

Hastelloy C276- Technical Specifications

1. Product Description:-

Hastelloy C276 is a nickel-molybdenum-chromium alloy known for excellent corrosion resistance in harsh environments, high temperature stability, and suitability for chemical processing, petrochemical, and pollution control applications.

2. Chemical Composition:-

Element	Composition (%)
Nickel (Ni)	57 (balance)
Molybdenum (Mo)	15 - 17
Chromium (Cr)	14.5 - 16.5
Iron (Fe)	04-Jul
Tungsten (W)	3 - 4.5
Cobalt (Co)	≤ 2.5
Manganese (Mn)	≤ 1
Vanadium (V)	≤ 0.35
Silicon (Si)	≤ 0.08
Carbon (C)	≤ 0.01
Phosphorus (P)	≤ 0.04
Sulfur (S)	≤ 0.03

3. Mechanical Properties:-

Property	Value
Density	8.89 g/cm ³
Melting Point	1370-1395°C (2500-2540°F)
Tensile Strength	759 MPa (110 ksi)
Yield Strength	355 MPa (51.5 ksi)
Elongation	40%
Hardness	90 Rockwell B (HRB)
Modulus of Elasticity	205 GPa (29.7 x 10 ³ ksi)
Thermal Conductivity	10.2 W/m·K at 20°C
Specific Heat Capacity	427 J/kg·K at 20°C

As per ASTM B574

Property	Value
Tensile Strength (min)	690 MPa (100 ksi)
Yield Strength (0.2% offset, min)	283 MPa (41 ksi)
Elongation (min)	40%
Hardness (max)	100ckwell B (HRB)

4. Heat Treatment :-

Hastelloy C276 typically undergoes solution heat treatment to achieve optimal mechanical and corrosion-resistant properties. The standard heat treatment process is:

- **Solution Annealing:** Heat the alloy to 1121–1177°C (2050–2150°F).
- **Rapid Quenching:** Quench immediately in water or rapidly cool to retain corrosion resistance and mechanical properties.

5. Physical Properties:-

Property	Value
Density	8.89 g/cm ³
Melting Point	1370–1395°C (2500–2540°F)
Thermal Conductivity	10.2 W/m·K at 20°C
Specific Heat Capacity	427 J/kg·K at 20°C
Electrical Resistivity	1.26 μΩ·m at 20°C
Coefficient of Thermal Expansion	11.2 μm/m·°C from 20–1000°C

5.Applications:-

Hastelloy C276 is used in various applications due to its corrosion resistance and high-temperature stability, including:

- **Chemical Processing:** Reactors and piping for corrosive chemicals.
- **Petrochemical Industry:** Oil refining and gas production.
- **Pollution Control:** Flue gas desulfurization systems.

- **Pulp and Paper Production:** Bleach plants and chemical handling.
- **Waste Treatment:** Aggressive waste stream management.
- **Marine Applications:** Components exposed to seawater.
- **Pharmaceuticals:** Equipment requiring high cleanliness and corrosion resistance.

7. Corrosion Resistance:-

Hastelloy C276 offers exceptional corrosion resistance, including:

- **Pitting and Crevice Corrosion:** Highly resistant in chloride environments.
- **Stress Corrosion Cracking:** Excellent protection against SCC, especially in chlorides.
- **Oxidizing and Reducing Environments:** Versatile performance in various conditions.
- **High-Temperature Corrosion:** Maintains integrity under elevated temperatures.
- **Acid Resistance:** Effective against sulfuric and hydrochloric acids.