



Designation: F 1092 – 87 (Reapproved 1994)^{ε1}

An American National Standard

Standard Specification for Fiberglass (GRP) Pultruded Open-Weather Storm- and Guard-Square Handrails¹

This standard is issued under the fixed designation F 1092; 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—Section 10 was added editorially in June 1994.

1. Scope

1.1 This specification provides the material requirements, construction, installation, and testing requirements for open-weather deck, storm-and-guard, fiberglass square rails. The handrail 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 and may be approximate.

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:

- D 570 Test Method for Water Absorption of Plastics²
- D 638 Test Method for Tensile Properties of Plastics²
- D 695 Test Method for Compressive Properties of Rigid Plastics²
- D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials²
- D 792 Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement²
- D 3846 Test Method for In-Plane Shear Strength of Reinforced Plastics³
- D 3917 Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes³
- E 84 Test Method for Surface Burning Characteristics of Building Materials⁴

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 rails, for use along the exposed peripheries of freeboards, weather docks, and superstructure decks.

4.1.2 *Type 2F*—Two course rails, 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 of handrail).

5.1.2 Name of material (fiberglass pultruded square handrail).

5.1.3 Type (See 4.1).

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

5.1.5 Attachment method for rail 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 by ¼ in. (51 by 6.4 mm) with the outside corner radius ⅜ in. (2.4 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

¹ This specification is under the jurisdiction of ASTM Committee F25 on Shipbuilding and is the direct responsibility of Subcommittee F25.03 on Outfitting. Current edition approved Oct. 30, 1987. Published December 1987.

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 04.07.