SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3374 | REV. D

Issued 1987-01
Revised 2013-11

Superseding AMS3374C

Sealing Compound
Aircraft Firewall, Silicone

RATIONALE

5 year review. Defined spec to be for silicone firewall sealants. Updated standard language in sections 4 and 8. Revised surface treatment of aluminum panels to sulfuric acid anodize due to temperature considerations. Removed Corrosion Resistance reference from Table 1. Added Table 3.

1. SCOPE

1.1 Form

This specification covers six (6) types of silicone sealing compounds curing to elastomeric materials.

1.2 Application

These products are used primarily for sealing aircraft firewall structures against passage of air, vapors, and flames but usage is not limited to such applications. The sealing compounds are effective at all temperatures from -65 to +400 °F (-54 to +204 °C) and are able to withstand flash temperatures of up to 2000 °F (1093 °C).

1.3 Safety - Hazardous Materials

Shall be in accordance with AS5502 (1.1)

1.4 Classification

Compounds covered by this specification are classified as follows:

Type 1 - One-part (or two part, pre-mixed, room temperature stable) high temperature silicone, condensation cured
Type 2 - Two-part high temperature silicone, addition cured
Type 3 - Two-part high temperature silicone, condensation cured
Type 4 - Two-part high temperature silicone, rapid curing, condensation cured
Type 5 - One-part high temperature silicone, condensation cured, extended life
Type 6 - Two-part high temperature silicone, lightweight, rapid curing, addition cured

2. APPLICABLE DOCUMENTS

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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS3374D

2.1 SAE Publications

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

AMS2471	Anodic Treatment of Aluminum Alloys Sulfuric Acid Process, Undyed Coating
AMS3021	Fluid, Reference for Testing Di-Ester (Polyol) Resistant Material
AMS4911	Titanium Alloy Sheet, Strip, and Plate, 6Al 4V, Annealed
AMS5517	Steel, Corrosion Resistant, Sheet and Strip 18Cr-8Ni (SAE30301), Cold Rolled, 125 ksi (862MPa) Tensile Strength
AMS-QQ-A-250/5	Aluminum Alloy Alclad 2024, Plate and Sheet
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS5127	Methods for Testing Aerospace Sealants
AS5127/1	Aerospace Standard Test Methods for Aerospace Sealants Two-Component Synthetic Rubber Compounds
AS5127/2	Test Method for Aerospace Firewall Sealant Flame Penetration
AS5502	Standard Requirements for Aerospace Sealants

2.2 PRI Publications

Available from Performace Review Institute, 161 Thorn Hill Road, Warrendale, PA15086-7527, Tel: 724-772-1616, www.pri-network.com.

PD2000	Procedures for an Industry Qualified Product Management Process
PD2001	Manufacturer Request for Product Approval and Qualification Process
PD2103	Aerospace Quality Assurance, Product Standards, Qualification Procedure, Sealants
PRI-QPL-AMS3374	Products Qualified Under AMS3374

3. TECHNICAL REQUIREMENTS

3.1 Date of Packaging

Shall be in accordance with AS5502 (3.1).

3.1.1 Shelf life of sealing compounds conforming to Types 1 - 4 and Type 6 shall be a minimum of 6 months when stored at manufacturer's recommended conditions. Shelf life of sealing compound conforming to Type 5 shall be a minimum of 2 years when stored at manufacturer's recommended conditions.

3.2 Toxicological Formulations

Shall be in accordance with AS5502 (3.2).

3.3 Quality

Shall be in accordance with AS5502 (3.3).

3.4 Properties

Shall conform to the following requirements and test methods in Table 1.

TABLE 1 – PROPERTIES

	Property	Requirement	Test Procedures (paragraph)
3.4.1	Nonvolatile Content, % min.		AS5127/1 (5.1)
	Type 1	90	
	Type 2, 6	97	
	Type 3	96	
	Type 4	96	
	Type 5	80	
3.4.2	Flow, inches (mm), max	0.5 (13)	AS5127/1 (5.5.1)
3.4.3	Application Time, hours, min (25 g/minute requirement)		AS5127/1 (5.6.2)
	Type 1, 5	Not applicable	
	Type 2, 3	4	
	Type 4	0.5	
	Type 6 (5 g/minute requirement)	0.5	
3.4.4	Tack-Free Time, hours, max.		AS5127/1 (5.8)
	Types 1, 3, 5	6	
	Type 2, 6	24	
	Type 4	2	
3.4.5	Specific Gravity, max		AS5127/1 (6.1)
	Types – 1, 3, 4, 5	1.5	
	Type 2	1.6	
	Type 6	0.85	
3.4.6	Standard Cure Time, (to reach 30 Durometer A), max.		AS5127/1 (6.2)
	Types – 1, 2, 3, 5, 6	48 hrs	
	Type 4	4 hrs	
3.4.7	Resistance to Thermal Rupture, max. deformation, oven air aging at 300 °F (149 °C), 10 psi (69 kPa) 30 minutes	0.125-inch (3.2 mm) No blistering or sponging	AS5127/1 (7.2) [1]
3.4.8	Low Temperature Flexibility	No cracking or loss of adhesion	AS5127/1 (7.6.1) [1]
3.4.9	Oil Resistance	No loss of adhesion, softening, blistering or reversion	AMS3374 (4.5.1)
3.4.10	Shear Strength, psi (kPa) min. 85% Cohesion min.		AMS3374 (4.5.2)
	Type 1, 2, 3, 4, 5	150 (1034)	
	Type 6	100 (690)	

