidence of corrosion	
	Aluminum/Epoxy Graphite (AS4/3501-6) Composite Couple	No visible evidence of corrosion	
3.2.19	Weight Loss Flexibility and Swell		4.5.20
3.2.19.1	Weight loss, max	10%	

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TABLE 1 (Continued)

Paragraph	Property	Requirement	Test Method
3.2.19.2	Flexibility	No cracking or checking	
3.2.19.3	Swell	5 to 15%	
3.2.20	Thermal Rupture, max	0.15 inch (3.8 mm) No blistering or sponging	4.5.21
3.2.21	Air Content, max (Class B only)	4%	4.5.22

3.3 Quality:

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

3.4 Qualification:

The sealing compounds furnished under this specification for U.S. Government procurement shall be products which are authorized by the qualifying agency for listing on the applicable qualified products list at the time set for opening of bids (See 4.2.2 and 8.2).

3.5 Shelf Life:

Packaged material shall have a minimum shelf life of nine months from Date of Packaging when stored unopened at 80 °F (27 °C) or lower.

- 3.5.1 Date of Packaging:** Date of Packaging is defined as the date finished material is assembled from its components, base compound and curing compound, into a package, labeled kit or unit by the manufacturer. Date of Packaging shall be no more than 90 days from the last day of full quality acceptance testing in accordance with 4.2.1. Material may be retested by the manufacturer at any time to determine conformance to full quality acceptance testing in accordance with 4.2.1. Repackagers may assign a date of packaging provided that the date is no more than 90 days from the last day of full quality acceptance testing in accordance with 4.2.1. A sample of the material may be sent back to the manufacturer at any time for testing to determine conformance to full qualification testing in accordance with 4.2.2.

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4. QUALITY ASSURANCE PROVISIONS:**4.1 Responsibility for Inspection:**

The manufacturer of the product shall supply all samples for vendor's tests and shall be responsible for performing 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 requirements of this specification.

4.1.1 Source Inspection: Material procured by the U.S. Military under this specification shall be third party approved prior to shipment, to ensure that material meets acceptance tests (4.2.1). Third party approval shall be by a third party accreditation process in accordance with AS7001, AS7002, AS7003, and AS7200/1. Sealant shall be from a manufacturer that currently holds a third party accreditation and shall be from a batch of material that has been third party source inspected in accordance with AS7200/1. Distributors supplying sealant shall supply material from an accredited manufacturer and from a batch of material that has been third party source inspected. Distributors shall also be third party accredited in accordance with AS7201 or AS7202, whichever is applicable.

4.2 Classification of Tests:

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

Hardness

Nonvolatile content

Viscosity of the base compound

Viscosity of the curing agent

Application time (3.2.6)

Assembly time (3.2.7)

Tack-free time (3.2.8)

Standard curing rate (3.2.9)

Peel strength two aluminum panels coated with material conforming to MIL-C-27725 aged in equal parts AMS 2629 jet reference fluid (JRF) and 3% sodium chloride solution for seven days at 140 °F (60 °C) (3.2.11)

Shear strength (Class C only)

Corrosion test-Galvanic cell test only

4.2.1.1 Testing viscosity of base compound or curing agent shall be performed in quart cans (1 L) on compound packaged in sectionalized containers or small size containers of less than eight ounces (235 mL).

4.2.2 Qualification Tests: All technical requirements are qualification tests and shall be performed prior to or on the initial shipment of sealing compound to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

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4.2.2.1 The first compound that a manufacturer must qualify is Class B-2. That compound shall meet all applicable requirements of this specification. Once qualification for Class B-2 is obtained, other classes may be qualified. The formulation for the other classes and application times shall be the same as that for the Class B-2, except for minor variations necessary for viscosity and application life. It will not always be necessary for the qualifying agency to conduct all tests on the other classes. In general, the acceptance tests will be sufficient, although additional tests can be required. The manufacturer shall show proof that all requirements are met prior to requesting qualification approval for any class. This includes assurance that the compound will cure at standard conditions. After the compound has been accepted for qualification, approval will be granted and the compound will be identified by reference to the manufacturer's code or formula number.

4.2.2.2 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient sealing 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 time, flow, and tack-free time.

4.3.1.1 Compound for testing shall be mixed, as much as possible, in the same containers in which the sealing compounds were procured.

4.3.1.2 If the compound is being procured in plastic injection kits, such as those conforming to MIL-S-38714, all tests shall be conducted on compound that has been packaged and mixed in the initial sample injection kits except for viscosity of base compound and viscosity of the curing agent. During filling of the initial sample injection kits, base compound and curing agent shall be placed in 1-quart (1 L) cans for the viscosity tests. If more than one size of injection kits are to be packaged from a particular batch, it is necessary to test compound from only one size kit.

4.3.1.3 If the compound is being procured in cans, pails, or drums, the batch shall be tested on the compound placed in 1-quart (1 L) cans.

4.3.1.4 If the compound is being procured in both type containers, the quality conformance tests shall be conducted on the compound packaged in plastic injection kits (See 4.3.1.2).

4.3.1.5 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.3.1.

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4.3.1.6 For U.S. Government Procurement: Each batch shall be subjected to both initial and final acceptance testing. Sufficient compound for initial acceptance testing shall be packaged in the same type containers that are being procured. Initial acceptance tests are those listed in 4.2.1. After successful completion of the initial quality conformance tests, the batch shall be released for final packaging. During packaging, test kits shall be picked at random to perform the following final acceptance tests:

Application time (3.2.6)
Tack-free time (3.2.8)
Standard cure time (3.2.9)
Air content (3.2.21)

4.3.1.6.1 If the batch is being packaged in different type and/or different size containers, the final acceptance tests shall be conducted on each type and/or each size containers. If the compound is being procured under different purchase orders, but the purchase orders call for the same type and size containers, it is only necessary to conduct the final acceptance tests once.

