SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS-S-8802B

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Superseding AMS-S-8802A

Sealing Compound, Temperature Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion

1. SCOPE:

1.1 Form:

This specification covers temperature resistant, two-component synthetic rubber compounds of the polysulfide type for sealing and repairing integral fuel tanks and fuel cell cavities, for continuous service use from -65 to +250 °F (-54 to 121 °C).

1.2 Application:

This sealing compound has been used typically for fuel tank sealing, cabin pressure sealing, and aerodynamic smoothing, but usage is not limited to such applications. It can be used for faying surface sealing, for wet-installation of fasteners, for overcoating fasteners, and for sealing joints and seams. The sealing compound can be used in fuel areas as well as in non-fuel areas. It may in some cases be used as a non-structural adhesive. It cures at room temperature and the cure can be accelerated by higher temperatures.

1.2.1 AMS 3100 adhesion promoter can be applied prior to application of the sealant.

1.3 Classification:

Sealing compounds covered by this specification are classified as follows:

Type 1 – Dichromate Cured Sealant. Material with a dichromate curing agent.

Type 2 – Manganese Dioxide Cured Sealant. Material with a manganese dioxide curing agent.

TO PLACE A DOCUMENT ORDER:
Tel: 877-606-7323 (inside USA and Canada)
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1.3.1 Both Type 1 and Type 2 sealing compounds shall be supplied in the following classes:

Class A - Suitable for application by brush. Available in the following application times in hours:

A-1/2
A-1
A-2

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

B-1/2
B-1
B-2
B-4

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

Notation: ( ) Assembly time in hours:

C-8(20)
C-24(80)

1.4 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 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 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 4911	Titanium Sheet, Strip and Plate, 6Al 4V, Annealed

2.1 (Continued):

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
AS5127	Methods for Testing Aerospace Sealants
AS5127/1	Methods for Testing Aerospace Sealants, Two-Component Synthetic Rubber Compounds
AS5502	Standard Requirements for Aerospace Sealants

2.2 U.S. Government Publications:

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

MIL-PRF-23377	Primer Coatings: Epoxy, High Solids
MIL-DTL-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys

2.3 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-AMS-S-8802	Products Qualified Under AMS-S-8802

3. TECHNICAL REQUIREMENTS:

3.1 Materials:

The basic ingredient used in the manufacture of these products shall be synthetic rubber of the polysulfide (T) type. 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 compounds or leachable chromate 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.

3.1.1 Qualification: All products sold to this specification shall be listed, or approved for listing, on the qualified product list, PRI-QPL-AMS-S-8802. The qualified products list shall be in accordance with PD 2000.

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 9 months from the date of packaging. Material may be retested for shelf life extension.

3.5.1 Premixed and Frozen Material: Premixed and frozen material shall have a minimum storage life of 30 days at -40 °F (-40 °C) or lower, or 10 days at -10 to -40 °F (-23 to -40 °C) from date of mix/ freeze. The date of mix/freeze shall be within the shelf life of the unmixed material.

3.6 Properties:

The sealing compound and the curing agent shall conform to the requirements shown in Table 1, when determined in accordance with the specified test methods.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.1	Nonvolatile Content, by weight, min		AS5127/1 (5.1)
	Class A	84%	
	Class B	90%	
	Class C	90%	
3.6.2	Air Content, max (Class B only)	4%	AS5127/1 (5.2)
3.6.3	Viscosity of Base Compound		AS5127/1 (5.3)
	Class A (Use No. 6 spindle at 10 rpm)	100 to 500 poises (10 to 50 Pa•S)	
	Class B (Use No. 7 spindle at 2rpm)	9000 to 14000 poises (900 to 1400 Pa•S)	
	Class C (Use No. 6 spindle at 2 rpm)	1000 to 4000 poises (100 to 400 Pa•S)	

TABLE 1 - Properties (Continued)