TABLE 1 - PROPERTIES (CONT.)

	Property	Requirement	Test Procedures (paragraph)
3.4.11	Flame Resistance	No Flame Penetration	AS5127/2, Class B
3.4.12	Peel Strength, lbs./inch (N/m), min.		AS5127/1 (8.2) [3]
	Types 1, 2, 3, 4, and 5	10 (1750)	
	Type 6	5 (875)	
3.4.13	Repairability	Adhere, meet 3.4.12 requirements	AS5127/1 (8.2) [3]
3.4.14	Storage Stability		
3.4.14.1	Accelerated Storage		
	Type 2 only	Meet AMS3374 (4.2.2) requirements	AS5127/1 (9.1) [4]
3.4.14.2	Long Term Storage	Meet AMS3374 (4.2.2) requirements	AS5127/1 (9.2) [5]

1 Test control specimens only, no AMS2629 exposure requirement.
2 Test using 2 each AMS-QQ-A-250/5 aluminum alloy anodized per AMS2471, AMS4911 titanium alloy and AMS5517 stainless steel panels only. Test control specimens and specimens aged in air at 400 °F ± 5 (204 °C ± 3) for 72 hours ±1.
3 Omit AMS2629 fluid soak from panel preparation.
4 Use AS5127/1 (9.1) for sealing compound material conditioning only.
5 AS5127/2 compliant materials shall be tested per manufacturer's recommendations.

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).

4.2 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). Any changes in ingredients and/or processing of any adhesion promoter used to qualify sealing compounds shall require retesting of all technical requirements in Table 1, which rely on the use of adhesion promoter for qualification [Low Temperature Flexibility (3.4.8), Oil Resistance (3.4.9), Shear Strength (3.4.10), Peel Strength (3.4.12) and Repairability (3.4.13)].

4.2.1.1 Qualification

All materials sold to this specification shall be listed or approved for listing on the PRI qualified products list, PRI QPL-AMS3374. The qualified products list shall be in accordance with PD2000, PD2001 and PD2103.

4.2.2 Initial Acceptance Tests

Requirements in Table 2 shall be tested in accordance with AS5502 (4.2.2.1).

TABLE 2 – INITIAL ACCEPTANCE TESTS

Test	Requirement Paragraph
Nonvolatile Content	3.4.1
Flow	3.4.2
Application Time	3.4.3
Tack-Free Time	3.4.4
Standard Cure Time	3.4.6
Shear Strength[1]	3.4.10
Peel Strength[2]	3.4.12

1 Test only using AMS4911 titanium substrate

2 Test only using AMS-QQ-A-250/5 aluminum alloy anodized per AS2471 substrate. Omit for Type 2 material.

4.2.3 Final Acceptance Tests

Requirements in Table 3 shall be tested in accordance with AS5502 (4.2.2.2).

TABLE 3 – FINAL ACCEPTANCE TESTS

Test	Requirement Paragraph
Application Time	3.4.3
Tack-Free Time	3.4.4
Standard Cure Time	3.4.6

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 the material from one batch of each component assembled as finished product in one size and/or type of container at the same time. The lot when used shall be traceable to a specific batch of base compound and curing agent.

4.3.1.2 Initial and Final Acceptance Test

Each batch shall be subjected to both initial and final acceptance testing. Sufficient material for initial acceptance testing shall be packaged in the same type of containers that are being procured. Initial acceptance test 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 shall consist of those tests outlined in Table 3.

4.3.1.2.1 Final Acceptance Test Option

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

4.3.2 Qualification Test Samples

Samples shall consist of six containers of sealing compound. Purchaser and manufacturer shall agree upon the container size. Samples shall be identified as specified below and forwarded to the activity responsible for qualification testing as designated in the letter of authorization from that activity.

