

4130

Grade

AISI 4130 (UNS G41300, ASTM A29)

Type

Cr-Mo Steel usually supplied in the hardened, quenched and tempered condition.

Overview

Low alloy steel typically containing 0.3% Carbon and alloyed with 1% Chromium and 0.2% Molybdenum to give enhanced mechanical properties.

The grade has poor through hardenability with a typical ruling section of around 4 inches (at 75 Ksi) depending on the chemical composition, and it is critical that the hardenability of the grade must be taken into account when designing and selecting it for specific equipment.

Impact toughness is generally good to temperatures as low as -46°C with typically 27J average and 20J single achieved, this is limited though dependent on a number of factors such as ruling section, chemical composition and heat treatment condition, with impact toughness achieved decreasing with higher strength, increased ruling section and at lower test temperatures due to the materials Ductile / Brittle transition temperature.

Minimum hardness is based on API 6A requirements. Maximum hardness shown is based on compliance with NACE MRO175 / ISO 15156

Grade is typically used for pressure containing applications such as valve bodies or pipework, also used for valve gates and stems.

Very good weldability, and so may be readily welded to itself or weld inlayed. However there have been

recent concerns on using the grade for buttered connections. The grade does require a post weld heat treatment at 620 °C min in order to meet sour service (NACE MRO175/ ISO 15156) requirements.

Composition	
Element	Weight%
Carbon	0.28 - 0.33
Silicon	0.15 - 0.35
Manganese	0.4 - 0.6
Phosphorus	0.025 max
Sulphur	0.025 max
Molybdenum	0.15 - 0.25
Chromium	0.8 - 1.1
Nickel	0.5 max
Manganese	0.4 - 0.6

Notes: Various other hybrid analysis available in order to enhance hardenability and mechanical properties.

S and P values conform with API 6A, PSL 3 requirements. Higher values may be permitted if delivered to alternative specifications

Mechanical Properties

Hardened followed by water, oil or polymer quenching and tempering

Typical tempering range is 620 – 680 °C, depending on properties required

Property	Values
0.2% Yield Strength	60 KSI min (420 MPA min)
Ultimate Tensile Strength	85 KSI min (586 MPA min)
Elongation	17
Reduction of area	35% min
Hardness	197 - 237 HBN