



Standard Specification for Fiberglass (GRP) Pultruded Open-Weather Storm and Guard, Square Railing Systems¹

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1. Scope

1.1 This specification provides the material requirements, construction, installation, and testing requirements for open-weather deck, storm-and-guard, fiberglass square railing systems. Components are to be manufactured by the pultrusion process.

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

1.3 The following safety hazards caveat pertains only to the test methods portion, Section 9, of this specification: *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:²

- D 570 Test Method for Water Absorption of Plastics
- D 638 Test Method for Tensile Properties of Plastics
- D 695 Test Method for Compressive Properties of Rigid Plastics
- D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D 3846 Test Method for In-Plane Shear Strength of Reinforced Plastics
- D 3917 Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes
- E 84 Test Method for Surface Burning Characteristics of Building Materials

3. Terminology Definition

3.1 *pultrusion*—process of pulling fiberglass rovings (strands), mats, and other forms of reinforcements such as woven fiberglass through baths of thermosetting liquid resin, and then through a heated forming die (made of steel) to form a completed composite fiberglass structural shape.

3.2 *Discussion*—The heated die causes a chemical reaction to be initiated in the resin. The liquid resin molecules will cross-link and develop into a hardened plastic that is reinforced with the fiberglass.

4. Classification

4.1 Handrails and stanchions shall be fiberglass pultruded square tube available in the following two types:

4.1.1 *Type 1F*—Three-course railing systems, for use along the exposed peripheries of freeboards, weather decks, and superstructure decks.

4.1.2 *Type 2F*—Two-course railing systems, for use on bridges, platforms, walkways, and elsewhere as needed.

5. Ordering Information

5.1 Orders for materials under this specification shall include the following information:

5.1.1 Quantity (lineal feet (metres) of railing system).

5.1.2 Name of material (fiberglass pultruded square railing system).

5.1.3 Type (See 4.1).

5.1.4 Fiberglass coaming, if specified (lineal feet (metres)). (See 6.2.5).

5.1.5 Attachment method for stanchions (see 6.2.6).

5.1.6 ASTM designation and year of issue.

6. Materials and Manufacture

6.1 Materials:

6.1.1 The fiberglass (GRP) pultruded square tube shall be 2 × 2 × ¼ in. (50 × 50 × 6.4 mm) with the outside corner radius ⅝ in. (4 mm). A synthetic surface veil shall be the outermost layer of reinforcement covering the entire exterior surface. The resin used throughout the part shall be either a flame retardant isophthalic polyester or a flame retardant vinyl ester resin containing an ultra-violet radiation (UV) inhibitor. The fiberglass pultruded square tube shall achieve a flame

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