Description

2507/1.4410 is a super duplex stainless steel that combines high strength and excellent corrosion resistance, especially in chloride environments. It features a mixed microstructure of approximately 50% austenite (γ) and 50% ferrite (α), which provides superior mechanical properties and resistance to stress corrosion cracking.

Chemical Composition

The typical chemical composition of 2507 is as follows:

- Carbon (C): ≤ 0.03%
- Manganese (Mn): ≤ 1.0%
- Silicon (Si): ≤ 1.0%
- Phosphorus (P): ≤ 0.03%
- Sulfur (S): ≤ 0.01%
- Chromium (Cr): 24.0% - 26.0%
- Nickel (Ni): 6.0% - 8.0%
- Molybdenum (Mo): 3.5% - 5.0%
- Nitrogen (N): 0.24% - 0.30%
- Copper (Cu): ≤ 0.5%.

Mechanical Properties

The mechanical properties of 2507 at room temperature (20°C) are:

- Tensile Strength (Rm): ≥ 620 MPa
- Yield Strength (Rp0.2): ≥ 450 MPa
- Elongation (A): ≥ 25%
- Hardness: ≤ 32 HRC.

Thermal & Physical Properties

- Density: 7.9 g/cm³
- Melting Point: ~ 1450°C
- Thermal Conductivity: 13.5 W/m·K
- Specific Heat: 460 J/kg·K

- Mean Coefficient of Thermal Expansion: 14.0 x 10^{-6}/K (20-200°C) and 14.5 x 10^{-6}/K (20-400°C).

Other Designations

- UNS Number: S32750
- DIN Number: 1.4410
- AFNOR: Z3 CN 25.06 Az.

Fabrication and Heat Treatment

2507 can be fabricated using standard methods such as welding, machining, and forming.
Heat Treatment:

- Solution annealing is recommended at temperatures of 1025-1100°C, followed by rapid cooling (water or air quenching) to restore corrosion resistance and mechanical properties.

Welding:

- Good weldability; recommended welding processes include SMAW, GTAW, and SAW. Preheating is generally not required, but interpass temperatures should be controlled to avoid detrimental effects on the weld integrity.

Applications

2507 is widely used in various industries due to its excellent mechanical properties and corrosion resistance. Typical applications include:

- Oil and gas industry equipment
- Offshore platforms and heat exchangers
- Chemical processing plants
- Desalination plants
- High-pressure RO plants
- Structural components and piping systems.

Supplied Form

2507 is available in various forms, including:

- Bars and rods

- Fittings and flanges
- Coils.

Features

- Superior resistance to pitting and crevice corrosion.
- High strength and toughness.
- Excellent resistance to stress corrosion cracking.
- Suitable for harsh environments, including marine applications.

This datasheet summarizes the critical aspects of 2507 grade stainless steel, making it suitable for various demanding applications.