SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3573B

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Superseding AMS 3573A

Resin, Polyurethane (EU) Casting Polyether-Type, Flexible, Solid Low-Temperature Resistant, 80 to 90

1. SCOPE:

1.1 Form:

This specification covers a plasticized, polyether-type, urethane (EU) resin and hardener which, when mixed and cured, produces elastomeric polyurethane products.

1.2 Application:

This resin has been used typically for applications, such as electronic encapsulation or for casting parts and shapes, requiring exceptional flexibility down to -55 °C (-67 °F) where poor reversion resistance can be tolerated, but usage is not limited to such applications.

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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2825	Material Safety Data Sheets

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM D 257	D-C Resistance or Conductance of Insulating Materials
ASTM D 412	Rubber Properties in Tension
ASTM D 624	Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer
ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 1053	Rubber Property-Stiffening at Low Temperatures: Flexible Polymers and Coated Fabrics
ASTM D 1824	Apparent Viscosity of Plastisols and Organosols at Low Shear Rates by Brookfield Viscometer
ASTM D 2240	Rubber Property-Durometer Hardness
ASTM D 2383	Testing Plasticizer Compatibility in Poly(Vinyl Chloride) (PVC) Compounds Under Humid Conditions

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 or www.dsp.dla.mil.

MIL-STD-2073-1	DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material:

The product shall be a two-component, polyether-type polyurethane (EU) system, consisting of a prepolymer and a separate curing agent. The prepolymer shall cure by the addition of the curing agent and shall not depend on solvent evaporation or moisture reaction for curing. The prepolymer and curing agent shall be of high quality, selected for the purpose. The material shall contain a urethane-grade triethylene glycol dipelargonate plasticizer.

3.2 Properties:

The compound shall conform to the following requirements:

3.2.1 Uncured Material:

3.2.1.1 Appearance: The liquid, mixed compound shall have a uniform, homogeneous texture and shall be free of lumps, coarse particles, and air bubbles before molding or potting. There shall be no separation of pigment which cannot be dispersed readily. Solidification of the compound is permissible provided it can be reliquified readily by heating.

3.2.1.2 Storage Life: The unmixed resin and hardener shall meet the requirements of this specification at any time up to six months from date of receipt by purchaser when stored in the original, unopened containers at 30 °C (86 °F) or lower.

3.2.1.3 Viscosity: Shall be not greater than 3000 centipoise (3.0 Pa-s) at 23 °C (73 °F), determined, within 5 minutes after mixing, in accordance with ASTM D 1824 using a Brookfield Model LVF viscometer and No. 2 spindle at 12 revolutions per minute or equivalent equipment.

3.2.1.4 Pot Life: Usable life of the compound, defined as the time to attain double the initial viscosity determined in 3.2.1.3, shall be not less than 30 minutes at 23 °C ± 2 (73 °F ± 4).

3.2.1.5 Curing Time: The time required to develop the cured product properties specified in 3.3.2 shall be not more than five days at 23 °C (73 °F) or not more than two hours at 93 °C (199 °F).

3.2.1.6 Demold Time: The time required before the part can be removed from the mold and retain its integrity shall be not more than 24 hours at 23 °C (73 °F).

3.2.2 Cured Product: Resin, when mixed and cured in accordance with manufacturer's instructions, shall have properties as shown in Table 1, determined in accordance with specified ASTM test methods.

TABLE 1 - Properties of Cured Products

Paragraph	Property	Requirement	Test Method
3.2.2.1	Hardness, Durometer "A" or equivalent	85 ± 5	ASTM D 2240
3.2.2.1.1	The readings shall not drop more than 5 points in 10 seconds		
3.2.2.2	Tensile Strength, min	1600 psi (11.0 MPa)	ASTM D 412
3.2.2.3	Elongation, min	500%	ASTM D 412
3.2.2.4	Tensile Stress at 100% Elongation, min	300 psi (2.07 MPa)	ASTM D 412
3.2.2.5	Tear Strength, min	150 pounds force per inch (26 kN/m)	ASTM D 624, Die C
3.2.2.6	Specific Gravity	1.05 ± 0.03	ASTM D 792
3.2.2.7	Insulation Resistance:		ASTM D 257
3.2.2.7.1	At 25 °C ± 1 (77 °F ± 2), min	10,000 megohms	
3.2.2.7.2	After exposure at 35 ° ± 1 (95 °F ± 2) and 90% RH ± 2 for 96 hours ± 0.5, min	500 megohms	
3.2.2.8	Low-Temperature Resistance:		ASTM D 1053
3.2.2.8.1	Modulus of Rigidity at -55 °C ± 1 (-67 °F ± 2), max	7,000 psi (48.3 MPa)	
3.2.2.9	Plasticizer Compatibility Rating:	None (Dry)	ASTM D 2383

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of the product shall supply all samples for required tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for appearance of the mixed, uncured compound (3.2.1.1) and for hardness (3.2.2.1) and specific gravity (3.2.2.6) of the cured product are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 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, contracting officer, or request for procurement.

4.3 Sampling and Testing: 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 product from the same batch of compound processed in one continuous run and presented for manufacturer's inspection at one time.

4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser and (R) manufacturer, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and manufacturer.

4.4 Approval:

4.4.1 Sample resin shall be approved by purchaser before resin for production use is supplied, unless such approval be waived by purchaser. Results of tests on production resin shall be essentially equivalent to those on the approved sample.

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

4.5 Reports:

The supplier of resin shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements, identifying the resin system cure cycle used, and stating that the resin conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3573B, manufacturer's identification, and quantity.