

## Description

Stainless Steel Grade **310/ 1.4845**, also known as UNS S31000, is an austenitic heat-resistant alloy characterized by its high chromium and nickel content. It is designed for high-temperature applications and exhibits excellent oxidation resistance at temperatures up to 2010°F (1100°C). This alloy is particularly effective in mildly cyclic conditions and is resistant to sulfidation, making it suitable for various industrial applications.

## Chemical Composition

The chemical composition of Grade 310 is as follows:

Element	Composition (%)
Chromium (Cr)	24.0 - 26.0
Nickel (Ni)	19.2 - 22.0
Carbon (C)	0.25 Max
Silicon (Si)	1.50 Max
Manganese (Mn)	2.00 Max
Phosphorus (P)	0.045 Max

Sulfur (S)	0.03 Max
Molybdenum (Mo)	0.75 Max
Copper (Cu)	0.50 Max
Iron (Fe)	Balance

### Mechanical Properties

The mechanical properties of Grade 310 at room temperature are summarized below:

Property	Value
Ultimate Tensile Strength	80.0 ksi
Yield Strength (0.2% offset)	35.0 ksi
Elongation	52%

At elevated temperatures, the properties vary:

Temperature (°F)	Ultimate Tensile Strength (ksi)	Yield Strength (ksi)	Elongation (%)
1000	67.8	20.8	47
1200	54.1	20.7	43
1600	19.1	12.2	48

## Thermal & Physical Properties

- Density: Approximately 0.29 lb/in<sup>3</sup> (8.0 g/cm<sup>3</sup>)
- Thermal Conductivity: 16.2 BTU·in/(hr·ft<sup>2</sup>·°F) (23.4 W/(m·K))
- Specific Heat: 0.11 BTU/(lb·°F) (0.46 kJ/(kg·K))
- Melting Point: Approximately 2550°F (1400°C)

## Other Designations

- UNS S31000
- DIN 1.4845
- ASTM A240, A276, A312

## Fabrication and Heat Treatment

Grade 310 can be easily welded and fabricated using standard procedures.

- Hot Forming: Heat uniformly to 1742 – 2192°F (950 – 1200°C). After hot forming, a final anneal at 1832 – 2101°F (1000 – 1150°C) followed by rapid quenching is recommended.
- Cold Forming: The alloy is ductile and forms similarly to Type 316. However, cold forming of pieces with long-term exposure to high temperatures is not recommended due to potential carbide precipitation.

- Welding: Suitable for all common welding processes, including TIG, MIG, and SMAW.

## Applications

Stainless Steel Grade **310/ 1.4845** is used in various applications, including:

- Kilns and furnaces
- Heat exchangers
- Food processing equipment
- Cryogenic components
- Chemical processing equipment
- Oil and gas applications

## Supplied Form

Grade 310 is available in various forms, including:

- Bar
- Fittings (elbows, tees, etc.)
- Weld wire

## Features

- High oxidation resistance up to 2010°F (1100°C)
- Good mechanical strength at elevated temperatures
- Excellent toughness at cryogenic temperatures
- Low magnetic permeability

This datasheet provides a comprehensive overview of Stainless Steel Grade 310, highlighting its properties, applications, and fabrication methods.