

AEROSPACE
MATERIAL
SPECIFICATION

AMS

3075D

Issued 4-1-43
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COMPOUND, CORROSION-PREVENTIVE
Hard Film, Hot Application

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-8-84. It is recommended that this specification not be specified for new designs.

This cover sheet should be attached to the "D" revision of the subject specification.

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AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AMS 3075D

Superseding AMS 3075C

Issued 4-1-43
Revised 4-15-78

COMPOUND, CORROSION-PREVENTIVE Hard Film, Hot Application

1. SCOPE:

- 1.1 Form: This specification covers a stable, nonvolatile, petroleum-base compound in a form suitable for application by dipping at 170° - 210° F (75° - 100° C).
- 1.2 Application: Primarily for preservation of metal parts, tools, subassemblies, and equipment during shipment and storage where a compound readily removable without component damage is required.

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 Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 3160 - Solvent, Petroleum
AMS 4037 - Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn
(2024; - T3 Flat Sheet, - T351 Plate)

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19120.

ASTM A109 - Steel, Carbon, Cold-Rolled Strip
ASTM B117 - Salt Spray (Fog) Testing
ASTM D92 - Flash and Fire Points by Cleveland Open Cup
ASTM D127 - Drop Melting Point of Petroleum Wax, Including Petrolatum
ASTM D217 - Cone Penetration of Lubricating Grease
ASTM D1748 - Rust Protection by Metal Preservatives in the Humidity Cabinet

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

2.3.1 Military Standards:

MIL-STD-290 - Packaging, Packing, and Marking of Petroleum Products

3. TECHNICAL REQUIREMENTS:

- 3.1 Setting: Compound, applied to metal parts, shall set to a firm, hard film within 24 hr at 68° - 86° F (20° - 30° C) and, after 120 hr standing, shall not have checked or cracked so as to expose the metal surface underneath.

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- 3.1.1 Toxicity: Compound shall not contain materials of known toxicity. The vapor shall not cause discomfort or injury to workmen engaged in application of the compound.
- 3.1.2 Abrasiveness: Compound shall not contain abrasive substances.
- 3.2 Properties: Compound shall conform to the following requirements; tests shall be conducted in accordance with specified test methods:
- 3.2.1 Melting Point 150° - 170°F (66° - 77°C) ASTM D127
- 3.2.2 Flash Point, min 350°F (177°C) ASTM D92
- 3.2.3 Consistency 30 - 90 ASTM D217
- 3.2.4 Nonvolatile Matter by wt, min 99.0% 4.5.1
- 3.2.5 Stability: Compound shall remain homogenous with age, determined in accordance with 4.5.2.
- 3.2.6 Application and Removability: Compound shall form a continuous, completely protective film on metal surfaces under normal conditions of storage in all climates; it shall be readily removed by dipping in, or spraying with, AMS 3160 petroleum solvent or by wiping with cloths saturated with the solvent.
- 3.2.7 Wetting Properties and Low-Temperature Adhesion: Compound shall thoroughly wet the surface of test panels, shall form a smooth, unbroken film and shall evince satisfactory adhesion, determined in accordance with 4.5.3.
- 3.2.8 Rosin: Compound shall show no evidence of the presence of rosin, determined in accordance with 4.5.4.
- 3.2.9 Acidity: Compound shall show no evidence of the presence of inorganic acid, determined in accordance with 4.5.5.
- 3.2.10 Lead Solubility: Compound shall not cause a change in weight of a lead specimen of more than 5 mg per sq in. (0.78 mg/cm²), determined in accordance with 4.5.6.
- 3.2.11 Loss on Heating: Compound shall lose not more than 5% in weight when tested as in 4.5.7.
- 3.2.12 Humidity Protection: Compound, exposed to humid atmosphere as in 4.5.8, shall protect metal panels from corrosion and pitting for not less than 28 days.
- 3.2.13 Salt Spray Protection: Compound, exposed to salt spray as in 4.5.9.1 and 4.5.9.2, shall protect metal panels from corrosion and pitting for not less than the following times:

Panel Material	Protection Time
	Days, min
Sand blasted steel	7
Polished steel	7
Polished aluminum	28

- 3.2.14 Corrosion: Compound shall not corrode polished steel, copper, magnesium, aluminum, or cadmium plate when maintained in contact with those metals for 4 hr ± 0.25 at $210^{\circ}\text{F} \pm 2$ ($99^{\circ}\text{C} \pm 1$).

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of compound shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems 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 melting point (3.2.1), application and removability (3.2.6), wetting properties and low-temperature adhesion (3.2.7), humidity protection (3.2.12), and salt spray protection (3.2.13) requirements are classified as acceptance tests.

- 4.2.2 Periodic Tests: Tests to determine conformance to flash point (3.2.2), consistency (3.2.3), non-volatile matter (3.2.4), stability (3.2.5), rosin (3.2.8), acidity (3.2.9), lead solubility (3.2.10), and loss on heating (3.2.11) requirements are classified as periodic tests.

- 4.2.3 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification tests.

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

- 4.3 Sampling: Sufficient compound shall be selected at random from each lot to permit performing the required acceptance 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 two. Frequency of sampling for periodic tests and the size of samples for periodic tests and for qualification tests shall be as agreed upon by purchaser and vendor.

- 4.3.1 A lot shall be all compound produced in a single production run from the same batches of component ingredients under the same fixed conditions and submitted for vendor's inspection at one time.

