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

AMS 2421

Issued 7-15-61
Revised

PLATING MAGNESIUM FOR SOLDERABILITY
Zinc Immersion Process

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

2. APPLICATION: Primarily to prepare magnesium parts for soft soldering.

3. PREPARATION:

3.1 Impregnation of castings, when required or permitted, shall be done prior to plating. All excess impregnant shall be completely removed prior to curing or baking.

3.2 Unless otherwise specified, all machining shall be completed prior to cleaning and plating.

4. PROCEDURE: Consists of thorough cleaning of the magnesium surfaces, pickling, and activating, followed by application of a zinc immersion coating, a copper strike, a copper plate, and an electrodeposit of tin.

4.1 Cleaning and Pickling: Prior to plating, the parts shall be cleaned to remove all grease, oil, and other surface contamination in accordance with the following procedure.

4.1.1 Vapor degrease.

4.1.2 Cathodically clean parts in a suitable alkaline aqueous solution at 200 F ± 10, using a current density of 10 to 40 asf at 6 volts. The solution shall have a pH of 11.0 or higher.

4.1.3 Rinse in cold running water.

4.1.4 Acid pickle in an aqueous solution suitable for the alloy and form of material being processed.

4.1.5 Rinse in cold running water.

4.2 Activation and Zinc Immersion Coating: Shall be performed by the following procedure or other suitable method.

4.2.1 Immerse in an aqueous solution containing 13 - 14 oz per gal ammonium bifluoride and 1.50 - 1.75 pt per gal phospheric acid at 80 F ± 10 for 30 - 120 seconds.

4.2.2 Rinse in cold running water.

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4.2.3 Providing mild agitation to the bath, immerse in a zinc immersion solution containing 3 - 4.5 oz per gal zinc sulfate monohydrate, 13 - 18 oz per gal tetrasodium pyrophosphate, and 0.8 - 1.2 oz per gal potassium fluoride at 180 F ± 5 for 3 - 10 minutes. The pH of the solution shall be maintained at 10.0 - 10.6 by additions of potassium carbonate.

4.2.4 Rinse in cold running water.

4.3 Plating:

4.3.1 Copper strike in solution having pH of 9.6 - 10.4 at 140 F ± 10, making electrical contact before immersion. A suitable solution consists of 5.5 oz per gal copper cyanide, 9.0 oz per gal potassium cyanide, 4.0 oz per gal potassium fluoride, and 1.0 oz per gal free cyanide.

4.3.2 Rinse in cold running water.

4.3.3 Copper plate in a high speed copper cyanide solution to a thickness of 0.0004 - 0.0006 inch.

4.3.4 Rinse in cold running water.

4.3.5 Electrodeposit tin, in accordance with AMS 2408, to a thickness of 0.0001 - 0.0003 inch. If other electrodeposit is specified, the thicknesses shall be as shown on the drawing.

4.3.6 Rinse in cold running water.

4.3.7 Rinse in hot water and dry.

4.3.8 Reflow tin in hot palm oil or other suitable tinning oil at 500 F ± 25.

4.3.9 Quench in cold trichloroethylene or other equivalent media.

5. QUALITY:

5.1 The final deposit shall be smooth, continuous, adherent, and free from objectionable imperfections. No evidence of blistering shall be present.

5.2 If practical, a magnesium strip of like or similar composition approximately 1/32 x 1 x 4 in., when cleaned and plated simultaneously with parts, shall withstand bending at room temperature through an angle of 180 deg around a diameter equal to 4 times the nominal thickness of the specimen, without exhibiting separation of the deposit from the basis metal when examined at approximately 4 diameters. Slight cracking in the bend, which does not result in flaking, shall not be considered cause for rejection.

5.3 The plating shall be capable of being soldered as determined by soldering the specimen used for the adherence test in 5.2 using a non-corrosive flux and 60Sn - 40Pb solder.