SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS3240 REV. K

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Superseding AMS3240J

(R) Chloroprene (CR) Rubber Weather Resistant 35 - 45

RATIONALE

This standard has been revised to clarify testing methods, to make obsolete references current and to correct typographic errors.

1. SCOPE

1.1 Form

This specification covers a chloroprene (CR) rubber in the form of sheet, strip, tubing, extrusions, and molded shapes.

1.2 Application

These products have been used typically for parts, such as window channels, bumper pads, chafing strips, and seals, requiring resistance to weather and for use from -40 to +212 °F (-40 to +100 °C), but usage is not limited to such applications.

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

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

2.1 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
MAM2279	Tolerances, Metric, Rubber Products
AMS2810	Identification and Packaging, Elastomeric Products
AMS4027	Aluminum Alloy, Sheet and Plate, 1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated
AMS5513	Steel, Corrosion-Resistant, Sheet, Strip, and Plate, 19Cr - 9.2Ni (SAE 30304), Solution Heat Treated
AMS5630	Steel, Corrosion-Resistant, Bars, Wire, and Forgings, 17Cr - 0.52Mo (0.95 - 1.20C) (SAE 51440C)
AMS6345	Steel, Sheet, Strip, and Plate, 0.95Cr - 0.20Mo (0.28 - 0.33C) (SAE 4130), Normalized or Otherwise Heat Treated
AMS-QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
AMS-QQ-A-250/12	Aluminum Alloy 7075, Plate and Sheet

2.2 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 471	Rubber Property - Effect of Liquids
ASTM D 573	Rubber - Deterioration in an Air Oven
ASTM D 624	Rubber Property - Tear Resistance
ASTM D1149	Rubber Property- Ozone Resistance
ASTM D 2137	Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D 2240	Rubber Property - Durometer Hardness

2.3 ASME Publications

Available from American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ASME B46.1	Surface Texture, Surface Roughness, Waviness and Lay

2.4 U.S. Government Publications

Available from the document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 1911-5094, Tel: 215-697-6257, https://assist.daps.dla.mil/quicksearch/.

MIL-PRF-6083 Hydraulic Fluid, Petroleum Base

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be a compound, based on a chloroprene (CR) elastomer, suitably cured to produce a product meeting the requirements of 3.2.

3.2 Properties

The product shall conform to requirements shown in Table 1, 3.2.11, and 3.2.12; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable.

TABLE 1 - PROPERTIES

Paragraph	Property	Requirement	Test Method
3.2.1	Hardness, Durometer "A" or equivalent	40 ± 5	ASTM D 2240
3.2.2	Tensile Strength, minimum	900 psi (6.21 MPa)	ASTM D 412, Die B or C
3.2.3	Elongation, minimum	350%	ASTM D 412, Die B or C
3.2.4	Tensile Stress at 100% Elongation	Preproduction Value ±20%	ASTM D 412, Die B or C Stretch specimen to 125% elongation twice within 5 minutes before testing
3.2.5	Tear Resistance pounds force per inch (kN/m), minimum	80% of Preproduction Value	ASTM D 624, Die B
3.2.6	Specific Gravity	Preproduction Value ±0.02	ASTM D 297
3.2.7	Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 in IRM 903 212 °F ± 2 (100 °C ± 1) 70 hours ± 0.5
3.2.7.1	Tensile Strength Change, maximum	–70%	
3.2.7.2	Elongation Change, maximum	–50%	
3.2.7.3	Volume Change	+60 to +120%	

TABLE 1 - PROPERTIES (CONTINUED)

