

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3274

REV. H

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Superseding AMS3274G

Acrylonitrile Butadiene (NBR) Rubber Sheet and Molded Shapes
Nylon Cloth Reinforced
Fuel Resistant

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 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.
- 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.
- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.
- 2.1.1 Aerospace Material Specifications:
- AMS 2810 - Identification and Packaging, Elastomeric Products

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- 2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 471 Rubber Property-Effect of Liquids
 ASTM D 573 Rubber-Deterioration in an Air Oven
 ASTM D 751 Testing Coated Fabrics
 ASTM D 2137 Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics

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 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 D 751.

- 3.2.2 Aliphatic Fuel Resistance:
 (After 24 hours $\pm$ 0.5 drying at 70°C $\pm$ 1 (158°F $\pm$ 2))
- | | |
|--------------|---------------------------|
| ASTM D 471 | |
| Medium: | ASTM Ref. Fuel A |
| Temperature: | 20°- 30°C
(68° - 86°F) |
| Time: | 24 hours $\pm$ 0.25 |
- 3.2.2.1 Volume Change

Nominal Thickness		
Inch	Millimeters	
0.008	0.20	-20 to +10%
0.010	0.25	-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 <u>Aromatic Fuel Resistance:</u> (Immediate Deteriorated Properties)	ASTM D 471	
	Medium:	ASTM Ref. Fuel B
	Temperature:	20° - 30°C (68° - 86°F)
	Time:	24 hours ± 0.25

3.2.3.1 Volume Change

	Nominal Thickness		
	Inch	Millimeters	
0.008		0.20	0 to +35%
0.010		0.25	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°C ± 1 (158°F ± 2)
For 24 hours ± 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 D 573 at 100°C ± 1 (212°F ± 2) for 70 hours ± 0.5.

3.2.5 Low-Temperature Brittleness: ASTM D 2137, Method B
Temperature: -55°C ± 1
(-67°F ± 2)
Time: 10 minutes ± 0.1

3.2.5.1 As Received Pass

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.

TABLE I

As-Received Properties

Nominal Thickness Inch	Breaking Strength, Grab Method			Bursting Strength		Adhesion	
	lb, min	Warp	N, min	Diaphragm	Bursting Tester	lb per inch	N/m
	Warp	Filling		psi, min	kPa, min	width, min	width, min
0.008	35	35	156	75	517	7	1226
0.010	65	60	289	135	931	7	1226
0.013	65	60	289	135	931	7	1226
0.017	65	60	289	135	931	7	1226
0.020	65	60	289	135	931	7	1226
0.025	300	300	1334	500	3447	7	1226
0.030	65	60	289	135	931	7	1226
0.050	300	300	1334	500	3447	7	1226

TABLE II

Dry Heat Resistance Properties

Nominal Thickness Inch	Breaking Strength, Grab Method			Bursting Strength		Surface Hardening
	lb, min	Warp	N, min	Diaphragm	Bursting Tester	
	Warp	Filling		psi, min	kPa, min	
0.008	35	35	156	75	517	None
0.010	65	60	289	135	931	for
0.013	65	60	289	135	931	all
0.017	65	60	289	135	931	thick-
0.020	65	60	289	135	931	nesses
0.025	300	300	1334	500	3447	
0.030	65	60	289	135	931	
0.050	300	300	1334	500	3447	

- 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 inch (0.20, 0.25, 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 Millimeters	Tolerance, Millimeter	
	plus	minus
0.020	0.05	0.03
0.25, 0.33, 0.43	0.05	0.05
0.51, 0.64, 0.76	0.08	0.08
1.27	0.13	0.13

- 3.4.2 Width: ± 1.0 inch (± 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. 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 properties as-received (3.2.1), aromatic fuel resistance (3.2.3), and dry heat resistance (3.2.4) are acceptance tests and shall be performed on each lot.

- 4.2.2 Preproduction Tests: Tests for 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.

- 4.2.2.1 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, contracting officer, or request for procurement.