

AEROSPACE MATERIAL SPECIFICATION



AMS-R-83248A

Issued APR 1999
Cancelled SEP 2005

Superseding AMS-R-83248

Rubber, Fluorocarbon Elastomer,
High Temperature, Fluid, and Compression Set Resistant

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of September, 2005, and has been superseded by AMS 3216, AMS 3218, AMS 7259 and AMS 7276. The requirements of the latest issues of AMS 3216, AMS 3218, AMS 7259 and AMS 7276 shall be fulfilled whenever reference is made to the cancelled AMS-R-83248. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by AMS 3216, AMS 3218, AMS 7259 and AMS 7276.

Cancelled specifications are available from SAE.

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NOTICE

This document has been taken directly from U.S. Military Specification MIL-R-83248C 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-83248C. 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.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical report.

1. SCOPE:

1.1 Scope:

This specification covers high temperature, compression set, and fluid resistant fluorocarbon elastomer sheets, strips, molded parts, and extruded shapes for aeronautical and aerospace applications.

1.2 Classification:

The synthetic rubber shall be furnished in the specified types and classes (see 6.2).

1.2.1 Types: The synthetic rubber types shall consist of the following:

- a. Type I: O-rings, compression seals, molded-in-place gaskets, and molded o-ring cord
- b. Type II: Molded parts (other than type I), sheets, strips, and extruded shapes

1.2.2 Classes: The synthetic rubber classes shall be designated as follows:

- a. Class 1: 75 $\pm$ 5 hardness
- b. Class 2: 90 $\pm$ 5 hardness

2. APPLICABLE DOCUMENTS:

The following publications, of the issue in effect on date of invitation for bids or request for proposal, form a part of this 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, Wrapping
PPP-B-601	Boxes, Wood, Cleated-Plywood
PPP-B-636	Boxes, Shipping, Fiberboard
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing
MIL-P-4861	Packing, Preformed, Rubber, Packaging of
MIL-R-83248/1	Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set, Resistant, O-Rings, Class 1, 75 Hardness
MIL-R-83248/2	Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set, Resistant, O-Rings, Class 2, 90 Hardness
MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized Unit Loads
MIL-STD-289	Visual Inspection Guide for Rubber Sheet Material
MIL-STD-298	Visual Inspection Guide for Rubber Extruded Goods
MIL-STD-407	Visual Inspection Guide for Rubber Molded Items
MIL-STD-413	Visual Inspection Guide for Elastomeric O-Rings
MIL-STD-2073-1	DoD Material Procedures for Development and Application of Packaging Requirements

2.2 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS568 Aerospace Size Standard for O-Rings

2.3 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-5094.

ASTM D 297	Rubber Products, Chemical Analysis of (DoD adopted)
ASTM D 395	Rubber Property - Compression Set, Tests for (DoD adopted)
ASTM D 412	Rubber Properties in Tension, Tests for (DoD adopted)
ASTM D 471	Rubber Property - Effect of Liquids, Tests for (DoD adopted)
ASTM D 573	Rubber - Deterioration in an Air Oven - Tests for (DoD adopted)
ASTM D 1329	Evaluating Rubber Property - Retraction at Low Temperature (TR TEST), Test for (DoD adopted)
ASTM D 1414	Rubber O-Rings, Testing (DoD adopted)
ASTM D 2240	Rubber Property - Durometer Hardness, Tests for (DoD adopted)
ASTM D 3951	Standard Practice for Commercial Packaging (DoD adopted)

3. REQUIREMENTS:

3.1 Qualification:

Parts furnished under this specification shall be products which are authorized by the qualifying agency for listing on the applicable qualified products list at the time set for opening of bids.

3.2 Materials:

The cured compound of fluorocarbon elastomer shall be entirely suitable for the intended purpose, and shall be of the same composition as the material used for qualification. A dihydroxy/bisphenol cure system shall be used. Amine cure systems shall not be used. Material shall be based on 100% virgin fluorocarbon elastomer. No amount of reprocessed or reground fluorocarbon scrap or non-fluoro elastomer polymer is acceptable.

3.3 Physical properties:

The physical properties of the fluorocarbon elastomer rubber shall conform to the requirements specified in table I, II, III, and IV as applicable.

