



Designation: D 3841 – 97 (Reapproved 2001)

An American National Standard

Standard Specification for Glass-Fiber-Reinforced Polyester Plastic Panels¹

This standard is issued under the fixed designation D 3841; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This specification covers the classification, materials of construction, workmanship, minimum physical requirements, and methods of testing glass-fiber reinforced polyester plastic panels intended for use in construction. Panels for specialized or unique applications may require values significantly above or below those stated in this specification. Recommended practices for certain specific applications are included as Appendix X1. This specification is not intended to restrict or limit technological changes affecting performance when those changes are agreed upon between the purchaser and the seller.

1.2 Supplementary information on chemical resistance, resistance to heat, and installation practices are provided in Appendix X1.

1.3 The classification of these plastic panels into types based on relative response to a laboratory test shall not be considered a fire hazard classification.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in Tables and Figures) shall not be considered as requirements of this standard.

1.6 *Laboratory flammability tests (Test Methods D 635, D 1929, D 2843, and E 84) applicable to this standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of these tests may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.*

1.7 The following precautionary caveat pertains only to the test method portion, Section 8 of this specification. *This specification 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 specification to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There are no ISO standards covering the subject matter of this specification.

2. Referenced Documents

2.1 ASTM Standards:

- D 570 Test Method for Water Absorption of Plastics²
- D 618 Practice for Conditioning Plastics for Testing²
- D 635 Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position²
- D 638 Test Method for Tensile Properties of Plastics²
- D 696 Test Method for Coefficient of Linear Thermal Expansion of Plastics between —30°C and 30°C with a Vitreous Silica Dilatometer²
- D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials²
- D 883 Terminology Relating to Plastics²
- D 1435 Practice for Outdoor Weathering of Plastics²
- D 1494 Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels²
- D 1600 Terminology for Abbreviated Terms Relating to Plastics²
- D 1929 Test Method for Ignition Properties of Plastics³
- D 2843 Test Method for Density of Smoke from the Burning or Decomposition of Plastics³
- D 3892 Practice for Packaging/Packing of Plastics⁴
- D 4364 Practice for Performing Accelerated Outdoor Weathering of Plastics Using Concentrated Natural Sunlight⁴

¹ This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.24 on Plastic Building Products.

Current edition approved April 10, 1997. Published November 1997. Originally published as D 3841 – 80. Last previous edition D 3841 – 92.

² *Annual Book of ASTM Standards*, Vol 08.01.

³ *Annual Book of ASTM Standards*, Vol 08.02.

⁴ *Annual Book of ASTM Standards*, Vol 08.03.

*A Summary of Changes section appears at the end of this standard.

- E 72 Method for Conducting Strength Tests of Panels for Building Construction⁵
- E 84 Test Method for Surface Burning Characteristics of Building Materials⁵
- E 424 Test Method for Solar Energy Transmittance and Reflectance (Terrestrial) of Sheet Materials⁶
- E 631 Terminology of Building Constructions⁷
- E 831 Test Method for Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis⁷
- E 903 Test Method for Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres⁸
- E 972 Test Method for Solar Photometric Transmittance of Sheet Materials Using Sunlight⁸
- E 1084 Test Method for Solar Transmittance (Terrestrial) of Sheet Material Using Sunlight⁸
- E 1175 Test Method for Determining Solar or Photopic Reflectance, Transmittance and Absorptance of Materials Using a Large Diameter Integrating Sphere⁸
- G 26 Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With or Without Water for Exposure of Nonmetallic Materials⁷

3. Terminology

3.1 *General*—Definitions are in accordance with Terminology D 883 and E 631 and abbreviations with Terminology D 1600 unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard*: Description of Term Specific to This Standard:

3.2.1 *limited flammability*—less response to fire than general purpose material when tested under laboratory conditions.

NOTE 2—Limited flammability is considered a fire hazard classification (see 1.3 and 1.6).

