

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3307D

Issued 1969-05
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Revised 2009-05

Superseding AMS3307C

Rubber, Silicone (VMQ)
Low Compression Set, Non-Oil-Resistant
65 - 75

RATIONALE

AMS3307D results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a silicone (VMQ) rubber in the form of sheet, strip, and molded shapes.

1.2 Application

Primarily for parts required to operate or seal from -55° to +200°C (-67° to +392°F), compounded especially for low compression set. Silicone rubber is resistant to deterioration by ozone, smog, and weathering and remains flexible over the temperature range noted. These products are not intended for use with petroleum-base fluids or lubricants. Certain design applications may cause these products to be susceptible to cutting, tearing, and abrasion.

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

2.1 The purchase order date shall stipulate the published document that shall be in effect. The supplier may work to a subsequent revision unless a particular revision is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published revision shall apply

2.2 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2279 Tolerances, Rubber Products
AMS2810 Identification and Packaging, Elastomeric Products

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<http://www.sae.org/technical/standards/AMS3307D>**

2.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 297 Rubber Products - Chemical Analysis
 ASTM D 395 Rubber Property - Compression Set
 ASTM D 412 Rubber Properties in Tension
 ASTM D 573 Rubber - Deterioration in an Air Oven
 ASTM D 624 Rubber Property - Tear Resistance
 ASTM D 1329 Evaluating Rubber Property - Retraction at Low Temperature (TR Test)
 ASTM D 2240 Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be a compound, based on a silicone (VMQ) rubber, suitably cured to produce a product meeting the requirements of 3.2.

3.2 Properties

The product shall conform to the following requirements shown in Table 1; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable:

TABLE 1 – TEST REQUIREMENTS

Property		Requirement	Test Method
3.2.1	Original Properties		
3.2.1.1	Hardness, Durometer "A" or equivalent	70 ± 5	ASTM D 2240
3.2.1.2	Tensile Strength, minimum	800 psi (5.52 MPa)	ASTM D 412, Die B or C
3.2.1.3	Elongation, minimum	125%	ASTM D 412, Die B or C
3.2.1.4	Tear Resistance, minimum	50 pounds force per inch (8.76 kN/m)	ASTM D 624, Die B
3.2.1.5	Specific Gravity	Preproduction Value ± 0.02	ASTM D 297
3.2.2	Dry Heat Resistance		ASTM D 573
3.2.2.1	Hardness Change, Durometer "A" or equivalent	±10	Temperature: 225°C ± 3 (437°F ± 5) Time: 22 hours ± 0.5
3.2.2.2	Tensile Strength Change, maximum	-15%	
3.2.2.3	Elongation Change, maximum	-30%	
3.2.2.4	Bend (flat)	No cracking or checking	
3.2.3	Compression Set		ASTM D 395, Method B
	Percent of Original Deflection, maximum	20	Temperature: 175°C ± 3 (347°F ± 5) Time: 22 hours ± 0.5
3.2.4	Low-Temperature Resistance		
3.2.4.1	Temperature Retraction, TR-10 Point, maximum	-45°C (-49°F)	ASTM D 1329, Elongate specimens 75%

3.3 Quality

The product, as received by purchaser, shall be uniform in quality and condition, smooth, as free from foreign material as commercially practicable, and free from imperfections detrimental to usage of the product.

3.4 Dimensions and Tolerances

Dimensions and tolerances shall be as specified in the parts standard, drawing or purchase document. If not specified, shall conform to all applicable requirements of AMS2279 .

3.5 Toxicological Formulations

The material shall have no adverse effects on the health of personnel when used for its intended purpose in accordance with manufacturer's instructions and with appropriate handling procedures.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of the product shall be responsible for performance of all required tests. Purchaser reserves the right to sample and perform any testing deemed necessary to ensure that the product conforms to the AMS requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Tests for requirements shown in Table 2 are acceptance tests and shall be performed on each lot:

TABLE 2	
Requirement	Paragraph Reference
Hardness, as received	3.2.1.1
Tensile Strength, as received	3.2.1.2
Elongation, as received	3.2.1.3
Specific Gravity	3.2.1.5
Compression Set	3.2.3

4.2.1.1 Lot: A quantity of one size of product processed and packaged as one production entity from a batch

4.2.1.2 Batch: The quantity of compound run through a mill or mixer at one time.

4.2.1.3 Random Sampling

The method shall be as specified in the parts standard, drawing or purchase document. If not specified, product shall be taken at random from each lot to perform all the required acceptance tests. The number of test iterations for each requirement shall be specified in the applicable test procedure.

4.2.2 Qualification Tests

All technical requirements shall be performed prior to the initial shipment of the product to a purchaser when a change in ingredients and/or processing requires approval, when purchaser deems confirmatory testing to be required, and for reapproval of qualification per 3.5.1.

4.2.2.1 Sample shall be from a production batch/lot

4.2.2.2. Report

The supplier of the product shall make a qualification test report available. This report shall include AMS number, manufacturer's identification and product designation, batch/lot number, date of manufacture and the results of all qualification tests. The report shall be from a PRI approved laboratory.

4.2.3 Preproduction Tests

All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of a 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.

4.3 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 If specimens cannot be prepared from the product, ASTM test specimens prepared from the same batch and state of cure shall be used. When the product supplied is an extrusion of such shape that suitable test specimens cannot be cut from the product, a separate flat strip test sample from the same production lot shall be supplied upon request. This strip shall be prepared from tubing 1.000 inch $\pm$ 0.063 (25.40 mm $\pm$ 1.60) in OD by 0.075 inch $\pm$ 0.008 (1.90 mm $\pm$ 0.20) in wall thickness, mechanically slit and flattened into a strip while being extruded, and cured in the same manner as production product. When the product is a molded shape from which test specimens cannot be cut, a slab 6 inches (152 mm) square by 0.075 inch $\pm$ 0.008 (1.90 mm $\pm$ 0.20) molded from the same batch of compound shall be supplied upon request.

4.3.1.2 When a statistical sampling plan has 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 shall state that such plan was used.

4.4 Approval

4.4.1 Sample product shall be approved by purchaser before product for production use is supplied, unless such approval be waived by purchaser. Results of tests on production product 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 product which are essentially the same as those used on the approved sample product. 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 ingredients and/or processing and, when requested, sample product. Production product made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS3307D, vendor's compound number, form and size or part number, and quantity.