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

AEROSPACE MATERIAL SPECIFICATION

AMS 3359

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Revised

SILICONE POTTING COMPOUND, ELASTOMERIC
Two-Part, General Purpose
200 - 400 Poise Viscosity

1. SCOPE:

1.1 Form: This specification covers a room-temperature-vulcanizing, elastomeric silicone compound.

1.2 Application: Primarily for potting and encapsulating electronic products for use at temperatures from -65° to +260°C or -85° to +500°F where resistance to reversion is not required.

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, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

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

ASTM D149 - Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies
ASTM D150 - A-C Loss Characteristics and Dielectric Constant (Permittivity) of Solid Electrical Insulating Materials
ASTM D257 - D-C Resistance or Conductance of Insulating Materials
ASTM D412 - Tension Testing of Vulcanized Rubber
ASTM D792 - Specific Gravity and Density of Plastics by Displacement
ASTM D1084 - Viscosity of Adhesives
ASTM D2240 - Indentation Hardness of Rubber and Plastics by Means of a Durometer

2.3 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: Shall consist of two parts, a base compound and a separate catalyst which, when mixed in proper proportions, will cure at room temperature to a rubbery solid.

3.1.1 Base Compound: Shall be an uncatalyzed silicone polymer with necessary fillers.

3.1.2 Catalyst: Shall be a paste consisting of dibutyl tin dilaurate and inert filler in a silicone polymer.

3.2 Properties:

3.2.1 Base Compound:

3.2.1.1 Color: Shall be white.

3.2.1.2 Viscosity: Shall be 200 - 400 poises (20 - 40 Pa·s) determined at 25°C ± 1 (77°F ± 1.8) in accordance with ASTM D1084, Method B, using a No. 3 spindle at 5 rpm on a Brookfield Model HAF viscometer.

3.2.2 Catalyst:

3.2.2.1 Color: Shall be of a contrasting color to that of the base compound.

3.2.3 Unmixed Compound:

3.2.3.2 Storage Life: The base compound and the catalyst stored in closed containers, at a temperature not higher than 32°C (90°F), when mixed in proper proportions at any time up to one year from date of manufacture, shall meet the requirements of 3.2.4 and 3.2.5.

3.2.4 Mixed, Uncured Product:

3.2.4.1 Pot Life: Shall be 2 - 5 hr, determined in accordance with 4.5.2.

3.2.5 Mixed, Cured Product: The product shall conform to the following requirements; tests shall be performed on specimens cut from air-free slabs prepared as in 4.5.1 and tested at 25°C ± 1 (77°F ± 1.8) and relative humidity of 45 - 55% in accordance with specified test methods:

3.2.5.1 As Received:

3.2.5.1.1	Hardness, Durometer "A" or equiv., min	55	ASTM D2240
3.2.5.1.2	Tensile Strength, min	550 psi (3.79 MPa)	ASTM D412, Die C
3.2.5.1.3	Elongation, min	100%	ASTM D412, Die C
3.2.5.1.4	Specific Gravity	1.33 - 1.43	ASTM D792, Method A
3.2.5.1.5	Dielectric Strength, short time test, min	400 V per mil (15,750 V/mm)	ASTM D149
3.2.5.1.6	Volume Resistivity, min	1 x 10^{13} ohm-cm	ASTM D257
3.2.5.1.7	Dielectric Constant, max		ASTM D150
	At 100 Hz	3.5	
	At 100,000 Hz	3.5	
3.2.5.1.8	Dissipation Factor, max		ASTM D150
	At 100 Hz	0.04	
	At 100,000 Hz	0.04	
3.2.5.2	Dry Heat Resistance:		ASTM D573
			Temperature: 250°C ± 3 (482°F ± 5.4)
3.2.5.2.1	Hardness Change, Durometer "A" or equiv.	-10 to +10	Time: 70 hr ± 0.5

3.2.5.2.2 Tensile Strength Change, max	-20%	
3.2.5.2.3 Elongation Change, max	-25%	
3.2.5.2.4 Bend (flat)	No cracking or checking	
3.2.5.3 Low Temperature Resistance:		ASTM D2137, Method A Temperature: -65°C ± 3 (-85°F ± 5.4)
3.2.5.3.1 Brittleness	Pass	

3.3 Quality: The product shall be uniform in quality and condition, clean, homogeneous, and free from foreign materials.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product 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 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems 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 the following requirements are classified as acceptance or routine control tests:

Property	Paragraph
Base Compound	3.2.1
Catalyst	3.2.2
Mixed, Uncured Product	3.2.4
Mixed, Cured Product	
Hardness	3.2.5.1.1
Tensile Strength	3.2.5.1.2
Elongation	3.2.5.1.3
Specific Gravity	3.2.5.1.4
Dielectric Strength	3.2.5.1.5

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification or periodic control tests.

4.2.2.1 For direct U. S. Military procurement, qualification test material and supporting test data shall be submitted to the cognizant qualification agency as directed by the request for procurement, the procuring activity, or the contracting officer.

4.3 Sampling: Shall be as follows:

4.3.1 Acceptance Tests: Sufficient material shall be taken from each lot of base compound and catalyst to determine viscosity of base compound and pot life of mixed compound on one sample and to perform all other acceptance tests in triplicate.

4.3.2 Qualification Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production material which are essentially the same as those used on the approved sample material. If any change is necessary 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 and processing and, when requested, sample material. No production material made by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Slabs from which test specimens are cut for determining properties of the mixed cured product shall be not less than 0.075 in. (1.90 mm) thick and approximately 6 in. or 150 mm square, prepared from a mixture of 100 parts by weight of base compound and 10 parts by weight of catalyst, cured for not less than 72 hr at 25°C ± 1 (77°F ± 1.8) and relative humidity of 45-55%.

4.5.2 Pot Life: Place approximately 50 g of mixed, uncured compound in a suitable container so that a layer of compound approximately 1/2 in. or 13 mm thick is formed. Using a micro-spatula having a flat tip approximately 1/4 in. or 6 mm wide, probe the compound periodically by dipping the tip of the spatula well below the surface of the compound, withdrawing the spatula slowly, and observing the strings of the compound. The time required for the strings to break without stretching more than 1 in. (25 mm) shall be considered the pot life.

4.6 Reports:

4.6.1 The vendor of the product shall furnish with each shipment of compound and each shipment of catalyst, three copies of a report of the results of tests to determine conformance to the acceptance test requirements and stating that the product conforms to the other technical requirements of this specification. This report shall include the purchase order number, material specification number, vendor's compound and catalyst designations, lot numbers, dates of manufacture, and quantity of compound and catalyst.

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

4.7 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product 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 product 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 Base Compound: Shall be supplied in 1 lb (454 g), 10 lb (4.5 kg), 50 lb (22.7 kg), or 450 lb (204.3 kg) containers, as ordered. Each container shall be marked to show this specification number and title, vendor's identification, "BASE COMPOUND", formula number, lot number, date of manufacture, and quantity and any directions for use or precautions for storage.