4.3.2 For Qualification Tests: Samples shall consist of 80 six-ounce (178 mL) two-component kits, and two 1-quart (1 L) kits of sealing compound, and two pints (1/2 L) of adhesion promoter. Samples shall be identified as follows and forwarded to the activity responsible for qualification testing as designated in letter of authorization from that activity (See 8.2).

SEALING COMPOUND, POLYTHIOETHER, NONCHROMATED, CORROSION
INHIBITING, FOR INTERMITTENT USE TO 360 °F (182 °C)

AMS 3259 CLASS XX

MANUFACTURER'S IDENTIFICATION

NAME OF MANUFACTURER

LOT NUMBER

DATE OF MANUFACTURE

SUBMITTED BY (NAME) (DATE) FOR QUALIFICATION TESTS IN ACCORDANCE WITH
AMS 3259 CLASS UNDER AUTHORIZATION (REFERENCE AUTHORIZING LETTER)

4.3.3 Shelf Life Surveillance and Updating:

4.3.3.1 Sampling: The minimum number of samples to be tested during shelf life surveillance and updating are as follows in Table 2.

TABLE 2 - Samples

Items in Stock	Samples to be Tested
Up to 100	3
100 to 500	5
Over 500	7

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4.3.3.2 Testing: The following inspections shall be conducted for shelf life surveillance and updating.

Condition of container

Application time

Tack-free time

Standard cure time

Peel Strength; two aluminum panels, sulfuric acid anodized per AMS 2471, coated with MIL-C-27725 corrosion-preventive coating, and aged in AMS 2629, Type I, for seven days at 140 °F (60 °C)

4.3.3.2.1 If the tests are being performed at the end of the stated shelf life to update the shelf life of the sealing compound, and all tests are passed, the shelf life will be extended an additional three months. Up to three updatings will be allowed.

4.4 Approval:

4.4.1 Except as specified in 4.4.1.1 sealing compound shall be approved by purchaser before sealing compound for production use is supplied, unless such approval be waived by purchaser. Results of tests on production sealing compound shall be essentially equivalent to those on the approved (qualified) sample.

4.4.1.1 For direct U.S. Military procurement and for procurement for use on U.S. Military contracts, the sealing compound shall be listed, or approved for listing, on the applicable U.S. Military qualified products list.

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

4.5 Test Methods:

Testing shall be as follows:

4.5.1 Standard Conditions:

4.5.1.1 Test Conditions: Standard laboratory conditions shall be 77 °F ± 2 (25 °C ± 1) and 50% ± 5 relative humidity. All test specimens shall be cured under these conditions. Test specimens shall be prepared at 77 °F ± 5 (25 °C ± 3) and immediately upon completion of preparation, shall be placed into standard conditions for cure. Unless otherwise specified by this specification, tests shall be performed at 77 °F ± 5 (25 °C ± 3).

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- 4.5.1.2 Standard Tolerances: Unless otherwise specified herein, Table 3 shows standard tolerances applied throughout test methods.

TABLE 3 - 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)

- 4.5.1.3 Standard Heat Cycle: Standard heat cycle shall consist of the following:

Four hours at 260 °F (127 °C)
 40 minutes ± 5 at 320 °F (160 °C)
 One hour at 360 °F (182 °C)
 Cool to under 100 °F (38 °C)
 The cycle shall be repeated an additional five times.

- 4.5.2 Preparation of Test Specimens:

- 4.5.2.1 Aluminum Test Panels:

- 4.5.2.1.1 Chemical Conversion Coating Application:

- 4.5.2.1.1.1 Coating Preparation: A chemical conversion coating conforming to MIL-C-81706, Class 1A, Form II, Method C, shall be used. It shall be prepared according to manufacturer's instructions. The pH of the resulting solution shall be adjusted to 1.5 using nitric acid.

- 4.5.2.1.1.2 Panel Preparation: Clean, using a method which results in surfaces free of waterbreak. Rinse the cleaned panels in warm flowing tap water 60 to 100 °F (16 to 38 °C), and check for cleanliness by observing for a waterbreak free surface. If a waterbreak occurs on the panel surfaces, repeat the cleaning procedure until a waterbreak free surface is obtained. Immediately transfer the cleaned panels to a deoxidizing solution consisting of the following:

Butyl alcohol - 35% by weight
 Distilled or deionized water - 22% by weight
 Isopropyl alcohol - 25% by weight
 Phosphoric acid (85% by weight) - 18% by weight

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4.5.2.1.1.3 MIL-C-38334 acid deoxidizer may also be used. Allow the panels to remain in the above solution for three to five minutes at room temperature. Rinse the panels thoroughly under flowing tap water.

4.5.2.1.1.4 Coating Application (Immersion): Transfer the deoxidized panels immediately to the MIL-C-81706 chemical conversion coating solution. Mix the conversion coating solution in either 18-8 stainless steel, polyethylene, or other compatible plastic containers. DO NOT MIX IN GLASS CONTAINERS. Immerse the panels in the solution at standard temperature for three to five minutes or until a light straw color develops. Color development time will vary with the aluminum alloy being conversion coated. After removal from the conversion coating solution, immediately rinse thoroughly in flowing distilled or deionized water. Arrange the panels in an upright position to permit them to drain dry. Apply the test materials to the conversion coated surfaces within 48 hours.

4.5.2.2 Preparation of Composite Panels:

4.5.2.2.1 Graphite Epoxy: AS4/3501-6 test panels shall be fabricated using eight plies of unidirectional tape laid (0, 45, 90, 135) symmetrical. Size of the test panels shall be 0.040 x 2.75 x 6 inches (1.0 x 70 x 152 mm). Cure as in 4.5.2.2.2.1.

