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

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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 and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

~~C177~~ Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus²

~~C 177~~ Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

~~D 149~~ 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 Rubbers and Thermoplastic Elastomers—Tension—412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension

~~D 542~~ Test Method Method for Index of Refraction of Transparent Organic Plastics

~~D569~~ Test Method for Measuring the Flow Properties of Thermoplastic Molding Materials⁵—570 Test Method for Water Absorption of Plastics

~~D570~~ Test Method for Water Absorption of Plastics⁵—696 Test Method for Coefficient of Linear Thermal Expansion of Plastics Between 30C and 30C with a Vitreous Silica Dilatometer

~~D696~~ Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C⁵—792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

~~D792~~ Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement⁵—1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

~~D1003~~ Test Method for Haze and Luminous Transmittance of Transparent Plastics⁵—1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheet

~~D1004~~ Test Method for Initial Tear Resistance of Plastic Film and Sheet⁵—1045 Test Methods for Sampling and Testing Plasticizers Used in Plastics

¹ This guide is under the jurisdiction of ASTM Committee F-7F07 on Aerospace and Aircraft and is the direct responsibility of Subcommittee F07.08 on Transparent Enclosures and Materials.

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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* Vol 04.06, volume information, refer to the standard's Document Summary page on the ASTM website.