SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3284A

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Superseding AMS 3284

Sealing Compound, Low Adhesion, for Removable Panels and Fuel Tank Inspection Plates

1. SCOPE:

1.1 Form:

This specification covers a polysulfide sealing compound with low adhesive strength. This elastomeric compound shall be supplied as a two-component system which cures at room temperature.

1.2 Application:

This compound has been used typically for sealing aircraft access doors and accessories where gaskets are required, but usage is not limited to such applications. The sealing compounds are resistant to jet fuels and high aromatic aviation gasolines and are usable from -67 to 250 °F (-54 to 120 °C).

1.3 Classification:

The sealing compound covered by this specification is classified as corrosion inhibiting or non-corrosion inhibiting, method of application, and application time as follows:

Type 1: Non-corrosion inhibiting
Type 2: Corrosion inhibiting (Non-chromated)

Class A - Suitable for brush application, available with the following application times:

Class A-1/2
Class A-2

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

Class B-1/2
Class B-2

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1.4 Precautions:

1.4.1 Safety - Hazardous Materials: Shall be in accordance with AS5502 (1.1)

2. APPLICABLE DOCUMENTS:

Shall be in accordance with AS5502 (2).

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2471	Anodic Treatment of Aluminum Alloys, Sulfuric Acid Process, Undyed Coating
AMS 2629	Fluid, Jet Reference
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 4911	Titanium Sheet, Strip, and Plate, 6Al-4V Annealed
AMS 5516	Steel, Corrosion Resistant, Sheet, Strip, and Plate, 18Cr - 9.0Ni (SAE 30302), Solution Heat Treated
AMS-C-27725	Coating, Corrosion Preventive, for Aircraft Integral Fuel Tanks
ARP 1917	Clarification of Terms Used in Aerospace Metals Specifications
AS5127	Methods for Testing Aerospace Sealings
AS5127/1	Methods for Testing Aerospace Sealants, Two-Component Synthetic Rubber Compounds
AS5502	Standard Requirements for Aerospace Sealants

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM D 1974	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D 2240	Standard Test Method for 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 or www.assistdocs.com.

PPP-C-96	Can, Metal, 28 Gage and Lighter
MIL-PRF-23377	Primer Coating: Epoxy, High Solids

2.4 PRI Publications:

Available from PRI, 161 Thornhill Road, Warrendale, PA 15086-7527 or www.pri.sae.org.

PD 2000	Procedures for an Industry Qualified Product Management Process
PRI-QPL-AMS3284	Products Qualified Under AMS 3284

3. TECHNICAL REQUIREMENTS:

3.1 Materials:

The basic ingredient shall be a polysulfide type synthetic rubber. 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 consist of corrosion inhibiting and non-corrosion inhibiting types but neither shall contain 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. 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 Qualification:

All products sold to this specification shall be listed, or approved for listing, on the qualified products list, PRI-QPL-AMS3284. The qualified products list shall be in accordance with PD 2000.

3.3 Date of Packaging:

Shall be in accordance with AS5502 (3.1).

3.4 Toxicolological Formulations:

Shall be in accordance with AS5502 (3.2).

3.5 Quality:

Shall be in accordance with AS5502 (3.3).

3.6 Shelf Life:

Packaged material shall have a minimum shelf life of 9 months from Date of Packaging when stored unopened at 80 °F (27 °C) or lower.

3.7 Properties:

The sealing compound, when mixed in accordance with the manufacturer's instructions and cured as specified in 4.5.3.3, shall conform to the requirements shown in Table 1, and, determined in accordance with the specified test methods.