4.5.2.2.2 Graphite Bismaleimide (BMI): IM7/5250-4 BMI test panels shall be fabricated using eight plies of unidirectional tape laid (+45°, 90°, -45°, 0°) symmetrical. Size of the test panels shall be 0.040 x 2.75 x 6 inches (1.0 x 70 x 152 mm). Cure as in 4.5.2.2.2.1.

4.5.2.2.2.1 Install peel ply to bag surface of laminate. Nylon peel ply is acceptable. Apply a vacuum of not less than 28 inches (711 mm) of mercury and 85 psi (587 kPa) pressure. Heat to 375 °F ± 10 (190 °C ± 5) at a rate of 1 to 4 F (0.5 to 2 C) degrees per minute. From 320 °F (160 °C) to 375 °F (190 °C) heat at a rate of less than 1 F (0.5 C) degrees per minute. Keep free air temperature at or below 390 °F (199 °C). Hold laminate at 375 °F (190 °C) for 360 minutes ± 20. Cool laminate to 150 °F (65 °C) or below at an average rate less than or equal to 5 F (3 C) degrees per minute while maintaining a minimum of 25 psi (172 kPa) pressure. Remove peel ply.

4.5.2.3 Preparation of Sealing Compound:

4.5.2.3.1 Qualification Tests: The quantity of sealing compound required for the tests shall be machine mixed as thoroughly as practical exercising care to minimize air inclusion. Where applicable, the sealing compound, immediately after mixing, shall be placed in cartridges for extrusion from a pneumatic sealing gun. Sealing compound in sectional type containers are to be machine mixed.

4.5.2.3.2 Acceptance Tests: The quantity of sealing compound required for the test shall be hand mixed as thoroughly as possible according to manufacturer's instructions. MIL-S-38714 containers shall be used when applicable.

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- 4.5.2.4 **Cleaning of Test Panels:** All test panels shall be cleaned by scrubbing and rinsing using a suitable solvent and clean AMS 3819 Grade A cloths. The panels shall be wiped dry with clean AMS 3819 Grade A cloths. Titanium, AMS 5516 corrosion resistant steel panels, and epoxy graphite panels shall be scrubbed with abrasive mats and a suitable solvent. After scrubbing, the panels shall be rinsed using a suitable solvent and clean AMS 3819 Grade A cloths and then wiped dry. The abrasive mats shall conform to MIL-A-9962, Type I, Class I, Grade A for the stainless steel and epoxy graphite and MIL-A-9962, Type III, Class 1, Grade A for the titanium.
- 4.5.2.4.1 When organic coating is specified for the test panels, the coating shall be fully cured as defined by the applicable coating specification before cleaning. The applied coatings shall be at least 14 days but not more than six months old when stored at ambient indoor temperatures.
- 4.5.2.5 **Application of Adhesion Promoter:** Panels that are to be tested with adhesion promoter as specified in Table 4 shall be tested with adhesion promoter recommended by the manufacturer. Treatment shall be done immediately after the panel is abraded and cleaned, by wetting a clean AMS 3819 cloth with recommended adhesion promoter and wiping the surface. Allow adhesion promoter to air dry at least 30 minutes but no more than two hours before applying the sealant. If more than two hours has elapsed, reclean and reapply the adhesion promoter before applying the sealant.
- 4.5.2.6 **Application of Sealing Compound:** Unless otherwise specified herein, test panels shall be given an application of sealing compound to produce a coating having a total thickness of $1/8$ inch \pm $1/64$ (3.2 mm \pm 0.4) when cured.
- 4.5.2.7 **Cure of Sealing Compound:** For qualification testing the sealing compound shall be cured for 14 days at 77 °F (25 °C) and 50% \pm 5 relative humidity. For acceptance tests, the sealing compound shall be given an accelerated cure for 48 hours at 77 °F (25 °C) and 50% \pm 5 relative humidity plus 24 hours at 140 °F (60 °C). Tests on the cured sealing compound shall commence not more than two days after the completion of the specified cure.
- 4.5.3 **Nonvolatile Content:** Within five minutes after mixing or warming to application temperature, 11 to 12 grams of mixed sealing compound shall be transferred as rapidly as possible to a previously weighted (W_1) aluminum dish approximately 57 mm in diameter. The Class A and C sealant shall be poured into the dish. The Class B sealant shall be extruded from a plastic cartridge fitted with 0.125 inch (3.18 mm) orifice nozzle, filling the bottom of the dish to a uniform depth. The initial weight (W_2) shall be determined using an analytical balance accurate within ± 1 mg. Immediately following weighing, the sample and dish shall be placed in a circulating air oven preheated to 158 °F (70 °C), and allowed to dwell for 72 hours \pm 2. Following this, the sample and dish shall be removed from the oven and allowed to cool in a desiccator to room temperature. Final weight (W_3) shall be determined on the same balance used for the initial weights. All weights shall be recorded to the nearest milligram.

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4.5.3 (Continued):

Percent nonvolatile content shall be determined from the average of three samples calculated using Equation 1.

$$\text{Percent nonvolatile} = \frac{(W_3 - W_1) \times 100}{W_2 - W_1} \quad (\text{Eq.1})$$

4.5.4 Viscosity of Base Compound:

4.5.4.1 Shall be determined with the base compound placed in a quart (1 L) can. The can shall be filled with the base compound to within 1/2 inch (13 mm) of the top, covered, and stored at 77 °F (25 °C) for not less than eight hours. The base compound shall be thoroughly mixed by stirring slowly for not less than three minutes after which the can shall be closed and the base compound shall be allowed to stand for not less than one hour.

4.5.4.2 The Brookfield model RVF viscometer, or equivalent, shall be used. The readings obtained shall be converted to poises (Pa·S). For Class B materials, the No. 7 spindle, at 2 rpm, shall be used. For Class C material, the No. 6 spindle, at 2 rpm, shall be used. The highest reading shall be taken after the instrument has run in the base compound for one minute.

4.5.5 *Viscosity of the Curing Agent:* The viscosity of the curing agent shall be determined in accordance with 4.5.4 except a No. 7 spindle at 10 rpm shall be used.

