

## ASTM A572/A572M Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel



ASTM A572/A572M Specification covers the standard requirements for Grades 42 [290], 50 [345], 55 [380], 60 [415], and 65 [450] of high-strength low-alloy columbium-vanadium structural steel shapes, plates, sheet piling, and bars for applications in bolted, welded, and riveted structures in bridges and buildings. ASTM A572/A572M Standard main steel grade: ASTM A572 Grade 42,50,55,60,65 (A572GR42, A572GR50, A572GR55, A572GR60, A572GR65).

Standard: ASTM A572

Grade : ASTM A572 Gr 42, 50, 55, 60, 65

Thickness : 8mm-500mm

Width : 1000mm-4000mm

EMAIL: [info@steelguang.com](mailto:info@steelguang.com)

TEL: 0086-371-55023661

Length : 1000mm-20000mm

MOQ: 1 PC

Product type : Steel plate

Delivery time : Promptly ( Stock) or 10-40 days (Production)

Stock : Available

MTC: Available

Delivery condition: AR

TABLE 2 Chemical Requirements<sup>A</sup>  
(Heat Analysis)

Diameter, Thickness, or Distance Between Parallel Faces, in. [mm] Plates and Bars	Structural Shape Flange or Leg Thickness, in. [mm]	Grade	Carbon, max, %	Manganese, <sup>B</sup> max, %	Phosphorus, max, %	Sulfur, max, %	Silicon	
							Plates to 1½ in. [40 mm] Thick, Shapes with Flange or Leg Thickness to 3 in. [75 mm] inclusive, Sheet Piling, Bars, Zees, and Rolled Tees <sup>C</sup>	Plates Over 1½ in. [40 mm] Thick and Shapes with Flange Thickness Over 3 in. [75 mm]
							max, %	range, %
6 [150]	all	42 [290]	0.21	1.35 <sup>D</sup>	0.04	0.05	0.40	0.15-0.40
4 [100] <sup>E</sup>	all	50 [345]	0.23	1.35 <sup>D</sup>	0.04	0.05	0.40	0.15-0.40
2 [50] <sup>F</sup>	all	55 [380]	0.25	1.35 <sup>D</sup>	0.04	0.05	0.40	0.15-0.40
1½ [32] <sup>F</sup>	≤2 [50]	60 [415]	0.26	1.35 <sup>D</sup>	0.04	0.05	0.40	°
>½ - 1½ [13-32]	>1-2 [25-50]	65 [450]	0.23	1.65	0.04	0.05	0.40	°
≤½ [13] <sup>F</sup>	≤ 1 <sup>F</sup>	65 [450]	0.26	1.35	0.04	0.05	0.40	°

<sup>A</sup> Copper when specified shall have a minimum content of 0.20 % by heat analysis (0.18 % by product analysis).

<sup>B</sup> Manganese, minimum, by heat analysis of 0.80 % (0.75 % by product analysis) shall be required for all plates over ¾ in. [10 mm] in thickness; a minimum of 0.50 % (0.45 % by product analysis) shall be required for plates ¾ in. [10 mm] and less in thickness, and for all other products. The manganese to carbon ratio shall not be less than 2 to 1.

<sup>C</sup> Bars over 1½ in. [40 mm] in diameter, thickness, or distance between parallel faces shall be made by a killed steel practice.

<sup>D</sup> 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 is permitted, up to a maximum of 1.60 %.

<sup>E</sup> Round bars up to and including 11 in. [275 mm] in diameter are permitted.

<sup>F</sup> Round bars up to and including 3½ in. [90 mm] in diameter are permitted.

<sup>G</sup> The size and grade is not described in this specification.

<sup>H</sup> An alternative chemical requirement with a maximum carbon of 0.21 % and a maximum manganese of 1.65 % is permitted, with the balance of the elements as shown in Table 2.

EMAIL: [info@steelguang.com](mailto:info@steelguang.com)

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**TABLE 4 Tensile Requirements<sup>A</sup>**

Grade	Yield Point, min		Tensile Strength, min		Minimum Elongation, % <sup>B,C,D</sup>	
	ksi	[MPa]	ksi	[MPa]	in 8 in. [200 mm]	in 2 in. [50 mm]
42 [290]	42	[290]	60	[415]	20	24
50 [345]	50	[345]	65	[450]	18	21
55 [380]	55	[380]	70	[485]	17	20
60 [415]	60	[415]	75	[520]	16	18
65 [450]	65	[450]	80	[550]	15	17

<sup>A</sup> See specimen Orientation under the Tension Tests section of Specification A 6/A 6M.

<sup>B</sup> Elongation not required to be determined for floor plate.

<sup>C</sup> For wide flange shapes over 426 lb/ft [634 kg/m], elongation in 2 in. [50 mm] of 19 % minimum applies.

<sup>D</sup> For plates wider than 24 in. [600 mm], the elongation requirement is reduced two percentage points for Grades 42, 50, and 55 [290, 345, and 380], and three percentage points for Grades 60 and 65 [415 and 450]. See elongation requirement adjustments in the Tension Tests section of Specification A 6/A 6M.

A572Gr, high-strength low-alloy yttrium-vanadium structural steel plates, which can be produced by domestic steel mills, are implemented in accordance with ASTM A572/A572M.

### Folding specifications of ASTM A572 GR

it is 8-300mm thickness and can be fixed length and fixed width.

### Usage of ASTM A572 GR

8 ~ 300mm thick A572Gr50 low-alloy high-strength structural steel plate is widely used in engineering structures, such as construction steel structures, construction machinery, mining mountainous machinery, trucks, bridges, pressure vessels, etc., especially for the requirements of better Weldability and toughness of construction and engineering machinery components. Being exported to South Korea, Taiwan and other places, the cumulative export volume has reached more than 10,000 tons.

### Chemical composition of of ASTM A572 GR

Melting ingredients, %

EMAIL: [info@steelguang.com](mailto:info@steelguang.com)

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Grade	C	Si	Mn	P	S	Nb
A572Gr50	≤0.20	≤0.40	≤1.50	≤0.04	≤0.05	0.005~0.05

**Mechanical behavior:**

Grade	$\sigma_s$ , MPa	$\sigma_b$ , MPa	$\delta_{200}$ , %	$0^\circ\text{C Akv}$ , J
A572Gr50	≥345	≥450	≥18	≥34

**Quality:**

Grade	Yield strength	Tensile strength	Elongation rate	Impact energy, Akv, Longitudinal	
	MPa	MPa	$\delta_{200}$ , %	temperature. $^\circ\text{C}$	J
A572Gr50	345~470	490~600	22~35	0	45~150