SAE-AMS 2518

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# AEROSPACE MATERIAL SPECIFICATION

SAE AMS-2518 REV A

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Superseding AMS-2518

Submitted for recognition as an American National Standard

## THREAD COMPOUND, ANTI-SEIZE, GRAPHITE-PETROLATUM

1. SCOPE:

1.1 Form: This specification covers an anti-seize compound in the form of a grease.

1.2 Application: Primarily for use as an anti-seize compound on aircraft engine spark plugs and threaded fasteners and fittings. This compound may be used safely in contact with austenitic corrosion-resistant steels, titanium, nickel, and cobalt alloys, and similar corrosion-resistant metals and alloys. This compound contains graphite which may promote corrosion of aluminum, magnesium, ferrous, zinc, and cadmium alloys or plated coatings and should not be used in contact with such metals.

1.3 Safety - Hazardous Materials: While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM C 136 - Sieve Analysis of Fine and Coarse Aggregates
ASTM C 560 - Chemical Analysis of Graphite
ASTM C 561 - Ash in Graphite
ASTM D 91 - Precipitation Number of Lubricating Oils
ASTM D 92 - Flash and Fire Points by Cleveland Open Cup
ASTM D 127 - Drop Melting Point of Petroleum Wax, Including Petrolatum
ASTM D 130 - Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test
ASTM D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
ASTM D 482 - Ash from Petroleum Products
ASTM D 664 - Neutralization Number by Potentiometric Titration
ASTM D 937 - Cone Penetration of Petrolatum
ASTM D 1500 - ASTM Color of Petroleum Products (ASTM Color Scale)
ASTM D 2273 - Trace Sediment in Lubricating Oils

2.2 U.S. Government Publications: Available from Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.2.1 Federal Specifications:

FED-STD-791 - Lubricants, Liquid Fuels, and Related Products; Method of Testing

2.2.2 Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-290 - Packaging of Petroleum and Related Products

3. TECHNICAL REQUIREMENTS:

3.1 Composition (Percent by Weight):

| | min | | max |
|---|---|---|---|
| Petrolatum | 48 | - | 52 |
| Graphite | 48 | - | 52 |

3.2 Properties: The individual components and the product shall conform to the following requirements; tests shall be performed on the components and product supplied and in accordance with specified test methods, insofar as practicable:

3.2.1 Petrolatum: Shall be uniform in quality, clean, homogenous, and free from abrasive and foreign materials and shall conform to the following:

| | | | |
|---|---|---|---|
| 3.2.1.1 | Color | 2 to 8 | ASTM D 1500 |
| 3.2.1.2 | Melting Point | 45° to 60°C (113° to 140°F) | ASTM D 127 |
| 3.2.1.3 | Viscosity, Kinematic at 100°C (212°F) | 11.6 to 18.0 cSt | ASTM D 445 |
| 3.2.1.4 | Flash Point, minimum | 200°C (392°F) | ASTM D 92 |
| 3.2.1.5 | Penetration (unworked) | 150 to 275 | ASTM D 937 |
| 3.2.1.6 | Corrosion at 100°C ± 1 (212°F ± 2) 24 hours, (copper strip) | No discoloration of petrolatum or copper strip | ASTM D 130 |
| 3.2.1.7 | Ash Content, by weight, maximum | 0.1% | ASTM D 482 |
| 3.2.1.8 | Neutralization Number, maximum | 0.1 | ASTM D 664 |
| 3.2.1.9 | Precipitation Number, maximum | 0.10 | 4.5.2.1 |
| 3.2.1.10 | Abrasive Material | None | 4.5.2.2 |
| 3.2.1.11 | Evaporation Loss, maximum | 2% | 4.5.2.3 |

3.2.2 Graphite: Shall be a uniform, dry powder, either natural or manufactured, free from caking or lumping, and free from adulterants, abrasives, and foreign matter, and shall conform to the following requirements:

| | | | |
|---|---|---|---|
| 3.2.2.1 | Graphite, Carbon Content, minimum | 95% | ASTM C 560 |
| 3.2.2.2 | Ash Content, maximum | 2.5% | ASTM C 561 |
| 3.2.2.3 | Particle Size (retained on 100 mesh (150 µm) screen) | None | ASTM C 136 |
| | (retained on 200 mesh (75 µm) screen), maximum | 2.0% | |

3.2.3 Product: The product, mixed according to the composition of 3.1, shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with specified test methods, insofar as practicable:

| | | | |
|---|---|---|---|
| 3.2.3.1 | Worked Penetration | 170 to 260 | ASTM D 937 |
| 3.2.3.2 | Stability | No separation of mixture | 4.5.1 |

3.3 Quality: The product, as received by purchaser, shall be uniform in quality and condition and free from foreign materials and from other contaminants detrimental to usage of the product.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all Ø samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for worked penetration (3.2.3.1) and stability (3.2.3.2) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in ingredients 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, contracting officer, or request for procurement.

4.3 Sampling and Testing: Shall be as follows:
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4.3.1 For Acceptance Tests:

4.3.1.1 Bulk Quantity: Samples shall be selected in accordance with FED-STD-791, Method 8001.

4.3.1.2 Filled Containers: A random sample of filled containers shall be taken Ø from each lot in accordance with MIL-STD-105 at Inspection Level I to verify conformance to all requirements of this specification regarding fill, closure, marking, and other requirements not involving tests.

4.3.1.3 A lot shall be 500 pounds (227 kg) or less of product produced in a single production run and presented for vendor's inspection at one time. A lot may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

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

4.4 Approval:

4.4.1 Sample 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.

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 compound. 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 ingredients 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: Shall be as follows:

4.5.1 Stability of Compound: Place 100 grams of the compound in each of two cone-shaped centrifuge tubes (See apparatus description in ASTM D 2273) and centrifuge at 1500 rpm for 20 minutes. Separation shall be defined as droplets or a layer of oil appearing on the surface of the compound after centrifuging.

4.5.2 Petrolatum:

4.5.2.1 Precipitation Number: Melt a sample of the petrolatum in a small beaker, stir vigorously, and transfer 10 mL of the melted material into a graduated centrifuge tube. Add 70 - 80 mL of precipitation naphtha conforming to ASTM D 91. Immerse the tube in a water bath at 65°C ± 3 (149°F ± 5) and allow to remain, with occasional shaking, until the petrolatum grease is in solution. Add precipitation naphtha to make 100 mL. Invert at least 20 times and proceed in accordance with ASTM D 91.

4.5.2.2 Abrasive Material: Precipitate obtained from the precipitation number test (See 4.5.2.1) shall be rubbed between two smooth pieces of plate glass. If grittiness is felt or if scratches appear on the glass plates, abrasive material is present.

4.5.2.3 Evaporation Loss: Place 5 grams of the petrolatum to be tested in a suitable crucible or container of tared weight. Heat in an oven maintained at 105° to 110°C (221° to 230°F) for 60 minutes ± 5. Remove container, cool in a desiccator to 25°C ± 3 (77°F ± 5), and weigh. Loss in weight shall be calculated in percent as evaporation loss.

4.6 Reports: The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the product conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS-2518A, lot number, and quantity.