



AEROSPACE MATERIAL SPECIFICATION

AMS2535™

REV. B

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Superseding AMS2535A

Coating, Vapor Deposited Poly-Monochloro-Para-Xylylene
for Microcircuits

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1. SCOPE:

- 1.1 Purpose: This specification covers requirements for poly-monochloro-para-xylylene coatings.
- 1.2 Application: Primarily for use as a secondary moisture barrier coating on hybrid microcircuit substrates and on active monolithic devices. Additionally, the coating immobilizes undesirable particles remaining in sealed microcircuits and enhances to some degree the strength of fine wire interconnections.
- 1.3 Safety - Hazardous Materials: While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.
2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 Aerospace Material Specifications:

AMS 2517 - Dimer, Dichloro 2,2 Para-Cyclophane
AMS 2825 - Material Safety Data Sheets
AMS 3871 - Glazed Ceramic Sheet, 95% Alumina

- 2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 3359 - Measuring Adhesion by Tape Test
ASTM E 252 - Thickness of Thin Foil and Film by Weighing

- 2.3 U.S. Government Publications: Available from Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.3.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

- 3.1 Material: The coating shall be a vapor-deposited poly-monochloro-para-xylylene polymer.

3.2 Equipment:

- 3.2.1 Coating Chamber: Equipment used for the deposition of poly-monochloro-para-xylylene films shall consist of a closed system (Fig. 1) capable of maintaining the necessary zone-controlled pressures and temperatures which will produce coatings conforming to the requirements of 3.5.

- 3.2.2 Fixtures: Fixtures shall be designed to ensure that surfaces which require coating are not covered by the holding devices. Masking gaskets shall be adequate to prevent coating on specified surfaces and shall not damage or distort the surfaces being protected. In general, the opening in the fixture shall be as large as practical so as not to impede deposition flow and uniformity of coating. Typical fixturing for holding microcircuits during coating various configurations is shown in Fig. 2. When required, fixtures shall provide a mechanism for "shorting out" of microcircuit leads to prevent damage to sensitive devices as a result of electrostatic discharge.

3.3 Preparation:

- 3.3.1 Preparation for Lidded Microcircuits: Microcircuits, which are to be coated through a hole in the lid or cover, shall be prepared in the following manner: The hole in the lid or cover shall be established prior to lid attachment by drilling from the inside surface or by punching a hole from the outside surface consistent with the information presented in Figure 3. The edge produced by the hole and the inside surface of the lid shall be sharp and free of burrs. Prior to making the hole in the lid, "pre-tin" an area on the outside surface of the lid where the hole will be located. This will facilitate subsequent solder sealing of the lid after completion of the coating operation.

- 3.3.2 Handling Microcircuits: Precautions shall be used in handling microcircuits to ensure that leads are not displaced or broken and that uncovered substrates are not touched or contaminated. Microcircuits which contain devices which are subject to electrostatic discharge damage shall be handled at all times by persons who are properly electrically grounded and only on approved work stations equipped to prevent static discharge damage to sensitive active devices.
- 3.3.3 Cleaning: Pre-cleaning of microcircuits shall be done by the microcircuit fabricator and the cleaned assembly shall be shipped to the coater in a suitable protective container. Any subsequent solvent or plasma cleaning operation performed by the coating vendor shall be used only with the permission and written approval of purchaser. Cleaned microcircuits shall be handled only in laminar flow booths or under clean room conditions. This applies to all handling prior to final hermetic sealing.
- 3.3.4 Masking: In addition to the masking provided by the fixture and gasketing, additional masking shall be provided as necessary to prevent coating of leads which are subsequently soldered to provide electrical connections. The use of reusable room temperature vulcanizing (RTV) silicone rubber molded boots or removable masking compounds is permissible.
- 3.3.5 Adhesion Promoter Application: An adhesion promoter, acceptable to purchaser, shall be applied to surfaces to be coated. If solvents are used in the application of an adhesion promoter, they shall be of a purity consistent with that used for cleaning semiconductors and shall not contribute ionic species to the surface of active devices.
- 3.4 Procedure:
- 3.4.1 Place the microcircuits in a fixture consistent with the device configuration to be coated (Figure 2). Fixtures and gasket surfaces which contact the microcircuit shall be free of parylene film left from prior deposition runs.
- 3.4.2 Uniformly locate not less than three witness specimens with each load of parts for coating. The specimens shall be similar to actual devices being coated but need not have components in place. In order to satisfy preproduction test requirements and specific acceptance test requirements, foil witness substrates may be required in addition to the hardware specimens.
- 3.4.2.1 If witness specimens are representative of "through hole" coating prelidded devices, the lids shall not be welded or soldered in place but shall be assembled using a low out-gassing adhesive such as a two-part epoxy. Prior to bonding the lid to the substrate assembly, coat the inside top surface of the lid with an extremely thin film of diffusion pump oil or other low vapor pressure [less than 1 micron (1.0 µm) at 25 °C (77°F)] release agent, making sure surfaces to be epoxy bonded are not coated. These steps will simplify disassembly of the witness specimens after deposition and aid in removal of the parylene film from the lid inner surface, providing the specimens for determination of coating properties.