SEALING COMPOUND, AIRCRAFT FIREWALL, SILICONE
AMS3374D Type _____
Manufacturer's Identification _____
Name of Manufacturer_____
Batch/Lot Number _____
Date of Manufacture _____
Shelf Life Expiration Date_____

4.3.3 Shelf-Life Surveillance and Updating

4.3.3.1 Sampling

An inspection lot shall consist of items bearing the same lot or batch identification number. The minimum number of samples to be tested from each inspection shall be in accordance with AS5502 (4.1.2).

4.4 Test Methods

Shall be in accordance with test methods shown in Table 1.

4.4.1 Standard Tolerances

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

4.4.2 Standard Test Conditions

Shall be in accordance with AS5127 (4).

4.4.3 Preparation of Test Specimens

Test specimens shall be prepared in accordance with AS5127 (6) unless otherwise specified herein.

4.4.3.1 Cleaning of Test Panels

Test panels shall be cleaned in accordance with AS5127 (6).

4.4.3.2 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".

4.4.4 Application of Adhesion Promoter

When required by the sealant manufacturer, apply the recommended adhesion promoter in accordance with AS5127 (6.7) "Application of Adhesion Promoter". Any adhesion promoter used for qualification must be documented and will be included on any qualification approval documentation.

4.4.5 Application of Sealing Compound

Unless otherwise specified herein, freshly mixed or opened sealing compound shall be applied to test panels in accordance with AS5127 (6.8) "Application of Sealing Compound".

4.4.6 Cure of Sealant Compound

Cure the sealing compound at standard conditions in accordance with AS5127 (4) according to the schedule in Table 2. Use Standard Cure for qualification or preproduction testing. Accelerated Cure, Table 4, is optional and may be used for acceptance testing.

TABLE 4

Type	Standard Cure	Accelerated Cure
1, 3, 5	14 days	None
2, 6	7 days	1 day at standard conditions + 4 hours at 120 °F (49 °C)
4	7 days	None

4.5 Test Procedures

Standard Test methods are in accordance with AS5127, AS5127/1, and AS5127/2. In the event of a conflict between the text of this document and any of the aforementioned documents, the text of this document takes precedence.

4.5.1 Oil Resistance

All test panels shall be cleaned in accordance with AS5127 (6.1.1). Prepare two panels AMS-QQ-A-250/5 aluminum alloy chemically treated per AS5127 (6.1), 0.040 × 2.75 × 6 inches (1.0 × 69.8 × 152 mm), and apply two parallel strips of sealing compound, each strip being 0.188 × 0.75 × 5 inches (4.76 × 19 × 127mm) extending to within 0.5 inch (13 mm) of the edge of the panel. Compound on the panel shall be cured as in 4.4.6. Immerse panels vertically in AMS3021 fluid at 140 °F (60 °C) for 72 hours ± 1. Examine sealant to requirements of Table 1 (3.4.9).

4.5.2 Shear Strength

Twenty-four of each of the following panels shall be prepared:

0.050 × 1 × 3 inches (1.27 × 25 × 76 mm), corrosion resistant steel alloy conforming to AMS5517

0.050 × 1 × 3 inches (1.27 × 25 × 76 mm), titanium alloy conforming to AMS4911

0.050 × 1 × 3 inches (1.27 × 25 × 76 mm), AMS-QQ-A-250/5 aluminum alloy anodized per AMS2471

All panels shall be cleaned in accordance with AS5127 (6.1.1) and arranged in pairs to fabricate 12 lap shear specimens. Mixed sealant shall be applied to a one square inch area at one end of each panel. Allow Type 5 sealant to air dry 15 minutes before assembling panels. The panels shall then be assembled with a one square inch overlap and contact pressure applied and maintained on the bonded areas. Sufficient sealant shall be applied to produce a continuous bond film thickness of 0.011 ± 0.004 inches (0.28 ± 0.1 mm). After the assembled parts are cured per 4.4.6, excess sealant shall be trimmed from the panels. A set of three specimens from each type shall be exposed to one of the following conditions for seven days:

1. Dry heat 400 °F ± 5 (204 °C ± 3)
2. Relative humidity 95% ± 5% at 120 °F (49 °C)
3. AS1241 at 75 °F (24 °C)
4. Control (no conditioning), kept at 77 °F (24 °C)

At the completion of the conditioning period, the specimens shall be allowed to cool to room temperature prior to removal from test fluids. The shear test shall be performed at standard conditions within 30 minutes of removal from the conditioning fluids. Determine shear strength of the sealant by pulling in shear at a crosshead speed of 2 inches (51 mm) per minute. Record maximum load, in pounds, required to separate the strips and the percentage of cohesive failure. Calculate the average shear strength for each set of three identical specimens.