

Description

Duplex Stainless Steel **2205/1.4462**, also known as UNS S32205, is a nitrogen-enhanced duplex stainless steel characterized by its unique microstructure, which consists of approximately 40-50% ferrite and the remainder as austenite. This combination provides excellent mechanical properties and corrosion resistance, making it suitable for various demanding applications.

Chemical Composition

The typical chemical composition of Duplex 2205 is as follows:

Element	Composition (%)
Chromium (Cr)	21.0 - 23.0
Nickel (Ni)	4.5 - 6.5
Molybdenum (Mo)	2.5 - 3.5
Carbon (C)	≤ 0.030
Nitrogen (N)	0.08 - 0.20
Manganese (Mn)	≤ 2.0

Silicon (Si)	≤ 1.0
Phosphorus (P)	≤ 0.030
Sulfur (S)	≤ 0.020
Iron (Fe)	Balance

Mechanical Properties

Duplex 2205 exhibits superior mechanical properties compared to standard austenitic stainless steels:

Property	Value
Ultimate Tensile Strength	Minimum 95 ksi
Yield Strength (0.2% offset)	Minimum 65 ksi
Hardness	Maximum 31 Rockwell C

Thermal & Physical Properties

- Density: Approximately 7.8 g/cm³
- Melting Point: 1400 - 1450 °C

- Thermal Conductivity: 16.2 W/m·K
- Specific Heat: 500 J/kg·K

Other Designations

Duplex 2205 is recognized by several designations, including:

- UNS S31803
- UNS S32205
- ASTM A240
- EN 1.4462
- DIN W.Nr 1.4462

Fabrication and Heat Treatment

Duplex 2205 can be fabricated using standard techniques, including welding, machining, and forming. It is weldable with appropriate filler materials (e.g., ER2209).

Heat treatment is not typically required for this grade, but if necessary, it should be performed at temperatures below 300 °C to avoid embrittlement.

Applications

Duplex 2205 is widely used in various industries due to its excellent corrosion resistance and mechanical strength. Common applications include:

- Chemical processing equipment (vessels, piping, heat exchangers)
- Oil and gas industry (piping, tubing)
- Marine environments (cargo tanks, offshore platforms)
- Pulp and paper manufacturing (digesters, bleaching equipment)
- Food processing equipment

Supplied Form

Duplex 2205 is available in several forms, including:

- Sheets
- Plates
- Bars
- Tubes (welded and seamless)
- Fittings (elbows, tees, flanges, etc.)

Features

- High resistance to chloride stress corrosion cracking
- Excellent pitting and crevice corrosion resistance
- Good weldability and workability
- High strength, approximately double that of standard austenitic stainless steels

This datasheet provides a comprehensive overview of Duplex Stainless Steel 2205, highlighting its properties and applications in various industries.

