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AEROSPACE MATERIAL SPECIFICATION

AMS 3374

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Revised

SEALING COMPOUND, ONE-PART SILICONE
Aircraft Firewall

1. SCOPE:

1.1 Form: This specification covers a one-part, high-temperature-resistant silicone sealing compound which cures to an elastomeric material upon exposure to air and is furnished in cartridges ready for extrusion. Acid is not given off during cure. A primer is required to achieve maximum adhesion.

1.2 Application: Primarily for sealing aircraft firewall structures.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 3021 - Reference Fluid for Testing Di-Ester (Polyol) Resistant Material
AMS 4037 - Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate)
AMS 4919 - Titanium Alloy Sheet, Strip, and Plate, 6Al - 2Sn - 4Zr - 2Mo, Annealed
AMS 5513 - Steel Sheet, Strip, and Plate, Corrosion Resistant, 19Cr - 9.5Ni (SAE 30304)

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D2240 - Rubber Property - Durometer Hardness

REAFFIRMED

Printed in U.S.A.

10-91, 4/94

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-S-4383 - Sealing Compound, Topcoat, Fuel Tank, Buna-N Type

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: The sealing compound shall be a one-part silicone of caulking consistency which will cure to an elastomeric material under ambient (room temperature) conditions. Acid shall not be given off during cure.

3.2 Properties: The compound shall conform to the following requirements:

3.2.1	Specific Gravity	Preproduction Value ± 0.03	4.5.2
3.2.2	Nonvolatile Content min	90%	4.5.3
3.2.3	Flow	0.05 - 0.75 in. (1.3 - 18.7 mm)	4.5.4
3.2.4	Tack-free Time, max	6 hr	4.5.5
3.2.5	Hardness, Durometer A or equiv, min	45	4.5.6
3.2.6	Thermal-Rupture Resistance (Deformation), max	1/8 in. (3.2 mm)	4.5.7
3.2.7	Low-Temperature Flexibility	No cracking, checking, or loss of adhesion	4.5.8
3.2.8	Peel Strength, min	10 lb per in. (1750 N/m)	4.5.9
3.2.9	Corrosion Resistance	No loss of adhesion, softening, blistering, or leaching. No corrosion of panels. Discoloration is acceptable.	4.2.10

3.2.10 Flame Resistance		4.5.11
3.2.10.1 Unsoaked Panels	No ignition, flame-up, or burn-through to the panel. No appearance of flame at the hole.	
3.2.10.2 Soaked Panels	No appearance of flame at the hole.	
3.2.11 Oil Resistance	No loss of adhesion, softening, or blistering	4.5.12
3.2.12 Storage Stability	Shall meet requirements for flow, tack-free time, and hardness.	4.5.13

3.3 Quality: The uncured compound shall be uniform in quality and consistency and shall be free of agglomerates or foreign particles. The cured compound shall present an appearance of smooth homogeneity.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the sealing compound shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6.1. Purchaser reserves the right to perform any confirmatory testing deemed necessary to ensure that the compound conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for specific gravity (3.2.1), nonvolatile content (3.2.2), flow (3.2.3), tack-free time (3.2.4), hardness (3.2.5), and peel strength (to corrosion resistant steel only) (3.2.8) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed on the initial shipment of compound to a purchaser, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient compound shall be taken at random from each lot to permit performing all required tests. The number of tests for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A batch shall be all compound run through a mixer at one time.

4.3.1.2 An inspection lot shall be not more than 200 gal (750 L) of compound from one batch.

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6.1 shall state that such plan was used.

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

4.4 Approval:

4.4.1 Sealing compound shall be approved by purchaser before compound for production use is supplied unless such approval be waived by purchaser. Results of tests on production compound shall be essentially equivalent to those on the approved sample compound.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production compound which are essentially the same as those used on the approved sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material and/or processing and, when requested, sample compound. Production compound made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Specimen Preparation:

4.5.1.1 Curing and Test Conditions: Standard laboratory testing conditions shall be 25°C ± 1 (77°F ± 2) and 50% ± 5 relative humidity. Except as otherwise specified, all test specimens shall be prepared, cured, and tested under these conditions.

