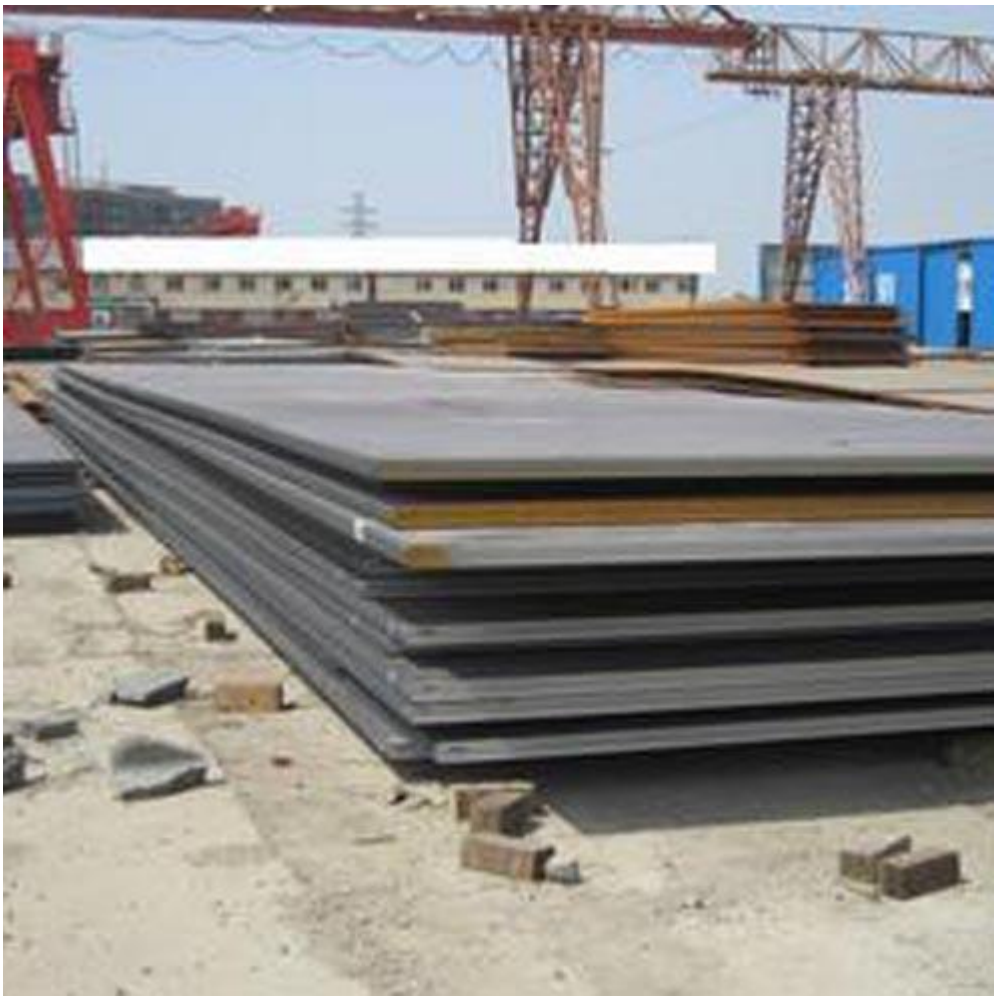
ASTM A36/A36M Standard Specification for Carbon Structural Steel



ASTM A36 / A36M standard specification covers carbon structural 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. ASTM A36 / A36M Standard main steel grade:A36 carton steel.

Standard: ASTM A36 Grade : ASTM A36
Thickness : 8mm 500mm Width : 1000mm-4000mm Length : 1000mm-20000mm
MOQ: 1 PC

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Product type : Steel plate
Delivery time : Promptly (Stock) or 10-40 days (Production)
Stock : Available
MTC: Available

Delivery condition: AR

TABLE 2 Chemical Requirements

NOTE 1— Where "..." appears in this table, there is no requirement. The heat analysis for manganese shall be determined and reported as described in the heat analysis section of Specification A 6/A 6M.

Product	Shapes[A]	Plates[B]					Bars[B]			
Thickness, in. [mm]	All	To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ to 2½ [40 to 65], incl	Over 2½ to 4 [65 to 100], incl	Over 4 [100]	To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ 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	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulfur, max, %	0.05	0.05	0.05	0.05	0.05	0.05	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	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

[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 %.

TABLE 3 Tensile Requirements[A]

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 inthe Tension Tests section of Specification A 6/A 6M.
[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 A 6/A 6M.

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ASTM A36/A36M description

This is a type of weldable carbon engineering structural steel. Its carbon content is usually less than 0.25%, higher than ordinary **carbon structural steel** yield point σs or yield strength σ0.2 (30 ~ 80kgf/mm2) and yield ratio σs/σb (0.65 ~ 0.95), it's better in the hot and cold machinability, good weldability, low cold and brittle tendency, notch and aging sensitivity, as well as better resistance to atmospheric, seawater and other corrosion. Its low content of alloying elements, generally below 2.5%, is used after hot rolling or after simple heat treatment (non-tempered state); ASTM A36 carbon steel is widely used in bridges, rivets, bolt structures, and other structural elements including drilling rigs, electric shovels, electric drive wheels, anti-landmine vehicles, mining vehicles, excavators, loaders.

Related role of ASTM A36/A36M

At present, the new **low alloy high strength steels** are characterized by low carbon (≤0.1%) and low sulfur (≤0.015%). The commonly used alloying elements can be classified according to their role in the strengthening mechanism of the steel: solid solution strengthening elements (Mn, Si, Al, Cr, Ni, Mo, Cu, etc.); refinement of grain elements (Al, Nb, V) , Ti, N, etc.); precipitation hardening elements (Nb, V, Ti, etc.) and transformation hardening elements (Mn, Si, Mo, etc.) (see strengthening of metals).

C; The formation of pearlite in the steel or dispersed alloy carbide precipitation, so that the steel is strengthened, can greatly improve the steel's toughness and welding performance.

Mn; High Mn/C ratio is good for improving steel yield strength and impact toughness.
Si; Most low-alloy high-strength steels do not require silicon alloying, but silicon is an indispensable additive element in hot-rolled ferritic-martensite multiphase steels.
Mo; molybdenum-containing steel (~0.15%Mo) has higher strength and higher toughness than conventional ferrite-pearlite steel. Nb, V, Ti; 0.05-0.15% Nb (or V, Ti) is added to low-carbon manganese steel or low-carbon manganese-molybdenum steel, which has obvious grain refinement and precipitation hardening effects. Titanium forms sulfides in steel, improving the anisotropy and cold formability of the impact absorption work.

Rare earth (RE); trace (about 0.001%) rare earth metals do not affect the strength of the steel. Its main function is desulfurization, reducing the anisotropy of toughness and preventing the layered tear of steel.

Other elements such as Ni, Cr, Cu, etc., are not very effective in solid solution hardening in microalloyed steels, and are generally controlled at lower content ranges in non-quenched and tempered steels.

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