3.2.8	Dry Heat Resistance:		ASTM D 573 212 °F ± 2
3.2.8.1	Hardness Change, Durometer “A” or equivalent	0 to +15	(100 °C ± 1) 70 hours ± 0.5
3.2.8.2	Tensile Strength Change, maximum	–25%	
3.2.8.3	Elongation Change, maximum		
3.2.8.3.1	For parts other than extrusions	–50%	
3.2.8.3.2	For extruded parts	–60%	
3.2.8.4	Bend (flat)	No cracking No checking	
3.2.9	Compression Set:		ASTM 395, Method B 212 °F ± 2
3.2.9.1	Percent of Original Deflection, maximum		(100 °C ± 1) 70 hours ± 0.5
3.2.9.1.1	For parts other than extrusions	75	
3.2.9.1.2	For extruded parts	83	
3.2.10	Low-Temperature Resistance:		
3.2.10.1	Brittleness	Pass	ASTM D 2137, Method A –31 °F ± 2 (–35 °C ± 1)

3.2.11 Weather Resistance

The product shall show no evidence of cracking when tested in accordance with ASTM D 1149, Method B Procedure B2 for 7 days at 105 °F ± 2 (40 °C ± 1). The ozone pressure shall be 50 MPa ± 5.

3.2.12 Corrosion and adhesion

Size -214 O-rings, two for each metallic plate below and using whole uncut rings, shall be prepared for corrosion testing by inserting sufficient quantities of the seals in a desiccator or similar humidity chamber maintained at 92 percent minimum relative humidity and 75 °F ± 5 for at least 72 hours. Plates of the metals listed below shall be polished to a surface roughness of 4 to 16 RHR in accordance with ASME B46.1. The edges shall also be polished to reduce the formation of edge corrosion. The plates shall be washed with toluene or aliphatic naphtha, or similar degreasing agent that will produce a clean dry surface free from film. The metals used shall be as follows:

AMS-QQ A-250/4	Aluminum Alloy 2024
AMS4027	Aluminum Alloy 6061
AMS-QQ-A-250/12	Aluminum Alloy 7075
AMS5630	440C Stainless Steel
AMS5513	304 Stainless Steel
AMS6345	4130 Steel, Aircraft Quality

The humidified seals and the metallic plates shall be immersed in MIL-PRF-6083 fluid and drained to the drop point. The seals and plates shall then be so laid together in a stack that at least two whole seals contact each specified metal. The stack shall be held together with a pressure of 20 to 30 pounds and placed in a desiccator which is maintained at not less than 92 percent relative humidity 75 °F ± 5. This relative humidity may be produced by the use of a salt of sufficient concentration in solution with distilled water. No more than 15 minutes should be required for assembling the test samples. Time of humidity exposure for this portion of test shall be 14 days. At the termination of this test, the procedures outlined below shall be followed:

The surface of the plates which were in contact with the seals shall be inspected for discoloration, deposits, pitting, or other evidence of corrosion or adhesion. If any exist, the surfaces of the plates shall be washed in aliphatic naphtha. Deposits determined as rubber compounds or elements there from, which can be removed by this process and which do not occur on other surfaces of the plates, shall be construed as adhesion.

Any pits or eroded marks remaining after this process shall be construed to be corrosion. Discoloration or staining (marks which do not physically affect the surfaces of the plates and which easily wash or buff off) shall not be considered detrimental. If any doubt should arise about the presence of pitting, erosion or corrosion on the metal plates from the O-rings, a microscope of approximately 10- to 15-power magnification shall be used to determine the actual condition.

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 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 or MAM2279.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of the product shall supply all samples for required tests and shall be responsible for performing all required tests. 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 for requirements shown in Table 2 are acceptance tests and shall be performed on each lot. See 4.3.1 and 4.3.1.1.

TABLE 2 - ACCEPTANCE TESTS

Requirement	Paragraph
Hardness	3.2.1
Tensile Strength	3.2.2
Elongation	3.2.3
Specific Gravity	3.2.6
Compression Set	3.2.9
Tolerances	3.4

4.2.2 Preproduction Tests

4.3 Tests for all technical requirements are preproduction tests and shall be performed prior to or on the first-article shipment of a product by the manufacturer, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.4 Sampling and Testing

Shall be as follows: