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Alloy 254 SMO-Technical Specification

1. Product Description:-

Alloy 254 SMO is a super-austenitic stainless steel that is highly resistant to corrosion in environments containing chlorides, sulfur, and other corrosive chemicals. It is a preferred material in the chemical, petrochemical, and seawater industries due to its high strength and excellent resistance to localized corrosion.

.2. Chemical Composition:-

Element	Composition (%)
Nickel (Ni)	20-22
Chromium (Cr)	19-21
Molybdenum (Mo)	6.0-6.5
Iron (Fe)	Balance
Copper (Cu)	0.5 max
Manganese (Mn)	1.5 max
Silicon (Si)	0.8 max
Nitrogen (N)	0.18-0.25
Carbon (C)	0.020 max
Phosphorus (P)	0.03 max
Sulfur (S)	0.02 max

3. Mechanical Properties:-

Property	Value
Yield Strength (0.2% offset)	50,000–80,000 psi (345–550 MPa)
Ultimate Tensile Strength	85,000–110,000 psi (585–760 MPa)
Elongation	35% min
Hardness	95 max
Modulus of Elasticity	19,000 ksi (131 GPa)

4. Physical Properties:-

Property	Value
Density	8.0 g/cm^3
Melting Point	1320°C to 1370°C (2408°F to 2500°F)
Electrical Resistivity	0.00092 ohm-cm
Thermal Conductivity	15.0 W/m·K
Specific Heat	0.13 cal/g°C

5. Heat Treatment:-

- Solution Annealing: Alloy 254 SMO is typically annealed at 1050°C to 1150°C (1922°F to 2102°F) and then quenched rapidly in water or air to maintain its excellent corrosion resistance.
- Post-Weld Heat Treatment: Not usually required unless the material is heavily welded in very corrosive environments.

6. Applications:-

- Chemical Processing: Equipment such as heat exchangers, reactors, and tanks for handling aggressive chemicals (e.g., hydrochloric acid, sulfuric acid).
- Marine and Offshore Applications: Used in seawater applications, desalination plants, and offshore structures due to its resistance to chloride-induced corrosion.
- Petrochemical Industry: Valves, pumps, and other components exposed to sulfur-containing chemicals.
- Pulp and Paper Industry: Equipment used in the production of paper and pulp where highly corrosive chemicals are present.
- Power Generation: Used in scrubbers, flue gas desulfurization systems, and other pollution control equipment.

7. Corrosion Resistance:-

- Pitting and Crevice Corrosion: Excellent resistance to pitting and crevice corrosion in environments with high chloride content.
- Stress Corrosion Cracking: Highly resistant to stress corrosion cracking in chloride-containing environments.
- General Corrosion: Outstanding resistance to general corrosion in both acidic and alkaline environments.
- Oxidizing Acids: Good resistance to oxidizing acids, including sulfuric and phosphoric acids.