AERONAUTICAL MATERIAL SPECIFICATION

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Revised

CHROMIUM PLATING, HARD

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

2. PURPOSE: Primarily intended for chromium plating 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. PREPARATION: (a) The surfaces of the parts to be plated shall be smooth and free from blemishes, pits, tool marks or other irregularities.

(b) Parts to be finished after plating shall have smooth surfaces before plating.

(c) Parts not finished after plating shall have a surface finish, before plating, that is equal to or better than that required on the part after plating.

(d) Unless otherwise specified, parts having hardness higher than Rockwell C40 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.

(e) Before placing parts in plating solutions 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 used in plating, or by other methods agreed upon between purchaser and plater.

4. PROCEDURE: (a) Tight electrical connections shall be made and maintained for satisfactory plating.

(b) The plating process consists of electrodeposition of chromium from a chromic acid solution containg 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, such as copper or nickel 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.

(c) After plating, washing and drying, parts shall be treated as follows, unless otherwise permitted, to remove hydrogen embrittlement due to cleaning and plating:

(1) Parts, including roll threaded parts, cold worked after being heat treated to hardness over Rockwell C27 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.

(2) Parts having hardnesses of Rockwell C33 and over 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) 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 between purchaser and vendor.

5. THICKNESS: (a) The finished thickness of plate shall be as specified on the drawing or in a letter of instruction.

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

(c) The plate shall be substantially uniform in thickness on significant surfaces.

6. QUALITY: (a) Adherence of plate on parts shall be equivalent to that on separate specimens when tested in accordance with Paragraph 7(a). Other methods of determining satisfactory adherence may be used.

(b) Plated chromium shall be firmly bonded to the basis metal, and shall be smooth, uniform in appearance, and free from frosty areas, pin holes, nodules, blisters and other defects detrimental to performance of finished parts.

(c) The plate shall have hardness not lower than Vickers 700 or the equivalent.

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

7. TESTS AND INSPECTION: (a) Test specimens approximately 0.040 in. thick, plated under the same conditions as the plated parts and having approximately 0.004 in. thickness of plate, shall be bent 180° on a diameter equal to the thickness of the specimen, straightened, and examined under 4 diameters magnification for evidence of non-adherence.

(b) When magnetic particle inspection is specified, parts shall be so inspected before plating, and after plating and complete finishing.

(c) Parts shall be visually inspected for conformance to the requirements of paragraph 6(b) after plating and finishing. This visual inspection may be aided by magnification of not greater than 5 diameters.

(d) Thickness of chromium plate shall be determined by micrometer measurement, stripping or dropping tests, or by magnetic methods. These methods shall be calibrated by microscopic examination.

(e) Other means of inspection may be used when agreed between the purchaser and the plater.