4.5.1.2 Primer: The compound manufacturer's recommended primer shall be used in preparation of all applicable test specimens.

4.5.1.3 Curing Time: Compound shall be cured for 14 days at standard conditions before conducting hardness and performance tests. Compound for application tests shall be cured as specified in the applicable test method. Primer shall be dried at standard conditions as specified by the manufacturer but drying time shall not exceed one hour.

4.5.2 Specific Gravity: Specimens approximately 1/8 x 1 x 1 in. (3 x 25 x 25 mm) shall be cut with a sharp blade from a sheet of cured sealing compound. The specimen shall be weighed to the nearest milligram, dipped in methyl alcohol and, while still wet, immediately suspended in distilled water and reweighed. Specific gravity shall be calculated from the equation:

$$\text{Specific Gravity} = \frac{\text{Weight in air}}{\text{Weight in air} - \text{Weight in water}}$$

4.5.3 Nonvolatile Content: A 3 - 5 g sample of compound shall be transferred as rapidly as possible to a cup approximately 3 in. (75 mm) in diameter and 1/8 in. (3 mm) deep. A fitted cover shall immediately be placed over the cup and the weight determined to the nearest milligram. The weight of the cup and cover shall have been determined prior to use; this weight shall be subtracted from the initial and final weights to calculate the sample weights. The cover shall be removed and the compound allowed to cure for 48 hours. The cured sample shall then be heated in an oven at 70°C ± 1 (160°F ± 2) for 7 days, cooled to room temperature in a desiccator, the cover replaced, and the weight again determined. Total nonvolatile content shall be calculated from the equation:

$$\text{Nonvolatile Content, \%} = \frac{\text{Final weight}}{\text{Initial weight}} \times 100$$

4.5.4 Flow: Shall be determined using a flow-test jig as shown in Fig. 1. Depth of plunger is critical and shall be controlled within the tolerance during the test. The flow-test jig shall be placed on a table with the front face upward and plunger depressed to the limit of its travel. Compound shall be extruded into the recess cavity of the jig and leveled off even with the block. Within 10 sec after the leveling operation, the jig shall be placed on its end and the plunger immediately advanced to the limit of its forward travel. The flow measurement shall be taken exactly 30 min. after the compound was applied to the jig. Flow shall be measured from tangent to the lower edge of the plunger to the farthest point to which flow has advanced.

4.5.5 Tack-Free Time: An AMS 4037 aluminum alloy panel, 0.040 x 2-3/4 x 6 in. (1 x 70 x 150 mm) shall be cleaned and covered with compound to a depth of 1/8 in. ± 1/16 (3.2 mm ± 1.6). The compound shall be allowed to cure at standard conditions for 6 hr, after which two 1-in. (25-mm) pieces of polyethylene film, 0.004 in. ± 0.002 (0.1 mm ± 0.5) thick, shall be applied to the compound and held in place under a pressure of 1/2 oz per sq in. (0.2 N/mm^2) for 2 minutes. The strips shall be withdrawn slowly and evenly at right angles to the compound surface. The film shall come away clean and free of compound.

4.5.6 Hardness: Shall be determined in accordance with ASTM D2240, using 1/8-in. (3.2 mm) thick specimens plied up to not less than 1/4 in. (6.25 mm).

4.5.7 Thermal-Rupture Resistance: Panels of AMS 5513 corrosion resistant steel 0.040 in. (1 mm) thick x 3-1/2 in. (88 mm) square with a 1/4-in. (6.25-mm) diameter hole in the center shall have a layer of compound 1/8 in. (3 mm) thick x 2 in. (50 mm) in diameter applied and the compound cured as in 4.5.1. After curing, each panel in turn shall be placed in the test fixture (See Fig. 2) with the compound on the interior (pressure) side of the fixture chamber. The fixtures, with the panels, shall be heated to 205°C ± 5 (400°F ± 10) in an air oven and pressure of 5 psig ± 0.5 (136 kPa ± 14) applied for 15 min. ± 1. Fixtures shall be removed from the oven, cooled to room temperature, and the deformation measured.