TABLE I. Physical properties, type I

	Class 1 (75 hardness)	Class 2 (90 hardness)
Original		
Tensile strength, psi, min	1400	1400
Elongation, %, min	125	100
Hardness, points	75±5	90±5
Specific, gravity	As determined	As determined
Temperature retraction, 10% (TR-10)°F, max.	+5	+5
Air age 70 hours @ 518°F ± 5°F		
Tensile strength decrease, %, max	35	45
Elongation decrease, %, max	15	20
Hardness change, points	+10, -5	+10, -5
Weight loss, %, max.	10	10
Air age 22 hours @ 392°F ± 5°F		
Compression set, % of original deflection, max.		
0.066 to 0.110 inch, inclusive	20	35
over 0.110 inch	15	25

TABLE I. Physical properties, type I

	Class 1 (75 hardness)	Class 2 (90 hardness)
Air age 336 hours @ 392°F ± 5°F		
Compression set, % of original deflection, max.		
0.066 to 0.110 inch, inclusive	45	65
over 0.110 inch	40	60
Oil age 70 hours @ 392°F ± 5°F in ARM 200		
Tensile strength decrease, %, max.	35	35
Elongation decrease, %, max.	20	20
Hardness change, points	+0, -15	+0, -15
Volume change, %	+1 to +25	+1 to +25
Compression set, % of original deflection, max.		
0.066 to 0.110 inch, inclusive	30	35
over 0.110 inch	10	20
Fuel age 70 hours @ 75°F ± 5°F in ASTM Reference Fuel B (ASTM D 471)		
Tensile strength decrease, %, max.	20	20
Elongation decrease, %, max.	20	20
Hardness change, points	±5	±5
Volume change, %	+0 to +5	+0 to +5

TABLE II. Physical properties after humidity aging, type 1 (brown seals only)

The following properties shall be determined on brown O-rings that have been aged for 28 days at 77°F ± 2°F and 95 ± 3 percent relative humidity.

	Class 1 (75 hardness)	Class 2 (90 hardness)
Properties		
Tensile strength, psi, min	1400	1400
Elongation, %, min.	125	100
Tensile strength decrease, %, max. <u>1</u> /	15	15
Elongation decrease, %, max. <u>1</u> /	15	15
Air age 70 hours @ 518°F ± 5°F		
Tensile strength decrease, %, max. <u>2</u> /	35	45
Elongation decrease, %, max. <u>2</u> /	25	25
Air age 22 hours @ 392°F ± 5°F		
Compression set, % of original deflection, max.	15	25

TABLE II. Physical properties after humidity aging, type 1 (brown seals only)

The following properties shall be determined on brown O-rings that have been aged for 28 days at 77°F ± 2°F and 95 ± 3 percent relative humidity.

	Class 1 (75 hardness)	Class 2 (90 hardness)
Oil age 70 hours @ 392°F ± 5°F in ARM 200		
Tensile strength decrease, %, max. <u>2</u> /	35	35
Elongation decrease, %, max. <u>2</u> /	20	20
Compression set, % of original deflection, max.	10	15

- 1/ Shall be based on the original tensile strength and elongation found when tested to the requirements of table 1.
- 2/ Shall be based on the tensile strength and elongation found after aging 28 days at 77°F ± 2°F and 95 ± 3 percent relative humidity.

TABLE III. Physical properties, type II

	Class 1 (75 hardness)	Class 2 (90 hardness)
Original		
Tensile strength, psi, min	1600	1600
Elongation, %, min	125	100
Hardness, points	75±5	90±5
Specific gravity	As determined	As determined
Temperature retraction, 10% (TR-10)°F, max.	+5	+5
Air age 70 hours @ 518°F ± 5°F		
Tensile strength decrease, %, max	35	45
Elongation decrease, %, max	15	20
Hardness change, points	+10, -5	+10, -5
Weight loss, %, max.	10	10
Air age 22 hours @ 392°F ± 5°F		
Compression set, % of original deflection, max.	15	25
Air age 336 hours @ 392°F ± 5°F		
Compression set, % of original deflection, max.	45	65