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INTERNATIONAL
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-R-83285

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Submitted for recognition as an American National Standard

Rubber, Ethylene-Propylene, General Purpose

NOTICE

This document has been taken directly from U.S. Military Specification MIL-R-83285 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-R-83285. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Any material relating to qualified product lists has not been adopted by SAE. This material was part of the original military specification and is reprinted here for historic reference only.

1. SCOPE:

1.1 Scope:

This specification covers two grades of ethylene-propylene rubber having excellent resistance to ozone and hot water, but poor resistance to hydrocarbon oils or solvents.

1.2 Classification:

The rubber covered by this specification shall be of the following grades, as specified (see 6.2):

Grade 60 60 nominal Durometer Shore A hardness.

Grade 80 80 nominal Durometer Shore A hardness.

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2. APPLICABLE DOCUMENTS:

The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

2.1 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

UU-P-268	Paper, Kraft, Untreated Wrapping
PPP-B-585	Box, Wood, Wirebound
PPP-B-591	Box, Fiberboard, Cleated
PPP-B-601	Boxes, Wood, Cleated-Plywood
PPP-B-621	Box, Wood, Nailed and Lock Corner
PPP-B-636	Box, Fiberboard
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing
MIL-P-4861	Packing, Preformed, Rubber Packing, Packaging of
MS 33666	Packing, Preformed-Aeronautical, Elastomeric, Range of Sizes
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-289	Visual Inspection Guide for Rubber Sheet Material
MIL-STD-298	Visual Inspection Guide for Rubber Extruded Goods

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 297	Chemical Analysis of Rubber Products
ASTM D 395	Tests for Compression Set of Vulcanized Rubber
ASTM D 412	Tension Testing of Vulcanized Rubber
ASTM D 471	Test for Changing Properties for Elastomeric Vulcanizates Resulting from Immersion in Liquids
ASTM D 573	Test for Accelerated Aging of Vulcanized Rubber by the Oven Method
ASTM D 624	Test for Tear Resistance of Vulcanized Rubber
ASTM D 746	Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D 1149	Test for Accelerated Ozone Cracking of Vulcanized Rubber
ASTM D 2240	Test for Indentation Hardness of Rubber and Plastics by Means of Durometer

3. REQUIREMENTS:

3.1 Preproduction sample:

The synthetic rubber furnished under this specification shall be a product which has met the preproduction tests specified herein. If there are any changes in materials or manufacturing processes, new preproduction tests are required.

3.2 Materials:

The materials used to formulate the rubber covered by this specification shall be ethylene-propylene polymers.

3.3 Dimensions and tolerances:

3.3.1 Sheets and strips: Unless otherwise specified (see 6.2) the width of the sheet material shall be 36 ± 1 inches, the length shall be 120 inches ± 1 percent, and tolerances on thickness shall be as shown in Table I. The width of strip shall be 4 inches with a tolerance of ± 5 percent, the length shall be 75 feet ± 1 foot; the tolerance on thickness shall be as shown in Table I. The dimensions and tolerances of the shapes cut from sheets shall be as specified on the detail drawings.

Table I. Thickness tolerances of sheet and strip

Nominal thickness (inch)	Tolerances (inch)
.031 and less	±.010
over .031 to .063 inclusive	±.012
over .063 to .125 inclusive	±.016
over .125 to .188 inclusive	±.020
over .188 to .375 inclusive	±.031
over .375 to .563 inclusive	±.047
over .563 to .750 inclusive	±.063
over .750 to 1.000 inclusive	±.093
over 1.000	±10%

3.3.2 Molded parts and extruded shapes (including tubing): Unless otherwise specified (see 6.2) dimensions and tolerances of molded parts and extruded shapes (including tubing) shall be as specified on the drawing or in the contract or order.

3.3.3 O-Rings: Unless otherwise specified, dimensions and tolerances of O-rings shall be in accordance with MS 33666.

3.4 Physical properties:

The physical properties of the ethylene-propylene rubber shall be as specified in table II.

