

## Description

**2594/ 1.4507** grade stainless steel is a super duplex alloy designed for applications requiring high strength and excellent corrosion resistance. It is particularly effective in environments where pitting and stress corrosion cracking are concerns. This grade is commonly used in the petrochemical industry, offshore applications, and other sectors requiring robust materials.

## Chemical Composition

The typical chemical composition of 2594 grade stainless steel is as follows (in weight percent):

- Carbon (C):  $\leq 0.03\%$
- Chromium (Cr): 24.0 - 27.0%
- Nickel (Ni): 8.0 - 10.5%
- Molybdenum (Mo): 2.5 - 4.5%
- Copper (Cu):  $\leq 1.5\%$
- Manganese (Mn):  $\leq 2.5\%$
- Nitrogen (N): 0.20 - 0.30%
- Phosphorus (P):  $\leq 0.03\%$
- Sulfur (S):  $\leq 0.02\%$
- Silicon (Si):  $\leq 1.0\%$

STAINLESS STEEL WIRES & BARS

## Mechanical Properties

The mechanical properties of 2594 grade stainless steel include:

- Yield Strength (Rp0.2): 620 MPa
- Ultimate Tensile Strength (Rm): 780 MPa
- Elongation (A5): 26%
- Impact Energy (ISO-V): 60 J at -20°C, 50 J at -40°C
- Hardness: Typically around HRc 28-30

## Thermal & Physical Properties

- Density: Approximately 7.8 g/cm<sup>3</sup>
- Melting Point: 1350 - 1400°C
- Thermal Conductivity: 13 W/m·K
- Specific Heat Capacity: 500 J/kg·K

## Other Designations

2594 grade stainless steel is known by several designations, including:

- DIN: 1.4507
- UNS: S32550
- Other Designations: X2 CrNiMoCuN 25-6-3, X2 CrNiMoN 25-7-4

## Fabrication and Heat Treatment

2594 can be fabricated using standard methods for stainless steel. It is typically used in the as-welded condition without the need for extensive heat treatment. However, post-weld heat treatment may be applied depending on the application requirements.

## Applications

This grade is widely used in:

- Offshore oil and gas industries
- Chemical processing
- Pulp and paper production
- Marine applications
- Pollution control equipment manufacturing

## Supplied Form

2594 grade stainless steel is available in various forms, including:

- Welding rods (ER 2594)

## Features

- High resistance to intergranular corrosion, pitting, and stress corrosion cracking.
- Exceptional mechanical strength.
- Suitable for welding dissimilar metals and heterogeneous joints.

This datasheet provides a comprehensive overview of the **2594/ 1.4507** grade stainless steel, highlighting its properties and applications relevant to various industries.

