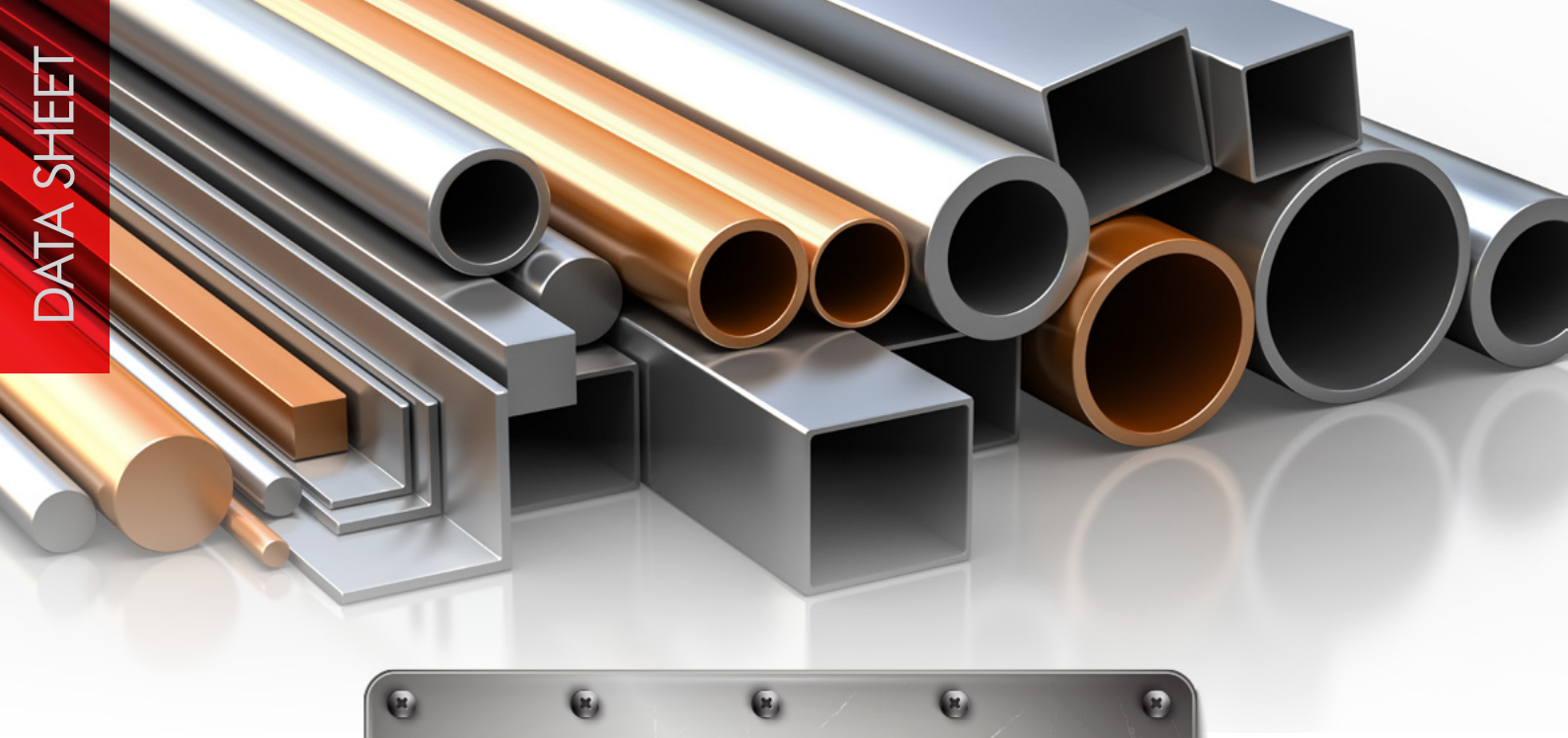
DATA SHEET



S. S. 431

UNS No - S43100

Grade 431 Stainless Steels are martensitic, heat-treatable grades with phenomenal corrosion resistance, torque strength, high toughness and tensile properties. Entire of these properties make them perfect for bolt and shaft applications. These steels, however, cannot be cold-worked owing to their elevated return strength, henceforth they are suitable for operations for example, deep drawing, spinning, bending or cold heading. Fabrication of martensitic steels is usually carried out using methods that permit hardening and tempering treatments and poor weldability. The corrosion resistance properties of grade 431 Stainless Steels are not higher than austenitic grades. The operations of grade 431 are constrained by their loss of strength at high temperatures, because of over-tempering, and loss of ductility at negative temperatures.

Applications

- Laboratory equipment
- Marine systems
- Beater bars
- Pump and propeller shafts
- Nuts and bolts

Characteristics

- Excellent impact strength at high hardness levels
- Best corrosion resistance

SUNMACH™
shaping exotic metals

S. S. 431

Corrosion Resistance
Grade 431 stainless steels have impressive resistance to salt water, yet they are less resistant to tropical water when correlated to that of grade 316 steels. Grade 431 steels have general corrosion resistance similar to, or slightly lower than, that of grade 304 steels. Grade 431 steels, along with a smooth surface completely perform well in tempered and hardened conditions.

Heat Resistance
Grade 431 steels are resistant to scaling at temperatures of 925°C in intermittent conditions, and 870°C during persistent operations. Normally, these steels are not to be utilized at temperatures above standard tempering temperatures, owing to loss of mechanical properties.

Machining
Grade 431 steels can be effectively machined in their annealed state. However, it is very hard to machine these steels if they are hardened above 30HRC.

Welding
Welding of grade 431 stainless steels is very hard because of the chances of cracking. It is recommended for pre-heat the materials to 200 - 300°C since welding and carry out post-weld heat treatment at 650°C. Welding can be easily performed by utilizing grade 410 filler rod, yet ductile welds can accomplish utilizing grades 308L, 309 or 310 steels.

Hot Working
Heat working to 2100-2200 F (1149-1204 C) for one of the best results. Do not work material below 1650 F (900 C).

Cold Working
This alloy is effectively spun, drawn, headed, sheared and bent compared with other stainless steels.

Annealing
1200-1250 F (650-677 C), furnace or air cools.

Tempering
Temper for desired properties. Temperatures within 700-1050 F (371-565 C) will adversely affect impact strength and corrosion properties.

Hardening
Hardening at 1800-1950 F (982-1066 C) oil quench or air cool for maximum properties.

S. S. 431

Chemical Properties

C	Si	P	S	Cr	Mn	Ni	Fe
0.20 max	1.0 Max	0.040 Max	0.030 Max	15.0- 17.0	1.0 Max	1.25- 2.50	Reminder

Mechanical Properties

*Material stocked generally in condition T.

Tensile Strength (ksi)	0.2% Yield Strength (ksi)	Elongation% in 2 inches
123.2	94	20

Physical Properties

Properties	Units	Temperature in °C
Density	7.8 g/cm^3	Room
Specific Heat	0.11 Kcal/kg.C	22°
Melting Point	1482 °C	-
Modulus of Elasticity	200 KN/mm^2	20°
Electrical Resistivity	432 µΩ.cm	Room
Coefficient of Expansion	10.2 µm/m °C	20-100°
Thermal Conductivity	20.2 W/m-°K	20°

ASTM Specifications

Sheet / Plate	Bar	Forging	Fitting	Wire
A 176	A 276	A 473	A 579	A 580, A 493

Availability

MANUFACTURING
Fasteners
Custom Machining
Custom Fabrication
Stamped Parts

RAW MATERIALS
Bars
Wires
Sheets
Plates