SAE-AMS-S-7916

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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-S-7916

Issued SEP 1997

Submitted for recognition as an American National Standard

SEALING COMPOUND, THREAD AND GASKET, FUEL, OIL, AND WATER RESISTANT

NOTICE

This document has been taken directly from U.S. Military Specification MIL-S-7916D and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, (b) the use of the existing government specification or standard format, and (c) the exclusion of any qualified product list (QPL) sections.

1. SCOPE:

1.1 Scope:

This specification establishes the requirements for sealing compounds used on threads and gaskets.

2. APPLICABLE DOCUMENTS:

The following publications, of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

QUESTIONS REGARDING THIS DOCUMENT: (412) 772-7154 FAX: (412) 776-0243
TO PLACE A DOCUMENT ORDER: (412) 776-4970 FAX: (412) 776-0790

2.1 Government Publications:

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

MIL-H-5559	Hydraulic Fluid, Arresting Gear
MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8ST
MIL-A-8625	Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
P-D-680	Dry Cleaning and Degreasing Solvent
QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
PPP-C-96	Can, Metal, 28 Gage and Lighter
PPP-T-1637	Tube, Shipping, Collapsible
FED-STD-313	Material Safety Data Sheets, Preparation and submission of
AN815	Union, Flared Tube
AN817	Nut, Tube, Coupling, Long

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D471	Standard Test Method for Rubber Property - Effect of Liquids
ASTM D3951	Practice for Commercial Packaging

3. REQUIREMENTS:

3.1 Material:

Material used in the formulation of this sealing compound shall be of high quality, suitable for the purpose intended. Physical properties shall conform to the requirements in Table 1, 3.2, 3.3 and 3.4.

3.2 Application:

The sealing compound after being blended shall be a smooth, homogeneous mixture that is applied by brush or spatula.

TABLE I. Physical properties.

PROPERTY	REQUIREMENT	TEST PARAGRAPH
Solubility		4.5.1
Change in weight, percent		
Distilled water	-6 to +2	
Petroleum base oil	-4 to +4	
Hydrocarbon std. test fluid	-7 to +2	
Turbine fuel (JP-4)	-4 to +2	
Hydraulic fluid	-7 to +2	
Seal breaking torque, % change	0 to +35	4.5.2
Flow (vertical), inch, max.	0.25	4.5.3
Non-volatile content, %, min.	80	4.5.4
Viscosity, poises	500 to 3000	4.5.6

3.3 Accelerated storage stability:

After the accelerated storage as specified in 4.5.5, the sealing compound shall be capable of being applied by brush or spatula. There shall be no adverse change in appearance. The viscosity, initially and after accelerated storage, shall conform to the requirement listed in Table I when tested as specified in 4.5.6.

3.4 Toxicity:

The sealing compound shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate medical service who will act as advisor to the contracting agency (see 4.4.1 and 6.4).

3.5 Workmanship:

The sealing compound shall be smooth, homogeneous, and of uniform consistency. There shall be no evidence of lumps, cakes, abrasives or any foreign matter.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for inspection:

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use its own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance: All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections:

The inspection requirements specified herein are classified as Quality conformance inspection (see 4.3).

4.3 Quality conformance inspection:

4.3.1 Lot formation: A lot shall consist of all sealing compound manufactured as one batch at the same time and submitted for acceptance under contract at one time. The unit containers shall be the same size. The lot quantity shall be expressed in gallons.

4.3.2 Sampling:

4.3.2.1 Sampling for physical tests: Sufficient sealing compound shall be selected at random from the lot offered for inspection to perform all the tests specified in 4.3.3.1. There shall be no failures.

4.3.2.2 Sampling for preparation for delivery: An examination of packaging shall be made on shipping containers fully prepared for shipment just prior to closure. The sample unit shall be one shipping container. The sample size shall be in accordance with MIL-STD-105, Inspection Level S-2.

4.3.3 Examinations:

4.3.3.1 Physical tests: The selected sample shall be tested to all the requirements of this specification. The test results for each requirement shall be the average of three determinations. There shall be no failures.

4.3.3.2 Packaging inspection: An examination shall be made in accordance with Table II. There shall be no defects.

TABLE II. Packaging examination.