Table II. Physical properties

Property and condition	Grade 60	Grade 80	Test method
Original physical values			
Tensile, psi, min	2000	2000	ASTM D 412
Elongation, %, min	300	150	ASTM D 412
Tear, ppi, min	120	100	ASTM D 624
Hardness, Durometer, Shore A	60±5	80±5	ASTM D 2240
Brittle Point, °F, max	-65	-65	ASTM D 746
Specific gravity	1/	1/	ASTM D 297
Ozone resistance, 1000 pphm @ 122°F bent loop, hr. to first crack, min	168	168	ASTM D 1149
Compression set - method B, 70 ± 1 hr. @ 100°C (212°F): % of original deflection	20	25	ASTM D 395
Dry heat resistance, 70 ± 1 hr. @ 125°C (257°F)			
Tensile change, %, max	-15	-15	ASTM D 412
Elongation change, %, max	-20	-20	ASTM D 412
Hardness change, max	+10	+10	ASTM D 2240
Resistance to hot water, 7 days @ 100°C (212°F)			
Tensile change, %, max 2/	-15	-15	ASTM D 412
Elongation, change, %, max	-20	-20	ASTM D 412
Hardness change, max	±5	±5	ASTM D 2240
Volume change %	0 to +5	0 to +5	ASTM D 471

1/ "As Determined". This denotes that the value shall be determined during preproduction testing. The quality conformance test values shall not deviate from the original "As Determined" values by more than ±0.02.
2/ Based on area before immersion.

3.5 Identification of product:

3.5.1 Sheets and strips: Unless otherwise specified (see 6.2), sheet material (including strips cut from sheets) shall be marked to show the specification number, the manufacturer, the manufacturer's designation (compound number), and the cure date by quarter and year; for example, 1Q70, thus:

MIL-R- XYZ Co.
Compound Number
Cure date

The identification shall recur constantly, from one end of the sheet to the other, in rows spaced approximately 5 inches apart; shall be clear, legible, and not less than 3/8 inch high; and shall be applied by suitable means using marking fluid that is not deleterious to the thylene-propylene rubber. The marking shall not be obliterated by normal handling. The color of the marking shall be white, or a contrasting color if the product is white or very light.

3.5.2 Extruded shapes (including tubing): Where the size of the product permits, the identification shall be marked as indicated in 3.5.1. When identification marking of the product is impractical, the unit package shall show the compound number and manufacturer in addition to those markings specified in 5.

3.6 Workmanship:

The rubber shall be uniform in quality and condition, clean, and free from foreign materials and from defects detrimental to fabrication, appearance, or performance of parts.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for inspection:

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may utilize his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of tests:

The inspection and testing of the synthetic rubber shall be classified as follows:

a. Preproduction inspection (see 4.3).
b. Quality conformance inspection (see 4.4).

4.3 Preproduction inspection:

4.3.1 Samples: Samples for this material shall be obtained from 6 inches by 6 inches by 0.075 inch sheets or strips. Hardness shall be determined on specimens of sufficient dimensions to comply with ASTM D 2240.

4.3.2 Tests: Preproduction tests shall consist of all the tests specified in 4.6.

4.4 Quality conformance inspection:

4.4.1 Sampling for inspection: Sampling for quality conformance inspection shall be in accordance with MIL-STD-105, except where otherwise indicated herein. Quality conformance tests are required for all production lots of material.

4.4.1.1 Lot: A lot shall consist of all the material of the same identity, cured in the same production run, from the same batch, and submitted at the same time for inspection.

4.4.1.2 Batch: A batch shall be the quantity of material run through a mill or mixer at one time.

4.4.2 Quality conformance test samples: Whenever possible, the end item, or specimens cut from the end item, shall be used as the sample. If these items are unsuitable for use as test samples, tests shall be performed on samples of identical composition and state of cure as that of the end item.

4.4.3 Inspection of materials and components: The supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with referenced subsidiary specification and standards to the extent specified, or if none, in accordance with this specification (see 4.1). In the event of conflict, this specification shall govern.

