

# Stainless Steel: 1.4301 (304)

## Bar and Section

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### Description

Stainless steel types 1.4301 and 1.4307 are commonly known as grades 304 and 304L, respectively. Type 304 is recognized as the most versatile and widely used stainless steel. It is sometimes referred to by its old name, 18/8, derived from the nominal composition of type 304 being 18% chromium and 8% nickel.

Type 304 stainless steel, an austenitic grade, is highly suitable for severe deep drawing applications, making it the dominant choice in various applications such as sinks and saucepans.

Type 304L is the low-carbon version of 304, employed in heavy gauge components for enhanced weldability. Some products, including plate and pipe, may be available as “dual certified” material meeting the criteria for both 304 and 304L.

For high-temperature applications, the high carbon content variant, 304H, is available.

Property data provided in this document is typical for Bar and Section, following EN 10088-3:2005 standards. ASTM, EN, or other standards may cover products sold, and while specifications in these standards are expected to be similar, they may not be identical to those presented in this datasheet.

### Designations

Stainless Steel Grade 1.4301/304 corresponds to the following designations, but it may not be a direct equivalent:

- S30400
- 304S15
- 304S16
- 304S31
- EN58E

### Supplied Forms

- Sheet
- Strip
- Tube
- Bar
- Fittings & Flanges
- Pipe
- Plate
- Rod

### Applications

- 304 stainless steel is typically used in:
  - Sinks and splashbacks
  - Saucepans
  - Cutlery and flatware
  - Architectural panelling
  - Sanitaryware and troughs
  - Tubing
  - Brewery, dairy, food and pharmaceutical production equipment
  - Springs, nuts, bolts and screws

### Corrosion Resistance

Stainless Steel Grade 304 (1.4301) exhibits excellent corrosion resistance in various environments and when exposed to different corrosive media. However, pitting and crevice corrosion may occur in settings containing chlorides, and stress corrosion cracking can manifest above 60°C.

### Heat Resistance

Grade 304 has good resistance to oxidation in intermittent service up to 870°C and in continuous service up to 925°C. Continuous use within the range of 425-860°C is not recommended if corrosion resistance in water is crucial. In such cases, Grade 304L is suggested due to its resistance to carbide precipitation. For applications requiring high strength between 500°C and 800°C, Grade 304H is recommended, maintaining aqueous corrosion resistance.

### Fabrication

All stainless steel fabrication, including Grade 304, should be conducted with tools exclusively dedicated to stainless steel materials. Thorough cleaning of tooling and work surfaces before use is essential to prevent cross-contamination, which could lead to discoloration of the fabricated product.

### Cold Working

Grade 304 readily work hardens during cold working. Methods involving cold working may necessitate an intermediate annealing stage to alleviate work hardening and prevent tearing or cracking. A full annealing operation at the completion of fabrication is recommended to reduce internal stresses and optimize corrosion resistance.

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Fabrication methods like forging, involving hot working, should take place after uniform heating to 1149-1260°C. The fabricated components should then be rapidly cooled to ensure maximum corrosion resistance.

### Machinability

Grade 304 demonstrates good machinability. Machining can be enhanced by keeping cutting edges sharp, ensuring light but sufficiently deep cuts to prevent work hardening, and employing chip breakers to clear swarf. Due to the low thermal conductivity of austenitic alloys, coolants and lubricants are necessary and should be used in substantial quantities.

### Heat Treatment

304 stainless steel cannot be hardened by heat treatment. Solution treatment or annealing can be performed by rapidly cooling after heating to 1010-1120°C.

### Weldability

Fusion welding performance for Type 304 stainless steel is excellent, both with and without fillers. Recommended filler rods and electrodes for stainless steel 304 include grade 308 stainless steel. For 304L, the recommended filler is 308L. Heavy welded sections may require post-weld annealing, though this step is not necessary for 304L. Grade 321 may be used if post-weld heat treatment is not possible.

### Chemical Composition

EN 10088-3:2005. 1.4301 Steel

Element	% Present
Chromium (Cr)	17.50 - 19.50
Nickel (Ni)	8.00 - 10.50
Manganese (Mn)	0.0 - 2.00
Silicon (Si)	0.0 - 1.00
Nitrogen (N)	0.0 - 0.11
Carbon (C)	0.0 - 0.07
Phosphorous (P)	0.0 - 0.05
Sulphur (S)	0.0 - 0.03
Iron (Fe)	Balance

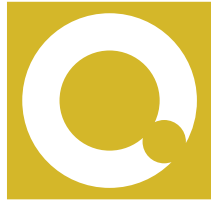
### Physical Properties

Property	Value
Density	8.00 g/cm <sup>3</sup>
Melting Point	1450 °C
Thermal Expansion	17.2 x10 <sup>-6</sup> /K
Modulus of Elasticity	193 GPa
Thermal Conductivity	16.2 W/m.K
Electrical Resistivity	0.72 x10 <sup>-6</sup> Ω .m

### Mechanical Properties

EN 10088-3:2005. Bar & Section. Up to 160mm Dia / Thickness

Property	Value
Proof Stress	190 Min MPa
Tensile Strength	500 to 700 MPa
Elongation A50 mm	45 Min %
Hardness Brinell	215 Max HB



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#### Disclaimer

This data serves as an indicative reference and should not be used as a substitute for the full specification. Mechanical properties can vary significantly depending on the temper, product, and its dimensions. All the information provided is based on our current knowledge and is given in good faith. The company bears no responsibility for any actions taken by third parties based on this information.

Please be aware that the 'Datasheet Update' date mentioned above does not guarantee accuracy or whether the datasheet is up to date. The information in this datasheet has been compiled from various reliable sources, including EN Standards, well-established industry references (both printed and online), and data from manufacturers. However, we cannot guarantee that the information is the latest available or that these sources are completely accurate.

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