

Standard Specification for Flanged Steel U-Channel Posts¹

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1. Scope

1.1 This specification covers flanged U-channel carbon steel posts having a nominal weight ranging from 0.75 to 6.0 lb/ft and a nominal width ranging from 1.25 to 4.0 in. These posts are furnished in the as-wrought condition intended for applications requiring high tensile strength or crashworthiness and with a lower carbon (LC) designation for use where higher ductility or improved weldability are required. These materials are available in multiple yield strength levels of 50, 60, 70, and 80 ksi (345, 420, 485, and 550 MPa). The 50- and 60-ksi (345- and 420-MPa) yield strength grades are available as lower carbon posts, designated as Grades 50LC or 60LC.

Note 1—This specification does not cover high-strength low-alloy (HSLA) post. Refer to Specification A572/A572M for HSLA. For structural Grade 36, refer to Specification A36/A36M.

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

1.3 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
- A1 Specification for Carbon Steel Tee Rails
- A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
- A29/A29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for
- A36/A36M Specification for Carbon Structural Steel
- A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A499 Specification for Steel Bars and Shapes, Carbon Rolled from "T" Rails
- A572/A572M Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
- 2.2 AASHTO Standard:

AASHTO Manual for Assessing Safety Hardware³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *crashworthiness*, *n*—ability of signs, signals, and other safety hardware to fail in such a manner so as not to shatter or cause injury to passengers in vehicles involved in an impact or collision.

3.1.2 *lot*, *n*—for product produced from rolled "T" rails, a lot shall consist of material of the same size product produced in one shift in accordance with Specification A499.

3.1.3 *U-channel post, n*—bars with a "flanged U shape" to provide increased stiffness when loaded in the transverse direction, typically having punched holes and primarily used for the attachment of highway signs.

4. Ordering Information

4.1 Orders for material under this specification should include the following information:

4.1.1 Quantity (weight or number of pieces);

4.1.2 Name of material (steel posts);

4.1.3 Grade of steel (Grades 50, 50LC , 60, 60LC, 70, or 80);

4.1.4 Weight per foot;

4.1.5 Condition (as-rolled, painted, powder coated, or galvanized);

4.1.6 Hole punching, if required;

4.1.7 ASTM designation and date of issue;

4.1.8 Certification, if required (Section 11);

4.1.9 Product marking; and

4.1.10 Product packaging and package marking.

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.15 on Bars.

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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.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, http://www.transportation.org.

Note 2—A typical ordering description is as follows: 1000 pieces, flanged u-channel post, Grade 60, 8 ft (2.4 m) long, 2 lb (0.9 kg) per foot, as-rolled, ASTM AXXXX dated ______.

5. Materials and Manufacture

5.1 *Feedstock*—Material may be manufactured from rerolled rail steel or rolled from billet steel.

5.2 Material produced from rerolled rails shall be made to conform to Specification A499.

5.3 Material produced from billet steel shall be made by the commercially available steel-making processes.

5.4 Posts shall be supplied in the hot rolled condition, unless otherwise specified in the purchase order.

6. Chemical Composition

6.1 Material rerolled from rails shall conform to the chemistry requirements of Specification A1, as the chemistry is not significantly changed by the hot rolling process.

6.2 Material rolled from billets shall conform to the requirements prescribed in Table 1.

6.2.1 The heat analysis report shall be furnished to the purchaser.

6.2.2 By agreement between the purchaser and supplier, limits can be established for elements or compounds not specified in Table 1.

6.2.3 The product analysis shall be permitted to vary from the heat analysis according to the limits established in Table A of A6/A6M.

7. Mechanical Properties

7.1 *Requirements*—The material as represented by the test specimens shall conform to the tensile requirements specified in Table 2.

7.2 *Test Specimens*—Test specimens may be taken from a full section or a machined section.

7.2.1 Sub-sized tensile specimens shall be taken from the flat part of the U-shaped section.

7.3 *Test Method*—Tensile tests shall be made in accordance with Test Methods and Definitions A370.

8. Dimensions, Mass, and Permissible Variations

8.1 *Dimensions*—Because of differences in mill facilities, tolerances of post sections vary among the manufacturers and such tolerances are subject to agreement between manufacturer and purchaser.

8.2 Weight per Unit Length—The permissible variation for weight per foot shall be in accordance with the requirements specified in Table 4.

TABLE 1 Chemical Requirements^A

Grades	Carbon	Manganese	Phosphorus, max	Sulfur, max	Silicon
Standard	0.55–0.84	0.60–1.10	0.035	0.040	0.10–0.50
LC	0.22–0.55	0.30–0.90	0.035	0.040	0.10–0.50

^A Other alloying elements not specified in Table 1 may be typically added at the discretion of the producer, but shall be reported in the heat analysis.

