



Designation: D 1730 – 03

Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 These practices cover four types of treatment for preparation of aluminum and aluminum-alloy surfaces for painting, as follows:

1.1.1 Type A—Solvent Cleaning.

1.1.2 Type B—Chemical Treatments.

1.1.3 Type C—Anodic Treatments.

1.1.4 Type D—Mechanical Treatments. These four types cover a number of procedures, as described herein.

1.2 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, although the quality produced by any individual method may vary with different alloys.

1.3 *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. Type A—Solvent Cleaning

3.1 Solvent cleaning does not disturb the natural oxide film on the metal and may prove adequate for some applications,

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

such as ambient indoor or very mild service conditions. Three methods may be employed, as follows:

3.1.1 *Method 1, Manual Swabbing or Dip-Washing*, with a solvent such as mineral spirits or high-flask solvent naphtha. With this method it is extremely difficult to prevent accumulation of contaminants on the swab or in the solvent. This method is only recommended when other treatments are impractical.

3.1.2 *Method 2, Solvent Spray Cleaning*, in accordance with Method A, Procedure 1 of Practice D 609.

3.1.3 *Method 3, Vapor Degreasing*, in special equipment employing trichloroethylene vapor, in accordance with Method A, Procedure 2 of Practice D 609.

4. Type B—Chemical Treatments

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.

4.1 *Method 1, Alkaline Cleaners*—Alkaline solutions, such as caustic soda, etch the metal, thus destroying the natural oxide film. They are followed by an acid treatment, preferably nitric acid or phosphoric acid. They shall not be used on assembled structures. Inhibited alkaline cleaners are sometimes employed as a pretreatment to remove grease and oil prior to an acid treatment. Inhibited alkaline cleaners do not etch the surface. They are not generally recommended unless followed by a conversion treatment, such as described in Methods 4, 5, 6, or 7.

4.2 *Method 2, Sulfuric Acid, Chromium Trioxide Etch*—This treatment provides a clean and uniform surface without undue etching, and is effective for removing oil and water stains and any film formed during heat-treatment. The etching solution is prepared by adding 1 gal (3.78 L) of concentrated sulfuric acid and 45 oz (1.28 kg) of chromium trioxide to 9 gal (34 L) of water. It is used at a temperature of 160 to 180°F (71 to 82°C) (depending on the alloy and the amount of film) for about 5 min and is followed by a water rinse. This treatment produces a passive surface suitable for painting under mild to intermediate exposure conditions and where clear finishes are to be applied.