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. 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 any change is necessary in ingredients or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material and 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 Nonvolatile Matter: A 5-g sample of compound shall be weighed to the nearest mg into a tared evaporating dish and the dish and contents heated for 24 hr ± 0.25 in an oven at $221^{\circ} - 230^{\circ}\text{F}$ ($105^{\circ} - 110^{\circ}\text{C}$). After heating, the dish shall be cooled to room temperature, reweighed, and the nonvolatile matter calculated from the residual weight.

- 4.5.2 Stability: A sample of compound shall be placed in a test tube, heated to $220^{\circ}\text{F} \pm 2$ ($104^{\circ}\text{C} \pm 1$), and maintained at that temperature for 60 min. ± 5 . Tube and compound shall be cooled to room temperature, held for 60 min. ± 5 , further cooled to $-40^{\circ}\text{F} \pm 2$ ($-40^{\circ}\text{C} \pm 1$), and maintained at that temperature for 60 min. ± 5 . Tube and compound shall be reheated to $220^{\circ}\text{F} \pm 2$ ($104^{\circ}\text{C} \pm 1$) and maintained at that temperature for 60 min. ± 5 . Compound, after returning to room temperature, shall be examined for homogeneity.
- 4.5.3 Wetting Properties and Low Temperature Adhesion: Two $1/16 \times 4 \times 2$ in. ($2 \times 100 \times 50$ mm) polished and alkaline-cleaned panels of ASTM A109, Temper No. 4, or equivalent, steel shall be immersed for 1 min. in compound at $205^{\circ} - 210^{\circ}\text{F}$ ($96^{\circ} - 99^{\circ}\text{C}$), withdrawn, and suspended vertically in an atmosphere of not more than 60% relative humidity at $77^{\circ}\text{F} \pm 7$ ($25^{\circ}\text{C} \pm 4$) for $24 \text{ hr} \pm 0.5$. Panels shall be cooled to $0^{\circ}\text{F} \pm 2$ ($-18^{\circ}\text{C} \pm 1$), and maintained at that temperature for 60 min. ± 5 . While at $0^{\circ}\text{F} \pm 2$ ($-18^{\circ}\text{C} \pm 1$), four parallel scratches about $1/8$ in. (3 mm) apart and 1 in. (25 mm) long shall be made in the compound film with a pointed knife blade; four similar scratches which intersect the first four at right angles shall also be made. There shall be no flaking of the film within the area bounded by the scratches.
- 4.5.4 Rosin: To 25 mL of 95% ethyl alcohol shall be added 10 g of compound and the mixture heated to boiling. One or two drops of the solution of compound in alcohol shall be placed on a porcelain spotplate with three or four drops of acetic anhydride. Subsequently, one drop of chemically pure sulfuric acid shall be added. A rose-violet coloration, or a flash of purple produced when the acid meets the anhydride, indicates the presence of rosin.
- 4.5.5 Acidity (Inorganic Acid): A 25 - 50 g sample of compound shall be introduced into a 250 mL separatory funnel followed by 100 mL of boiling distilled water. The funnel shall be shaken vigorously and, after compound and water have separated, the water layer shall be drained into a 500 mL casserole. Compound in the funnel shall be washed twice more by vigorously shaking with 50 mL portions of boiling distilled water. After each washing and separation, the water layer shall be drained into the casserole. One drop of 1% solution of phenolphthalein shall be added to the 200 mL of accumulated water and the water then boiled. A change in color to pink indicates the solution is alkaline. If addition of phenolphthalein causes no change in color, two drops of 0.1% solution of methyl orange shall be added. A change to red or pink in such instances indicates the presence of inorganic acid.
- 4.5.6 Lead Solubility: A $1/16 \times 1 \times 1$ in. ($2 \times 25 \times 25$ mm) polished specimen of lead sheet shall be accurately weighed and immersed for $4 \text{ hr} \pm 0.25$ in $50 \text{ g} \pm 1.0$ of compound maintained at $205^{\circ} - 210^{\circ}\text{F}$ ($96^{\circ} - 99^{\circ}\text{C}$). Specimen shall be removed, cleaned with solvent, and reweighed. Change in weight per sq in. (per cm^2) shall be calculated from the change in weight and the total area of the specimen.
- 4.5.7 Loss on Heating: Two $1/16 \times 4 \times 2$ in. ($2 \times 100 \times 50$ mm) polished and alkaline-cleaned panels of ASTM A109, Temper No. 4, or equivalent, steel shall be weighed to the nearest milligram. Panels shall be immersed for 1 min. in compound at $205^{\circ} - 210^{\circ}\text{F}$ ($96^{\circ} - 99^{\circ}\text{C}$), withdrawn, and suspended vertically in an atmosphere of not more than 60% relative humidity at $77^{\circ}\text{F} \pm 7$ ($25^{\circ}\text{C} \pm 4$) for $24 \text{ hr} \pm 0.25$. Panels shall be weighed to determine the weight of the coating and then suspended for $4 \text{ hr} \pm 0.25$ in an oven at $135^{\circ}\text{F} \pm 2$ ($57^{\circ}\text{C} \pm 1$). After heating, panels shall be carefully removed from the oven, cooled to room temperature, and reweighed. The percentage loss shall be calculated from the loss in weight and the original weight of coating.