4.5.6 *Flow/Class B Only:* A standard sealant gun cartridge, fitted with a suitable nozzle, shall be filled with freshly mixed sealing compound. The gun and sealing compound shall be maintained at standard conditions throughout the test. The test shall be conducted with a flow test jig as shown in Figure 1. Depth of the plunger tolerances is critical and shall be controlled within the tolerance during all tests. The flow jig shall be placed on a table with the front face upward and the plunger depressed to the limit of its travel. Within 15 minutes after the beginning of mixing, enough of the mixed sealing compound shall be extruded from the application gun to fill the recessed cavity of the jig and leveled off with the block. The test at this interval shall be considered the initial flow of the sealing compound. Within 10 seconds after the leveling operation, the jig shall be placed on its end and the plunger immediately advanced to the limit of its forward travel. The flow measurement shall be taken 30 minutes after the sealing compound has been applied to the test jig. The flow shall be measured from tangent to the lower edge of the plunger to the further point to which the flow has advanced. As the sealing compound progresses in its application time, the flow test shall be repeated at the time intervals specified below. All time intervals, other than for the initial test, shall be measured from the end of the mixing period.

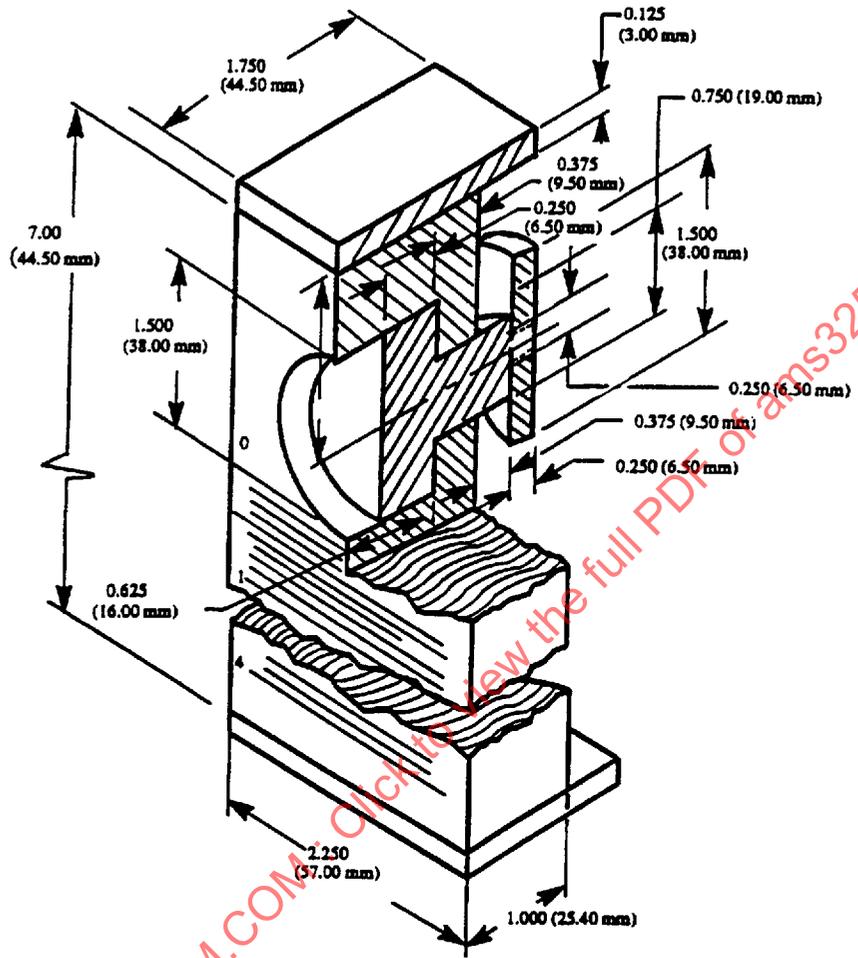
Class B-1/2: Initial reading only.

Class B-2: Initial, 50 minutes, 90 minutes

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MATERIAL: ALUMINUM ALLOY
 DIMENSIONS IN INCHES (MILLIMETERS)
 TOLERANCES:
 DECIMALS ± 0.016 INCH (± 0.41 MM).

(NOT TO SCALE)

FIGURE 1 - Flow Test Fixture

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4.5.7 Application Time:**4.5.7.1 Class B and C:**

4.5.7.1.1 The base compound, curing agent, and application gun shall be stabilized at standard conditions (See 4.5.1) for not less than eight hours before not less than 250 grams of the base compound is mixed with the proper amount of curing agent.

4.5.7.1.2 The mixed sealing compound shall be used to fill a standard sealing gun cartridge, having a nozzle with an orifice of 0.125 inch \pm 0.005 (3.19 mm \pm 0.13). The gun and sealing compound shall be maintained at standard conditions throughout the test.

4.5.7.1.3 The gun shall be attached to a constant air supply of 90 psi \pm 5 (620 kPa \pm 34). From 2 to 3 inches (51 to 76 mm) of sealing compound shall be extruded initially to clear any entrapped air. At the end of the rated application time for the particular class being tested, measured from the beginning of the mixing period, the sealing compound shall be extruded onto a previously weighted suitable receptacle for one minute and the weight of extruded sealing compound determined.

