



AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N. Y. 10017

AMS 3132C

Superseding AMS 3132B

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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):**

Nonvolatile	28 - 32%
Volatile	68 - 72%
 - 4.2 **Nonvolatile:** 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 the issue of ASTM D154 specified in the latest issue of AMS 2350, except that samples shall be heated for 1 hr at 295 - 305 F (146.1 - 151.7 C) instead of 3 hr at 221 - 230 F (105 - 110 C).
 - 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:** When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.
 - 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 0.2 - 0.5 poise at 77 F (25 C).
 - 5.3 **Stability:** Seeding out of resin material shall not occur within 30 days of date of manufacture. Skin-ning 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% nonvolatile content shall have properties as specified in 5.4.1 through 5.4.8 below when determined on panels prepared as follows:

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Panels shall be of low carbon steel buffed to produce surface roughness not greater than 16 microinches. 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 $180\text{ F} \pm 5$ ($82.2\text{ C} \pm 2.8$), 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. 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 $77\text{ F} \pm 5$ ($25\text{ C} \pm 2.8$).
- 5.4.3 Curing: Films air dried for not less than 15 min. and then heated either at $335\text{ F} \pm 5$ ($168.3\text{ C} \pm 2.8$) for 20 min. or at $290\text{ F} \pm 5$ ($143.3\text{ C} \pm 2.8$) for 50 min. shall be hard, tough, and free from bubbles, craters, pin holes, and other surface irregularities. Cured films shall be green in color and 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 (149 C) 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 $200\text{ F} \pm 5$ ($93.3\text{ C} \pm 2.8$). 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 deg 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 for 250 hr in accordance with ASTM B117.
- 5.4.6.2 Cycles of 8 hr in atmosphere of approximately 100% relative humidity at $120\text{ F} \pm 5$ ($48.9\text{ C} \pm 2.8$) followed by 16 hr in air at $-65\text{ F} \pm 5$ ($-53.9\text{ C} \pm 2.8$) for a total of 168 hours. Test may be interrupted at the end of any 8 or 16 hr period of exposure.