

ASTM A36 / ASME SA36

SPECIFICATION FOR CARBON STRUCTURAL STEEL

This specification covers carbon steel shapes, plates, and bars of structural quality for use in riveted, bolted, or welded construction of bridges and buildings, and for general structural purposes.

TABLE 1 Appurtenant Material Specifications

| Material | ASTM Designation |
|-----------------------------|------------------------------------|
| Steel rivets | A502, Grade 1 |
| Bolts | A307, Grade A or F568M, Class 4.6 |
| High- | A325 or A325M |
| Steel nuts | A563 or A563M |
| Cast steel | A27/A27M, Grade 65–35 [450–240] |
| Forgings (carbon steel) | A668/A668M, Class D |
| Hot-rolled sheets and strip | A1011/A1011M, Grade Grade 36 [250] |
| Cold-formed tubing | A500, Grade B |
| Hot-formed tubing | A501 |
| Anchor bolts | F1554, Grade 36 |

NOTE 1—The specifier should be satisfied of the suitability of these materials for the intended application. Chemical composition or mechanical properties, or both, may be different than specified in A36/A36M.

General Requirements for Delivery

Structural products furnished under this specification shall conform to the requirements of the current edition of Specification A6/A6M, for the specific structural product ordered, unless a conflict exists in which case this specification shall prevail.

Chemical Composition

The heat analysis shall conform to the requirements prescribed in Table 3

| Product | Shapes ^A | Plates > 15-in. [380 mm] Width ^B | | | | | Bars; Plates ≤ 15-in. [380 mm] Width ^B | | | |
|---|---------------------|---|------------------------------------|--------------------------------------|-----------------------------------|--------------|---|------------------------------------|-----------------------------|--------------|
| | | To 3/4 [20], incl | Over 3/4 to 1 1/2 [20 to 40], incl | Over 1 1/2 to 2 1/2 [40 to 65], incl | Over 2 1/2 to 4 [65 to 100], incl | Over 4 [100] | To 3/4 [20], incl | Over 3/4 to 1 1/2 [20 to 40], incl | Over 1 1/2 to 4 [100], incl | Over 4 [100] |
| Carbon, max, % | 0.26 | 0.25 | 0.25 | 0.26 | 0.27 | 0.29 | 0.26 | 0.27 | 0.28 | 0.29 |
| Manganese, % | ... | ... | 0.80–1.20 | 0.80–1.20 | 0.85–1.20 | 0.85–1.20 | ... | 0.60–0.90 | 0.60–0.90 | 0.60–0.90 |
| Phosphorus, max, % | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 |
| Sulfur, max, % | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.05 | 0.05 | 0.05 |
| Silicon, % | 0.40 max | 0.40 max | 0.40 max | 0.15–0.40 | 0.15–0.40 | 0.15–0.40 | 0.40 max | 0.40 max | 0.40 max | 0.40 max |
| Copper, min, % when copper steel is specified | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

A Manganese content of 0.85–1.35 % and silicon content of 0.15–0.40 % is required for shapes with flange thickness over 3 in. [75 mm].

B For each reduction of 0.01 percentage point below the specified carbon maximum, an increase of 0.06 percentage point manganese above the specified maximum will be permitted, up to the maximum of 1.35 %.

Tension Test

The material as represented by the test specimen shall conform to the requirements as to the tensile properties prescribed in Table 2.

| | |
|--|-----------------------|
| Plates, Shapes, ^B and Bars: | |
| Tensile strength, ksi [MPa] | 58–80 [400–550] |
| Yield point, min, ksi [MPa] | 36 [250] ^C |
| Plates and Bars: ^{D,E} | |
| Elongation in 8 in. [200 mm], min, % | 20 |
| Elongation in 2 in. [50 mm], min, % | 23 |
| Shapes: | |
| Elongation in 8 in. [200 mm], min, % | 20 |
| Elongation in 2 in. [50 mm], min, % | 21 ^B |

A See the Orientation subsection in the Tension Tests section of Specification A6/A6M.

B For wide flange shapes with flange thickness over 3 in. [75 mm], the 80 ksi [550 MPa] maximum tensile strength does not apply and a minimum elongation in 2 in. [50 mm] of 19 % applies.

C Yield point 32 ksi [220 MPa] for plates over 8 in. [200 mm] in thickness.

D Elongation not required to be determined for floor plate.

E For plates wider than 24 in. [600 mm], the elongation requirement is reduced two percentage points. See the Elongation Requirement Adjustments subsection under the Tension Tests section of Specification A6/A6M.

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