4.5.8 Assembly Time (Class C Only): Six test panels, 0.40 x 1.5 x 4 inches (10 x 38 x 102 mm), shall be prepared from AMS 4049 aluminum alloy. Drill two holes with a number 11 drill, 1.2 inches (30 mm) from one end with center 3/4 inch (19 mm) apart and 3/8 inch (9.5 mm) from each side. Deburr and clean with MIL-C-38736 solvent. Accurately determine the thickness of the panels around the holes. Apply approximately 0.015 inch (0.38 mm) of freshly mixed sealant to the drilled end of three specimens and allow to cure for 30 minutes. Place the other cleaned panels on those with sealant so that the holes line up and results in a one inch (25 mm) overlap. Sealant shall cover the entire one inch (25 mm) faying surface over lap area. Insert two (10-32) steel bolts that have been heat treated to at least 160 ksi (1103 MPa), into the holes and tighten (NAS 679-A3) nuts only until sealant starts to squeeze out. The thickness of the assembly shall be measured at this time and the thickness of the sealant shall be 0.010 to 0.015 inch (0.25 to 0.38 mm). Allow the specimens to be exposed to standard conditions for two hours. Tighten nuts to a torque value of 40 inch-pound (4.5 N·m). Measure the thickness of the assembly at the bolts with a micrometer and from this thickness subtract the thickness of the panels. Evaluate in accordance with 3.2.7. The sealant must squeeze out to a thickness of 0.005 inch (0.13 mm) or less at the bolts.

4.5.9 Tack-Free Time:

4.5.9.1 A 0.040 x 2-3/4 x 6 inch (1.0 x 70 x 152 mm) AMS 4049 aluminum alloy panel shall be cleaned in accordance with 4.5.2.4. Sealing compound, mixed and applied in accordance with 4.5.2.3 and 4.5.2.6 shall cover the cleaned panel surface to a depth of 1/8 inch \pm 1/64 (3.2 mm \pm 0.4). The panel shall be set aside to cure at standard conditions (See 4.5.2.7).

4.5.9.2 At the end of the tack-free time (See 3.2) two 1 x 7 inch (25 x 178 mm) pieces of polyethylene 0.005 inch \pm 0.002 (0.13 mm \pm 0.05) thick shall be applied to the sealing compound and held in place at a pressure of approximately 0.5 ounce per square inch (0.0002 N/mm²) for two minutes.

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- 4.5.9.3 The strips shall then be slowly and evenly peeled back at right angles to the sealing compound surface. The polyethylene shall come away clean and free for sealing compound.
- 4.5.10 Standard Cure Time: The instantaneous hardness shall be determined in accordance with FED-STD-601, method 3021, after sealing compound is allowed to cure at standard conditions as specified in 4.5.1.1 for the time specified in 3.2.9. The reading shall be taken on a double back-to-back, 0.125 inch (3.18 mm) thick specimen.
- 4.5.11 Peel Strength:
- 4.5.11.1 The type and quantity of panels listed in Table 4 shall be used for evaluation of peel strength. All panels shall be 2.75 x 6 inches (70 x 152 mm). The thickness of the panels shall be as listed in Table 4. The panels shall be prepared in accordance with 4.5.2. When specified, AMS 3100 adhesion promoter shall be applied per 4.5.2.5. Sealing compound shall cover five inches (127 mm) of one side of the panel surface to a depth of 1/8 inch \pm 1/64 (3.2 mm \pm 0.4).
- 4.5.11.2 A 2-3/4 x 12 inch (69.8 x 305 mm) strip of CCC-C-419, Type III, cotton duck or a strip of wire screen (20 to 30 mesh aluminum or monel wire fabric) shall be impregnated with the sealing compound, so that approximately five inches (127 mm) at one end is completely covered on both sides.
- 4.5.11.3 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.
- 4.5.11.4 An additional coating of sealing compound shall be applied over the fabric approximately 1/32 inch (0.8 mm) thick.
- 4.5.11.5 At the end of the sealing compound cure, two panels of each substrate listed in Table 4, except those coated with MIL-P-23377 Type I, Class C primer, MIL-C-85285 urethane topcoat, and MIL-P-85582 waterbased primer, shall be subjected to each of the test conditions listed below:
- Seven days at 140 °F (60 °C) in AMS 2629 Type I JRF
Seven days at 140 °F (60 °C) in equal parts JRF and 3% by weight aqueous sodium chloride solution.

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TABLE 4 - Peel Strength Panels

Quantity	Panel Material	Panel Dimensions
4	AMS 4049 aluminum alloy, chemical treated in accordance with 4.5.2.1	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
4	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
4	AMS 5516 stainless steel (Use AMS 3100 Adhesion Promoter)	0.025/0.040 x 2.75 x 6.0 inch (0.64/1.0 x 70 x 152 mm)
8*	AMS 4901 titanium (Use AMS 3100 Adhesion Promoter)	0.025/0.040 x 2.75 x 6.0 inch (0.64/1.0 x 70 x 152 mm)
8*	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, and coated with MIL-C-27725	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
4	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, and coated with MIL-C-27725 (Use AMS 3100 Adhesion Promoter)	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
2	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, coated with MIL-C-23377 Type I, Class C and cured seven days at standard conditions	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
2	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, coated with MIL-P-23377 Type 1, Class C and cured two hours at 200 °F (93 °C)	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
2	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, primed with MIL-P-23377 Type I, Class C and coated with MIL-C-85285 urethane topcoat	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
2	AMS 4045 aluminum alloy, anodized in accordance with AMS 2471, coated with MIL-P-85582 waterbased primer (Use AMS 3100 adhesion promoter)	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)

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TABLE 4 (Continued)

Quantity	Panel Material	Panel Dimensions
8	Graphite Epoxy as in 4.5.2.2.1. Test both peel side and tool side. Do not test both sides of the same panel.	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)
8	Graphite Bismaleimide (BMI) as in 4.5.2.2.2. Test both peel side and tool side. Do not test both sides of the same panel.	0.040 x 2.75 x 6.0 inch (1.0 x 70 x 152 mm)

4.5.11.5.1 In addition, two panels of each of the substrates marked with an asterisk (*) in Table 4 shall be subjected to each of the following test conditions:

70 days at 140 °F (60 °C) in AMS 2629, Type I, with fluid change every 14 days.

