1. Magnesium Alloys — Surface Treatment

A. General

Magnesium alloys are highly susceptible to corrosion when the metal surface is exposed without a protective finish. An oxide carbonate film will normally form on an exposed magnesium alloy surface but this surface provides very little protection against corrosion. A proper protective finish is therefore required.

B. Procedure

NOTE: All magnesium alloy surfaces that have been reworked shall be cleaned and treated with a conversion coating. See Magnesium Alloy - Corrosion Removal, 51-13-22, Repair. The coating materials convert magnesium alloy surface into an inhibiting passive layer on base metal that resists corrosion. This coating is applied using brush on technique.

(1) Solution Preparation

(a) The chemicals used for solution are:

- Chromic Acid (as Cr03)
- Calcium Sulfate (CaSO4.2H2O)

(b) Solution shall be prepared and stored in polyethylene or glass containers.

(c) Prepare solution using the following proportions and controls:

1. The chemicals shall be added to water in order given:

- Chromic Acid; 1.3 oz / gal
- Calcium Sulfate; 1 oz / gal
- Distilled Water to make 1 gal
- pH 1.2 - 1.6

NOTE: Adjust pH with additions of sodium hydroxide or sulfuric acid as required.

(d) Vigorously stir for 15 minutes to ensure that solution is saturated with calcium sulfate.

(e) Let solution stand for 15 minutes to allow undissolved calcium sulfate to settle to bottom of container.

(f) Place solution in another container without transferring undissolved calcium sulfate.

CAUTION: THE FOLLOWING PROCEDURE IS NOT APPLICABLE TO ADHESIVE-BONDED PARTS OR ASSEMBLIES, AREAS WHERE THE BRUSH ON SOLUTION MIGHT BECOME LODGED OR ON LOCAL AREAS BARED SPECIFICALLY FOR GROUNDING OR ELECTRICAL BONDING PURPOSES.

(2) Conversion coating application

(a) Wipe treatment area with dry clean cheesecloth to remove loose particles and residue.

(b) Wipe with cheesecloth dampened (not saturated) with Methyl Ethyl Ketone (MEK). Repeat using clean cheesecloth until no visible residue transfer to cheesecloth.

(c) Allow to air dry for a minimum of 15 minutes and perform water break test to determine cleanliness as follows:
NOTE: The water break test may be used to determine cleanliness. In this method a mist of distilled water is atomized onto surface to be coated. If water gathers and forms into droplets within 25 seconds, the surface shall be considered as failing the test. If the water forms a continuous film by flashing out suddenly over a large area, the surface shall also be considered as failing the cleanliness test because of impurities on surface. If the water drops coalesce into a continuous film of water without a sudden flash and forms a lens, then the surface shall be considered as having passed the water break test.

1 Apply water, in form of mist, on surface:
   a If water breaks hand wipe with MEK or acetone and allow to dry.
   b Once solvent is dry repeat Steps 1.B.(2)(c)1 and 1.B.(2)(c)1 a until water is break free.
   c When water is break free proceed to Step 1.B.(2)(d).

(d) Mask off dissimilar metal inserts, except chromium, nickel, corrosion resistant steel or titanium.

CAUTION: SEVERE RUBBING OF WET SURFACE CAN CAUSE COATING DAMAGE.

(e) Apply solution by swabbing with brush, swab, swatches, cellulose sponge or white blotting paper. Maintain a continuous wet film until metal surface becomes dull golden to dark brown in color.

(f) Rinse with clean cold water.

CAUTION: DO NOT DIRECT HIGH PRESSURE AIR TO SURFACE WHILE DRYING AS COATING IS FRAGILE.

(g) Allow to air dry at ambient temperature. Air dry if possible using moderate forced air.

(h) Apply original finish. See Original Finishes, 51-20-00, General.

(i) Remove masking and protective covering.