TABLE 1 - Properties

Paragraph	Property	Requirement	AS5127/1 Standard Test Method (paragraph)
3.7.1	Color	Reddish	Visual Examination
3.7.2	Specific Gravity, max	1.65	(6.1)
3.7.3	Nonvolatile Content By weight, min.		(5.1)
	Class A	84%	
	Class B	97%	
3.7.4	Viscosity of Base Compound		(5.3)
	Class A	100 to 500 poise (10 to 50 Pa·S)	
	Class B	(6000 to 14000 poise) (600 to 1400 Pa·S)	
3.7.5	Flow (Class B only)	0.10 to 0.75 inch	(5.5.1)
	Class B	(2.5 to 19.0 mm)	
3.7.6	Application Time, min		(5.6.1) Use No. 7 spindle at 10 rpm
	Class A	2500 poise (250 Pa·S) max	(5.6.2)
	Class B	15 grams/minute, min	

TABLE 1 - Properties (cont.)

Paragraph	Property	Requirement	AS5127/1 Standard Test Method (paragraph)
3.7.7	Tack-Free Time (Measured from the beginning of mixing), max		(5.8)
	Class A-1/2	10 hours	
	Class A-2	24 hours	
	Class B-1/2	10 hours	
	Class B-2	24 hours	
3.7.8	Standard Cure Time, Durometer A Hardness, min		(5.9)
	Class A-1/2	30 @ 24 hours	
	Class A-2	30 @ 72 hours	
	Class B-1/2	30 @ 24 hours	
	Class B-2	30 @ 72 hours	
3.7.9	Low Temperature Flexibility	No cracking or checking	(7.6)
3.7.10	Peel Strength, max	4 pounds force/inch (lbf) (720 N/m), 98% adhesive failure, min	4.5.4.1
3.7.11	Resistance to Heat	No visual evidence of softening, sponging, checking, or cracking.	4.5.4.2
3.7.12	Accelerated Storage Stability	Must pass Viscosity, Tack Free Time, and Application Time	(9.1) and Table 3
3.7.13	Weight Loss and Flexibility, max	8% Weight Loss. No cracking or checking.	(7.4)
3.7.14	Corrosion, Mixed-Metal Assemblies (Type 2, only)	No evidence of corrosion	(7.10.2)

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

Shall be in accordance with AS5502 (4.1).

4.1.1 Source Inspection: Shall be in accordance with AS5502 (4.1).

4.1.2 Shelf-Life Surveillance and Updating:

4.1.2.1 Sampling: Shall be in accordance with AS5502 (4.1.2).

4.1.2.2 Testing: The following inspections are to be conducted for shelf-life surveillance and updating:

Condition of container
Viscosity of the base compound
Application time
Tack-free time
Standard cure time

4.1.2.2.1 Tests are to be conducted in accordance with test methods outlined in this specification for acceptance tests. 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 updates will be allowed.

4.2 Classification of Tests:

Shall be in accordance with AS5502 (4.2).

4.2.1 Qualification Tests: Shall be in accordance with AS5502 (4.2.1).

4.2.2 Preproduction Tests: Shall be in accordance with AS5502 (4.2.2).

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

Color
Nonvolatile content
Viscosity of the base compound
Flow
Application time
Tack-free time
Standard cure time, hardness
Peel adhesion on MIL-PRF-23377

4.3 Sampling and Testing:

Shall be in accordance with AS5502 (4.3).

4.3.1 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.3.2 For Acceptance Tests: Shall be in accordance with AS5502 (4.3.1).

4.3.2.1 A batch shall be the quantity of material run through a mill or mixer at one time.

4.3.2.2 Material for testing shall be mixed, as much as practical in the same containers in which the sealing compounds were procured. Sealant shall be either hand-mixed or machine mixed.

4.3.2.3 A statistical sampling plan, acceptable to the purchaser, may be used in lieu of sampling as in 4.3.2 and the report for 4.6 shall state that such a plan was used.

4.4 Approval:

Shall be in accordance with AS5502 (4.4).

4.4.1 Purchaser Approval: Shall be in accordance with AS5502 (4.4.1).

4.4.2 Method of Inspection: Shall be in accordance with AS5502 (4.4.2).

4.5 Test Methods:

4.5.1 Standard Conditions: Standard laboratory conditions shall be in accordance with AS5127 (4.1).

4.5.2 Standard Tolerances: Unless otherwise specified herein, standard tolerances of AS5127 (3.1) "Standard Tolerances" shall apply.