TABLE 2 Mechanical Requirements

Grade	50LC	60LC	50	60	70	80
Yield strength, min, ksi (MPa) Tensile strength,	50 (345) 70	60 (415) 80	50 (345) 80	60 (415) 90	70 (485) 95	80 (550) 110
min, ksi (MPa)	(485)	(550)	(550)	(620)	(655)	(760)
Elongation in 8 in or 200 mm, min, %	12	10	5	5	5	5
Elongation in 2 in or 50 mm, min, %	14	12	7	7	7	7

TABLE 3 Permissible Variations in Weight per Unit Length

Permissible Variations from Specified Size, %
$\pm 5~\%$ of ordered weight per unit length before subsequent manufacturing processing such as hole punching

8.3 *Length*—The permissible variations for length shall be in accordance with the requirements specified in Table 3.

8.4 *Straightness*—Variations in straightness shall not exceed 0.25 in. in any 5 ft [4 mm in any meter] or 0.25 in. \times number of feet of length divided by 5 [4 mm \times number of metres of length].

9. Finish, Condition, and Appearance

9.1 *Surface Finish*—The posts shall have a commercial hot-wrought finish obtained by conventional hot rolling. The posts shall be free of injurious defects, such as, but not limited to, seams, scabs, inclusions visible to the unaided eye, laps, splits or slivers.

9.2 *Condition*—Posts can be furnished as-rolled, painted, coated, or galvanized as specified by the purchaser.

9.2.1 When specified by the purchaser to be galvanized, the posts shall be zinc coated in accordance with Specification A123/A123M.

10. Number of Tests and Retests

10.1 One tension test shall be made from each heat.

10.2 When the heat or lot is produced to multiple sizes (varying by more than 10 % in weight per foot), tensile tests shall be performed on the thickest and thinnest material rolled from that heat.

10.3 Retesting for failed mechanical properties shall be permitted in accordance with Specification A29/A29M.

11. Rejection and Rehearing

11.1 Material that fails to conform to the requirements of this specification shall be rejected in accordance with the procedures of Specification A29/A29M. Rejection should be reported to the producer or supplier promptly and in writing within two weeks of testing or inspection. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for rehearing.

12. Certification

12.1 When specified in the purchase order or contract, the purchaser shall be furnished certification stating samples representing each heat or lot have been tested as indicated in this specification and the requirements have been met.



TABLE 4 Permissible Variations in Length

Permissible Variations over Specified Length, in. (cm) ^{A,B}					
To 5 ft	Over 5–10 ft	Over 10-20 ft	Over 20-30 ft	30 to 40 ft	
(1.52 m),	(1.52–3.05 m),	(3.05–6.10 m),	(6.10–9.14 m),	(9.14–12.19 m)	
incl.	incl.	incl.	incl.		
½ in. (1 cm)	⁵⁄∞ in. (2 cm)	³ ⁄4 in. (2 cm)	1 in. (3 cm)	1½ in. (4 cm)	

^A No permissible variation under ordered length.

^B Where a plus and minus tolerance from specified length is desired and the order so specifies, half of these tolerances may be taken over and half under.

12.2 When specified in the purchase order or contract, a report of the test results shall be furnished. Test reports may be transmitted to the purchaser by electronic services. The content of the electronically transmitted document shall conform to any existing agreement between the purchaser and the seller.

13. Product Marking

13.1 Product marking details shall be specified in the purchase order.

14. Packaging and Package Marking

14.1 Unless otherwise specified in the purchase order, the product shall be tied in bundles, with each bundle tagged with a unique identification (ID) or heat/lot number and the quantity and length of the product shipped.

15. Keywords

15.1 carbon steel post; delineator post; flanged U-channel post; signpost; U-channel post

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified by the purchaser in the purchase order or contract.

S1. When specified, the certification sheet shall contain a notarized statement that the flanged U-channel posts do not contain any highly toxic or radioactive metals or compounds within the limits prescribed by law, such as arsenic, cadmium, beryllium or mercury, and further state that the starting materials were melted and manufactured in the United States.

S2. Flanged U-channels and posts shall be subject to crashworthiness tests as outlined in the AASHTO Manual for Assessing Safety Hardware before acceptance. Posts intended for use with signs, signals, solar panels, message boards or other types of safety hardware shall be tested with the appropriate attachments. Reports shall be furnished when requested.

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