AEROSPACE MATERIAL SPECIFICATION

AMS3266™	REV. B
Issued 1989-10 Revised 2022-11 Superseding AMS3266A	

Sealing Compound, Polythioether Elastomeric Two-Part Electrically Conductive

RATIONALE

Revised to update electrical contact resistance test method and for Five-Year Review.

1. SCOPE

1.1 Form

This specification covers two types of electrically conductive, elastomeric polythioether sealing compounds that cure at room temperature. The sealing compound is supplied as either a two-component system or as premixed and frozen.

1.2 Application

These materials primarily provide an electrically conductive sealant or metal joint interface for shielding purposes. They have been used in aircraft to provide an electrically conductive path in faying surface seals as well as overcoating of fasteners and sealing of seams and joints along with providing an effective corrosion barrier. They have a continuous service use from -65 to +250 °F (-54 to +121 °C). The cured sealant materials are resistant to exposure to both jet fuel and aviation gas.

1.3 Classification

1.3.1 Types

Type 1 - Contains chromate type corrosion inhibitor
Type 2 - Contains non-chromate type corrosion inhibitors

1.3.2 Classes

Class B - Suitable for application by extrusion gun or spatula. Available with the following application times in hours:

B-1
B-2

1.4 Safety - Hazardous Materials

Shall be in accordance with AS5502 (1.1).

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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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2629 Fluid, Jet Reference

AMS-S-8802 Sealing Compound, Fuel Resistant, Integral Fuel Tanks and Fuel Cell Cavities

AS5127 Aerospace Standard Test Methods for Aerospace Sealants Methods for Preparing Aerospace Sealant Test Specimens

AS5127/1 Aerospace Standard Test Methods for Aerospace Sealants, Two-Component Synthetic Rubber Compounds

AS5502 Standard Requirements for Aerospace Sealants and Adhesion Promoters

2.2 U.S. Government Publications

Copies of these documents are available online at https://quicksearch.dla.mil.

MIL-PRF-23699 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Number O-156

MIL-PRF-83282 Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537

2.3 NAS Publications

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 703-358-1000, http://www.aia-aerospace.org/

NAS705 Terminal, Stud-Turret, Single End, Midget

2.4 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

2.5 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.pri-network.org.

OP 2007 Appendix G9 Additional Requirements for the Aerospace Sealants and Associated Materials (G9) QPG

PRI-QPL-AMS3266 Products Qualified Under AMS3266

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3. TECHNICAL REQUIREMENTS

3.1 Materials

The basic ingredient shall be synthetic rubber, made from polythioether polymer, and shall contain nickel filler and corrosion inhibitors suitable to the designated type. The sealing compound shall cure by the addition of a separate curing agent to the base compound and shall not depend on solvent evaporation for curing. The curing agent shall contain either manganese dioxide curative or epoxy curative and 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 sealing compound shall be red or pink in color.

3.1.1 Adhesion Promoter

The adhesion promoter, if required, shall be an air drying liquid and shall be included as part of the package with the base compound.

3.2 Date of Packaging

Shall be in accordance with AS5502 (3.1).

3.3 Toxicological Formulations

Shall be in accordance with AS5502 (3.2).

3.4 Quality

Shall be in accordance with AS5502 (3.3).

3.5 Shelf-Life

Shelf-Life shall be a minimum of 6 months from the date of packaging when stored at 40 to 60 °F (4 to 16 °C) in the original unopened containers, with intermittent and reasonable temperature excursions allowed during shipment. The manufacturer may recommend storage at lower temperatures to preserve application and handling properties. Material may be retested for Shelf-Life extension per 4.3.3.

3.5.1 Premixed and Frozen Material

Premixed and frozen material shall have a minimum storage life of 30 days at -80 °F (-62 °C) or lower from date of mix/freeze. The date of mix/freeze shall be within the Shelf-Life of the unmixed material.

3.6 Properties

The base compound and the curing agent, when mixed in accordance with manufacturer's instructions and cured in accordance with 4.5.3.5, shall conform to the requirements shown in Table 1, when determined in accordance with the specified test methods.

