

<p>NOT MEASUREMENT SENSITIVE</p>
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MIL-S-7916D  
28 June 1994  
SUPERSEDING  
MIL-S-7916C  
16 May 1973

MILITARY SPECIFICATION

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

This specification is approved for use by all  
Departments and Agencies of the Department  
of Defense.

1. SCOPE

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

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (See 6.2b).

SPECIFICATIONS

FEDERAL

P-D-680 - Dry Cleaning and Degreasing Solvent  
QQ-A-250/4 - Aluminum Alloy 2024, Plate and Sheet

<p>Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Warfare Center Aircraft Division, Code SR3, Highway 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.</p>
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AMSC N/A

FSC 8030

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

PPP-C-96 - Can, Metal, 28 Gage and Lighter  
PPP-T-1637 - Tube, Shipping, Collapsible

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- 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

STANDARDS

FEDERAL

- FED-STD-313 - Material Safety Data Sheets, Preparation and submission of

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage

(Unless otherwise indicated, copies of Federal and Military Specifications, Standards and Handbooks are available from the DODSSP - Customer Service, Standardization Documents Order Desk, 700 Robbins Avenue, Bldg 4D, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

CODE OF FEDERAL REGULATIONS

49 CFR - Transportation

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20370.)

AIR FORCE-NAVY AERONAUTICAL STANDARDS

- AN815 - Union, Flared Tube
- AN817 - Nut, Tube, Coupling, Long

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting officer or as directed by the contracting officer.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2b).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

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ASTM-D471 - Standard Test Method for Rubber Property - Effect of Liquids

ASTM-D3951 - Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government Standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets or MS standards), the text of this document takes precedence. Nothing in the document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

### 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

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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
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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  $\pm 2^\circ\text{C}$  ( $\pm 4^\circ\text{F}$ ). 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:

<u>FLUID</u>	<u>TEMPERATURE °C (°F)</u>
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  $46 \pm 0.25$  hour at  $70^\circ \pm 1^\circ\text{C}$  ( $158^\circ \pm 2^\circ\text{F}$ ).

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  $22 \pm 0.25$  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

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removed by dipping the specimens in water. The specimens shall then be oven dried for  $22 \pm 0.25$  hours at  $70^\circ \pm 1^\circ\text{C}$  ( $158^\circ \pm 2^\circ\text{F}$ ). 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.

#### 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  $70^\circ \pm 1^\circ\text{C}$  ( $158^\circ \pm 2^\circ\text{F}$ ). 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  $21^\circ$  to  $27^\circ\text{C}$  ( $70^\circ$  to  $80^\circ$ ) 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  $70^\circ \pm 1^\circ\text{C}$  ( $158^\circ \pm 2^\circ\text{F}$ ), for  $46 \pm 0.25$  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

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compound shall be conditioned for 10 days at  $49^{\circ} \pm 1^{\circ}\text{C}$  ( $120^{\circ} \pm 2^{\circ}\text{F}$ ). The compound, after cooling to room temperature, shall be examined for appearance and tested for viscosity.

4.5.6 Viscosity. The viscosity of the sample shall be tested at  $23^{\circ} \pm 1^{\circ}\text{C}$  ( $73.4^{\circ} \pm 2^{\circ}\text{F}$ ) using a RVF Brookfield Viscometer with a #7 spindle operated at 4 RPM. The compound shall be stirred vigorously for 3 to 5 minutes. After stirring, the sample shall be permitted to stand undisturbed for 30 minutes. The test may be conducted in a quart can that is at least half full. The spindle guard and calibration sleeve shall not be used. Results shall be reported as the average of three readings taken when the pointer reaches a position where it is stationary in relation to the rotating dial.

## 5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial, as specified (6.2d).

5.1.1 Level A.

5.1.1.1 Unit package. The sealing compound shall be unit packaged in 8 ounce, one-pint, or one-quarter round multiple friction top cans conforming to PPP-C-96, Type V or 8 ounce collapsible tubes conforming to PPP-T-1637, type I, style 1.

5.1.1.2 Intermediate containers. Eight ounce cans shall be further packaged in accordance with the appendix of PPP-C-96. Eight ounce collapsible tubes shall be packaged in accordance with the appendix of PPP-T-1637.

5.1.2 Commercial. The sealing compound shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B or Commercial, as specified (see 6.2d).

5.2.1 Level A. The sealing compound packaged in cans shall be packed in accordance with the appendix of PPP-C-96 for Level A pack. Collapsible tubes shall be packed in accordance with PPP-T-1637 for Level A pack.

5.2.2 Level B. Sealing compound packaged as specified in 5.1.1 shall be packaged as specified in 5.2.1 except for domestic shipment.

5.2.3 Commercial. Sealing compound packaged as specified in accordance with 5.1.2 shall be packed in such a manner as to ensure acceptance by common carrier and safe delivery to destination at the lowest rate. Shipping containers shall conform to the consolidated Freight Classification Rules in effect at the time of shipment, or regulations of other carriers as applicable to the mode of transportation.

5.3 Marking. In addition to any special marking required by the contract or order, each unit package, intermediate package and shipping container shall be marked in accordance with MIL-STD-129. Each unit package shall also include the following information:

- a. Application instructions.
- b. Precautions to be exercised in use of the material.
- c. Recommended thinner (Instructions for thinning).
- d. Replace closure tightly after use.
- e. Date of manufacture.
- f. Store in a cool place.

