AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 3065

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COMPOUND, CORROSION-PREVENTIVE
(Thin Film)

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

2. USE: This material shall be suitable for use as a preservative coating to inhibit fingerprint corrosion on metallic surfaces when applied cold before or immediately after handling. It is intended primarily for use during shop processing and interplant shipments and is not applicable for extended periods of storage.

3. MATERIAL: The material shall be a mixture consisting of corrosion preventive organic substances dissolved or emulsified in a volatile solvent so as to fulfill the requirements specified herein. When the volatile portion of the mixture has evaporated, the deposited protective film shall be easily removed with Petroleum Solvent AMS 3160 by spraying or dipping.

4. REQUIREMENTS: The corrosion preventive shall have the following properties:

(a) Flash Point (closed cup)	100°F Min
Corrosion - copper strip	No discoloration or pitting
Film Thickness, Inches	.001 Max

(b) Non-Volatile.- The non-volatile content shall not vary more than ±5% from the approved sample.

(c) Corrosion.- General Materials.- The corrosion preventive shall produce no evidence of pitting, corrosion, appreciable weight change, or other adverse effect on steel, copper, silver, tin, zinc, cadmium, lead-indium, magnesium, aluminum, brass, or bronze specimens, couples or combinations thereof, glyceryl phthalate enamels, and phenolic resin coatings. The weight change of lead when coated with this corrosion preventive shall not exceed ten milligrams per square centimeter for the period of time specified in section 5(d).

(d) Protection.- A film of the material shall protect panels of polished low carbon steel, and sandblasted low carbon steel for a minimum of 150 hours, when tested as detailed in section 5(e).

(e) Water Displacement.- The corrosion preventive shall be capable of displacing water to such a degree that a sandblasted low carbon steel panel completely wetted with water shall after immersion in the solvent material withstand the corrosion test specified in section 5(f).

(f) Finger Print Inhibiting.- The corrosion preventive shall be capable of inhibiting finger print contamination and shall pass the test specified in section 5(g).

5. TEST PROCEDURE: All tests shall be conducted on a sample of the solvent mixture which has been decanted from its storage container. Unless otherwise specified, all tests shall be conducted in accordance with ASTM methods.

(a) Non-Volatile.- Evaporate 10 grams ±0.1 gram of Corrosion Preventive over a hot water bath using a glass evaporating dish (90mm diameter x 50mm deep). When a constant weight of residue is reached, determined when two successive weight readings one hour apart do not vary more than 10 milligrams, determine non-volatile content by the formula:

$$\frac{\text{Weight of Non-Volatile}}{\text{Weight of Sample}} \times 100 = \% \text{ Non-Volatile}$$

(save non-volatile for density determination)

(b) Corrosion - Copper Strip.- Place a clean strip of mechanically polished pure copper 1/2 x 3 inches in a clean test tube and cover completely with the sample of corrosion preventive to be tested. Close the tube with a vented stopper and maintain at 212°F ± 2° (100°C ± 1.1°) for 3 hours. Rinse the copper strip with sulphur free acetone and compare with a similar strip of freshly polished copper. Corrosion, indicated by discoloration or pitting, shall not be evident.

(c) Film Thickness.- A thoroughly cleaned polished panel 2 x 4 inches and 0.002 inch thick (shim stock) shall be weighed on an analytical balance. Submerge weighed panel in the sample of corrosion preventive for one minute. Remove the panel and allow to drain and condition in air at room temperature for 24 hours. Remove excess of sample which may have accumulated at bottom of panel with two clean blotters, one in each hand, applied to both sides of the panel within 1/8 inch from the bottom. Reweigh coated panel and calculate the film thickness by the formula:

$$\frac{(W + R) - W}{A \times D \times 2.54} = \text{Film thickness in inches}$$

where:

W = Weight of panel in grams.

R = Weight of sample residue in grams

A = Total area of both sides of panel in square centimeters

D = Density of non-volatile, gms./cm^3

(Note - Density may be determined by means of pycnometer after non-volatile of solvent mixture is obtained.)

(d) Corrosion - General Materials.- A sheet lead specimen, polished panels of low carbon steel, brass, bronze, copper, aluminum, magnesium, and electroplates of silver, tin, lead-indium, cadmium, and zinc, cleaned, and where possible polished, shall be provided for this test. In general, the panels shall be approximately one inch square. The exact weight of each panel shall be taken in grams. After the panels have been submerged in the sample of corrosion preventive for 72 hours they shall be removed, washed in clean petroleum solvent (clear gasoline, benzol or equivalent), dried and reweighed. Any significant change in weight other than on the lead panels or other evidence of corrosion shall be cause for rejection. The loss of weight of lead specimen shall be not greater than specified under section 4(c). Panels, one coated with glyceryl phthalate enamel and another with phenolic resin when treated and tested as above shall show no evidence of staining or other deterioration.

(e) Protection.- Duplicate 2" x 4" panels of low carbon steel, some polished and others sandblasted, of AMS 5040 or equivalent shall be prepared to provide smooth edges and rounded corners. The panels shall subsequently be cleaned by brushing using two separate alcohol washes and a final wash in acetone, and dried. Panels not to be used immediately shall be stored in a desiccator. The panels shall be submerged in the sample of corrosion preventive so as to completely coat all surfaces. Remove panels and suspend vertically for 4 hours at room atmosphere to permit draining and conditioning. At the end of this period the panels shall be supported in a vertical or near-vertical position and subjected to a humid atmosphere maintained at 120°F±5° (48.9°C±2.8°) and 95 - 100% relative humidity with continuous condensation and with an air flow of 7-9 linear feet per hour for a period of 150 hours. Corrosion involving either surface, except within 1/8 inch from any edge, shall be cause for rejection.

(f) Water Displacement.- Four 2" x 4" sandblasted low carbon steel panels of AMS 5040 or equivalent shall be prepared and cleaned as directed in section 5(e). After drying, the panels shall be submerged in tap water then immediately transferred to the corrosion preventive sample. After a 30 second dip observe water displacing properties as well as continuity of oil film after dip. Any break in the oil film shall be cause for rejection. Any corrosion except within 1/8" from any edge observed after allowing two panels to stand for 24 hours in room atmosphere and then washing in organic solvent (clear gasoline, benzol or equivalent), or after exposure of the remaining two panels to the humid atmosphere specified in paragraph 5(e) for a minimum of 24 hours shall be cause for rejection.

(g) Finger Print Neutralization.-

(1) Prepare and clean four test panels as directed in section 5(f). Dip each panel for 5 seconds in the specified test solution. Remove panels, then immediately submerge all surfaces in the sample of corrosion preventive by three repeated immersions for 30 seconds. Remove panels, drain and condition in room atmosphere at a temperature of 77°F±5° (25°C±2.8°) for 24 hours. Inspect two panels for corrosion after washing in clean petroleum solvent (clear gasoline, benzol or equivalent). Subject the remaining two panels to the humidity atmosphere specified in paragraph 5(e) for a minimum of 24 hours. Any evidence of corrosion, pitting or staining except within 1/8 inch from any edge shall be cause for rejection.

(2) The test solution shall be made to the following formula:

7 grams of sodium chloride
1 gram of urea
4 grams of lactic acid

To the above mixture add 175 ml distilled water and 525 ml of ethyl alcohol and adjust to a pH of 3.5 ± 0.1.

6. QUALITY: This corrosion preventive shall be clear and free of solids that remain in suspension, free acid or alkali, inorganic compounds, and other compounds known to be toxic to human skin. The odor of the solvent shall not be rancid or more objectionable than that of a "sweet" refined naptha.