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Table 1 - Properties

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.1	Nonvolatile Content, by Weight, Minimum	92%	AS5127/1 (5.1)
3.6.2	Application Time, Minimum		AS5127/1 (5.6)
	From Beginning of Mixing, Not Less Than 15 g/min Shall be Extruded		AS5127/1 (5.6.2)
	B-1	1 hour	
	B-2	2 hours	
3.6.3	Tack-Free Time (Measured from Beginning of Mixing), Maximum		AS5127/1 (5.8)
	B-1	10 hours	
	B-2	24 hours	
3.6.4	Cure Time to Hardness (Time to Reach 30 Durometer A), Maximum		AS5127/1 (5.9)
	B-1	72 hours	
	B-2	72 hours	
3.6.5	Specific Gravity	1.9 – 2.25	AS5127/1 (6.1)
3.6.6	14 Day Hardness, Durometer Shore A, Instantaneous, Minimum	40	AS5127/1 (6.2)
3.6.7	Hydrolytic Stability, Minimum	40 Shore A	AS5127/1 (6.6)
3.6.8	Thermal Stability, 48 Hours at 250 °F (121 °C)	No blistering or sponging; hardness shall not deviate more than ±15 from initial	AMS3266 (4.6.3)
3.6.9	Low Temperature Flexibility	No visual evidence of cracking, checking or loss of adhesion	AMS3266 (4.6.2) and AS5127/1 (7.6)
3.6.10	Electrical Contact Resistance		AMS3266 (4.6.1)
3.6.10.1	Initial, Maximum, Type 1	0.05 Ω	
	Initial, Maximum, Type 2	0.5 Ω	
3.6.10.2	After 1000 Hours Salt Spray, Maximum	1.0 Ω	
3.6.11	Tensile Strength and Elongation, Minimum		AS5127/1 (7.7)
3.6.11.1	Cure per 4.5.3.5	50 psi (345 kPa)/40%	
3.6.11.2	Cure per 4.5.3.5 Plus 48 Hours at 140 °F (60 °C) in AMS2629, Type 1	50 psi (345 kPa)/40%	
3.6.11.3	Cure per 4.5.3.5 Plus 48 Hours at 140 °F (60 °C) in MIL-PRF-23699	50 psi (345 kPa)/40%	

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Table 1 - Properties (continued)

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.11.4	Cure per 4.5.3.5 Plus 24 Hours at 250 °F (121 °C) in MIL-PRF-23699	50 psi (345 kPa)/40%	
3.6.11.5	Cure per 4.5.3.5 Plus 48 Hours at 140 °F (60 °C) in MIL-PRF-83282	50 psi (345 kPa)/40%	
3.6.12	Shear Strength, Minimum	40 psi (276 kPa), 95% cohesive failure	AS5127/1 (7.8)
3.6.13	Corrosion Resistance		
3.6.13.1	Type 1	No pitting corrosion under conductive sealant	AMS3266 (4.6.4)
3.6.13.2	Type 2	No corrosion or signs of deterioration under the sealant	AS5127/1 (7.9)
3.6.14	Storage Stability		
3.6.14.1	Accelerated Storage		AS5127/1 (9.1) Storage time shall be 7 days at 120 °F (49 °C)
3.6.14.1.1	Appearance	No skinning, hardening or separation that cannot be restored by normal agitation	
3.6.14.1.2	Application Time, Minimum From Beginning of Mixing, Not Less Than 5 g/min Shall be Extruded B-1 B-2	 1 hour 2 hours	AS5127/1 (5.6) AS5127/1 (5.6.2)
3.6.14.1.3	Tack Free Time	Same as 3.6.3	
3.6.14.1.4	Cure Time to Hardness	Same as 3.6.4	
3.6.14.2	Long Term Storage		AMS3266 (4.6.5)
3.6.14.2.1	Appearance	No skinning, hardening or separation that cannot be restored by normal agitation	
3.6.14.2.2	Application Time	Same as 3.6.14.1.2	
3.6.14.2.3	Tack-Free Time	Same as 3.6.3	
3.6.14.2.4	Cure Time to Hardness	Same as 3.6.4	

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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 (4.1.1).

4.1.2 Sampling and Testing

Shall be in accordance with AS5502 (4.3).

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).

4.2.1.1 Qualification Requirements for Class B-2

Class B-2, if available, shall be the first material that is qualified for each supplier of sealing compound. Class B-2 sealing compound shall be tested for and shall meet all technical requirements of this specification with the exception of requirements unique to other application times or types of the sealing compound.