4.5.8 Low-Temperature Flexibility: Two AMS 4037 aluminum alloy panels, 0.040 x 2-3/4 x 6 in. (1 x 70 x 150 mm) shall have applied to the center of each panel a 0.094-in. (2.35-mm) layer of compound 1-1/2 in. (37.5 mm) wide x 4 in. (100 mm) long. Care shall be taken to ensure accuracy of compound thickness. Compound shall be cured as in 4.5.1 and the panels immediately mounted in a low-temperature flexibility jig as in Fig. 3 in which the panels are gripped on both sides of both 6-in. (150-mm) edges for a distance of 3 in. (75 mm) from one end. The jig with the mounted panels shall be stabilized at -55°C ± 1 (-65°F ± 2) for 2 hr ± 0.1 and the panels flexed through a 30-deg arc (15 deg either side of the neutral position) at a rate of 12 cycles per min. for 130 cycles.

4.5.9 Peel Strength: Four panels each of AMS 4037 aluminum alloy, AMS 4919 titanium alloy, and AMS 5513 corrosion resistant steel, 0.040 x 2-3/4 x 6 in. (1 x 70 x 150 mm) shall be coated with a layer of compound 1/8 in. ± 1/64 (3.2 mm ± 0.4) thick. A 2-3/4 x 12 in. (70 x 300 mm) strip of 20 - 40 mesh aluminum or nickel copper alloy wire screen shall be primed and impregnated with compound so that approximately 5 in. (125 mm) at one end is covered on both faces and well-worked into the screen. The compound-impregnated end of the screen shall be placed on the coated panel and smoothed down on the compound layer, taking care not to trap air beneath the screen. An additional 1/32-in. (0.8-mm) thick coating of compound shall be applied over the screen strips and the assemblies cured as in 4.5.1. Two specimens of each panel material shall then be aged at 205°C ± 3 (400°F ± 5) for 72 hr ± 1. A 1-in. (25-mm) wide section shall be cut from the center of the width of each assembly. The screen shall be stripped back at an angle of 180 deg to the panel in a suitable tensile machine having a jaw separation rate of 2 in. (50 mm) per minute. Peel strength shall be the numerical average of the peak loads.

4.5.10 Corrosion Resistance: One panel each of AMS 4037 aluminum alloy and AMS 5513 corrosion resistant steel, 0.040 x 2-3/4 x 6 in. (1 x 70 x 150 mm) shall have two strips of compound applied 3/16 in. (4.5 mm) thick x 3/4 in. (19 mm) wide x 5 in. (125 mm) long extending to within 1/2 in. (12 mm) of the edges of the panels and spaced approximately 1 in. (25 mm) apart. The coated panels shall be cured as in 4.5.1 except that 48 - 72 hr before the end of the curing period, the panels shall be dipped in MIL-S-4383 sealing compound topcoat and the cure allowed to continue. At the end of the 14-day curing period, the compound strips shall be trimmed to 1/16 in. (1.6 mm) thick and the panels immersed vertically in 3% sodium chloride solution in distilled water in a covered glass vessel so that one half the panel length is immersed in liquid and the other half exposed to air/vapor mixture. Panels shall be exposed at 60°C ± 1 (140°F ± 2) for 20 days. Immediately after removal from the liquid, examine the panels for conformance.

4.5.11 Flame Resistance: Four panels of AMS 5513 corrosion resistant steel, 0.040 x 2-7/8 x 6 in. (1 x 72 x 150 mm), having a 1/4-in. (6.25-mm) diameter hole at the center shall be coated with a 1/8-in. (3.2-mm) thick layer of compound and cured as in 4.5.1. Two of the panels shall be immersed vertically in AMS 3021 fluid at 60°C ± 1 (140°F ± 2) for 72 hr ± 1. Panels shall be subjected to Bunsen burner flame of 1095°C ± 55 (2000°F ± 100) for 15 min. ± 1. The flame shall be directed at the center of the coated face at a 45-deg angle (See Fig. 4).

