

ADHESIVE, ELECTRICALLY CONDUCTIVE
Silver - Organic Resin

1. SCOPE:

1.1 Form: This specification covers an electrically-conductive adhesive supplied as two components; a paste of silver-filled, epoxy-base adhesive and a separate curing agent which may be paste or liquid.

1.2 Application: Primarily for providing an electrically-conductive bond between metallic, thermosetting plastic, and ceramic surfaces and as an electrically-conductive sealing compound.

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
AMS 2825 - Material Safety Data Sheets

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

ASTM B117 - Salt Spray (Fog) Testing
ASTM D257 - D-C Resistance or Conductance of Insulating Materials
ASTM D1002 - Strength Properties of Adhesives in Shear by Tension Loading
(Metal-to-Metal)
ASTM G21 - Determining Resistance of Synthetic Polymeric Materials to Fungi

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

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2.3.1 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall consist of epoxy resin filled with silver powder, flakes, or balls. The filler metal shall remain dispersed and suspended in the adhesive. The curing agent shall be an amine type material.

3.1.1 Shelf Life: The unmixed adhesive shall meet the requirements of 3.2 at any time up to 6 months from date of manufacture when the adhesive and curing agent are stored in separate, unopened containers at not higher than 30°C (86°F).

3.2 Properties: The product shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable:

3.2.1 Properties of Mixed Adhesive:

3.2.1.1 Pot Life: Shall be not less than 30 min. at 25°C + 3 (77°F + 5).

3.2.1.2 Vapors: No corrosive or noxious vapors shall be produced during mixing or curing of the adhesive.

3.2.1.3 Consistency: Shall be suitable for application by spatula or pressure gun.

3.2.2 Properties of Cured Adhesive: The adhesive shall have the following properties when mixed and applied in accordance with manufacturer's instructions and cured at 25°C + 1 (77°F + 2) for not more than 24 hr or at 65°C + 1 (150°F + 2) for not more than 2 hours:

3.2.2.1 Lap Shear Strength, min (Aluminum Specimens)	1000 psi (6.90 MPa)	ASTM D1002
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3.2.2.2 Volume Resistivity, max	0.004 ohm-cm	ASTM D257
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3.2.2.3 Salt Spray Resistance, min	48 hr	ASTM B117
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3.2.2.4 Fungus Resistance	Pass (Rating 1)	ASTM G21
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3.2.2.5 Corrosion: The adhesive, unless otherwise specified, shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and vendor. Discoloration of metal shall not be considered objectionable.

3.3 Quality: The adhesive, as received by purchaser, shall be uniform in quality and condition, clean, and free from foreign materials and from internal and external imperfections detrimental to usage of the adhesive.

4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of the adhesive shall supply all
∅ samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the adhesive 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 tests and as preproduction tests and shall be performed prior to or on the initial shipment of adhesive to a purchaser, on each lot, when a change in material or processing, or both, requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.
- 4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.
- 4.3 Sampling: Shall be as follows:
- 4.3.1 For Acceptance Tests: Sufficient product shall be taken at random from
∅ each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.
- 4.3.1.1 A lot shall be all adhesive produced in a single production run from the
∅ same batch of raw materials under the same fixed conditions, or all adhesive subjected to the same unit chemical or physical process intended to make the final product homogeneous, and submitted for vendor's inspection at one time. An inspection lot shall not exceed 500 lb (225 kg) and may be packaged in smaller quantities under the basic lot approval provided the lot identification is maintained.
- 4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.
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- 4.4 Approval:
- 4.4.1 Sample adhesive shall be approved by purchaser before adhesive for production use is supplied, unless such approval be waived by purchaser. Results of tests on production adhesive shall be essentially equivalent to those on the approved sample.

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4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production adhesive which are essentially the same as those used on the approved sample adhesive. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material or processing, or both, and, when requested, sample adhesive. Production adhesive made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of the product shall furnish with each shipment three copies of a report showing the composition and the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, AMS 3681B, vendor's compound number, lot or batch number, part number, and quantity.

4.5.1.1 A material safety data sheet conforming to AMS 2825 or equivalent shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of adhesive for production use. Each request for modification of adhesive formulation shall be accompanied by a revised data sheet for the proposed formulation.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 3681B, contractor or other direct supplier of adhesive, supplier's material designation, part number, and quantity. When adhesive for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of adhesive to determine conformance to the requirements of this specification and shall include in the report either a statement that the adhesive conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.6 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the adhesive may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the adhesive represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Packaging shall be accomplished in such a manner as to ensure that the adhesive, during shipment and storage, will be protected from exposure to weather or any other normal hazard.