4.2.1.2 Qualification Requirements for Other Application Times

Once qualification for Class B-2 has been obtained (or B-1 if no B-2 exists), other application times of qualified classes may be qualified. The formulation for other application times of qualified classes shall be the same as Class B-2 except for minor variations necessary for conformance to application time requirements. All compounds shall meet all technical requirements of this specification. Application times of qualified classes need only to be tested to the initial acceptance tests listed in 4.2.2 and other tests as defined by the QPL agency. Any unique qualification tests for the sealant's application time shall also be tested per QP 2007 Appendix G9.

4.2.2 Initial Acceptance Tests

Requirements shown in Table 2 are initial acceptance tests and shall be performed on each batch in accordance with AS5502 (4.2.2.1).

Table 2 - Initial acceptance tests

Test	Requirement Paragraph
Application Time	3.6.2
Tack-Free Time	3.6.3
Cure Time to Hardness	3.6.4
Electrical Contact Resistance, Initial Only[1]	3.6.10.1

[1] For acceptance tests, sealant may be subjected to an accelerated cure per 4.5.3.5.

4.2.3 Final Acceptance Tests

Requirements shown in Table 3 are final acceptance tests and shall be performed on each lot in accordance with AS5502 (4.2.2.2).

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Table 3 - Final acceptance tests

Test	Requirement Paragraph
Application Time	3.6.2
Tack-Free Time	3.6.3
Cure Time to Hardness	3.6.4

4.3 Sampling and Testing

Shall be in accordance with AS5502 (4.3).

4.3.1 Qualification Tests

Samples shall be produced using production scaled equipment. Enough material shall be supplied to perform all required tests. Samples shall be identified as specified herein and below:

SEALING COMPOUND, POLYTHIOETHER ELASTOMERIC TWO-PART ELECTRICALLY CONDUCTIVE
AMS3266B TYPE AND CLASS
MANUFACTURER'S IDENTIFICATION _____
BATCH/LOT NUMBER _____
DATE OF PACKAGING _____
SHELF-LIFE EXPIRATION DATE _____
STORE BETWEEN 40 °F (4 °C) AND 60 °F (16 °C)

4.3.2 Acceptance Tests

Shall be in accordance with AS5502 (4.3.1).

4.3.2.1 Batch and Lot

A batch shall be defined as the quantity of material run through a mill or mixer at one time. A lot shall be defined as material from one batch of each component assembled (packaged) as finished product in one size and/or type of container at the same time. The lot, when used, shall be traceable to the batches of base compound and curing agent.

4.3.2.2 Initial and Final Acceptance Tests

Each batch shall be subjected to both initial and final acceptance testing. Initial acceptance tests are those listed in Table 2. After successful completion of the initial acceptance tests, the batch shall be released for final packaging. During packaging, test kits shall be selected at random for final acceptance testing. Final acceptance testing is to be conducted on the final packaged product and consist of those tests outlined in Table 3.

4.3.2.3 Final Acceptance Tests for Different Types and/or Size Containers

If the batch is being packaged in different types and/or size containers, the final acceptance tests shall be conducted on each type and/or each size containers. If the sealing 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 one time.

4.3.3 Shelf-Life Extension

4.3.3.1 Shelf-Life Testing

The tests to be conducted for Shelf-Life extensions are listed in Table 4.

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Table 4 - Shelf-life testing

Test	Requirement Paragraph
Application Time	3.6.14.1
Tack-Free Time	3.6.3
Cure Time to Hardness	3.6.4
Electrical Contact Resistance, Initial Only[1]	3.6.10.1

[1] For Shelf-Life testing, sealant may be subjected to an accelerated cure per 4.5.3.5.

4.3.3.2 Time and Limits of Shelf-Life Extensions

If the tests are performed at the end of the stated Shelf-Life to update the Shelf-Life of the sealing compound and all tests are passed, then the Shelf-Life may be extended an additional 3 months for kitted sealant in the original unopened containers, or an additional 30 days for pre-mixed and frozen sealant.

4.4 Approval

Shall be in accordance with AS5502 (4.4).

4.5 Test Methods

4.5.1 Standard Tolerances

Unless otherwise specified herein, standard tolerances of AS5127 (Section 3) shall apply.

4.5.2 Standard Conditions

Standard laboratory conditions shall be as specified in AS5127 (Section 4).

4.5.3 Preparation of Test Specimens

4.5.3.1 Cleaning and Surface Preparation of Test Panels

Panels shall be prepared, cleaned, surface treated, and coated in accordance with AS5127 (Section 6) prior to application of sealant for testing.

