AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 3132 B

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VARNISH, SYNTHETIC RESIN
Corrosion Preventive

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

2. TYPE: Colored but unpigmented baking varnish.

3. APPLICATION: Primarily as a corrosion preventive coating on interior parts of aircraft engines.

4. COMPOSITION:

4.1 Varnish (by weight):

Non-Volatile	28 - 32%
Volatile	68 - 72%

4.2 Non-Volatile: Shall consist of a thermosetting phenolic resin plus sufficient blue dye, Victoria Blue B Base, Spirit Soluble, Color Index No. 729 (American Association of Textile Chemists and Colorists), to provide dye content, in the completed product, of 0.09-0.11% by weight. Determinations shall be made in accordance with ASTM D154-47, except that samples shall be heated for 1 hr at 295-305 F instead of 3 hr at 221-230 F.

4.3 Volatile: Shall consist of the alcohols and diluents used by the resin manufacturer in preparation of the basis resin solution plus AMS 3170 thinner in such proportions as will, when combined with the basis resin solution, produce a varnish meeting all requirements of this specification.

5. TECHNICAL REQUIREMENTS:

5.1 General: The varnish shall be homogeneous and free from bubbles, grit and rough particles. It shall be free from ingredients of respiratory toxicity under normal conditions of use. When applied by brushing, spraying or dipping, varnish shall be free working, with leveling properties acceptable to purchaser.

5.2 Viscosity: Shall be 34-41 sec at 77 F, using ASTM cup with 0.070 in. orifice and the procedure described in ASTM D333-40, Section 9, or equivalent viscosity by other methods.

5.3 Stability: Seeding out of resin material shall not occur within 30 days of date of manufacture. Skinning and livering shall be absent in 1/4-filled closed containers at any time up to one week of standing.

5.4 Film Properties: Varnish thinned with AMS 3170 thinner to 24.5-25.5% non-volatile content shall have properties as specified in 5.4.1 through 5.4.8 below when determined on panels prepared as follows:

Panels shall be of low carbon steel buffed to produce surface roughness not greater than 16 microinches, RMS. Edges and corners of panels shall be rounded and smooth.

Panels shall, immediately after buffing, be degreased, cleaned in water solution containing approximately 1% of trisodium phosphate and 1% of a suitable wetting agent and maintained at 180 F ± 5, rinsed in cold water, then in hot water and finally in acetone, and dried. Unless panels are used immediately for testing, they shall be coated with suitable corrosion preventive compound, stored in desiccator until they are to be used and then cleaned as before.

Ø Panels shall be completely coated with the thinned varnish by spraying or dipping to produce, after air-drying and curing as in 5.4.3 below, a film thickness of 0.0003-0.0005 inch.

5.4.1 Appearance: Coating shall be a homogeneous film, free from craters, particles of hardened material and other defects causing discontinuity of the coating.

5.4.2 Air-Drying: Films shall air-dry to touch in not more than 15 min. at temperature of 77 F ± 5.

5.4.3 Curing: Films air-dried for not less than 15 min. and then heated either at 335 F ± 5 for 20 min. or at 290 F ± 5 for 60 min. shall be hard, tough and free from bubbles, craters, pin holes and other surface irregularities. Cured films shall be sufficiently transparent that underlying metal surfaces will be clearly discernible.

5.4.3.1 When immersed in c.p. phenol at approximately 300 F for 5 min., cured films shall not be wrinkled or removed; discoloration or slight surface softening of films shall not be cause for rejection.

5.4.4 Removability: Films on panels, cured as in 5.4.3 above, shall be completely removed within 10 min. when submerged in the cleaning solution described below, maintained at 200 F ± 5. A soft bristle brush may be used, if necessary, to facilitate removal. Cleaning solution shall be prepared by dissolving 8 oz of the following mixture in 1 gal of water; commercial grades of materials may be used.

	Parts by weight
Sodium resinate	1
Sodium metasilicate	3
Trisodium phosphate	1
Sodium carbonate	2
Sodium hydroxide	4

5.4.5 Adhesion: Films on panels, cured as in 5.4.3 above, shall not crack, chip or peel when rapidly bent at room temperature through an angle of 180 degrees around a diameter equal to not more than 18 times the panel thickness, except that slight cracking on bent portion will not be cause for rejection. Scratching with a blade or thin metal object shall produce a fine powdered residue but any flaking or peeling shall be cause for rejection. If flat, coated panels are sand blasted, film shall wear away by abrasion and shall not chip or peel.

5.4.6 Corrosion Resistance: Panels having films cured as in 5.4.3 above and cross-scratched X on one face with a sharp instrument so that metal is exposed and each leg of X is approximately 1-1/2 in. long shall show not more than scattered pin points of corrosion, except within 1/8 in. of any edge and within 1/16 in. of scratches, and films on such panels shall show no softening, peeling, blistering or other evidence of poor adhesion, when panels are subjected to the following tests:

5.4.6.1 Salt spray test in accordance with ASTM B117-49T for 250 hours.

5.4.6.2 Cycles of 8 hr in atmosphere of approximately 100% relative humidity at 120 F ± 5 followed by 16 hr in air at -65 F ± 5 for a total of 168 hours. Test may be interrupted at the end of any 8 or 16 hr period of exposure.

5.4.7 Solvent Resistance: Panels having films cured as in 5.4.3 above shall change in weight not more than 0.2 mg per sq in. of panel surface when subjected to the following test:

5.4.7.1 Panels shall be suspended in flask, fitted with reflux condenser and containing ASTM Reference Fuel No. 2, so as to be exposed, either continuously or intermittently, to vapors and condensate of the boiling liquid for a total of 24 hr, removed and air-dried.

5.4.8 Hot Oil Resistance: Films on panels air-dried 16-24 hr and immersed in unused aircraft engine lubricating oil (viscosity 100 SUS at 210 F), at temperature of 350 F ± 10 for not less than 15 min. shall be hard, tough and free from bubbles, pin holes and other film irregularities.

6. REPORTS: Unless otherwise specified, the vendor of varnish shall furnish with each shipment three copies of a report of the composition and quantitative results of tests conducted on the batch of varnish from which the order was filled. This report shall include the purchase order number, material specification number, formula number and/or batch number, and quantity.

7. PACKAGING AND MARKING:

7.1 Unless otherwise specified, varnish shall be supplied in 5 gal metal containers with sealed openings. Interior surfaces of containers shall be free from corrosion, and, if treated to prevent corrosion, shall be coated with material unaffected by the contents. Loosened particles of surface coating in contents shall be cause for rejection of varnish.

7.2 Each container shall be legibly marked to show this specification number and title, vendor's identification, formula number and/or batch number, date of manufacture, quantity, and any directions for use and precautions for storage.

8. APPROVAL:

8.1 To assure adequate performance characteristics, varnish shall be approved by purchaser before varnish for production use is supplied, unless such approval be waived. Results of tests on production varnish shall be essentially equivalent to those on the approved sample.