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## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The sealing compound covered by this specification is intended for use in sealing threaded joints and gaskets (as in flanged joints, fuel selector valves, etc.) where resistance to turbine fuel, petroleum base oil, non-corrosive ethylene glycol and to water is required.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issue of DODISS to be cited in the solicitation and if required the specific issue of individual documents referenced. (See 2.1 & 2.2).
- c. Type and capacity of containers required (See 5.1.1).
- d. Selection of applicable levels of preservation and packing (See 5.1 and 5.2).
- e. Total quantity desired.

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 227.405-70 exempts the requirement for a DOD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
4.5.2	DI-NDTI-80809	Test/Inspection Report	10.2.7

The above DID's were those cleared as of the date of this solicitation. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Material Safety Data Sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent government mailing addresses for submission of data are listed in FED-STD-313.

6.5 Thinning of sealing compound. When stored or partially used sealing compound has increased in viscosity to the point where thinning is



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required, the solvent for thinning and the thinning procedures shall be as specified by the manufacturer and shall be marked on the container.

6.6 Precaution. Do not use where contact with food is possible.

6.7 Subject term (key word) listing.

Break torque

Flange joints

Fluid resistance

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

**Custodians:**

Army - MR

Navy - AS

Air Force - 99

**Preparing Activity:**

Navy - AS

(Project No. 8030-0686)

**Interested Activities:**

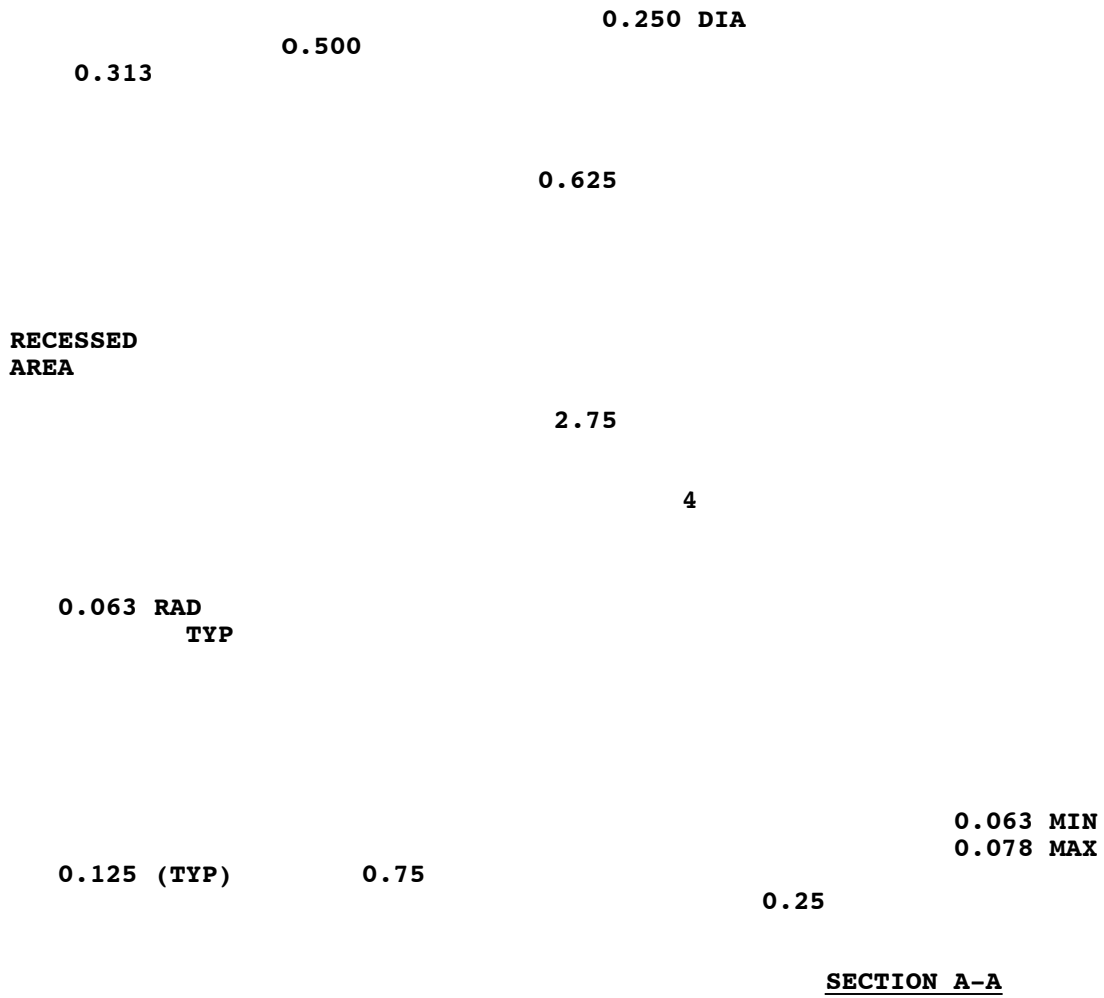
Army - EA, CR, AT, ME

Navy - SH, MC

Air Force - 84

Other agencies - GSA/FSS

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UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS IN INCHES  
TOLERANCES  $\pm 0.031$ "

TO OBTAIN METRIC DIMENSIONS: INCH X 25.4 = MILLIMETERS

FIGURE 1. Recessed panel.