



AEROSPACE MATERIAL SPECIFICATION

AMS2465™

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Disilicide Diffusion Coating of Molybdenum and Molybdenum Alloys
Pack Cementation Method

RATIONALE

AMS2465D stabilizes this document because this document contains mature technology that is not expected to change and thus no further revisions are anticipated.

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1. SCOPE:

- 1.1 Purpose: This specification covers the procedure for applying a disilicide diffusion coating to molybdenum and molybdenum alloy parts by the pack cementation method and the properties of the coating so deposited.
- 1.2 Application: Primarily to provide protection against oxidation above 1100°F (595°C) and for operation in oxidizing atmospheres to approximately 3000°F (1650°C) for limited duration.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA.15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103*

ASTM C664 - Thickness of Diffusion Coating

- 2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Equipment:

- 3.1.1 Retort: A specially constructed retort designed to withstand operating temperatures up to 2100°F (1150°C).

- 3.1.2 Coating Material: Shall be a siliconizing compound composed of inert filler, silicon, and a suitable halide salt.

3.2 Preparation:

- 3.2.1 Machining, welding, brazing, forming, and heat treating shall be completed before parts are coated.

- 3.2.2 Corners and edges shall be smoothly and uniformly rounded; corner radii shall be not less than 0.125 in. (3 mm) and radii on edges (including holes and cut outs) shall be not less than $t/2$ where "t" is the thickness of the material, but in no case shall be less than 0.005 in. (0.12 mm).
- 3.2.3 Parts to be coated shall be cleaned free of grit, dirt, oil, grease, and other foreign materials by a method which will produce results equivalent to the following: wet abrasive blast, wash in a detergent solution, rinse in distilled water, and dry with warm air blast (See 8.2.1).
- 3.2.4 Immediately before coating, parts shall be degreased with a volatile solvent.
- 3.3 Procedure:
- 3.3.1 The time and temperature used for application of the coating shall be adequate for the coating to comply with the requirements specified on the drawing but without causing recrystallization of the basis metal.
- 3.3.2 Components of riveted assemblies shall be coated prior to assembly and shall be recoated by the same procedure after assembly.
- 3.3.3 The parts to be coated shall be packed in a retort with the coating compound of 3.1.2 (See 8.2.2). An atmosphere control compound may also be used. Alloying materials may be added, when desired, to improve the characteristics of the coating. The retort shall be sealed and heated to a temperature between 1750°F (950°C) and 2100°F (1150°C), held at the selected temperature within $\pm 25^\circ\text{F}$ ($\pm 15^\circ\text{C}$) for not less than 3 hr, and cooled. Breaking of the seal and removal of the parts from the pack shall not be performed until the pack has cooled to 500°F (260°C) or lower.
- 3.3.4 Parts of extremely thin section or having other features which may require special handling shall be treated as agreed upon by purchaser and vendor (See 8.2.3).
- 3.4 Properties: Coating shall conform to the following requirements:
- 3.4.1 Thickness: The total coating thickness shall be 0.0015 - 0.0025 in. (38 - 62 μm), determined in accordance with ASTM C664, Method B.