70 days at 140 °F (60 °C) in equal parts AMS 2629, Type I, and 3% by weight aqueous sodium chloride solution with fluid change every 14 days.

4.5.11.5.2 Four of the panels coated with MIL-P-23377 Type I, Class C primer (two cured at standard conditions and two cured at 200 °F (93 °C)), two of the panels coated with MIL-C-85285 urethane topcoat, and two of the panels coated with MIL-P-85582 primer shall be subjected to seven days at 140 °F (60 °C) in 3% by weight aqueous sodium chloride solution.

4.5.11.6 After specified exposure, the panels shall be retained in the fluid for one day at controlled conditions (4.5.1.1). Measure peel strength within five minutes after removal from the test fluid.

4.5.11.7 Two 1-inch (25-mm) wide strips shall be cut through the sealing compound and fabric to the metal and extended the full length of the fabric. The specimens shall be stripped back at an angle of 180 degrees to the metal panel in a suitable tensile testing machine having a jaw separation rate of two inches (51 mm) per minute. During the peel strength testing, three cuts shall be made through the sealing compound to the panel in an attempt to promote adhesive failure. The cuts shall be at approximately 1-inch (25-mm) intervals.

4.5.11.8 The results shall be the numerical average of the peak loads during cohesive failure. Failure of the sealant compound to the fabric shall not be included in the peel strength values.

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4.5.12 Tensile Strength and Elongation: Mixed sealing compound shall be pressed between two polyethylene sheets $0.125 \text{ inch} \pm 0.015$ ($3.18 \text{ mm} \pm 0.38$) thick to fabricate a cured sheet of sealing compound, by removing the top sheet at the end of the tack-free time, and allowing the sealing compound to cure in accordance with 4.5.2.7. Eighteen tensile specimens shall be cut from the sheet using die C, as specified in ASTM D 412. Three specimens shall be exposed to each of the following environmental conditions after standard cure as in 4.5.2.7:

Condition 1. Standard Cure as in 4.5.2.7.

Condition 2. 12 days at $140 \text{ }^\circ\text{F}$ ($60 \text{ }^\circ\text{C}$) + 60 hours at $160 \text{ }^\circ\text{F}$ ($71 \text{ }^\circ\text{C}$) + six hours at $180 \text{ }^\circ\text{F}$ ($82 \text{ }^\circ\text{C}$), all in AMS 2629 Type I fluid.

Condition 3. Condition 2 + 24 hours at $120 \text{ }^\circ\text{F}$ ($49 \text{ }^\circ\text{C}$) + standard heat cycle as in 4.5.1.3.

Condition 4. Standard heat cycle as in 4.5.1.3.

Condition 5. 72 hours in AMS 3021 at $77 \text{ }^\circ\text{F} \pm 5$ ($25 \text{ }^\circ\text{C} \pm 3$)

Condition 6. 72 hours in AMS 3020 at $77 \text{ }^\circ\text{F} \pm 5$ ($25 \text{ }^\circ\text{C} \pm 3$)

Where fluid immersion is specified, the specimens shall be immersed in 400 mL of fluid. Specimens to be tested after the fluid immersion shall be cooled for 24 hours at $77 \text{ }^\circ\text{F}$ ($25 \text{ }^\circ\text{C}$) and tested within five minutes after removal from the fluid.

Specimens to be tested after oven aging shall be allowed to cool for 16 to 48 hours at controlled conditions (4.5.1.1) before testing.

The tensile and elongation tests shall be conducted at controlled conditions (4.5.1.1) and tested in accordance with ASTM D 412 at a jaw separation rate of $20 \text{ inches} \pm 1$ ($508 \text{ mm} \pm 25$) per minute. Inspect to the requirements of 3.2.11.

4.5.13 Shear Strength (Class C Only): Six test panels, $0.040 \times 1 \times 3 \text{ inches}$ ($1.0 \times 25 \times 76 \text{ mm}$), shall be prepared from AMS 4049 aluminum alloy. Apply a coat of sealant 0.010 to 0.020 inch (0.25 to 0.51 mm) thick to one end of three panels covering approximately one inch (25 mm) on each panel. Overlap the sealant with another panel making a one square inch (6.45 cm^2) lap test specimen. Reduce the thickness of the sealant to 0.005 to 0.010 inch (0.13 to 0.25 mm). Cure the sealant in accordance with 4.5.2.7. Determine the shear strength by pulling in shear at a speed of two inches (51 mm) per minute.

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4.5.14 Low-Temperature Flexibility:

4.5.14.1 Four AMS 4049 aluminum alloy test panels, 0.040 x 2.75 x 6 inches (1.02 x 69.8 x 152 mm), shall be prepared. A coating of the sealing compound 0.10 x 1.5 x 4 inches (2.5 x 38 x 102 mm) shall be applied to the center of each of the four panels. Care shall be taken to maintain an accurate sample thickness of 0.1 inch (2.5 mm). At the end of a standard cure, as in 4.5.2.7, the specimens shall be immersed in 900 mL of AMS 2629, Type I for 120 hours \pm 4 at 140 °F (60 °C) followed by 60 hours \pm 4 at 160 °F (70 °C) and six hours \pm 1 at 180 °F (82 °C). At the completion of the fluid exposure, the specimens shall be removed from the fluid and given a standard heat cycle as in 4.5.1.3. All four panels shall then be immediately placed in a low-temperature flexibility fixture (See Figure 2) consisting of a clamp support that will grip both sides of both six inch (152 mm) edges of the panel for 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 °F (-54 °C), stabilized at this temperature for at least two hours, and the panels flexed through 130 consecutive cycles.

4.5.15 Long-Term Storage: Three original unopened six-ounce (178 mL) two-component kits of sealing compound (3.5 fluid ounces (105 mL)) of base compound in each kit and the appropriate amount of curing compound shall be stored at 77 °F (25 °C) for nine months. At the end of the storage period the compound shall be tested in accordance with 4.5.6, 4.5.7, 4.5.8, 4.5.9, and 4.5.10 and inspected for flow, application time, assembly time, tack-free time, and standard cure time.

