



AEROSPACE MATERIAL SPECIFICATION

AMS3821**REV. C**

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Superseding AMS3821B

Cloth, Type "E" Glass, "B" Stage Epoxy-Resin-Impregnated
7781 Style Fabric, Flame Resistant

RATIONALE

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

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Documents

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1. SCOPE:

- 1.1 Form: This specification covers a style 7781 glass cloth impregnated with a
Ø heat-curable epoxy resin system, the resin being processed to a "B" stage condition, and furnished in the form of continuous rolls.
- 1.2 Application: Primarily for vacuum-bag molded, flame-resistant laminates used up to 80°C (180°F).

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) 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 2825 - Material Safety Data Sheets
AMS 3824 - Cloth, Type "E" Glass, Finished for Resin Laminates

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D638 - Tensile Properties of Plastics
ASTM D695 - Compressive Properties of Rigid Plastics
ASTM D790 - Flexural Properties of Plastics and Electrical Insulating Materials
ASTM D2344 - Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short Beam Method
ASTM F501 - Aerospace Materials Response to Flame with Vertical Test Specimen (for Aerospace Vehicles Standard Conditions)

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3.1 TECHNICAL REQUIREMENTS:

3.1 Material:

3.1.1 Reinforcement: Shall conform to AMS 3824, Style 181, 1581, or 7781.

3.1.2 Resin: Shall be a low-pressure-laminating epoxy resin modified as necessary to meet the requirements of 3.2, 3.3, and 3.4.

3.2 Shelf Life: The impregnated cloth shall have a shelf life of not less than three months from date of receipt by purchaser when stored below 7°C (45°F) in moisture-proof, sealed containers.

3.3 Working Life: The impregnated cloth shall meet the requirements of 3.4 when tested after continuous exposure up to 20 days within the relative humidity and temperature limits shown in Fig. 1.

3.4 Properties: Impregnated cloth shall conform to the following requirements:

3.4.1 Uncured Impregnated Cloth: Shall conform to the following requirements; tests shall be performed on the cloth after warming to above the dew point in its sealed moisture-proof container prior to sampling and in accordance with the specified test methods:

Volatiles, % by weight	To be reported in preproduction report	4.5.2
Resin Solids Content (Volatile Free), % by weight	40 ± 4	4.5.2
Gel Time, min.	Preproduction Value ±20%	4.5.3
Resin Flow	Preproduction Value ±20%	4.5.4

3.4.2 Cured Laminate: Shall conform to the following requirements; tests shall be performed at 25°C ± 3 (77°F ± 5) in accordance with specified test methods on specimens cut from test laminates prepared as in 4.5.1. Reported average values shall be based on four determinations for each requirement.

3.4.2.1 Tensile Strength: ASTM D638

Minimum Average	40,000 psi (275 MPa)
Individual Minimum	36,000 psi (250 MPa)

3.4.2.2	<u>Compressive Strength (Edgewise):</u>		4.5.5
	Minimum Average	47,000 psi (325 MPa)	
	Individual Minimum	42,300 psi (290 MPa)	
3.4.2.3	<u>Flexural Strength:</u>		ASTM D790
	Minimum Average	50,000 psi (345 MPa)	
	Individual Minimum	45,000 psi (310 MPa)	
3.4.2.4	<u>Flexural Modulus:</u>		ASTM D790
	Minimum Average	2,500,000 psi (170 GPa)	
	Individual Minimum	2,250,000 psi (155 GPa)	
3.4.2.5	<u>Flame Resistance:</u> (See 8.3)		
3.4.2.5.1	<u>Vertical Test, 60 Sec Ignition:</u>		ASTM F501
Ø		Average	Individual
	Time to Extinguish after Flame Removal, max	5.0 sec	6.0 sec
	Burn Length, max	6.0 in. (155 mm)	7.2 in. (185 mm)
	Drip Flaming Time, max	3.0 sec	3.6 sec
3.4.2.5.2	<u>Penetration Flame Test:</u>		4.5.6
		Average	Individual
	Time to Extinguish after Flame Removal, max	15 sec	18 sec
	Time of Afterglow, max	10 sec	12 sec
	Penetration (complete) of Laminate	None	None
3.4.2.6	<u>Interlaminar Shear Strength:</u>		ASTM D2344
Ø			
	Minimum Average	Preproduction Value minus 20%	
	Individual Minimum	Preproduction Value minus 20%	
3.5	<u>Quality:</u> The cloth, as received by purchaser, shall be uniform in quality and condition, clean, and free from foreign materials and from internal and external imperfections detrimental to usage of the cloth.		
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