4.5.12 Oil Resistance: Two AMS 4037 aluminum alloy panels, 0.040 x 2-3/4 x 6 in. (1 x 70 x 150 mm), shall have two parallel strips of sealing compound applied, each strip being 3/16 in. (5 mm) thick x 3/4 in. (19 mm) wide x 5 in. (125 mm) long extending to within 1/2 in. (12.5 mm) of the edge of the panel. Compound on the panel shall be cured as in 4.5.1 and the panels immersed vertically in AMS 3021 fluid at 60°C ± 1 (140°F ± 2) for 72 hr ± 1.

4.5.13 Storage Stability: After storage for 6 months at not higher than 4°C (40°F), compound shall meet the requirements of 3.2.3, 3.2.4, and 3.2.5 for flow, tack-free time, and hardness.

4.6 Reports:

4.6.1 The vendor of sealing compound shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the compound conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 3374, vendor's compound number, lot number, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 3374, supplier's compound number, part number, and quantity. When compound for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of compound to determine conformance to the requirements of this specification and shall include in the report either a statement that the compound conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.7 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the sealing compound may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the compound represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging:

5.1.1 Compound: Unless otherwise specified, the sealing compound shall be furnished in caulking cartridges containing 10.67 fl oz ± 0.25 (315 mL ± 2) of sealing compound, each. The cartridges shall include a self-contained plastic nozzle, the tip of which is designed to be cut off to allow extrusion of the compound. Unless otherwise specified, the cartridges shall be packaged in sectionalized cardboard boxes containing 24 cartridges per box.

5.1.2 Primer: Six 4-oz (120-mL) glass bottles of primer shall be furnished with each 24-cartridge box of sealing compound. The bottles shall be packaged in a suitable sectionalized cardboard box. Instructions for use of the primer shall be included.

5.1.3 Boxes of compound cartridges and of primer bottles shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1, 5.1.2 and 5.1.3 will be acceptable if it meets the requirements of Level C.

5.2 Identification:

5.2.1 Compound: Each cartridge and each box shall be permanently marked to show the following information:

SEALING COMPOUND, ONE-PART SILICONE, Aircraft Firewall
AMS 3374
MANUFACTURER'S IDENTIFICATION _____
COMPOUND NUMBER _____
LOT NUMBER _____
EXPIRATION DATE _____
Store below 27°C (80°F). Refrigerator or freezer storage can prolong useful life

5.2.2 Primer: Each bottle and each box shall be permanently marked to show the following information:

PRIMER NUMBER _____
MANUFACTURER'S IDENTIFICATION _____
LOT NUMBER _____
EXPIRATION DATE _____
Store below 27°C (80°F)
To be used with AMS 3374 Sealing Compound

5.2.3 Shipping Containers: Each exterior shipping container shall be marked to show the following information:

PRODUCT NAME (Compound or Primer)
AMS 3374
MANUFACTURER'S IDENTIFICATION _____
PURCHASE ORDER NUMBER _____
Store below 27°C (80°F)

6. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Sealing compound not conforming to this specification or to modifications authorized by purchaser will be subject to rejection.