4.5.3.2 Preparation of Sealing Compound

Sealing compound shall be prepared in accordance with AS5127/1 (Section 4) and (4.1), (4.2), and (4.3) as applicable.

4.5.3.3 Application of Adhesion Promoter

When adhesion promoter is used, it shall be applied in accordance with AS5127 (6.9). If adhesion promoter is used for qualification and initial or final acceptance testing, the adhesion promoter product shall be reported.

4.5.3.4 Application of Sealing Compound

Unless otherwise specified herein, freshly mixed sealing compound shall be applied to test panels in accordance with AS5127 (6.10).

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4.5.3.5 Curing of Sealing Compounds

Shall be in accordance with AS5127 (6.11). For qualification testing, Class B sealing compounds shall be cured for 14 days at standard conditions. For acceptance testing, Class B sealing compounds may be given an accelerated cure for 48 hours at standard conditions followed by 24 hours at 140 °F (60 °C).

4.6 Test Procedures

Standard test methods are in accordance with AS5127 and AS5127/1. In the event of a conflict between the text of this document and AS5127 and/or AS5127/1, the text of this document takes precedence.

4.6.1 Test Procedures for Electrical Contact Resistance

4.6.1.1 Test Specimen Preparation

At least ten test specimens shall be prepared as shown in Figure 1. Drill two holes using a No. 43 drill on one side on each of the 6061-T6 ASTM B221 aluminum angles, approximately 0.50 inch (12.7 mm) apart. Press fit silver plated terminals, conforming to NAS705, into the drill holes. Swage the terminals to ensure the terminals are held tightly into the aluminum angle (see Note 8.2). Solvent clean the faying surfaces of the angles per AS5127 (Section 6). Mix AMS-S-8802, Class B-2, polysulfide sealant according to manufacturer's instructions. Apply mixed AMS-S-8802 sealant to both faying surfaces. Place a piece of CCC-C-419 Type III cotton duck cloth, or equivalent, 1.0 x 1.5 inches (25 x 38 mm) over the coated surface and impregnate with sealant. Mate the two angles together and clamp. Also seal the terminal/angle joints with the same material. Allow to cure for 24 hours at standard conditions. Lightly abrade surface "A," as shown in Figure 1, with a Scotch-Brite 7447 aluminum oxide scouring pad (or an equivalent non-metallic pad), and clean per AS5127 (Section 6). Apply a fillet of electrically conductive sealant to surface "A." Assembly shall be left undisturbed while curing per 4.5.3.5 or for 48 hours at standard conditions followed by 24 hours at 140 °F (60 °C).

4.6.1.2 Resistance Measurements

A four-terminal probe with Kelvin connections (Keithley micro-ohmmeter model 580, model 2750, or equivalent) shall be used to measure contact resistance (see Note 8.2). A 100-mA current shall be applied across the test assembly. The voltage drop shall be measured and resistance can be calculated using the following formula:

$$\text{Electrical Contact Resistance } (\Omega) = \frac{\text{Voltage drop}}{0.1}$$

4.6.1.3 Salt Fog Aging

Not less than five test specimens as previously prepared in accordance with 4.6.1.1 shall be subjected to a salt fog test for 1000 hours in accordance with ASTM B117. After salt fog conditioning, specimens shall be rinsed with water to remove any salt deposits, and the specimens shall then be dried at standard conditions for 24 hours, followed by 24 hours at 140 °F (60 °C) in an air-circulating oven. After cooling to standard conditions, contact resistance shall be measured and shall meet the requirement of 3.6.10.2.

4.6.2 Low Temperature Flexibility

Low temperature flexibility shall be conducted in accordance with AS5127/1 (7.6). At the end of the cure in accordance with 4.5.3.5, all four panels shall be immediately placed in a low temperature flexibility fixture and equilibrated and tested at a temperature of -65 °F (-54 °C).

4.6.3 Thermal Stability

Three sealant specimens, 1.0 x 2.0 x 0.075 inches (25 x 51 x 1.9 mm) and cured per 4.5.3.5, shall be conditioned in an air-circulating oven for 48 hours at 250 °F (121 °C). The specimens may be molded or cut to the required dimensions from a cured sheet. After conditioning, the specimens shall be cooled to standard conditions and tested for conformance to 3.6.8.

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