Description

Stainless Steel Grade 347Si/1.4550 is an austenitic stainless steel alloy that incorporates silicon to improve its high-temperature stability and oxidation resistance. It is an enhanced version of Grade 347, with added silicon for better performance in extreme conditions. This grade is known for its excellent resistance to intergranular corrosion and its ability to maintain strength at elevated temperatures. It is commonly used in high-temperature applications where resistance to thermal oxidation is crucial.

Chemical Composition

- Chromium (Cr): 17.0 - 19.0%
- Nickel (Ni): 9.0 - 12.0%
- Silicon (Si): 0.75 - 1.50%
- Manganese (Mn): ≤ 2.00%
- Carbon (C): ≤ 0.08%
- Phosphorus (P): ≤ 0.045%
- Sulfur (S): ≤ 0.030%
- Titanium (Ti): 5 × (C + N) - 0.70%

Mechanical Properties

- Tensile Strength: 515 - 690 MPa (75 - 100 ksi)
- Yield Strength: 205 MPa (30 ksi)
- Elongation: 40% (in 50 mm)
- Hardness: ≤ 201 HB

Thermal & Physical Properties

- Density: 8.03 g/cm³ (0.290 lb/in³)
- Melting Point: 1375 - 1450°C (2500 - 2640°F)
- Thermal Conductivity: 16.3 W/m·K (112 BTU/h·ft·°F)

- Specific Heat: 500 J/kg·K (0.12 BTU/lb·°F)
- Coefficient of Thermal Expansion: 16.0 µm/m·K (9.0 µin/in·°F, 20-100°C / 68-212°F)

Other Designations

- UNS: S34700
- EN: 1.4550
- DIN: X6CrNiTi18-10
- JIS: SUS 347Si

Fabrication and Heat Treatment

- Welding: Grade 347Si/1.4550 can be welded using most common welding techniques. Preheating is not typically required, but post-weld heat treatment is recommended for optimal performance.
- Machining: This grade is machinable using conventional techniques. Its work-hardening rate should be considered during machining operations.
- Heat Treatment: Solution annealing at 1040 - 1150°C (1900 - 2100°F) followed by rapid cooling is recommended to achieve optimal corrosion resistance and mechanical properties.
- Cold Working: Can be cold worked to enhance mechanical properties and improve surface finish.

Applications

- Aerospace: Components exposed to high temperatures and thermal stress.
- Chemical Processing: Equipment and piping in corrosive and high-temperature environments.
- Power Generation: Parts in boilers and turbines where high-temperature stability is required.
- Heat Exchangers: Used in high-temperature and high-pressure applications.
- Petrochemical: Valves and fittings in petroleum refining processes.

Supplied Forms

- Bars
- Coils

Features

- Enhanced High-Temperature Performance: Improved resistance to thermal oxidation and stability at elevated temperatures due to silicon addition.
- Good Intergranular Corrosion Resistance: Effective in resisting corrosion after welding and high-temperature exposure.
- High Strength and Durability: Maintains strength and mechanical properties in harsh environments.
- Versatile Applications: Suitable for a wide range of industries requiring high-performance stainless steel.