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.4	Flow		AS5127/1(5.5)
	Class B	0.1 to 0.75 inches (2.5 to 19.0 mm)	AS5127/1 (5.5.1)
	Class C	0.010 inch (0.25 mm), min	AS5127/1 (5.5.2)
3.6.5	Application Time, min		AS5127/1 (5.6)
	Class A From the beginning of mixing, the viscosity shall not exceed 2500 poise (250 PaS), (Use No. 7 spindle at 10 rpm)		AS5127/1 (5.6.1)
	Class A-1/2	1/2 hour	
	Class A-1	1 hours	
	Class A-2	2 hours	
	Class B From beginning of mixing, not less than 15 grams per minute shall be extruded.		AS5127/1 (5.6.2)
	Class B-1/2	1/2 hour	
	Class B-1	1 hour	
	Class B-2	2 hours	
	Class B-4	4 hours	
	Class C From beginning of mixing, not less than 30 grams per minute shall be extruded		AS5127/1 (5.6.2)
	Class C-8(20)	8 hours	
	Class C-24(80)	8 hours	
3.6.6	Assembly Time (Class C only)		AS5127/1 (5.7)
	Class C-8(20)	20 hours	
	Class C-24(80)	80 hours	
3.6.7	Tack-Free Time (Measured from beginning of mixing), max		AS5127/1 (5.8)
	Class A-1/2	10 hours	
	Class A-1	20 hours	
	Class A-2	40 hours	
	Class B-1/2	10 hours	
	Class B-1	20 hours	
	Class B-2	40 hours	
	Class B-4	48 hours	

TABLE 1 - Properties (Continued)

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.8	Standard Cure Time (time to reach 30 Durometer A), max		AS5127/1 (5.9)
	Class A-1/2	40 hours	
	Class A-1	55 hours	
	Class A-2	72 hours	
	Class B-1/2	30 hours	
	Class B-1	55 hours	
	Class B-2	72 hours	
	Class B-4	90 hours	
	Class C-8(20)	168 hours	
	Class C-24(80)	4 weeks	
3.6.9	Fluid Immersion Cure Time, min (Classes A-1/2, B-1/2 only)		AS5127/1 (5.11)
	After 48 hours	25 Durometer A	
	After 120 hours	35 Durometer A	
3.6.10	Specific Gravity, max average	1.65	AS5127/1 (6.1)
3.6.11	Radiographic Density		AS5127/1 (6.3)
	Difference between plate and plate plus sealant, max	1.00	
	Through sealant in the slot, approximately	3.00	
3.6.12	Hydrolytic Stability	30 Durometer A	AS5127/1 (6.6)
3.6.13	Chalking, max Use AMS 2629 Type II	Slight	AS5127/1 (7.1)
3.6.14	Resistance to Thermal Rupture	No blistering or sponging, 0.125 inch (3.0 mm) max	AS5127/1 (7.2)
3.6.15	Weight Loss & Flexibility		AS5127/1 (7.4)
	Weight Loss, max	8%	
	Flexibility	No cracking or checking	
3.6.16	Low Temperature Flexibility	No visual evidence of cracking or checking. No loss of adhesion	AS5127/1 (7.6)
3.6.17	Tensile Strength and Elongation, min (Class B only)		AS5127/1 (7.7)

TABLE 1 - Properties (Continued)

