AERONAUTICAL
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 2413

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Revised

SILVER AND RHODIUM PLATING

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

2. APPLICATION: Primarily to provide a conductive surface for electrical contacts and/or microwave surfaces for parts operating at temperatures below 300 F.

3. PREPARATION:

3.1 Unless otherwise specified, roughness of surfaces to be plated shall not exceed 32 micro-inches prior to cleaning.

3.2 Unless otherwise specified, all machining, brazing, welding, forming, and heat treating shall be completed before parts are plated.

3.3 Parts shall be chemically clean when immersed in plating solutions.

3.4 Electrical contacts shall be made in non-critical areas and in such a manner as will ensure that no chemical or immersion deposition will occur.

4. PROCEDURE:

4.1 Plating of parts shall be conducted in the following sequence:

1. Copper Flash (Copper strike optional)
2. Silver Plate (Silver strike optional)
3. Rhodium Flash

During silver and rhodium plating, parts shall be introduced into the bath with the current on.

4.1.1 When used on corrosion or heat resistant steels or alloys, nickel flash (nickel strike optional) shall be used in lieu of copper flash (copper strike optional).

4.2 The plating baths shall be of the following types:

Copper cyanide, Watt's type nickel, or nickel chloride, as applicable
Silver cyanide
Rhodium sulfate or phosphate

4.3 After plating, all parts shall be immersed in water at a temperature not lower than 180 F for not less than 15 min. immediately after removal from the final plating tank.

4.3.1 Steel parts shall be subjected to an additional embrittlement relief not more than 30 min. after completion of the hot water immersion as follows:

4.3.1.1 Parts having hardness of Rockwell C 33 or higher that will not be decreased in hardness by heating to 375 F shall be heated to 375 F ± 10 and held at heat for not less than 3 hours.

4.3.1.2 Parts which will be decreased in hardness or otherwise deleteriously affected by heating to 375 F shall be heated to 275 F ± 10 and held at heat for not less than 5 hours.

4.3.1.3 Parts requiring special handling shall be treated as agreed upon by purchaser and vendor.

4.3.2 Copper alloy parts having hardness higher than Rockwell C 29 shall, not more than 30 min. after completion of hot water immersion, be heated in air, preferably in a circulating air furnace, to 275 F ± 10 and held at heat for 2 hours.

5. THICKNESS: Minimum plating thicknesses in inches shall be as follows; determination of plating thickness shall not be required as routine procedure:

Copper or nickel flash, including strike	0.0001
Silver plate including strike	0.0005
Rhodium flash	0.00002

6. QUALITY:

6.1 Deposits shall be smooth, fine grained, continuous, adherent, white in color, and free from blisters, pits, nodules, and indications of burning and other imperfections detrimental to performance of parts.

6.2 The following tests shall be used to determine adhesion.

6.2.1 Parts, or test panels 1 x 4 x 0.04 in. thick, shall be bent through an angle of 180 deg around a diameter approximately equal to the thickness of the basis metal and straightened repeatedly until fracture of the basis metal occurs. Following fracture of the basis metal, it shall not be possible to detach any deposited plating from the basis metal with a sharp instrument.

6.2.2 If parts are not suitable for bend testing, adhesion may be determined on parts prior to treatment for relief of hydrogen embrittlement by heating the parts to 350 F ± 10 and holding at heat for 1 hour. Following heating, no evidence of blistering shall be visible at a magnification of 4 diameters.

6.3 The salt spray corrosion resistance of the plating shall be determined by subjecting representative plated copper panels to a continuous salt spray corrosion test conducted in accordance with ASTM B117-49T. Plate shall be capable of withstanding salt spray for 100 hr with no visible corrosion products and no corroded areas greater than 1/32 in. in diameter.

7. APPROVAL:

7.1 To assure adequate performance characteristics, plated parts shall be approved by purchaser before parts for production use are supplied, unless such approval be waived.