



AEROSPACE MATERIAL SPECIFICATION

AMS-G-25871™

REV. A

Issued 1999-07
Reaffirmed 2006-01
Stabilized 2016-06

Superseding AMS-G-25871

Glass, Laminated, Aircraft Glazing

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 Scope:

This specification covers laminated glass, ready-cut, with various types of edge attachments, for use in aircraft glazing.

1.2 Classification:

Laminated glass shall be furnished in the following types and classes, as specified in the contract or order (see 6.2).

- Type I - Ready-cut, commercial polished plate or float glass.
- Type II - Ready-cut, high-light-transmission polished plate or float glass.
- Type III - Ready-cut, heat-absorbing polished plate or float glass.
- Type IV - Ready-cut, low expansion borosilicate polished plate glass (coefficient of expansion from 45 to 60 X 10⁻⁷ per degree Celsius between 25° and 300°C)
- Type V - Chemically strengthen glass.

In any type, glass may be specified as:

- Class A - Flat
- Class B - Curved

2. APPLICABLE DOCUMENTS:

The following publications, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

NN-P-530	Plywood, Flat Panel
PPP-B-585	Box, Wood, Wirebound
PPP-B-591	Box, Fiberboard, Wood-Cleated
PPP-B-601	Box, Wood, Cleated Plywood
PPP-B-621	Box, Wood, Nailed and Lock Corner
PPP-B-636	Box, Shipping, Fiberboard
MIL-P-116	Preservation - Packaging, Methods of
MIL-L-10547	Liner, Case, And Sheet, Overwrap, Water Vaporproof or Waterproof, Flexible
MIL-B-13239	Barrier Material, Waterproofed, Flexible All Temperatures, Heat Sealable
MIL-G-25667	Glass, Monolithic, Aircraft Glazing
FED-STD-406	Plastic, Methods of Testing

2.1 (Continued):

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-1186	Cushioning, Anchoring, Bracing, Blocking, And Waterproofing, With Appropriate Test Methods

2.2 Consolidated Classification Publications:

Available from Consolidated Classification Committee, 202 Chicago Union Station, Chicago, Illinois 60606.

Consolidated Freight Classification Rules

3. REQUIREMENTS:

3.1 Materials:

3.1.1 Glass: The glass plies used in the construction of laminates of the types specified herein shall conform to the corresponding types of MIL-G-25667, except for identification of product.

3.1.2 Interlayer: The material used for interlayer shall be stable without edge sealing and shall have suitable binding characteristics. The material shall be polyvinyl butyral or a suitable high-temperature resistant material, as specified (see 6.2). Unless otherwise specified, polyvinyl butyral, when used, shall be plasticized with either 21.0 ± 2 parts by weight of triethylene glycol di-2-ethyl butyrate or 19.0 ± 2 parts by weight of di-n-hexyl adipate per 100 parts resin. The laminater's serialized identification number code shall provide traceability as to the type of interlayer used in each laminate (see 6.2). Use of either a different plasticizer or amount of plasticizer shall be approved by the procuring activity and specified in applicable drawings, specifications, or in the contract or order.

3.2 Design and construction:

The laminated glass shall consist of two or more plies of glass (see 6.1.5) held together by an interlayer or transparent material having suitable bonding characteristics. Laminated units may or may not have extended plastic edges, with or without metal reinforcements, as specified in the applicable drawing, or in the contract or order.

3.2.1 Parting medium: Types I through V glass may have a parting medium used to reduce or prevent bonding of the glass plies to the extended plastic edge only, to a specified portion of the interlayer only, or to both the plastic edge and interlayer, when so specified in applicable drawing or in the contract or order.

3.2.2 Edge reinforcement: Where edge reinforcement of the interlayer is employed, that portion underlying the glass shall be held to a minimum consistent with good commercial practice, or as specified in applicable drawings.

3.3 Temper:

Temper requirements for the individual glass plies shall be as specified in the contract or order in accordance with MIL-G-25667.

3.4 Dimensions and tolerances:

The linear dimensions and nominal thickness of Class A and Class B laminates and the curvature of Class B laminates shall be as specified by applicable drawings or specifications.

