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Standard Guide for Selection of Test Methods for Interlayer Materials for Aerospace Transparent Enclosures¹

This standard is issued under the fixed designation F942; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Editorial changes made in 3.2 in June 2023.

1. Scope

1.1 This guide summarizes the standard test methods available for determining physical and mechanical characteristics of interlayer materials used in multi-ply aerospace transparent enclosures.

1.2 Interlayer materials are used to laminate glass-to-glass, glass-to-plastic, and plastic-to-plastic. Interlayer materials are basically transparent adhesives with high-quality optical properties. They can also serve as an energy absorbing medium, a fail-safe membrane to contain cockpit pressure and to prevent entry of impact debris; a strain insulator to accommodate different thermal expansion rates of members being laminated and as an adherent to prevent spalling of inner surface ply material fragments. The relative importance of an interlayer characteristic will be a function of the prime use it serves in its particular application.

1.3 This guide, as a summary of various methods in Section 2, is intended to facilitate the selection of tests that can be applied to interlayer materials.

1.4 The test methods listed are for use in determining basic design characteristics and in assuring lot-to-lot uniformity of the materials being tested except as noted in 3.3.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This guide is under the jurisdiction of ASTM Committee F07 on Aerospace and Aircraft and is the direct responsibility of Subcommittee F07.08 on Transparent Enclosures and Materials.

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2. Referenced Documents

2.1 ASTM Standards:²

- C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D542 Test Method for Index of Refraction of Transparent Organic Plastics
- D570 Test Method for Water Absorption of Plastics
- D696 Test Method for Coefficient of Linear Thermal Expansion of Plastics Between –30°C and 30°C with a Vitreous Silica Dilatometer
- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics
- D1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheet
- D1045 Test Methods for Sampling and Testing Plasticizers Used in Plastics
- D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheet or Film at Elevated Temperature
- D1824 Test Method for Apparent Viscosity of Plastics and Organosols at Low Shear Rates
- D2240 Test Method for Rubber Property—Durometer Hardness
- D2766 Test Method for Specific Heat of Liquids and Solids (Withdrawn 2018)³
- D2857 Practice for Dilute Solution Viscosity of Polymers

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.