Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 2491B
Superseding AMS 2491A

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SURFACE TREATMENT OF POLYTETRAFLUOROETHYLENE
Bonding Preparation

1. SCOPE:

1.1 Purpose: This specification covers the engineering requirements for preparing surfaces of polytetrafluoroethylene for bonding and the properties resulting from the treatment.

1.2 Application: Primarily for rendering surfaces of parts capable of supporting a high strength adhesive bond. The bonding preparation can affect the electrical properties of the polytetrafluoroethylene and this should be considered before using it for treatment of electronic components.

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 Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 3690 - Adhesive Compound, Epoxy, Room Temperature Curing

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM D897 - Tensile Properties of Adhesive Bonds
ASTM D1002 - Strength Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal)

3. TECHNICAL REQUIREMENTS:

3.1 Material: The surface treating agent shall be a solution of sodium or other alkali metal in anhydrous liquid ammonia or tetrahydrofurannaphthalene or other suitable solvent.

Note. Safety Precaution: Sodium metal reacts violently with water. Tetrahydrofuran solvent is highly flammable. Therefore, it is recommended that persons handling these materials be experienced or trained in their use.

3.2 Preparation: Parts to be treated shall be cleaned of all dirt, grease, oil, and other contamination. Cleaned parts shall be thoroughly dried prior to surface treatment.

3.3 Procedure: The clean, dry parts shall be exposed to the surface treating agent until all surfaces to be bonded display a uniform color.

3.4 Post-Treatment: The treated parts shall be cleaned and thoroughly dried. A suitable cleaning technique is to immerse parts in acetone, then water, followed by a final rinse with clean, anhydrous acetone.

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3.4.1 Treated parts not to be bonded immediately shall be packaged in heat-sealed polyethylene bags in a manner which will prevent exposure to ultraviolet light and surface contamination.

3.5 Properties:

3.5.1 Color: Treated surfaces of parts shall have a uniform, dull, dark brown-to-black color.

3.5.2 Tensile and Shear Strengths: Representative specimens of surface-treated polytetrafluoroethylene which have been bonded to the applicable aluminum specimens with an epoxy adhesive compound conforming to AMS 3690 shall meet the following requirements:

3.5.2.1 Tensile Strength: Shall be not lower than 1000 psi (6.9 MPa) at 70° - 75° F (21.1° - 23.9°C), determined in accordance with ASTM D897 on specimens prepared by bonding a treated polytetrafluoroethylene disc approximately 0.030 in. (0.76 mm) thick between the two halves of a standard aluminum alloy tensile test specimen.

3.5.2.2 Shear Strength: Shall be not lower than 1000 psi (6.9 MPa) at 70° - 75° F (21.1° - 23.9°C), determined in accordance with ASTM D1002 on specimens prepared by bonding a treated polytetrafluoroethylene strip not greater than 0.030 in. (0.76 mm) in thickness between standard aluminum alloy lap shear plates.

3.6 Quality: Surfaces of treated parts shall be uniform in texture and appearance. There shall be no bare or definite lighter colored areas.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The processing vendor shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that processing conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance or routine control tests.

4.3 Sampling: Shall be as agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 To assure adequate performance characteristics, parts treated in accordance with this specification shall be approved by purchaser before parts for production use are supplied, unless such approval be waived.

4.4.2 Vendor shall use manufacturing procedures, processes, and methods of inspection on production parts which are essentially the same as those used on the approved sample parts. If any change in type of equipment or in established limits and operating conditions of process solutions is necessary, vendor shall submit for reapproval of the process and, when requested, sample process parts, test specimens, or both, and a statement of the revised operations. No production parts treated by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Reports: The processing vendor shall furnish with each shipment of treated parts three copies of a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, this specification number and its revision letter, part number, and quantity.