4. Classification

4.1 Light transmitting panels covered by this specification are divided into two types, based on relative response to a laboratory flammability test:

4.1.1 *Type CC1*—Limited flammability.

4.1.2 *Type CC2*—General purpose.

NOTE 3—Types CC1 and CC2 are classifications incorporated in the major model building codes. Panels used in other applications are also classified by major model building codes in accordance with appropriate chapters of those codes.

4.2 These types may be further subdivided by grades based on relative response to weathering tests:

4.2.1 *Grade 1*—Weather resistance.

4.2.2 *Grade 2*—General purpose.

4.3 Within the classification of type and grade of plastic panel described in this specification are commercial products with the following variations as agreed upon between purchaser and supplier:

4.3.1 *Size (Length and Width)*—The most common nominal sizes currently available are 26 to 60 in. (66.0 to 152.4 cm) in

width, and 6 to 16 ft (1.8 to 4.9 m) in length. Corrugated panels, to approximately 40 ft (12.2 m), and flat sheet in coils of longer lengths, are generally available.

4.3.2 *Surface Treatments*—Some manufacturers offer special surface treatments of various types for the purpose of improving durability. Individual suppliers can provide details.

4.3.3 *Light Transmission*—Refer to manufacturers' literature for range of transmission available.

4.3.4 *Solar Energy Transmission*—Refer to manufacturers' literature for range of transmission available.

4.3.5 *Color*—Refer to manufacturers' literature for range of colored products available.

4.3.6 *Load Deflection*—Refer to manufacturers' literature for load and deflection data on specific profiles.

4.3.7 *Weight Per Square Foot or Thickness*—Panels are generally designed and sold by weight per square foot, the most common of which are 4 through 12 oz (1.2 through 3.7 kg/m²). Other weights are available. Flat sheet may be designed and sold by either weight (as indicated above) or thickness, the most common of which are 0.030 through 0.125 in. (0.76 through 3.2 mm), as measured in accordance with 8.4.1. Other thicknesses are available.

4.3.8 *Profile, Pitch and Depth*—In addition to standard profiles, special or custom profiles may be developed as agreed upon between the buyer and the seller.

5. Materials

5.1 The polyester resin used in the panels shall be a thermosetting styrenated and acrylated polyester resin composed of polymeric esters in which the recurring ester groups are an integral part of the main polymer chain. The resin shall be reinforced with glass fibers. The polyester resin may contain additives for various purposes, such as additives to provide low smoke density or high fire retardancy, catalyst residues, stabilizers, pigments, dyes, fillers, and reinforcing fiber or filaments. For material specifications of other types of fiberglass reinforced plastics, consult the manufacturers' literature.

6. Workmanship, Finish, and Appearance

6.1 The panels will conform to the specific dimensions of the profile being produced and shall be fully cured. Panels shall not contain visual cracks, resin voids, foreign inclusions, or surface wrinkles that would impair the proper nesting of the corrugated panels, alter the specific dimensions of the panels, or otherwise affect their serviceability.

7. Physical Requirements

7.1 *Size (Length and Width)*—Tolerance on nominal length and width specified by the purchaser shall be ± 0.25 in. (± 6 mm) measured in accordance with 8.2. Panels exceeding 16 ft in length shall have a length tolerance of $+0.75 -0.125$ in. ($+19 -3.2$ mm).

7.2 *Squareness*—Panels shall be within 0.125 in. (3.2 mm) of square when measured in accordance with 8.3.

7.3 *Weight*—Tolerance on the specified weight of all panels shall be $\pm 10\%$ when determined in accordance with 8.4.

⁵ Annual Book of ASTM Standards, Vol 04.07.

⁶ Discontinued—Replaced by E 903 and E 1084.

⁷ Annual Book of ASTM Standards, Vols 08.03 and 14.02.

⁸ Annual Book of ASTM Standards, Vol 12.02.