

# AEROSPACE MATERIAL SPECIFICATION



AMS3244

REV. H

|                      |         |
|----------------------|---------|
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Chloroprene (CR) Rubber  
Flame Resistant  
65 - 75

## RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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## 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 grommets, seals, and line supports, on the firewall of aircraft or wherever flame resistance is of prime importance, but usage is not limited to such applications. Each application should be considered individually.

### 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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

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## 2.1 SAE Publications:

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

AMS 2279 Tolerances, Rubber Products

MAM 2279 Tolerances, Metric, Rubber Products

AMS 2810 Identification and Packaging, Elastomeric Products

## 2.2 ASTM Publications:

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

ASTM D 395 Rubber Property - Compression Set

ASTM D 412 Vulcanized Rubber and Thermo-Plastic Elastomers-Tension

ASTM D 471 Rubber Property - Effect of Liquids

ASTM D 573 Rubber Property - Deterioration in an Air Oven

ASTM D 624 Rubber Property - Tear Resistance

ASTM D 635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

ASTM D 792 Specific Gravity (Relative Density) and Density of Plastics by Displacement

ASTM D 2137 Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

ASTM D 2240 Rubber Property - Durometer Hardness

## 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 the requirements shown in Table 1, 3.2.8 and 3.2.9; tests shall be performed on the product supplied and in accordance with specified ASTM methods insofar as practicable:

TABLE 1 - Properties

|         | Property                                           | Requirement                                | Test Method                                                                      |
|---------|----------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------|
| 3.2.1   | Hardness, Durometer<br>"A" or equivalent           | 70 ± 5                                     | ASTM D 2240                                                                      |
| 3.2.2   | Tensile Strength, min                              | 1000 psi<br>(6.89 MPa)                     | ASTM D 412, Die B or C                                                           |
| 3.2.3   | Elongation, min                                    | 200%                                       | ASTM D 412, Die B or C                                                           |
| 3.2.4   | Tear Resistance, min                               | 70 pounds force<br>per inch<br>(12.3 kN/m) | ASTM D 624, Die B                                                                |
| 3.2.5   | Specific Gravity                                   | Preproduction<br>Value ± 0.02              | ASTM D 792<br>(Hydrostatic Method)                                               |
| 3.2.2.1 | Petroleum Hydraulic Oil Resistance:                |                                            | ASTM D 471<br>IRM 903<br>100 °C ± 1<br>(212 °F ± 2)<br>22 hours ± 0.5            |
| 3.2.2.1 | Tensile Strength Change<br>max                     | -60%                                       |                                                                                  |
| 3.2.2.2 | Elongation Change,<br>max                          | -60%                                       |                                                                                  |
| 3.2.2.3 | Volume Change                                      | +30 to +90%                                |                                                                                  |
| 3.2.2.4 | Decomposition                                      | None                                       |                                                                                  |
| 3.2.2.5 | Surface Tackiness                                  | None                                       |                                                                                  |
| 3.2.3   | Aromatic Fuel Resistance                           |                                            | ASTM D 471<br>ASTM Ref. Fuel B<br>20 to 30 °C<br>(68 to 86 °F)<br>22 hours ± 0.5 |
| 3.2.3.1 | Tensile Strength Change,<br>max                    | -75%                                       |                                                                                  |
| 3.2.3.2 | Elongation Change, max                             | -50%                                       |                                                                                  |
| 3.2.3.3 | Volume Change                                      | 0 to +80%                                  |                                                                                  |
| 3.2.3.4 | Decomposition                                      | None                                       |                                                                                  |
| 3.2.3.5 | Surface Tackiness                                  | None                                       |                                                                                  |
| 3.2.4   | Dry Heat Resistance:                               |                                            | ASTM D 573<br>125 °C ± 2<br>(257 °F ± 4)<br>70 hours ± 0.5                       |
| 3.2.4.1 | Hardness Change,<br>Durometer<br>"A" or equivalent | 0 to +20                                   |                                                                                  |
| 3.2.4.2 | Tensile Strength, Change<br>Max                    | -30%                                       |                                                                                  |

