



# 431 Stainless Steel

## 431 stainless round bar

### 431 stainless steel stockholders and suppliers, delivering throughout the UK.

431 is a martensitic stainless steel with a 17% chromium and 2.5% nickel content it is usually supplied in the hardened but still machineable condition. It offers good corrosion resistance in mild marine and industrial atmospheres where high tensile and yield strength with excellent toughness are required.

#### Related Specifications

BS 970 431S29T 1.4057 X17CrNi16-2 X16CrNi16  
AISI ASTM UNS S43100

#### Alternative stainless steel grades we supply

[17/4PH](#) | [FV520B](#) | [S31254](#) | [904L](#) | [316](#) | [310](#) | [304](#)  
[440B](#) | [440C](#) | [420](#) | [410](#) | [416](#)

#### Form of Supply

West Yorkshire Steel are suppliers and stockholders of round and flat bar in grade 431. Diameters or flats can be sawn to your required lengths as one offs or multiple cut pieces. 431 ground stainless steel bar can be supplied, providing a high quality stainless steel precision ground diameter bar to tight tolerances.



- Diameter
- Flat

Contact our experienced sales team who will assist you with your 431 enquiry.

## Applications

Used widely in the aircraft and marine industries, for components such as shafts, axles, pumps, valves, bolts and nuts. Suitable for applications requiring good strength, toughness combined with reasonable resistance to corrosion.

## Analysis

Carbon	0.12-0.20%	Silicon	1.00% max
Manganese	1.00% max	Chromium	15.00-18.00%
Nickel	2.00-3.00%	Sulphur	0.03% max
Phosphorous	0.04% max		

## Corrosion Resistance

431 stainless steel offers the best corrosion resistance of all martensitic stainless steel grades. Optimum corrosion resistance is achieved when used in the hardened and tempered condition. Allowing oxygen to circulate freely on the surface will form an oxide film which protects the surface. Keeping the surface free of scale and foreign particles improves the corrosion resistance and finished components should be passivated. For best machining and corrosion 431 stainless steel is commonly supplied in the 'T' condition.

## Forging

Pre heat carefully, then raise the temperature to 1150-1200°C, hold until temperature is uniform throughout the steel. Do not forge below 900°C. After forging cool slowly in furnace or warm ashes.

## Annealing

Heat slowly to 650-680°C hold until temperature is uniform through the steel. Soak well and allow to cool in the furnace.

## Hardening

Heat the component slowly to 950-1020°C and hold until the temperature is uniform throughout the steel. After adequate soaking time quench in oil or air cool. Temper as soon as tools are hand warm.

## Tempering

Heat carefully to a suitable tempering temperature. Soak as required and then allow to cool in air. Tempering between 590-680°C will achieve 'T' condition. Double tempering is recommended. 431 stainless can be tempered at lower temperatures to achieve higher tensile strengths but with lower impact properties. Tempering between 370-565°C is not advised as tempering within this range will seriously reduce impact properties and corrosion resistance

## Heat Treatment

Heat treatment temperatures, including rate of heating, cooling and soaking times will vary due to factors such as the shape and size of each steel component. Other considerations during the heat treatment process include the type of furnace, quenching medium and transfer facilities for the work piece. Please consult your heat treatment provider for full guidance on heat treatment of 431 stainless.

## Typical Mechanical Properties

Condition	Tensile (UTS) N/mm <sup>2</sup>	0.2% Yield N/mm <sup>2</sup>	Elongation %	Izod KCV J	Hardness Brinell
T	850-1000	635	11	34	248-302

## Certification

Stainless steel 431 grade is available with BS EN 10204 3.1 mill certificate, please request when placing any orders.

## Quality Assured Supply

431 stainless steel is supplied in accordance with our ISO 9001:2015 registration.



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