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.17.1	Standard Cure	200 psi (1380 kPa), 200% elongation	
3.6.17.2	14 days at 140 °F (60 °C) in AMS 2629, Type I	50 psi (345 kPa), 200% elongation	
3.6.17.3	7 days at 250 °F ± 5 (121 °C ± 3) in air	125 psi (862 kPa), 100% elongation	
3.6.17.4	72 hours at 140 °F (60 °C) in AMS 2629, Type I + 72 hours at 120 °F (49 °C) in air, + 7 days at 250 °F ± 5 (121 °C ± 3) in air	200 psi (1380 kPa), 75% elongation	
3.6.17.5	24 hours at 250°F ± 5 (121 °C ± 3) + 7 days at 140 °F (60 °C) in AMS 2629, Type I	100 psi (690 kPa), 150% elongation	
3.6.18	Shear Strength, min (Class C only)	200 psi (1379 kPa), 95 % cohesive failure	AS5127/1 (7.8)
3.6.19	Corrosion Resistance	No corrosion under sealant or signs of deterioration	AS5127/1 (7.9)
3.6.20	Peel Strength, min	All 100% cohesive failure:	AS5127/1 (8.1) and AMS-S-8802 Table 5
3.6.20.1	Classes A and B: After 7 day exposure After 70 day exposure	 20 lbf/inch (3580 N/m) 7 lbf/inch (1250 N/m)	
3.6.20.2	Class C: After 7 day exposure After 70 day exposure	 15 lbf/inch (2685 N/m) 7 lbf/inch (1250 N/m)	
3.6.20.3	Classes A-1/2 and B-1/2 only:	10 lbf/inch (1750 N/m)	
3.6.21	Repairability, min On itself and AMS 3276 sealants	10 lbf/inch (1750 N/m) /100% cohesive failure	AS5127/1 (8.2)
3.6.22	Storage Stability		

TABLE 1 - Properties (Continued)

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.6.22.1	Accelerated Storage		AS5127/1 (9.1)
	Appearance	No skinning, hardening or separation that cannot be restored by normal agitation	
	Flow	Same as 3.6.4	
	Application Time	Same as 3.6.5	
	Assembly Time	Same as 3.6.6	
	Tack Free Time	Same as 3.6.7	
	Standard Cure Time	Same as 3.6.8	
	Peel Strength: min, 2 aluminum panels, sulfuric acid anodized in accordance with AMS 2471 and coated with AMS-C-27725 Type II, Class B (See 8.6), After 7 days immersion in AMS 2629 Type I at 140 °F (60 °C)	20 lbf/inch (3503 N/m) /100 % cohesive failure	AS5127/1 (8.1)
3.6.22.2	Long Term Storage		AS5127/1 (9.2)
	Appearance	No skinning, hardening or separation that cannot be restored by normal agitation	
	Application Time	Same as 3.6.6	
	Tack-Free Time, max		
	Class A-1/2	16 hours	
	Class A-1	30 hours	
	Class A-2	64 hours	
	Class B-1/2	16 hours	
	Class B-1	30 hours	
	Class B-2	64 hours	
	Class B-4	72 hours	
	Standard Cure Time, max (30 Durometer A, min)		
	Class A-1/2	64 hours	
	Class A-1	78 hours	
	Class A-2	112 hours	
	Class B-1/2	45 hours	
	Class B-1	78 hours	
	Class B-2	112 hours	
	Class B-4	136 hours	

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: Shall be in accordance with AS5502 (4.1.2)

4.2 Classification of Tests:

Shall be in accordance with AS5502 (4.2)

4.2.1 Qualification Tests: All technical requirements listed in Table 1 are qualification tests (see 8.2) and shall be performed on the initial production of the sealing compound prior to shipment to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4, and when purchaser deems confirmatory testing to be required.

4.2.1.1 Qualification: All products sold to this specification shall be listed, or approved for listing, on the Qualified Products List, PRI-QPL-AMS-S-8802. The qualified products list shall be in accordance with PD 2000: See AS5502 (2.1). Class B-2 shall be the first material that is qualified for each supplier of sealing compound in accordance with (8.2). 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 classes of the sealing compound.

4.2.1.2 Once qualification for Class B-2 has been obtained, other classes of the sealing compound may be qualified. The formulation for other classes, and for other Class B application times, shall be the same as Class B-2, except for minor variations necessary for conformance to viscosity and application time requirements. All compounds shall meet all technical requirements of this specification. However, other classes of the sealing compound need only to be tested to the initial acceptance tests listed in 4.2.2, plus all peel strength tests listed in Table 5, or as defined by purchaser or QPL agency.

