

ETHYLENE-PROPYLENE-DIENE RUBBER
EPDM Type, General Purpose
45 - 55

1. SCOPE:

1.1 Form: This specification covers an ethylene propylene type rubber in the form of sheet, strip, tubing, extrusions, and molded shapes.

1.2 Application: Primarily for door seals, low pressure gaskets, dust covers, and shock absorption devices where resistance to weathering, phosphate ester base hydraulic fluids, and polar solvents such as steam, water, and ketones is required. This material has fair resistance to all materials listed. Where better resistance to a particular fluid is required, use an AMS for the material compounded specifically for good resistance to that fluid.

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 2810 - Identification and Packaging, Elastomeric Products

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

ASTM D297 - Rubber Products - Chemical Analysis

ASTM D395 - Rubber Property - Compression Set

ASTM D412 - Rubber Properties in Tension

ASTM D573 - Rubber - Deterioration in an Air Oven

ASTM D624 - Rubber Property - Tear Resistance

ASTM D2137 - Rubber Property - Brittleness Point of Flexible
Polymers and Coated Fabrics

ASTM D2240 - Rubber Property - Durometer Hardness

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3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a compound based on an ethylene propylene terpolymer (EPDM) elastomer, suitably cured to produce a product meeting the requirements of 3.2.

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 As Received:

3.2.1.1 Hardness, Durometer "A" or equiv. 50 ± 5 ASTM D2240

3.2.1.2 Tensile Strength, min 1800 psi (12.4 MPa) ASTM D412

3.2.1.3 Elongation, min 400% ASTM D412

3.2.1.4 Tear Resistance, min 100 lb per in. (17.5 kN/m) of width ASTM D624, Die C

3.2.1.5 Specific Gravity \emptyset Preproduction value ± 0.02 ASTM D297

3.2.2 Dry Heat Resistance: ASTM D573

3.2.2.1 Hardness Change, Durometer "A" or equiv. 0 to +10
Temperature: $100^{\circ}\text{C} \pm 1$ ($212^{\circ}\text{F} \pm 2$)
Time: 70 hr ± 0.5

3.2.2.2 Tensile Strength Change 0 to +25%

3.2.2.3 Elongation Change 0 to -50%

3.2.3 Compression Set: ASTM D395, Method B

3.2.3.1 Percent of Original Deflection, max 30
Temperature: $70^{\circ}\text{C} \pm 1$ ($158^{\circ}\text{F} \pm 2$)
Time: 22 hr ± 0.25

3.2.4 Low-Temperature Resistance: ASTM D2137, Method A

3.2.4.1 Brittleness Pass
Temperature: $-55^{\circ}\text{C} \pm 1$ ($-67^{\circ}\text{F} \pm 2$)

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

3.4 Tolerances: Unless otherwise specified, the following tolerances shall apply:

3.4.1 Sheet and Strip:

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TABLE I

Nominal Thickness (T) Inches	Tolerance, Inch plus and minus	
	Fixed	Closure (See 3.4.1.1)
Up to 0.400, incl	0.008	0.013
Over 0.400 to 0.630, incl	0.010	0.016
Over 0.630 to 1.000, incl	0.013	0.020
Over 1.000 to 1.600, incl	0.016	0.025
Over 1.600 to 2.500, incl	0.020	0.032
Over 2.500 to 4.000, incl	0.025	0.040
Over 4.000 to 6.300, excl	0.032	0.050
6.300 and over	0.005T	--

TABLE I (SI)

Nominal Thickness (T) Millimetres	Tolerance, Millimetres plus and minus	
	Fixed	Closure (See 3.4.1.1)
Up to 10.00, incl	0.20	0.32
Over 10.00 to 16.00, incl	0.25	0.40
Over 16.00 to 25.00, incl	0.32	0.50
Over 25.00 to 40.00, incl	0.40	0.63
Over 40.00 to 63.00, incl	0.50	0.80
Over 63.00 to 100.00, incl	0.63	1.00
Over 100.00 to 160.00, excl	0.80	1.25
160.00 and over	0.005T	--

3.4.1.1 Closure dimensions are across mold parting line.

3.4.2 Tubing Diameter and Wall Thickness:

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TABLE II

Nominal OD or ID (D) (not both), and Wall Thickness Inches	Tolerance, Inch plus and minus	Ovality, %
		(See 3.4.2.2)
Up to 0.100, incl (See 3.4.2.1)	0.016	10
Over 0.100 to 0.160, incl	0.020	15
Over 1.160 to 0.250, incl	0.025	15
Over 0.250 to 0.400, incl	0.030	15
Over 0.400 to 0.630, incl	0.040	15
Over 0.630 to 1.000, incl	0.050	15
Over 1.000	0.0450xD	

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TABLE II (SI)

Nominal OD or ID (D) (not both), and Wall Thickness Millimetres	Tolerance, Inch plus and minus	Ovality, % (See 3.4.2.2)
Up to 2.50, incl (See 3.4.2.1)	0.40	10
Over 2.50 to 4.00, incl	0.50	15
Over 4.00 to 6.30, incl	0.63	15
Over 6.30 to 10.00, incl	0.80	15
Over 10.00 to 16.00, incl	1.00	15
Over 16.00 to 25.00, incl	1.25	15
Over 25.00	0.0450xD	

3.4.2.1 In general, cross sectional dimensions less than 0.040 in. (1.00 mm) are impractical to extrude.

3.4.2.2 Ovality applies to tubing ordered in straight lengths with wall thickness of 0.063 in. (1.60 mm) and over, and shall be computed from ϕ the difference between the minor and major axis diameter measurements, taken at the same transverse plane of the tube, expressed as a percentage of the nominal diameter.

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 ϕ 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 the following ϕ requirements are classified as acceptance tests and shall be performed on each lot:

Requirement	Paragraph
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
Quality	3.3
Tolerances	3.4

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 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:

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. When the product 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 in. \pm 0.063 (25 mm \pm 1.60) in OD by 0.080 in. \pm 0.008 (2.00 mm \pm 0.20) in wall thickness, mechanically split and flattened into a strip while being extruded, and cured in the same manner as production material.

4.3.1.1 A lot shall be all product from the same batch of compound processed in a continuous run and submitted for vendor's inspection at one time. An inspection lot shall not exceed 500 lb (225 kg).

4.3.1.2 A batch shall be the quantity of compound run through a mill or mixer at one time.

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) 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 material shall be approved by purchaser before material for production use is supplied, unless such approval be waived by purchaser. Results of tests on production material shall be essentially equivalent to those on the approved sample.