

RESIN, POLYURETHANE (EU), CASTING  
Polyether-Type, Flexible, Solid  
Low-Temperature Resistant, 80 - 90

1. SCOPE:

- 1.1 Form: This specification covers a plasticized, polyether-type, urethane resin and hardener which, when mixed and cured, produces elastomeric polyurethane products.
- 1.2 Application: Primarily for applications such as electronic encapsulation or for casting parts and shapes requiring exceptional flexibility down to -55°C (-65°F), where poor reversion resistance can be tolerated.

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

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

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

- ASTM D257 - D-C Resistance or Conductance of Insulating Materials
- ASTM D395 - Rubber Property - Compression Set
- ASTM D412 - Rubber Properties in Tension
- ASTM D624 - Rubber Property - Tear Resistance
- ASTM D792 - Specific Gravity and Density of Plastics by Displacement
- ASTM D1053 - Rubber Property - Stiffening at Low Temperature Using a Torsional Wire Apparatus
- ASTM D2240 - Rubber Property - Durometer Hardness
- ASTM D2383 - Testing Plasticizer Compatibility in Poly(Vinyl Chloride) (PVC) Compounds Under Humid Conditions

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 Material: Resin shall be a two-component, polyether-type polyurethane 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 material 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 6 months from date of receipt by purchaser when stored in the original, unopened containers at 30°C (85°F) or lower.

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

3.2.2.1	Hardness, Durometer "A" or equiv.	85 $\pm$ 5	ASTM D2240
3.2.2.1.1	The readings shall not drop more than 5 points in 10 sec		
3.2.2.2	Tensile Strength, min	1600 psi (11.0 MPa)	ASTM D412
3.2.2.3	Elongation, min	500%	ASTM D412
3.2.2.4	Tensile Stress at 100% Elongation, min	300 psi (2.05 MPa)	ASTM D412
3.2.2.5	Tear Strength, min	150 lb per in. (25 kN/m)	ASTM D624, Die C
3.2.2.6	Specific Gravity	1.05 $\pm$ 0.03	ASTM D792
3.2.2.7	<u>Insulation Resistance</u> :		ASTM D257
3.2.2.7.1	At 25°C $\pm$ 1 (77°F $\pm$ 2)	10,000 Megohms	
3.2.2.7.2	After exposure at 35°C $\pm$ 1 (95°F $\pm$ 2) and 90% $\pm$ 2 RH for 96 hr $\pm$ 0.5	500 Megohms	
3.2.2.8	<u>Low-Temperature Resistance</u> :		ASTM D1053
3.2.2.8.1	Modulus of Rigidity at -55°C $\pm$ 1 (-65°F $\pm$ 2), max	7,000 psi (48.5 MPa)	
3.2.2.9	<u>Plasticizer Compatability Rating</u> :	None (DRY)	ASTM D2383

#### 4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product 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 product conforms to the requirements of this specification.

#### 4.2 Classification of Tests:

- 4.2.1 Acceptance Tests: Tests to determine conformance to requirements 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 classified as acceptance tests and shall be performed on each lot.
- 4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in material 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, 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 tests 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 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.
- 4.3.1.2 When a statistical sampling plan and acceptance quality level (AQL) for the product have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5.1 shall state that such plan was used.
- 4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.
- 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.