4.2.2 Initial Acceptance Tests: Requirements shown in Table 2 are initial acceptance tests and shall be performed on each batch.

TABLE 2 - Acceptance Tests

Test	Requirement Paragraph
Nonvolatile Content	3.6.1
Air Content (Class B only)	3.6.2
Viscosity of the Base Compound*	3.6.3
Flow (Class B only)	3.6.4
Application Time	3.6.5
Assembly Time (Class C only)	3.6.6
Tack-Free Time	3.6.7
Standard Cure Time (Classes A and B only)	3.6.8
Fluid Immersion Cure Time (Classes A-1/2 and B1/2 only)	3.6.9
Chalking**	3.6.13
Resistance to Thermal Rupture (Fluid Immersed only)	3.6.14
Shear Strength (Class C only) **	3.6.18
Peel Strength**: 4 aluminum panels, AMS 4045, sulfuric acid anodized in accordance with AMS 2471 and coated with AMS-C-27725 Type II Class B only (See 8.6) (7 day immersion only). Do not use AMS 3100 adhesion promoter.	3.6.20

* Acceptance testing of Viscosity of Base Compound shall be conducted on material in 1-quart or 1-liter cans regardless of type of packaging being pro cured.

** In lieu of 14-day cure specified, specimens may be subjected to an accelerated cure of 48 hours at standard conditions followed by 24 hours at 140 °F (60 °C). Class C-24(80) shall be cured 48 hours at standard conditions followed by 120 hours at 140 °F (60 °C).

4.2.3 Final Acceptance Tests: Requirements shown in Table 3 are final acceptance tests and shall be performed on each lot. Acceptance tests of the final packaged product shall consist of the following:

TABLE 3 - Final Acceptance Tests

Test	Requirement Paragraph
Air Content	3.6.2
Application Time	3.6.5
Tack-Free Time	3.6.7
Standard Cure Time	3.6.8

4.3 Sampling and Testing:

Shall be in accordance with AS5502 (4.3)

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

4.3.1.1 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.

4.3.1.2 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.

4.3.1.3 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.

4.3.1.4 Plastic Injection Kits: Shall be in accordance with AS5502 (4.3.1.3)

4.3.1.5 Cans, Pails, and Drums: Shall be in accordance with AS5502 (4.3.1.4)

4.3.1.6 Both Type Containers: Shall be in accordance with AS5502 (4.3.1.5)

4.3.2 Shelf-Life Surveillance and Updating:

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

4.3.2.2 Shelf-Life Testing: The inspections to be conducted for shelf-life surveillance and updating are listed in Table 4.

TABLE 4 – Shelf-Life Testing

Test	Requirement Paragraph
Appearance	3.4
Viscosity of Base Compound*	3.6.3
Application Time	3.6.5
Tack-Free Time	3.6.7
Standard Cure Time	3.6.8
Peel Strength: 2 aluminum panels, sulfuric acid anodized per AMS 2471, coated with AMS-C-27725 Type II Class B corrosion preventive coating (see 8.6), and aged in AMS 2629, Type I for 7 days at 140 °F (60 °C).	3.6.20

*Not possible with sectional-type containers

4.3.2.3 If 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 are permissible.

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 (3.1) “Standard Tolerances” shall apply.

4.5.2 Standard Test Conditions: Standard laboratory conditions shall be as specified in AS5127 (4). Test specimens shall be prepared and immediately after completion of preparation, shall be placed under 77 °F (25 °C) and 50 % ± 5 relative humidity to cure according to 4.5.4.1. Except as otherwise directed herein, tests shall be performed at conditions in accordance with AS5127 (4).

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 with AS5127 (6).

4.5.3.2 Preparation of Peel Strength Test Panels: Test panel configuration shall be in accordance with AS5127/1 (8.) “Peel Strength Properties” and (8.1) “Peel Strength Testing” and as in Figure 22 “Five-Inch Peel Specimen Configuration”.