4.5.16 Repairability:

4.5.16.1 Prepare a sufficient number of AMS 4045 aluminum alloy panels measuring 0.040 x 2.75 x 6 inches (1.02 x 69.8 x 152 mm) so that there are two panels for each Class B-2 sealing compound already qualified to this specification, plus two panels for the material being qualified and two panels for material qualified to AMS 3276. Sulfuric acid anodize in accordance with AMS 2471 and overcoat with MIL-C-27725.

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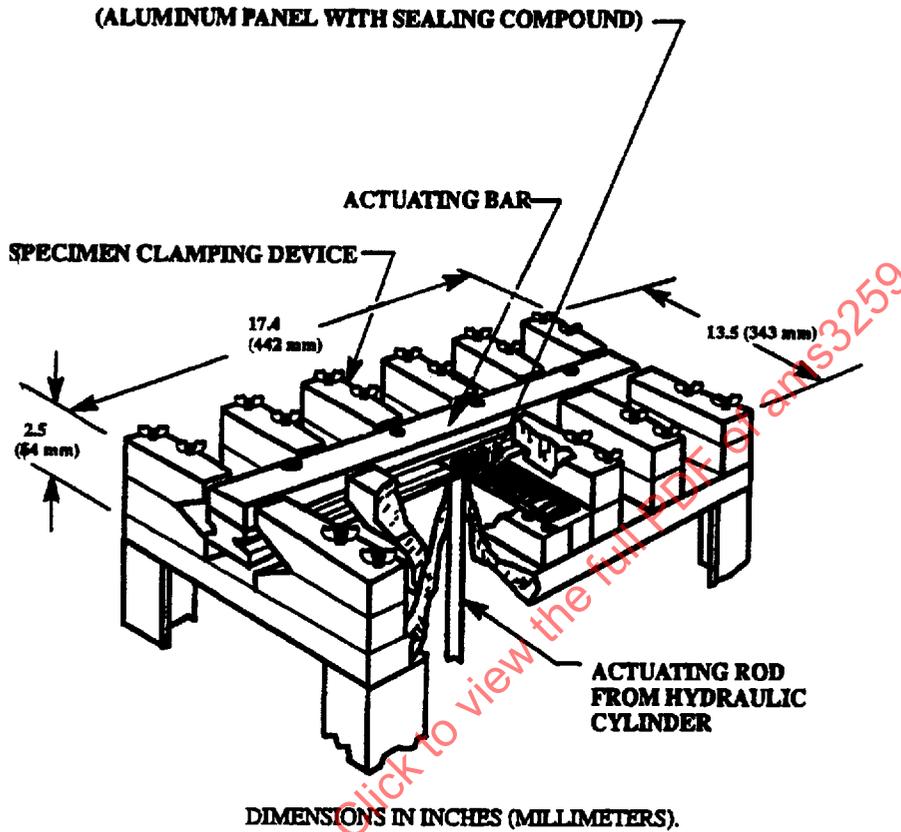


FIGURE 2 - Low Temperature Flexibility Apparatus

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- 4.5.16.2 Overcoat one side of the panels with $1/8$ inch $\pm 1/64$ (3.2 mm ± 0.4) of sealing compound so that two panels are coated with each Class B-2 sealing compound previously qualified to this specification, two panels are coated with AMS 3276 polysulfide sealing compound and two panels are coated with the sealing compound being qualified. After a standard cure per 4.5.2.7, expose one panel of each sealing compound to AMS 2629 JRF Type I for three days at 140 °F (60 °C), followed by three days air drying at 120 °F (49 °C), then seven days air aging at 250 °F (121 °C).
- 4.5.16.3 Clean all panels in accordance with 4.5.2.4 and apply a thickness of 0.125 inch (3.18 mm) of newly mixed sealing compound over the existing compound. A peel strength panel shall be prepared in accordance with 4.5.11. After a standard cure as in 4.5.2.7, the specimens shall be tested for peel strength as specified in 4.5.11.
- 4.5.17 Paintability: Two 0.040 x 2.75 x 6 inches (1.01 x 70 x 152 mm) aluminum alloy AMS 4045 panels shall be sulfuric acid anodized in accordance with AMS 2471 and coated with MIL-C-27725. A thin layer of sealant, approximately 0.031 inch (0.79 mm) thick, shall be applied to one surface and allowed to cure at standard conditions (See 4.5.1). After curing, the sealant coated surface of one panel shall be painted with MIL-P-23377 primer and MIL-L-81352 acrylic coating. The sealant coated surface of the other panel shall be coated with MIL-P-23377 primer and MIL-C-85285 polyurethane coating. When the coatings are thoroughly cured they shall be tested for adhesion using a wet tape adhesion test in accordance with FED-STD-141, Method 6301.2 after soaking the panels in distilled water for 24 hours. Inspect visually for separation of paint.
- 4.5.18 Shaving and Sanding (Class B Only): The groove and screw heads of a thermal expansion block (Figure 3), coated with MIL-P-23377, shall be filled with sealant allowing a small excess for shaving and sanding. After being given a standard cure (4.5.1), the excess compound shall be shaved off with a sharp razor blade and the surface sanded with 400 grit abrasive paper on a sanding block. Accomplishment of shaving and sanding shall be considered satisfactory if a smooth finish is obtained and unsatisfactory if the material rolls or tears while being worked. Inspect visually for evidence of rolling or tearing of sealant surface.
- 4.5.19 Corrosion:
- 4.5.19.1 Mixed Couple: All sealant types shall be subjected to mixed couple corrosion testing. Two test panels of each type assembled, as indicated in Table 5, cleaned in accordance with 4.5.2.4 and configured as shown in Figure 4, shall be used for each sealant.

