

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS 3274F

Superseding AMS 3274E

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**ACRYLONITRILE BUTADIENE (NBR) RUBBER SHEET AND MOLDED SHAPES
Nylon Cloth Reinforced
Fuel Resistant**

1. SCOPE:

1.1 Form: This specification covers nylon-cloth-reinforced acrylonitrile-butadiene (NBR) rubber in the form of sheet and of shapes molded and cured from partly cured sheet.

1.2 Application: Primarily for diaphragms in power plant fuel supply and control systems.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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 D471 - Rubber Property - Effect of Liquids

ASTM D573 - Rubber - Deterioration in an Air Oven

ASTM D751 - Testing Coated Fabrics

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

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3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication: Shall consist of a single ply of a nylon cloth, having either a plain weave or a 2-up and 1-down twill weave, coated on both faces, unless otherwise specified, with an acrylonitrile-butadiene (NBR) rubber compound, the rubber being cured to produce a product meeting the requirements of 3.2. Thickness of coating shall be uniform and shall be equal in thickness on both faces of sheet coated on both faces.

3.1.1 Color: Shall be black.

3.1.2 Surface Cleanliness: Product having evenly dusted surfaces will be acceptable. Surfaces shall be cleanable without damage to the sheet and shall be cementable.

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: Shall be as specified in Table I, determined in accordance with ASTM D751.

3.2.2 Aliphatic Fuel Resistance:
(After 24 hr $\pm$ 0.5 drying at
70°C $\pm$ 1 (158°F $\pm$ 2))

ASTM D471
Medium: ASTM Ref. Fuel A
Temperature: 20° - 30°C
(68° - 86°F)
Time: 24 hr $\pm$ 0.25

3.2.2.1 Volume Change

Nominal Thickness		
Inch	Millimetres	
0.008	0.20	-20 to +10%
0.010	0.26	-25 to 0%
0.013	0.33	-25 to 0%
0.017	0.43	-25 to 0%
0.020	0.51	-25 to 0%
0.025	0.64	-25 to 0%
0.030	0.76	-25 to 0%
0.050	1.27	-25 to 0%

3.2.3 Aromatic Fuel Resistance:
(Immediate Deteriorated Properties)

ASTM D471
Medium: ASTM Ref. Fuel B
Temperature: 20° - 30°C
(68° - 86°F)
Time: 24 hr $\pm$ 0.25

3.2.3.1 Volume Change

3.2.3.1 (Continued):

Nominal Thickness		
Inch	Millimetres	
0.008	0.20	0 to +35%
0.010	0.26	0 to +35%
0.013	0.33	0 to +35%
0.017	0.43	0 to +35%
0.020	0.51	0 to +40%
0.025	0.64	0 to +40%
0.030	0.76	0 to +40%
0.050	1.27	0 to +40%

- 3.2.3.2 Volume Change on Drying
At $70^{\circ}\text{C} \pm 1$ ($158^{\circ}\text{F} \pm 2$)
for $24 \text{ hr} \pm 0.5$
(After immersion as in
3.2.3.1) (Based on
unimmersed volume)

-25 to 0%

- 3.2.4 Dry Heat Resistance: Shall be as specified in Table II, determined on specimens aged in accordance with ASTM D573 at $100^{\circ}\text{C} \pm 1$ ($212^{\circ}\text{F} \pm 2$) for $70 \text{ hr} \pm 0.5$.

- 3.2.5 Low Temperature Brittleness:

ASTM D2137, Method B

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

- 3.2.5.1 As Received

Pass

Time: $10 \text{ min.} \pm 0.1$

- 3.2.5.2 After Aromatic Fuel Aging
Without Drying

Pass

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

- 3.2.7 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 vendor.
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 Sizes and Tolerances: Sheet shall be supplied in nominal thicknesses of 0.008, 0.010, 0.013, 0.017, 0.020, 0.025, 0.030, or 0.050 in. (0.20, 0.26, 0.33, 0.43, 0.51, 0.64, 0.76, or 1.27 mm) and in widths as ordered.
Tolerances shall be as follows:

3.4.1 Thickness: Shall be as specified in Table III.

TABLE III

Nominal Thickness Inch	Tolerance, Inch	
	plus	minus
0.008	0.002	0.001
0.010, 0.013, 0.017	0.002	0.002
0.020, 0.025, 0.030	0.003	0.003
0.050	0.005	0.005

TABLE III (SI)

Nominal Thickness Millimetres	Tolerance, Millimetre	
	plus	minus
0.020	0.05	0.02
0.26, 0.33, 0.43	0.05	0.05
0.51, 0.64, 0.76	0.08	0.08
1.27	0.12	0.12

3.4.2 Width: ± 1.0 in. (± 25 mm).

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 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 requirements for properties as-received (3.2.1), aromatic fuel resistance (3.2.3), and dry heat resistance (3.2.4) are classified as acceptance tests and shall be performed on each lot.

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 prior to or on the initial shipment of a product to a purchaser, when a change in material or processing, or both, 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: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient product shall be taken 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. If specimens cannot be cut from molded shapes, specimens shall be cut from flat sheet of the same nominal thickness and cured the same as the parts.

4.3.1.1 A lot shall be all product produced in a continuous coating operation from the same roll of cloth and the same batch of compound and presented for vendor's inspection at one time. An inspection lot shall not exceed 1000 lb (450 kg) and may be packaged in small quantities under the basic lot approval provided lot identification is maintained.

4.3.1.2 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.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production material which are essentially the same as those used on the approved sample material. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material or processing, or both, and, when requested, sample material. Production material made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the product conforms to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 3274F, vendor's compound number, form and size or part number, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3274F, contractor or other direct supplier of material, supplier's compound number, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification and shall include in the report either a statement that the material conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.6 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging: Shall be in accordance with AMS 2810.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Material not conforming to this specification or to modifications authorized by purchaser will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (ϕ) symbol is used to indicate technical changes from the previous issue of this specification.

8.2 Dimensions and properties in inch/pound units and the Celsius temperatures are primary; dimensions and properties in SI units and the Fahrenheit temperatures are shown as the approximate equivalents of the primary units and are presented only for information.

8.3 For direct U.S. Military procurement, purchase documents should specify not less than the following:

Title, number, and date of this specification
Form and size or part number of product desired
Quantity of product desired
Methods of test and acceptance standards for weather resistance
(See 3.2.6) and corrosion (See 3.2.7)
Applicable level of packaging (See AMS 2810)