

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
29 West 39th Street  
New York City

## AMS 3110C

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### PRIMER, ZINC CHROMATE

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. APPLICATION: As a protective coating and as an undercoat for use on metals and on molded or laminated synthetic resins.
3. COMPOSITION (by weight): The primer shall contain not less than 60% non-volatile matter and not less than 35% volatile matter. The volatile portion shall consist wholly of aromatic and/or aliphatic hydrocarbons. The non-volatile portion shall consist of not less than 55% as pigment and not less than 40% as non-volatile vehicle. The pigmentation shall be composed of not more than 15% as extender and the remainder shall be zinc chromate. A relatively small amount of other chromates shall not necessarily be cause for rejection.
4. PROCESSING: The component ingredients shall be compounded and processed to produce a product suitable for the purpose intended and not subject to abnormal change with age within a sealed container.
5. TECHNICAL REQUIREMENTS:
  - 5.1 Appearance: Primer shall be free from skins, lumps and grit and shall be capable of being easily mixed to a smooth homogeneous condition both when received and after six months storage.
  - 5.2 Odor: Shall be normal for the hydrocarbons permitted by the specification.
  - 5.3 Color: Unless otherwise specified, color shall be yellow, characteristic of zinc chromate.
  - 5.4 Weight: Shall be not less than 9.8 pounds per gallon at 77 F.
  - 5.5 Viscosity: Shall be 27 - 33 seconds at 77 F, using ASTM cup with 0.070 inch orifice and the procedure described in ASTM D333-40, Section 9, or equivalent viscosity by other methods; this requirement applies to a mixture of one part of primer and one part of toluene conforming to the latest issue of AMS 3180.
  - 5.6 Stability: Package material, from a full closed container which has been stored at 120 F for 96 hours, shall produce films showing no seediness or clear areas lacking in yellow color when one volume of aged packaged material is reduced with two volumes of toluene. After aging, the consistency of the package material shall not be such that it is unsuitable for production usage. Slight silking is permissible provided a continuous film is produced.
  - 5.7 Skinning: Shall be absent in 1/4-filled, closed containers after 24 hours.

- 5.8 Separation: There shall be not more than 10 ml of clear or cloudy supernatant liquid when 70 ml of a mixture of one volume of primer with 2.5 volumes of toluene is allowed to stand four hours. After standing 24 hours, all pigment shall be completely replaced in suspension by vigorously shaking the graduate for not more than 60 seconds. A flow-out film on an aluminum alloy panel immediately following the shaking shall show no seediness or clear areas lacking in yellow color. Slight silking is permissible provided a continuous film is produced.
- 5.9 Dip Tank Stability: A mixture of one volume of primer and two volumes of toluene shall be suitable for use in dip tanks, as shown by passing the following test.
- 5.9.1 A container of suitable size shall be filled to approximately 80% of capacity with the mixture specified in 5.9. Air shall be bubbled through the mixture, at a rate of approximately one liter per minute per 100 ml of mixture, for a total of 200 hours. Aeration may be interrupted as necessary to fit working schedules. During aeration, the level of the mixture shall be maintained by additions of toluene at least every 12 hours and/or by bubbling the influent air through toluene. In addition, the non-volatile matter shall be maintained in suspension by mechanical agitation or shall be replaced in suspension by stirring with a spatula or other suitable instrument at least once each day. At the end of the 200 hours, there shall be no appreciable oxidation or gelling of the resins and a dipped film of the aerated mixture on an aluminum alloy panel shall be free from seeding. Slight silking is permissible provided a continuous film is produced.
- 5.10 Drying Time:
- 5.10.1 A mixture of one volume of primer and two volumes of toluene when applied to aluminum alloy panels in a thin, wet, cross-coat showing a semi-transparent film shall air-dry for handling in not more than five minutes. After air drying for one hour, stacking these panels at 77 F under a pressure of one psi for one hour shall not cause these panels to stick to each other.
- 5.10.2 A mixture of one volume of primer and two volumes of toluene when used as a prime coat shall be suitable for recoating after 30 minutes air drying, with a high gloss lacquer, without undue absorption of primer by the lacquer or loss of gloss of the lacquer.
- 5.11 Flexibility: A mixture of one volume of primer and two volumes of toluene shall be flowed on to a clean AMS 4040 alclad aluminum alloy panel, air dried five minutes, baked at 350-365 F for four hours, and cooled to room temperature. The film shall not crack when the panel is bent through an angle of 180 degrees around a mandrel having a diameter six times the thickness of the panel. Other panel materials may be used when agreed upon by purchaser and vendor.
- 5.12 Adhesion: A clean panel of AMS 4037 aluminum alloy shall be sprayed with a mixture of one volume of primer and two volumes of toluene. The coating shall be 0.0005 - 0.00075 in. thick. The sprayed panel shall then be baked at 212 F for four hours. One coat of cellulose-nitrate lacquer shall be applied over the baked primer, and after air-drying for one hour and baking at 212 F for 16 hours, shall show satisfactory anchorage and adhesion to the primer. Another panel similarly prepared, except omitting the baking of the lacquer coat, shall have adhesion characteristics equal to the above panel on which the lacquer coat was baked.