

AISI 6150 Alloy Steel (UNS G61500)

Alloy steels are designated by AISI four-digit numbers. They are more susceptible to mechanical and heat treatments than carbon steels. They comprise different types of steels with compositions which exceed the limitations of B, C, Mn, Mo, Ni, Si, Cr, and Va in the carbon steels.

The datasheet given below provides more details about AISI 6150 alloy steel.

Chemical Composition

The chemical composition of AISI 6150 alloy steel is listed in the following table.

Element	Content (%)
Iron, Fe	97.095 - 97.72
Chromium, Cr	0.800 - 1.10
Manganese, Mn	0.7 - 0.9
Carbon, C	0.480 - 0.530
Silicon, Si	0.150 - 0.3
Vanadium, V	≥ 0.150
Sulfur, S	≤ 0.04
Phosphorous, P	≤ 0.0350

Properties	Metric	Imperial
Density	7.85 g/cm ³	0.284 lb/in ³

Properties	Metric	Imperial
Tensile strength, ultimate	670 MPa	97200 psi
Tensile strength, yield	415 MPa	60200 psi
Izod impact	27 J	19.9 ft-lb
Modulus of elasticity	190-210 GPa	27557-30458 ksi
Shear modulus (typical for steel)	80 GPa	11600 ksi
Bulk modulus (typical for steel)	140 GPa	20300 ksi
Poissons ratio (calculated)	0.27 – 0.30	0.27-0.30
Elongation at break (in 50 mm)	23%	23%
Hardness, Brinell	197	197
Hardness, Vickers (converted from Brinell hardness)	207	207
Hardness, Knoop (converted from Brinell hardness)	219	219
Hardness, Rockwell B (converted from Brinell hardness)	92	92
Hardness, Rockwell C (converted from Brinell hardness, value below normal HRC range, for comparison purposes only)	13	13
Machinability (annealed and cold drawn. Based on 100% machinability for AISI 1212 steel)	55	55

Properties		Metric	Imperial	
Thermal conductivity		46.6 W/mK	323 BTU in/hr.ft ² . °F	
AMS 6448	AMS 6455C	ASTM A519 (6150)	SAE J404 (6150)	SS 2230
AMS 6448C	AMS 7301	ASTM A752 (6150)	SAE J412 (6150)	B.S. 735 A 50
AMS 6450	ASTM A29 (6150)	ASTM A829	AFNOR 50 CV 4	B.S. En. 47
AMS 6450C	ASTM A322 (6150)	MIL S-8503	DIN 1.8159	
AMS 6455	ASTM A331 (6150)	SAE J1397 (6150)	UNI 50CrV 4	

Machinability

The machinability rating of 6150 alloy steel is 59.

Welding

AISI 6150 alloy steel can be welded using any common welding methods. However, preheating and post weld stress relieving have to be performed for welding of this steel.

Heat Treatment

AISI 6150 alloy steel is hardened at 871°C (1600°F). This steel is tempered followed by normalizing at 899°C (1650°F) and then air cooled.

Forging

Forging of 6150 alloy steel is performed at 1204°C (2200°F).

Annealing

AISI 6150 alloy steel is annealed at 843°C (1550°F) and then air cooled.

Applications

The following are the major applications of 6150 alloy steel:

- Shafts
- Gears
- Pinions