Examination	Defect
Material	Not as specified Construction not as specified Component missing Evidence of leakage Container bent or damaged
Count	Not specified number per shipping container
Marking	Omitted, illegible, incomplete or incorrect Not according to contract requirements

4.4 Test conditions:

Unless otherwise specified, the sealing compound shall be tested without treatment or preconditioning of any sort. Tests shall be conducted at a temperature of 21° to 27°C (70° to 80°F). Unless otherwise specified in the specific test method, the tolerance for test temperatures shall be ±2°C (±4°F). All metal panels shall be cleaned by wiping with bleached cheesecloth dampened with methyl ethyl ketone.

4.4.1 Manufacturer's data: The manufacturer shall submit a material safety data sheet prepared in accordance with FED-STD-313 which shows the sealing compound is not a health hazard to individuals under normal conditions of usage.

4.5 Test methods:

4.5.1 Solubility:

4.5.1.1 Immersion media: Each of the following fluids shall be used separately as the immersion medium at the indicated temperature:

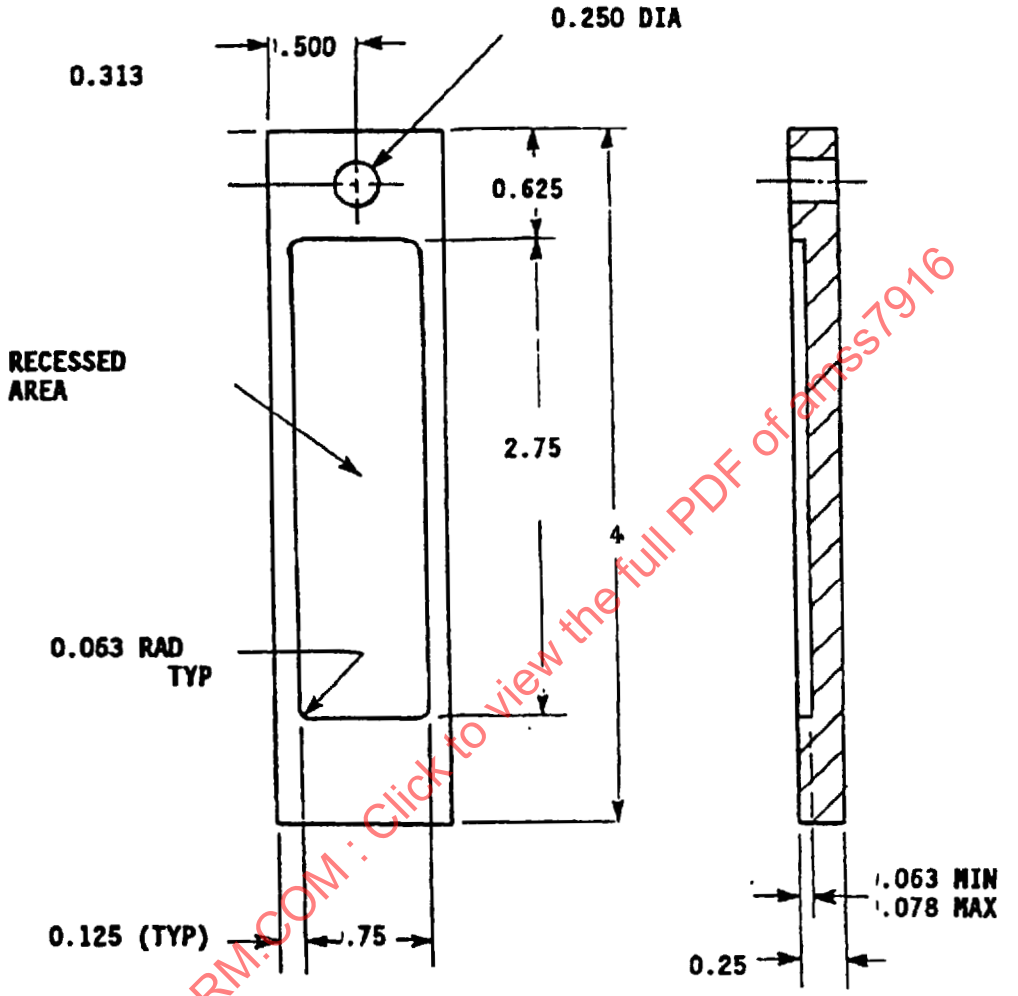
FLUID	TEMPERATURE °C (°F)
Distilled water (ASTM D471)	100 (212)
Petroleum base oil (ASTM D471, Oil #1)	70 (158)
Hydrocarbon Std. Test fluid (ASTM D471, Ref fuel B)	23 (73.4)
Turbine fuel (JP-4) (MIL-T-5624)	23 (73.4)
Hydraulic fluid (MIL-H-5559)	70 (158)

