

431 stainless steel

Specifications

- AISI 431
- AMS 5628
- ASTM A276
- ASTM A473 (Forging - Open Die)
- ASTM A493
- ASTM A511
- ASTM A579 (Forging - Open Die)
- ASTM A580
- DIN 1.4057
- MIL S-18732
- MIL S-8967
- UNS S43100

Chemistry Data

- Carbon 0.2 max
- Chromium 15 - 17
- Iron Balance
- Manganese 1 max
- Nickel 1.25 - 2.5
- Phosphorus 0.04 max
- Silicon 1 max
- Sulphur 0.03 max

Principal Design Features

431 is a martensitic stainless combining excellent impact strength at high hardness levels with the best corrosion resistance of any martensitic stainless steels.

Applications

431 has been successfully used in a variety of aircraft and general industrial applications. These include fasteners, bolts, valve components and chemical equipment.

Machinability

In the fully annealed condition, 431 will gall and build up on the tools. Good surface finishes are not easily obtained.

Welding

Most electric welding procedures have proven successful with 431 stainless. Filler metal should be AWS E/ER410. To avoid cracking, pre-heat the workpiece to 400-600 F (204-316 C). After air cooling, treat at 1200 F (649 C) to reattain maximum properties.

Hot Working

Heat to 2100-2200 F (1149-1204 C) for best results. Do not work material below 1650 F (900 C).

Cold Working

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

Annealing

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

Tempering

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

Hardening

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

Physical Data

Density (lb / cu. in.)	0.28
Specific Gravity	7.75
Specific Heat (Btu/lb/Deg F 32-212 Deg F)	0.11
Electrical Resistivity (microhm-cm (at 68 Deg F))	432
Melting Point (Deg F)	2700
Modulus of Elasticity Tension	29