AEROSPACE MATERIAL SPECIFICATION

AMS3381	
Issued	2014-05
Superseding	MIL-S-38249

Sealing Compound, Aircraft Firewall, Non-Silicone

RATIONALE

This document replaces MIL-S-38249 (cancelled in 1997) for flame-resistant, non-silicone, elastomeric compounds for sealing of firewall structure. AS5127/2 Class C is referenced for flame resistance requirements. AMS3374 supersedes MIL-S-38249 for silicone compounds.

1. SCOPE

1.1 Form

This specification covers non-silicone synthetic rubber 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). Sealants qualified to this specification are defined as flame tolerant in accordance with AS5127/2 and are able to prevent flame penetration from incidental exposure to smaller fires. Users should evaluate their specific flame-resistance requirements prior to specifying any firewall sealing compound.

1.3 Classification

None

1.4 Safety - Hazardous Materials

Shall be in accorrdance with AS5502 (1.1).

2. APPLICABLE DOCUMENTS

Shall be in accordance with AS5502 (2.).

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.

AMS2629 Fluid, Jet Reference

AMS3021 Fluid, Reference for Testing Di-Ester (Polyol) Resistant Material

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/AMS3381

AMS4911	Titanium Alloy Sheet, Strip, and Plate, 6Al-4V, Annealed
AMS5517	Steel, Corrosion Resistant, Sheet and Strip, 18Cr-8Ni (SAE 30301), Cold Rolled, 125 ksi (862 MPa) Tensile Strength
AMS-QQ-A-250/5	Aluminum Alloy Alclad 2024, Plate and Sheet
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
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
AS5127/2	Test Methods for Aerospace Firewall Sealant Flame Penetration
AS5502	Standard Requirements for Aerospace Sealants and Adhesion Promoters

2.2 PRI Publications

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

PD2000	Governance and Administration of an Industry Managed Product Qualification Program
PD2001	Manufacturer Request for Product Approval and Qualification Process
PD2103	Aerospace Quality Assurance, Product Standards, Qualification Procedure, Sealants
PRI-QPL-AMS3381	Products Qualified under AMS3381

3. TECHNICAL REQUIREMENTS

3.1 Materials

The basic ingredients shall not contain silicone compounds. The base compound and curing agent shall possess sufficient color contrast to permit easy identification of an unmixed or incompletely mixed sealing 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 of sealing compounds shall be a minimum of 12 months from date of packaging when stored below 80 °F (27 °C).

3.6 Properties

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

TABLE 1 - PROPERTIES

	Property	Requirement	Test Procedures (paragraph)
3.6.1	Nonvolatile Content, min	65%	AS5127/1 (5.1)
3.6.2	Flow, max	1.5 in (38 mm)	AS5127/1 (5.5.1)
3.6.3	Application Time, min, not less than 15 grams/minute shall be extruded	1.5 hrs	AS5127/1 (5.6.2)
3.6.4	Tack-Free Time, hours, max	24 hrs	AS5127/1 (5.8)
3.6.5	Specific Gravity, max	1.5	AS5127/1 (6.1)
3.6.6	Standard Cure Time, (to reach 30 Durometer A), max	48 hrs	AS5127/1 (6.2)
3.6.7	Resistance to Thermal Rupture, max deformation,		AS5127/1 (7.2)[1]
3.6.7.1	Oven air aging at 400 ±10 °F (204 ± 5 °C), 5 ± 0.5 psi (34 kPa), 15 minutes	0.125 inch (3.2 mm) No blistering or sponging	
3.6.7.2	Room temp test of 2000 °F Flame-tested panel, max deformation	0.125 inch (3.2 mm)	
3.6.8	Low Temperature Flexibility	No cracking, checking, or loss of adhesion	AS5127/1 (7.6.1)[1]
3.6.9	Oil Resistance	No loss of adhesion, softening, blistering or reversion	AMSXXXX (4.5.1)
3.6.10	Corrosion Resistance	No loss of adhesion, softening, blistering or leaching of the sealing compound or corrosion of the panel under the sealant.	AMSXXXX (4.5.2)
3.6.11	Flame Resistance	Sealing compound shall not burn through to panel and shall not continue to burn after a flame exposure of 15 minutes	AS5127/2 (8)
3.6.12	Peel Strength, min, Cohesive failure, min	10 lbs/in (1750 N/m) 100%	AS5127/1 (8.1)[2]
3.6.13	Repairability	Adhere, shall meet 3.6.12 requirement	AS5127/1 (8.2)[3]
3.6.14	Storage Stability		
3.6.14.1	Accelerated Storage		AS5127/1 (9.1)[4]
	Flow	Same as 3.6.2	
	Application Time	Same as 3.6.3	
	Tack-free Time	Same as 3.6.4	
	Standard Cure Time	Same as 3.6.6	
3.6.14.2	Long Term Storage		AS5127/1 (9.2)
	Application Time	Same as 3.6.3	
	Tack-free Time	Same as 3.6.4	
	Standard Cure Time	Same as 3.6.6	

[1] Test control specimens only, no AMS2629 exposure requirement.
[2] Test using 2 each AMS-QQ-A-250/5 aluminum alloy anodized per AS5127 (6.3), AMS4911 titanium alloy and AMS5517 stainless steel panels only. Test control specimens and specimens aged in air at 400 ± 10 °F (204 ± 5 °C) for 72 hours ± 1.
[3] Omit AMS2629 fluid soak from panel preparation.
[4] Use AS5127/1 (9.1) for sealing compound material conditioning only.

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 an adhesion promoter used to qualify sealing compounds shall require retesting of all technical requirements in Table 1 which rely on the use of an adhesion promoter for qualification (Low Temperature Flexibility (3.6.8), Oil Resistance (3.6.9), Corrosion Resistance (3.6.10), Peel Strength (3.6.12), and Repairability (3.6.13)).

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-AMS3381. The qualified products list shall be in accordance with PD2000, PD2001, and PD2103.

4.2.2 Initial Acceptance Tests

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

TABLE 2 – INITIAL ACCEPTANCE TESTS

Test	Requirement Paragraph
Nonvolatile Content	3.6.1
Flow	3.6.2
Application Time	3.6.3
Tack-Free Time	3.6.4
Standard Cure Time	3.6.6
Peel Strength[1]	3.6.12

[1] Test only using AMS-QQ-A-250/5 aluminum alloy substrate anodized per AS5127 (6.3).

4.2.3 Final Acceptance Tests

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

TABLE 3 – FINAL ACCEPTANCE TESTS

Test	Requirement Paragraph
Flow	3.6.2
Application Time	3.6.3
Tack-Free Time	3.6.4
Standard Cure Time	3.6.6

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 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 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. Sufficient material for initial acceptance testing shall be packaged in the same type containers that are being procured. 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.

4.3.1.2.1 Final Acceptance Test Option

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 purchanse 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:

SEALING COMPOUND, AIRCRAFT FIREWALL, NON-SILICONE
AMS3381
Manufacturer's Identification _____
Name of Manufacturer _____
Batch/Lot Number _____
Date of Packaging _____
Shelf Life Expiration Date _____
Store below 80 °F (27 °C)

4.3.3 Shelf-Life Surveillance and Updating

4.3.3.1 Sampling

An inspection lot shall consist of items produced by a single manufacturer and 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

4.4.1 Standard Tolerances

Unless otherwise specified herein, standard tolerances of AS5127 (3) "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 (6.9) "Application of Adhesion Promoter". Any adhesion promoter used for qualification must be documented and will be included on any qualification approval documentation.