



Designation: D 1731 – 03

Standard Practices for Preparation of Hot-Dip Aluminum Surfaces for Painting¹

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1. Scope

1.1 These practices describe procedures for the preparation of hot-dip aluminum surfaces for painting.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings and Related Coating Products²

2.2 Military Standards:

MIL-C-5541 Chemical Conversion Coatings on Aluminum and Aluminum Alloys³

3. Types of Surface Preparations

3.1 Two types of surface preparations are covered as follows:

3.1.1 Solvent Cleaning, and

3.1.2 Chemical Treatments.

3.2 These two types cover several methods as described in Section 5. Variations in surface treatment produce end conditions which differ and which do not necessarily yield identical results when paints are applied. Service conditions will dictate the type of surface preparation that should be selected.

4. Solvent Cleaning

4.1 The surfaces may be prepared for painting by any of the methods for solvent cleaning described in 4.2 and 4.3.

4.2 *Method 1*—Manual swabbing or dip washing with a solvent such as mineral spirits or high flask solvent naphtha. It

is extremely difficult to produce a clean metal surface by this method. Accumulated contaminants in the solvent or on the swab are frequently redeposited on the surface being prepared.

4.3 *Method 2*—Solvent spray cleaning in accordance with Method A, Procedure 1 of Practice D 609.

4.4 *Method 3*—Vapor degreasing in special equipment in accordance with the latest revision of Method A, Procedure 2 of Practice D 609, employing trichlorethylene or perchlorethylene vapor. Solvent cleaning does not disturb the natural oxide film on the metal and may prove adequate for some applications.

5. Chemical Treatment

5.1 The surfaces may be prepared for painting by any of the methods for chemical treatment (Note 1) described in 5.2 to 5.9:

NOTE 1—Materials and procedures employed in these methods of treatment are available from a number of sources as proprietary compounds or methods. Selection may be made from available sources. The hexavalent chromium methods given are not recommended as hexavalent chromium is a known carcinogen.

5.2 *Method 1, Alkaline Cleaners*—Etching alkaline solutions, such as caustic soda, should be avoided because of the possibility of dissolving away the aluminum coating thereby exposing the base metal. Since inhibited alkaline cleaners do not etch the surface, they can be used to remove grease, oil, and other organic solids from hot dip aluminum. After alkali cleaning, the surface should be thoroughly rinsed with clean water. Most often alkaline-cleaned surfaces are subsequently processed by one of the following methods, described in 5.3-5.9.

5.3 *Method 2, Alcoholic Phosphoric Acid Cleaners*—This treatment involves the use of an aqueous solution of phosphoric acid with alcohol or other organic solvents, together with wetting agents, emulsifying agents, etc. The solution may be applied by swabbing or dipping (preferably at a temperature of 70 to 90°F (21 to 32°C)). The solution should remain on the surface for several minutes, followed by thorough rinsing with clean water. A very thin phosphate film is formed which tends to protect the metal and promote paint adhesion.

NOTE 2—Materials meeting the requirements of the latest revision of U.S. Military Specification MIL-M-10578B may be used.

¹ These practices are under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.07 on Chromate Conversion Coatings.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098