

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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## AMS 2402 A

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### Z I N C P L A T I N G

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1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **PURPOSE:** To protect metal parts against corrosion.
3. **PREPARATION:** Before placing parts in the plating solution they shall have a chemically clean surface prepared in such a manner as to restrict abrasion of the surfaces to a minimum. Springs shall not be cleaned with inorganic acids. A momentary dip in acid after alkaline cleaning is permissible.
4. **PROCEDURE:**
  - (a) Consists of an electrodeposition of zinc from a zinc cyanide solution directly on the metal part without a flash coating of other metals, such as copper or nickel, underneath.
  - (b) Unless otherwise specified, zinc plated parts, after the final rinse from the plating operation, shall be treated by a process which will prevent the formation of white corrosion products when the plated parts are subjected for 100 hours to salt spray in accordance with the procedure referred to in paragraph 6(b) below.
  - (c) Unless otherwise specified, after plating, washing and drying, parts cold worked, including roll threaded parts, after being heat treated to a hardness over Rockwell C-33, springs and all other parts having a hardness of Rockwell C-40 and over, or a tensile strength of 180,000 lb per sq in. and over, except those which are carburized, shall be heated to 375°F in air, preferably in a circulating air furnace, and held at heat for 3 hours to remove hydrogen embrittlement due to cleaning and plating. Hardened parts which have been tempered at less than 375°F, including carburized parts, shall not be heated as above, but treated by an accepted method for each part.
5. **THICKNESS:** Plating shall be specified on the drawing or in a letter of instruction to comply with the following thickness designations, or the applications and salt spray resistance requirements:
  - (a) Thickness may be designated by this specification number followed by a dash number designating the minimum thickness in ten thousandths of an inch; thus AMS 2402-1 is a thickness of 0.0001 to 0.0003 inch, AMS 2402-6 is a thickness of 0.0006 to 0.0008 inch, etc. A tolerance of + 0.0002 inch in thickness of the plate is allowed except where other maximum and minimum values are specified.
  - (b) AMS 2402 applied to externally threaded parts shall mean a plate thickness capable of withstanding not less than 100 hours salt spray.
  - (c) AMS 2402 applied to all other parts not specifically covered by (b), including nuts internally threaded, shall designate a minimum plate thickness of 0.0003 inch on the outside surfaces and these surfaces shall withstand not less than 200 hours salt spray.

6. **THICKNESS DETERMINATION:** (a) When possible, the thickness shall be determined on representative plated parts, using the magnetic method unless other methods have been approved.

(b) The corrosion resistance of the plating is an indication of the plating thickness and is determined by subjecting representative plated parts to the salt spray corrosion test conducted in accordance with the general procedure outlined in ASTM B117-41T, using specifically a 20% by weight aqueous sodium chloride solution and an operating temperature of  $95 \pm 2^\circ\text{F}$ . The plating shall withstand the salt spray for the minimum time specified for the respective thickness shown in the table below, without definite rusting or pitting or other visible damage. A slight rustlike stain or discoloration which readily washes off without damage to the plate when scrubbed with a cloth or bristle brush is permissible.

Treated Plating Thickness inch	Required Salt Spray Resistance hours, minimum
0.0001	100
0.0002	150
0.0003	200
0.0005	250

**Note:** The salt spray resistance specified in the above table is required only of steel parts but the treated plating on parts of any metal shall prevent formation of white corrosion products during 100 hours exposure to the salt spray.

7. **QUALITY:** (a) The plated zinc shall be uniform in thickness, smooth, not coarsely crystalline, adherent, and free from pin holes, porosity and blisters.

(b) Steel strip specimens, approximately 1/32 inch thick x 1 inch wide x 4 inches long, when cleaned, plated and treated simultaneously with the parts, shall withstand bending through an angle of  $180^\circ$  on a diameter equal to the thickness of the specimen and then straightening, without the coating flaking or blistering or separating from the surface of the base metal.

8. **APPLICATION:** (a) There are no requirements established for the thickness of plating in holes, recesses, and other areas where a controlled deposit cannot be obtained under normal plating conditions and the resulting thickness shall be considered only when the surface of the part can be touched by a sphere 0.75 inch in diameter.

(b) Zinc will probably not plate in deep holes unless special plating methods are employed. When this specification number appears on a drawing, without notes referring to the plating, inside anodes for holes are not required, but all outside surfaces of the parts must be plated. If internal surfaces must be plated, a note on the drawing will so state.

(c) Unless otherwise specified, parts shall be within drawing limits before plating.