8. NOTES:

8.1 Test Fluid: AMS 3021 fluid may be ordered as Stauffer Blend No. 7700 from:

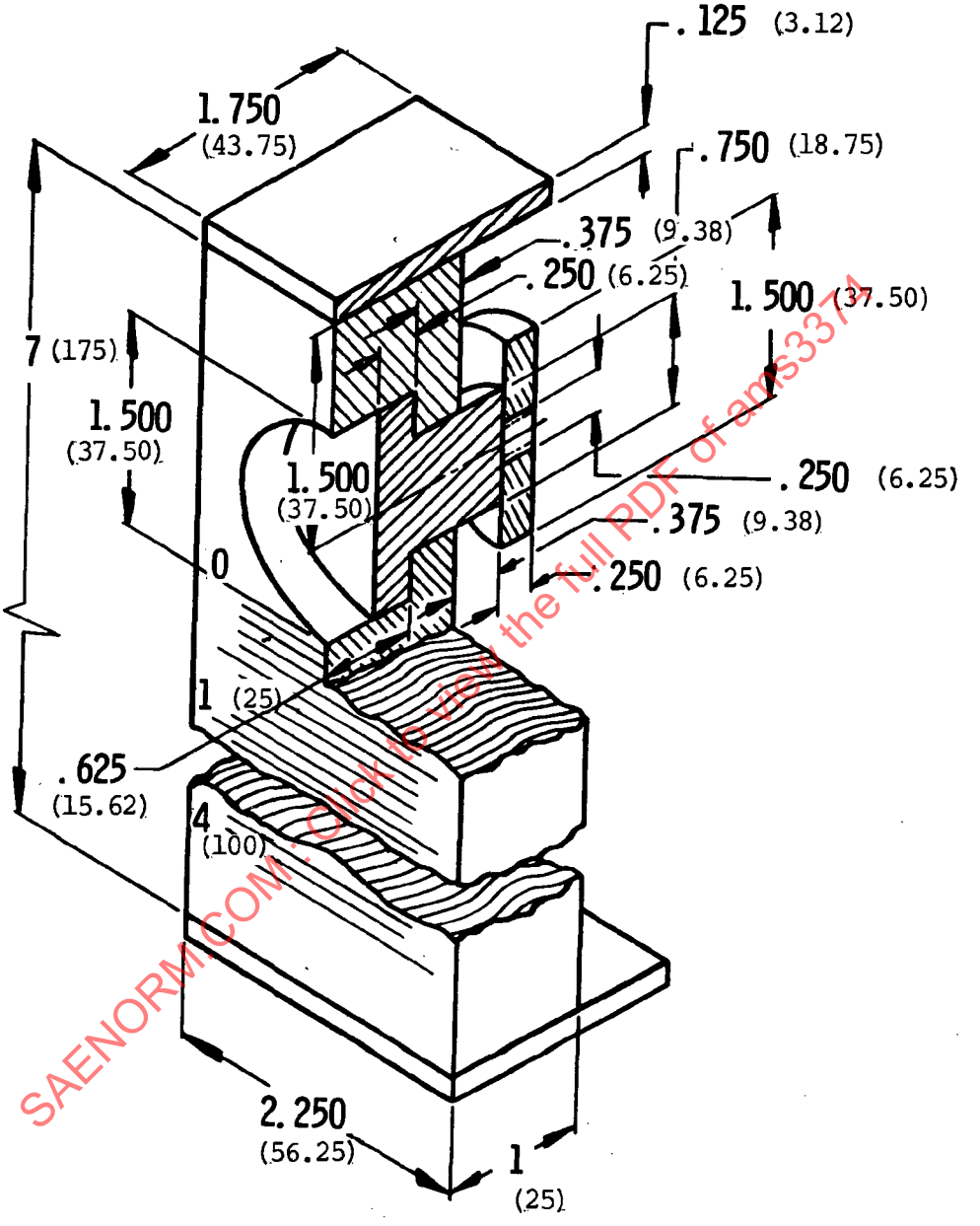
Stauffer Chemical Company
Special Chemical Division
Westport, CT 06880

8.2 For direct U.S. Military procurement, purchase documents should specify not less than the following:

Title, number, and date of this specification
Quantity of cartridges desired
Applicable level of packaging (See 5.1.4).

8.3 Sealing compound meeting the requirements of this specification has been classified under Federal Supply Classification (FSC) 9320.

This specification is under the jurisdiction of AMS Committee "C".



MATERIAL ALUMINUM ALLOY

DIMENSIONS IN INCHES (MILLIMETRES). UNLESS OTHERWISE SPECIFIED,

TOLERANCES: LINEAR DIMENSIONS ±0.016 In. (0.40 mm)

FIGURE 1. FLOW - TEST JIG