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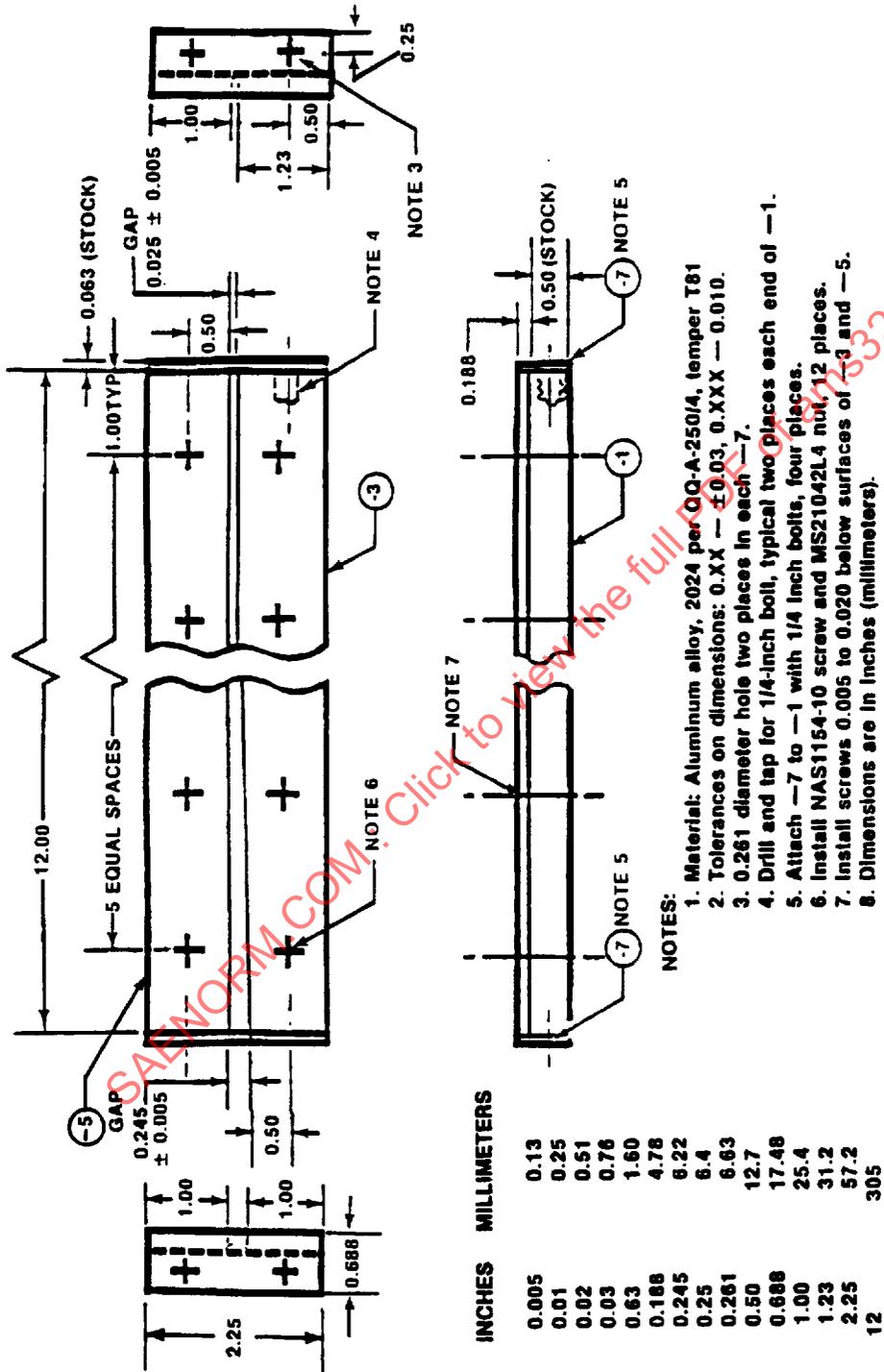


FIGURE 3 - Thermal Expansion Block

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TABLE 5 - Mixed Couple Assemblies

Assembly	Panel A (Figure 4)	Panel B (Figure 4)
1	Titanium ²	Aluminum ¹
2	Cadmium Plated Steel ³	Aluminum ¹
3	Epoxy/Graphite ⁴	Aluminum ¹

¹ AMS 4045 treated with MIL-C-81706, Class 1A, materials
² MIL-T-9046, Type III, Composite C (6Al - 4V)
³ AMS 2400 Cadmium Plated Low Alloy Steel
⁴ AS4/3501-6 in accordance with 4.5.2.2

4.5.19.2 Assembly Preparation: Five to seven mils (0.13 to 0.18 mm) of sealant shall be applied to one side of each metal (Figure 4). The coated portions shall be mated using inert nonmetal fasteners (e.g., nylon) tightened to produce a total sealant thickness of approximately seven mils (0.18 mm). Excess sealant shall be carefully removed from the panel surface. Class C sealant shall not be mated until one to two hours after panels are coated.

4.5.19.3 Exposure: Mixed couple assemblies shall be exposed as specified in 4.5.19.4 and evaluated as in 4.5.19.6.

4.5.19.4 Exposure: The prestressed or mixed couple assemblies shall be exposed for four weeks in a salt spray cabinet meeting the requirements of ASTM B 117, Appendix 1. The test shall be conducted under the following conditions:

Salt solution: 5% by weight sodium chloride

Cabinet temperature: 95 °F (35 °C)

Saturator Tower Temperature: 115 °F (46 °C)

Cycle: Continuous spray; for one hour in every six hours, four times daily, at a flow rate of 1 mL/minute/cubic foot (0.03 m³) of box.

4.5.19.5 The collected solution in the cabinet shall be tested weekly and shall conform to the following conditions:

1 to 2 ml/hour collection rate

pH: 2.5 to 3.2

Specific gravity: 1.02 to 1.04