4.4.4 Inspection of the end item: Examination of the end item shall be in accordance with the classification of defects, inspection levels, and acceptance quality levels (AQL's) set forth herein. The batch size, for the purpose of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of yards of sheets, strips, or extruded shapes, as applicable for examinations as specified in 4.4.4.1, 4.4.4.2, and 4.4.4.3. If the end item is less than 1 yard, the sample unit shall be the end item.

4.4.4.1 Examination for defects in appearance and workmanship: The sample unit shall be 1 yard, except if the end item is less than 1 yard, the sample unit shall be the end item. The examination shall be in accordance with MIL-STD-289 and MIL-STD-298, as applicable. Defects in marking such as "incomplete, not legibly identified", or not as specified in 5., shall be considered minor. The sample size shall be in accordance with inspection level II of MIL-STD-105 and the AQL shall be 1.0 major and 2.5 total.

4.4.4.2 Examination for dimensional defects: The sample unit shall be 1 yard, except if the end item is less than 1 yard, the sample unit shall be the end item. The dimensions shall be within the tolerances specified in 3.3.1. Dimensions for extruded shapes shall be as specified on the drawing or in the contract or order. The sample size shall be in accordance with inspection level II of MIL-STD-105 and the AQL shall be 1.5.

4.4.4.3 Examination for defects in preparation for delivery: An examination shall be made to determine that the packaging, packing, and markings comply with section 5. The sample unit for this examination shall be one shipping container fully packed, selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be examined for closure defects.

Examine	Defect
Packaging (extruded shapes)	Not the level specified.
	Not packaged as specified or required.
	Packaging material, closures not as specified.
	Unit items not individually wrapped when specified.
(Sheets)	Not interleaved; separator sheets do not fully cover the full area of contact between the sheets.
	Stacked over 10 inches high.
(Strips)	Not in rolls; not wound on suitable cores.
	Rolls not wrapped or sealed as specified.
	Total length per roll varies by more than the indicated tolerances.
Packing	Not level specified; not in accordance with contract requirements.
	Container not as specified, closures not accomplished by specified or required methods or materials.
	Any nonconforming component, component missing, damaged or otherwise defective, affecting serviceability.
	Inadequate application of components, such as incomplete closure of case liners, containing flaps loose or inadequate strapping, bulged or distorted containers.
Count	Less than specified or indicated quantity, linear footage, or units, as applicable.
Weight	Gross weight exceeds specified requirements.
Markings	Interior or exterior markings, as applicable, omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements.
	Date of cure, storage instruction missing.

The sample size shall be in accordance with inspection level II of MIL-STD-105 and the AQL shall be 2.5.

4.4.5 Quality conformance tests: The following tests shall be conducted on each lot of material (see 4.4.2):

Original	Air age 70 hours @ 257° ± 5°F
Tensile strength	Tensile strength
Elongation	Elongation
Hardness	Hardness

4.4.5.1 Rejection criteria: A lot shall be rejected upon the failure of any sample to meet the test requirements specified herein. A lot that has been rejected may be reworked to correct the deficiencies and resubmitted for acceptance.

4.5 Test condition:

All test specimens shall be conditioned and tested at normal laboratory conditions unless otherwise specified herein or in the applicable ASTM test method. In case of dispute over test results, the tests shall be repeated using standard conditions (see 4.5.1).

4.5.1 Standard conditions: Standard conditions shall be 50 ± 15 percent relative humidity and a temperature of 75° ± 5°F.

4.6 Test methods:

4.6.1 Physical properties: Unless otherwise specified herein, physical properties shall be determined in accordance with ASTM test methods for rubber products as follows:

Property	ASTM method
Tensile strength and elongation	D 412, die C
Tear	D 624, die C
Hardness	D 2240
Brittle point	D 746
Specific gravity	D 297
Ozone resistance	D 1149
Volume change	D 471
Compression set	D 395