- 3.4.1 Thickness tolerances: Unless otherwise specified in the contract or order, the following thickness tolerances shall be allowed. Thickness tolerance for individual plies shall be as specified in MIL-G-25667. Laminates shall have a thickness tolerance of ± 0.8 mm (0.03 in.) for assemblies of 9.5 mm (0.38 in.) thickness or less, ± 1.6 mm (0.06 in.) for assemblies between 9.5 and 25.4 mm (0.38 and 1 in.) in thickness, and ± 3.2 mm (0.12 in.) for assemblies above 25.4 mm (1 in.) in thickness.
- 3.4.2 Linear tolerances: Unless otherwise specified, the following linear dimensional tolerances shall be allowed. Annealed glass assemblies 6.4 mm (0.25 in.) or under in thickness shall be allowed a linear dimensional tolerance of ± 0.8 mm (0.03 in.). Annealed glass assemblies over 6.4 mm (0.25 in.) thick shall be allowed a linear dimensional tolerance of ± 1.6 mm (0.06 in.). Tempered glass assemblies regardless of thickness shall be allowed a linear dimensional tolerance of ± 1.6 mm (0.06 in.) and an overall slippage tolerance of 1.6 mm (0.06 in.).
- 3.4.3 Curvature: Unless otherwise specified in the contract or order, Class B units shall not vary from the specified contour by more than 3.2 mm (0.12 in.) when tested as specified in 4.4.7.

3.5 Resistance to temperature change:

When tested as specified in 4.4.2, the laminates shall withstand the temperature change without cracking, clouding, delamination, formation of bubbles, or other evidence of deterioration. For the laminates containing components of dissimilar size, the separation of small flakes or chips beyond the trim line of the smaller glass shall not be considered evidence of deterioration.

3.6 Nonscatterability:

Laminates subjected to the impact test in accordance with 4.4.3 shall show no separation of glass and interlayer other than in a permissible spot 6.4 mm (0.25 in.) diameter at point of impact, and within the area 3.2 mm (0.12 in.) wide along either side of any fracture line propagating from the point of impact. Very small amounts of glass may leave the underside of the assembly because of fracture of the bottom plate.

3.7 Original luminous transmittance:

The original luminous transmittance of Types I, II, IV and V laminates shall be equal to or greater than the requirements in Table I when tested in accordance with 4.4.4. The original luminous transmittance of Types I, II, IV and V laminates with a high-temperature resistant interlayer may be 0.032 percent less than the requirements of Table I for each 0.025 mm (0.001 in.) of interlayer thickness. The original luminous transmittance requirement for Type III laminates and laminates with an electrical conductive coating shall be as specified in the contract or order.

TABLE I. Original luminous transmittance

Thickness		Type		
mm	(inches)	I and V (percent)	II (percent)	IV (percent)
0.03 to 6.35	0.001 to 0.250	84.8	89.0	89.0
6.36 to 12.70	0.251 to 0.500	81.6	87.0	87.0
12.71 to 19.05	0.501 to 0.750	78.4	85.0	86.0
19.06 to 25.40	0.751 to 1.000	75.2	83.0	85.0
25.41 to 31.75	1.001 to 1.250	72.0	81.0	83.0
31.76 to 38.10	1.251 to 1.500	68.8	79.0	81.0
38.11 to 44.45	1.501 to 1.750	65.6	77.0	79.0

3.8 Solar-radiation transmittance:

This requirement applies only to Type III laminates. Individual plies of heat-absorbing glass shall comply with the solar-radiation transmittance requirements for Type III glass of MIL-G-25667.

3.9 Original haze:

The percentage of haze for all laminates shall not exceed 2.0 percent for thicknesses up to 15.9 mm (0.62 in.), and 2.5 percent the thicknesses above 15.9 mm (0.62 in.), when tested in accordance with 4.4.4. Original haze of laminates incorporating a high-temperature resistant interlayer may be 0.06 percent greater than the values specified above for each 0.025 mm (0.001 in.) of interlayer thickness.

3.10 Luminous transmittance and haze after exposure:

After exposure to the light exposure test specified in 4.4.5, the luminous transmittance and haze shall conform to the requirements of 3.7 and 3.9, as applicable.