

Description

Stainless Steel Grade **309VSi/1.4828** is a high-temperature chromium-nickel austenitic stainless steel known for its excellent oxidation resistance at elevated temperatures. It can withstand temperatures up to 1900°F (1038°C) in dry air and exhibits good resistance to sulfidation. However, it has limited resistance to carburization and is not suitable for highly carburizing environments. The alloy is non-magnetic in both annealed and cold-worked states and offers corrosion resistance comparable to Type 304/304L stainless steels.

Chemical Composition

The chemical composition of 309VSi typically includes:

Element	Composition (%)
Carbon (C)	0.20 max
Manganese (Mn)	2.00 max
Phosphorus (P)	0.045 max
Sulfur (S)	0.030 max
Silicon (Si)	1.00 max
Chromium (Cr)	22.0 - 24.0

Nickel (Ni)	12.0 - 15.0
Iron (Fe)	Balance

Mechanical Properties

At room temperature, the mechanical properties of 309VSi are as follows:

Property	Value
Tensile Strength (MPa)	560 (minimum)
Proof Stress (0.2% Offset) (MPa)	285 (minimum)
Elongation (% in 50mm)	40
Hardness (Brinell)	40



At elevated temperatures, the tensile stress values are:

Temperature (°C)	Tensile Stress (MPa)
550	440

650	360
750	240
850	150
950	70
1050	30

Thermal & Physical Properties

- Maximum Recommended Service Temperature:
 - Continuous: 1100°C
 - Intermittent: 980°C
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- Thermal Conductivity: Low thermal conductivity, which contributes to hot cracking during welding.
- Coefficient of Thermal Expansion: Relatively high, impacting the design of components subjected to temperature variations.

Other Designations

- UNS S30900
- ASTM A240
- ASTM A167
- DIN: 1.4828

Fabrication and Heat Treatment

- Welding: **309VSi/1.4828** can be welded using all common processes. For best results, filler metals such as ER309Si or ER308 can be used to enhance weld pool fluidity.
- Hot Working: Recommended forging temperatures range from 980°C to 1120°C, with finishing temperatures no cooler than 980°C.
- Annealing: Heat treatment should be performed between 1050°C and 1150°C followed by water quenching to ensure all carbides are in solution.
- Stress Relieving: Conducted at temperatures between 250°C and 400°C for about one hour.

Applications

309VSi is primarily used in applications requiring high-temperature oxidation resistance, such as:

- Furnace components
- Heat exchangers
- Industrial ovens
- Exhaust systems in power generation
- Applications in petrochemical industries

Supplied Form

309VSi is available in various forms, including:

- Sheets
- Plates
- Bars
- Rods
- Tubes

Features

- Excellent oxidation resistance at high temperatures
- Good mechanical properties at elevated temperatures
- Fabricable and weldable using standard practices
- Non-magnetic in both annealed and cold-worked conditions.

This datasheet provides a comprehensive overview of the **309VSi/1.4828** stainless steel grade, highlighting its properties, applications, and fabrication methods.