AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 2406 A

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CHROMIUM PLATING, HARD

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

2. APPLICATION: Primarily for use on ferrous parts for increasing abrasion resistance, increasing tool and die life, maintaining accuracy of gages, reconditioning of worn or undersized parts and increasing corrosion resistance.

3. TECHNICAL REQUIREMENTS:

3.1 The surfaces of the parts to be plated shall be smooth and free from blemishes, pits, tool marks, and other irregularities.

3.2 Parts to be finished after plating shall have smooth surfaces before plating.

3.3 Parts not finished after plating shall have a surface finish, before plating, that is equal to, or better than, that required on the parts after plating.

3.4 Unless otherwise specified, parts having hardness higher than Rockwell C 40 and which have been ground after heat treatment shall be suitably stress-relieved before cleaning for plating. Temperatures to which parts are heated shall be such that maximum stress-relief is obtained without reducing hardness of parts below drawing limits.

3.5 When so specified, parts shall be magnetically inspected before plating, and after plating and complete finishing.

3.6 Before placing parts in plating solution, they shall have chemically clean surfaces, prepared with minimum abrasion, erosion, or pitting. The final step in cleaning shall consist of anodically cleaning the parts in a chromic acid solution of concentration approximately equal to that of the chromic acid solution used in plating, or by other methods agreed upon by purchaser and vendor.

3.7 Tight electrical connections shall be made and maintained for satisfactory plating.

3.8 The plating process consists of electrodeposition of chromium from a chromic acid solution containing added sulphate or fluoride ions. Unless otherwise specified, the chromium shall be deposited directly on the basis metal without a flash coating of other metal underneath, except in the case of parts made of corrosion-resistant steel on which a preliminary flash of nickel or other suitable metal is permissible.

3.9 After plating, washing and drying, parts shall be treated as follows, unless otherwise permitted, to remove hydrogen embrittlement dueto cleaning and plating:

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3.9.1 Parts, including roll threaded parts, cold worked after being heat treated to hardness higher than Rockwell C 27 shall be heated to 375 F ± 10 in air, preferably in a circulating air furnace, and held at temperature for not less than 3 hours.

3.9.2 Parts having hardness of Rockwell C 33 and higher shall be heated to 375 F ± 10 in air, preferably in a circulating air furnace, and held at temperature for not less than 3 hours.

3.9.3 Parts, including carburized parts, which will decrease in hardness if heated to 375 F, shall be heated to 275 F ± 10 in air, preferably in a circulating air furnace, and held at temperature for not less than 5 hours, excepting parts requiring special handling which shall be treated as agreed upon by purchaser and vendor.

3.10 The finished thickness of plate shall be as specified on the drawing or in a letter of instruction.

3.11 Where parts are plated for corrosion resistance, finished thickness of plate shall be not less than 0.002 in., unless otherwise specified.

3.12 The plate shall be substantially uniform in thickness on significant surfaces.

3.13 Thickness of plate shall be determined by either micrometer measurement, stripping or dropping tests, or by magnetic methods. These methods shall be calibrated by microscopic examination.

3.14 Plate shall be firmly bonded to the basis metal, shall be smooth, uniform in appearance, and free from frosty areas, pin holes, nodules, blisters and other defects detrimental to performance of parts. The method of determining satisfactory adherence shall be as agreed upon by purchaser and vendor. Visual inspection may be aided by magnification of not greater than 5 diameters.

3.15 The plate shall have hardness not lower than Vickers 700, or the equivalent.

3.16 Parts rejected for defective plating shall be stripped before replating. Double plating and spotting-in after plating shall be causes for rejection.

4. PRECAUTIONS:

4.1 Recommended maximum thickness of hard chromium is 0.015 in. except on tools and dies.

4.2 Grinding after plating should be done with proper coolant, never dry, and never with a very heavy cut.

4.3 Parts which are to withstand high alternating stresses and/or impact in service should not be hard chromium plated. The brittle nature of the plate makes it unsatisfactory for these types of service.

4.4 The size and shape of parts and the thickness of plate shall be considered in providing adequate racks and anodes for plating.