4.5.1.2 Test panels: Recessed aluminum panels conforming to the design and measurement of Figure 1 shall be placed in a desiccator for one hour and then weighed to the nearest milligram (mg). The required number of panels shall then be filled with sealing compound and air dried in a circulating oven for 46 ± 0.25 hour at 70° ± 1°C (158° ± 2°F).

4.5.1.3 Procedure: After removal from the oven and cooling to room temperature in a desiccator, the specimens shall be weighed to the nearest mg and then immersed for 22 ± 0.25 hour in 250 milliliters (ml) of the respective fluid per specimen. After immersion, excess oil shall be removed from the specimens by wiping with P-D-680 solvent. Excess hydraulic fluid shall be removed by dipping the specimens in water. The specimens shall then be oven dried for 22 ± 0.25 hours at 70° ± 1°C (158° ± 2°F). After removal from the oven, the specimens shall be cooled to room temperature by placing them in a desiccator for at least one hour before reweighing. Tests shall be run in triplicate. Percent change in weight shall be calculated as follows:

$$\% \text{ weight change} = \frac{C_3 - C_2}{C_2 - C_1} \times 100$$

Where C_1 = Weight of panel
C_2 = Weight of panel + sealing compound before immersion
C_3 = Weight of panel + sealing compound after immersion.



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS IN INCHES
TOLERANCES ± 0.031"

TO OBTAIN METRIC DIMENSIONS: INCH X 25.4 = MILLIMETERS

FIGURE 1. Recessed panel.

4.5.2 Seal-breaking torque:

4.5.2.1 Test fittings: Three hydraulic fitting assemblies comprised of an AN815-8D union flared tubing and AN817-8D nut-sleeve coupling shall be utilized for this test.

4.5.2.2 Procedure: The sealing compound shall be brushed onto the threads of a clean union in sufficient quantity to fill the threads evenly, then assembled with the nut and tubing. After assembly is completed, excess compound which has extruded shall be wiped from the flange. The assembly shall be tightened to 200 inch-pounds of torque and then exposed in a circulating oven for 7 days at 70° ± 1°C (158° ± 2°F). After removal from the oven, excess compound on the outer edge of the joint shall be removed by scraping, then place the assembly in a desiccator for 24 hours. The torque required to break the seal shall be determined with the same wrench used to assemble the fitting.

4.5.3 Flow (vertical):

4.5.3.1 Test panels: Two panels, approximately 2.5 by 15 cm (1 by 6 inch) shall be prepared from aluminum alloy conforming to QQ-A-250/4-T3. One panel shall be bare, the other anodized in accordance with MIL-A-8625. Each panel shall be coated over a 2.5 by 5 cm (1 by 2 inch) section with a 1.6 mm (0.063 inch) thick coating of sealing compound. A scribe line shall be made on the uncoated portion of surface of the metal 0.25 inch below the compound.

4.5.3.2 Procedure: Immediately after coating, the panels shall be placed in a vertical position with the scribe line at the bottom of the panel and allowed to stand in this position for one hour at 21° to 27°C (70° to 80°) to determine the flow of the compound in reference to the scribe line.

4.5.4 Non-volatile content: Three to five grams of the compound shall be placed in an accurately weighed flat bottom metal dish having a diameter of about 8 cm. The dish and sample of compound shall be weighed and placed in a circulating air oven, maintained at 70° ± 1°C (158° ± 2°F), for 46 ± 0.25 hour. The percent non-volatile content shall be calculated as follows:

$$\text{Non-volatile content} = \frac{W_2}{W_1} \times 100$$

Where: W_1 = Weight of original sample
W_2 = Weight of residue

4.5.5 Accelerated storage stability: A one quart sample of the compound shall be conditioned for 10 days at 49° ± 1°C (120° ± 2°F). The compound, after cooling to room temperature, shall be examined for appearance and tested for viscosity.