



Designation: D3917 – 11

# Standard Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes<sup>1</sup>

This standard is issued under the fixed designation D3917; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification defines tolerances applicable to standard rods, bars, and shapes pultruded from thermosetting glass-reinforced plastics.

1.2 These dimensional tolerances apply to all shapes specified as “standard” by the pultrusion industry.

1.3 Custom shapes and products designed for special applications may carry specific tolerances that vary from the standard.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 4, 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.*

NOTE 1—There is no known ISO equivalent to this standard.

## 2. Terminology

### 2.1 Definitions:

2.1.1 *camber*—the deviation of the edge or surface from a reference straight line.

2.1.2 *mean wall thickness*—the average of two or more wall thickness measurements taken at multiple locations.

2.1.3 *straightness*—the upward deviation of a pultruded shape when resting on a flat surface measured in a manner that the weight of the pultruded part minimizes the deviation.

2.1.4 *unilateral tolerance*—a tolerance in which the variation is permitted in one direction (either “+” or “-”) from the specified dimension.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.18 on Reinforced Thermosetting Plastics.

Current edition approved April 1, 2011. Published April 2011. Originally approved in 1980. Last previous edition approved in 2008 as D3917 - 08. DOI: 10.1520/D3917-11.

## 3. Dimensional Criteria

3.1 Dimensional tolerances for cross sections shall be prescribed in Table 1.

3.2 Length tolerances for standard rods, bars, and shapes shall be as prescribed in Table 2.

3.3 Straightness tolerances shall be as prescribed in Table 3 (also see 4.2).

3.4 Twist tolerances for bars and shapes shall be as prescribed in Table 4 (also see 4.3).

3.5 Flatness (flat surface) tolerances for bars, solid shapes, and semihollow shapes shall be as prescribed in Table 5.

3.6 Flatness (flat surface) tolerances of hollow shapes shall be as prescribed in Table 6.

3.7 Angularity tolerances for bars and shapes shall be as prescribed in Table 7 (also see 4.4).

3.8 Camber tolerances for shapes can be as prescribed in Table 8, if required by the customer. Camber is not specified for standard shapes but will be a special customer requirement.

3.9 The selection, type, and amount of reinforcements, as well as resin system used, directly affect dimensions. Tolerances shall be agreed upon between the supplier and the user.

## 4. Test Methods

4.1 Obtain the specified tolerances with conventional measuring equipment. Measuring procedures, gages, and fixtures shall be agreed upon between the supplier and the user.

4.2 Measure departure from straightness by placing the section on a level table so that the arc or departure from straightness is vertical. Measure the vertical depth of the arc with a feeler gauge, a straightedge, or both.

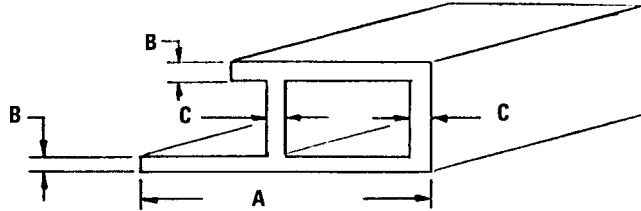
4.3 Measure twist by placing the pultruded section on a flat surface and using an inclinometer. An inclinometer is a commercially available device used to measure the angle of inclination.

4.4 Measure angles with protractors or gauges.

## 5. Keywords

5.1 dimensional tolerance; pultruded shapes; thermosetting plastic

TABLE 1 Cross-Sectional Dimensions—Standard Rods, Bars, and Shapes



Standard Pultruded Section with Dimension up to 36-in. (914-mm) Diameter

Solid Dimensions, ±in. (mm)<sup>A,4</sup>

Specified Dimension, in. (mm)	A Die Struck Dimension <sup>A</sup>	B Wall Thickness (open shape)	C Wall Thickness (closed shape)
All	±4 % (0.94 in. max)	-10 % of specified dimension, but not exceeding either -0.100 (2.54) max or -0.010 (0.25) min	-20 % of specified dimension, but not exceeding either -0.100 (2.54) max or -0.010 (0.25) min

<sup>A</sup> The outside dimension of a tube.

TABLE 2 Length—Standard Rods, Bars, and Shapes<sup>A</sup>

Allowable Deviation from Specified Length, +in. (+mm), except as noted

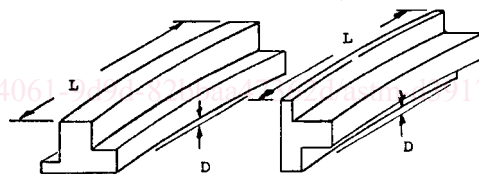
in. (mm)	Up to 8 ft (3.65 m) in Length, incl	Over 8 to 24 ft (3.65 to 9.14 m) in Length, incl	Over 24 to 50 ft (9.14 to 15.24 m) in Length, incl
Up to 0.499 (12.67) incl	±1/8 (±3.18)	±1/4 (±6.35)	±3 (±76.2)
0.500 to 1.249 (12.70 to 31.72) incl	±1/8 (±3.18)	±1/4 (±6.35)	±3 (±76.2)
1.250 to 2.999 (31.75 to 76.17) incl	±1/8 (3.18)	±1/4 (±6.35)	±3 (±76.2)
3.000 to 7.999 (76.20 to 203.17) incl	±3/16 (4.76)	±1/4 (±6.35)	±3 (±76.2)

<sup>A</sup> A unilateral tolerance is permitted if the range remains the same.

TABLE 3 Straightness—Standard Bars, Rods, and Shapes

Allowable Deviation (D) from Straight, in. (mm)

Product	Specified Diameter (Rods)	Specified Thickness (Rectangles)	In Total Length of Piece
	Specified Width (Bars)	Minimum Thickness (Shapes)	
	in. (mm)	in. (mm)	
Rods and square, hexagonal, and octagonal bars	all	...	0.030 (0.51) × length, ft (m)
Rectangular bars	Up to 1.499 (38.07), incl	Up to 0.094 (2.4), incl	0.050 (1.3) × measured length, ft (m)
		0.095 (2.4) and over	0.040 (1.01) × measured length, ft (m)
	1.500 (38.10) and over	all	0.040 (1.01) × measured length, ft (m)
Shapes—Open	all	all	0.050 (1.3) × measured length, ft (m)
Shapes—Closed	all	all	0.030 (1.3) × measured length, ft (m) <sup>A</sup>



<sup>A</sup> Measured when weight of pultrusion minimizes the deviation by contact with flat surface.