

AISI 431 / UNS S43100 / DIN 1.4057

Iron Chrome Martensitic Stainless Steel

Alloy 431 Data Sheet

Introduction

AISI 431 is high chromium, low carbon martensitic stainless steel with highest hardenability among all martensitic alloys. Usually supplied in hardened condition "T", this alloy has good corrosion resistance & high tensile strength. Alloy 431 is most suitable for pumps & Shafts.

Chemical Composition (Typical)

Element	Limits	
	min	max
Carbon	0.000	0.200
Manganese	0.000	1.000
Phosphorus	0.000	0.400
Sulphur	0.000	0.300
Silicon	0.000	1.000
Chromium	15.000	17.000
Nickel	1.250	2.500
Iron	Remainder	

Mechanical Properties (Typical)

Parameter	Value
Yield 0.2 % (Mpa/Nmm ²), Min	635
Tensile (Mpa/Nmm ²), Min	850
Elongation (% in 50MM), Min	11
Reduction Area(%), Min	--
Hardness (BHN), Max	302*

* Hardened Condition "T"

Physical Properties

Parameter	Value
Density (Kg/m ³)	7750
Elastic Modulus (Gpa)	205
*Co-eff of Expansion ($\mu\text{m}/\text{m}/^\circ\text{C}$)	10.5
*Thermal Condc. (W/m.K)	25
Electric Resistivity (n Ω .m) 25°C	800

*Note : @500°C

Corrosion Data

AISI 431 has highest corrosion resistance in 400 series martensitic stainless steel though not as high as Austenitic steel. It offers highest corrosion resistance in Hardened & Tempered condition. Passivation is recommended for finished products to retain the corrosive resistance.

Equivalent Grade Designation

AISI 431
SUS 431
En57
UNS S43100
EN-DIN 1.4057
X20CrNi 16 2
AFNOR Z20CN17.2M
BS 431S29
GOST 14Ch17N2

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Available Product Forms

Round, Square, Hexagon & Flat Bars
Seamless / Welded Pipes
Seamless / Welded Tubes
Hot & Cold Rolled Plates & Sheets
Forged Bars
Forged Flanges
Butt-Weld Pipe Fittings
Socket-Weld/Forged Pipe Fittings
Machined Components

Common Manufacturing Specifications

ASTM A176, ASTM A268, ASTM A276, ASTM A314, ASTM A473, ASTM A511, ASTM A815, QQ S763, QQ S766, ASME SA268, ASTM A580, FED QQ-S-763, FED QQ-S-766, MIL SPEC MIL-S-862, SAE J405 (51446), ASME SA176, ASME SA268, ASME SA276, ASME SA314, ASME SA473, ASME SA511, ASME SA815

Alternate to Alloy

AISI 304, AISI 316, XM-19, 17-4 PH, are good alternatives.

Applications & Industries

Pumps & Shafts
Aircraft Components
General Industrial parts
Fasteners - Bolts, Nuts etc
Valve & Chemical container components
Marine components

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