

## 304L - Technical Specification

**1. Product Description:-** 304L stainless steel is a low-carbon version of 304 stainless steel, designed to improve corrosion resistance after welding or stress-relieving. The reduced carbon content minimizes carbide precipitation, making it suitable for applications requiring excellent corrosion resistance, particularly in environments where welding is required.

### **2. Chemical Composition:-**

Element	Composition
Chromium (Cr)	18.0 - 20.0
Nickel (Ni)	8.0 - 12.0
Carbon (C)	Max 0.03
Manganese (Mn)	Max 2.0
Silicon (Si)	Max 1.0
Phosphorus (P)	Max 0.045
Sulfur (S)	Max 0.03
Nitrogen (N)	Max 0.10
Iron (Fe)	Balance

### **3. Mechanical Properties:-**

Property	Value
Tensile Strength (UTS)	485 MPa (70 ksi) min
Yield Strength (YS)	170 MPa (25 ksi) min
Elongation	40% min
Hardness (Brinell)	Max 201 HB

### **4. Physical Properties:-**

Property	Value
Density	8.0 g/cm <sup>3</sup>
Melting Point	1400°C - 1450°C (2550°F - 2640°F)
Thermal Conductivity	16.2 W/m·K at 100°C
Electrical Resistivity	0.72 μΩ·m at 20°C
Modulus of Elasticity	193 GPa

## 5. Heat Treatment:-

Solution Annealing:

- Temperature: 1010°C - 1120°C (1850°F - 2050°F)
- Cooling: Rapid quenching (water).
- Purpose: Dissolves carbides, restores corrosion resistance.

Stress Relieving:

- Temperature: 400°C - 750°C (752°F - 1382°F)
- Cooling: Air cooling.
- Purpose: Reduces residual stresses without affecting properties.

Avoid Sensitization:

- Critical Range: 450°C - 850°C (842°F - 1562°F)
- Avoid prolonged exposure to prevent intergranular corrosion.

## 6. Applications:-

- Food and Beverage Industry: Storage tanks, pipelines, and equipment requiring hygienic and corrosion-resistant materials.
- Chemical Processing: Components exposed to mild acids and alkaline solutions.
- Construction: Architectural applications such as handrails, roofing, and cladding.
- Medical Equipment: Surgical instruments and medical device components.
- Marine: Mild marine environments for non-critical components.

## 7. Corrosion Resistance:-

- **General Corrosion:** Excellent resistance in atmospheric and mildly corrosive environments, including many organic and inorganic chemicals.
- **Intergranular Corrosion:** Superior resistance due to low carbon content, preventing carbide precipitation during welding or heat treatment.
- **Pitting and Crevice Corrosion:** Moderate resistance in chloride-containing environments; not recommended for highly aggressive chloride exposures.
- **Oxidation Resistance:** Withstands temperatures up to 870°C (1600°F) for intermittent service and 925°C (1697°F) for continuous service.