4.5.3 Preparation of Test Specimens: Test specimens shall be prepared in accordance with AS5127 (6).

4.5.3.1 Cleaning of Test Panels: Test panels shall be cleaned in accordance with AS5127 (6).

4.5.3.2 Application of Sealing Compound: Unless otherwise specified herein, freshly mixed sealing coumpound shall be applied to test panels in accordance with AS5127 (6.8) “Application of Sealing Compound” and shall be given an application of sealing compound to produce a coating having a total thickness of 1/8 inch ± 1/64 (3.2 mm ± 0.4) when cured.

4.5.3.3 Curing of Sealing Compound: Shall be in accordance with AS5127 (6.9) “Curing of Sealing Compounds”. For qualification and preproduction testing, the sealing compound shall be cured 14 days at standard conditions. For acceptance testing, the sealing compound shall be given an accelerated cure of 48 hours at standard conditions followed by 24 hours at 140 °F (60 °C).

4.5.3.4 Curing of Organic Coating: 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.

4.5.4 Test Procedures: Standard test methods as shown in Table 3 shall be used. Standard test methods are in accordance with AS5127 and AS5127/1. In the event of a conflict between the test of this document and AS5127 and/or AS5127/1, the text of this document takes precedence.

TABLE 3 - Standard Test Methods

Test Methods	AS5127/1
Specific Gravity	(6.1) "Specific Gravity"
Nonvolatile Content	(5.1) "Nonvolatile Content"
Viscosity of Base Compound	(5.3) "Viscosity of Base Compound"
Flow (Class B only)	(5.5.1) "Flow (Classes B and D)"
Application Time (Class A)	(5.6.1) "Application Time, Class A material"
Application Time (Class B)	(5.6.2) "Application Time, Class B and C material"
Tack-Free-Time	(5.8) "Tack-Free-Time"
Standard Cure Time	(5.9) "Standard Curing"
Low Temperature Flexibility	(7.6) "Low Temperature Flexibility", use two panels, no fuel or heat aging
Accelerated Storage Stability	(9.1) "Accelerated Storage Stability", test in accordance with AS5127/1, (5.3), (5.6), and (5.8) only.
Weight Loss and Flexibility	(7.4) "Weight Loss and Flexibility"
Corrosion (Type II)	(7.10.2) "Corrosion, Mixed-Metal Assemblies"

4.5.4.1 Peel Strength: The panels listed in Table 4 shall be used for evaluation of peel strength. The panels shall be prepared in accordance with AS5127/1 under (8.) "Peel Strength Properties" and (8.1) "Peel Strength Testing" and as in (Figure 22) "Five-Inch Peel Specimen Configuration". Two panels shall be used for each substrate and after sealant cure, the panels shall be immersed for 48 hours at 77 °F (25 °C) in AMS 2629 Type I jet reference fluid. The MIL-PRF-23377 panels shall be immersed in distilled water for 48 hours at 77 °F (25 °C). After removal from the fluids, a 1-inch (25 mm) wide strip shall be cut through the sealant 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 2 inches (51 mm) per minute.

4.5.4.2 Resistance to Heat: A 0.040 x 2.75 x 6 inch (1.0 x 70 x 152 mm) AMS 4049 aluminum alloy panel shall be cleaned in accordance with 4.5.3.1. Sealing compound shall cover one side of the panel to a depth of 1/8 inch ± 1/64 (3.2 ± 0.4 mm). At the end of sealant cure (see 4.5.3.3), the panel shall be immersed vertically in AMS 2629 Type I jet reference fluid for 48 hours at 140 °F (60 °C) in a covered glass vessel with one-half of the sealant above the liquid level. The panel shall then be removed, air dried at 77 °F (25 °C) for 24 hours, and baked at 250 °F (121 °C) for 72 hours. At the end of the heat exposure, the sealing compound shall be visually examined to the requirements of 3.6.11.