TABLE 1 - Properties (Continued)

| Property                                                | Requirement | Test Method                                          |
|---------------------------------------------------------|-------------|------------------------------------------------------|
| 3.2.4.3 Elongation Change, max                          | -50%        |                                                      |
| 3.2.5 Compression Set:                                  |             | ASTM D 395<br>Method B<br>100 °C ± 1<br>(212 °F ± 2) |
| 3.2.5.1 Percent of Original Deflection, max             | 50          | 70 hours ± 0.5                                       |
| 3.2.6 Low-Temperature Resistance                        |             | ASTM D 2137<br>Method A<br>-35°C ± 1<br>(-31 °F ± 2) |
| 3.2.6.1 Brittleness                                     | Pass        |                                                      |
| 3.2.7 Flame Resistance (See 8.2):<br>Flameout time, max | 10 seconds  | 4.5.1                                                |

3.2.8 Weathering: When specified, the product shall have weather resistance acceptable to purchaser, determined by a procedure agreed upon by purchaser and supplier.

3.2.9 Corrosion: The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and supplier. Discoloration of metal shall not be considered objectionable.

### 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:

Shall conform to all applicable requirements of AMS 2279 or MAM 2279.

## 4. QUALITY ASSURANCE PROVISIONS:

### 4.1 Responsibility for Inspection:

The manufacturer of the product shall supply all samples 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 the following requirements shown in Table 2 are acceptance tests and shall be performed on each lot:

TABLE 2 - Acceptance Requirements

| Requirement                   | Paragraph Reference |
|-------------------------------|---------------------|
| Hardness, as received         | 3.2.1               |
| Tensile Strength, as received | 3.2.2               |
| Elongation, as received       | 3.2.3               |
| Specific Gravity              | 3.2.5               |
| Volume Change in Oil          | 3.2.2.3             |
| Flame Resistance              | 3.2.7               |
| Quality                       | 3.3                 |
| Tolerances                    | 3.4                 |

4.2.2 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, except as otherwise stated in 4.3.1.4.
- 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) thick molded from the same batch of compound shall be supplied upon request.
- 4.3.1.2 A lot shall be all product produced from the same batch of compound processed in one continuous run and presented for manufacturers inspection at one time.
- 4.3.1.3 A batch shall be the quantity of compound run through a mill or mixer at one time.
- 4.3.1.4 A statistical sampling plan acceptable to the purchaser may be used in lieu of sampling as in 4.3.1. Sample size for visual and dimensional requirements shall be as shown in Table 3; sample unit shall be one molded part and acceptable based on zero defects.

TABLE 3 - Visual and Dimensional Inspection

| Lot Size          | Sample Size |
|-------------------|-------------|
| 2 to 8            | Entire Lot  |
| 9 to 90           | 8           |
| 91 to 150         | 12          |
| 151 to 280        | 19          |
| 281 to 500        | 21          |
| 501 to 1200       | 27          |
| 1201 to 3200      | 35          |
| 3201 to 10,000    | 38          |
| 10,001 to 35,000  | 46          |
| 35,001 to 150,000 | 56          |
| 150,001 and Over  | 65          |

4.3.2 Preproduction Tests: Acceptable to purchaser or as stated in the contract.

#### 4.4 Approval:

4.4.1 Sample product shall be approved by the purchaser before product for production use is supplied, unless such approval is waived by the purchaser. Results of the tests on production product shall be essentially equivalent to those on the approved sample. Production product made by the revised procedure shall not be shipped prior to receipt of reapproval. If necessary to make any change in parameters for the process control factors, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and when requested, sample product.

4.4.2 Manufacturer shall make no significant change to materials, processes or controls from those on which the approval was based, unless the change is approved by the cognizant engineering organization. A significant change is one which, in the judgment of the cognizant engineering organization, could affect the properties or performance of the parts.

4.4.2.1 Control factors for producing products include, but are not limited to, the following:

- Compound ingredients and proportions thereof within established limits
- Sequence of mixing compound ingredients
- Type of mixing equipment
- Method and equipment for preparing preforms
- Basic molding procedure (compression, transfer, injection)
- Curing time and pressure; variations of  $\pm 10\%$  are permissible
- Finishing methods
- Methods of inspection