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Alloy 20 Technical Specification

1.Product Description:-

Alloy 20 is a nickel-iron-chromium alloy with additions of molybdenum and copper. This alloy is highly resistant to corrosion, especially in acidic environments. It is commonly used in industries where resistance to sulfuric acid is critical.

2. Chemical Composition:-

Element	Composition (%)
Nickel (Ni)	32-38
Iron (Fe)	Balance
Chromium (Cr)	19-21
Molybdenum (Mo)	2 to 3
Copper (Cu)	3 to 4
Manganese (Mn)	1.0 max
Silicon (Si)	1.0 max
Carbon (C)	0.05 max
Phosphorus (P)	0.045 max
Sulfur (S)	0.03 max
Tantalum (Ta)	0.10 max

3. Mechanical Properties:-

Property	Value
Yield Strength (0.2% offset)	35,000–60,000 psi (240–415 MPa)
Ultimate Tensile Strength	75,000–95,000 psi (515–655 MPa)
Elongation (in 8")	40% min
Hardness (Rockwell B)	85 max
Modulus of Elasticity	31,000 ksi (214 GPa)

4. Physical Properties:-

Property	Value
Density	8.2 g/cm^3
Melting Point	1350°C to 1400°C (2462°F to 2552°F)
Electrical Resistivity	0.00095 ohm-cm
Thermal Conductivity	10.5 W/m·K
Specific Heat	0.11 cal/g°C

5. Heat Treatment:-

- Solution Annealing: Alloy 20 is typically solution annealed at temperatures ranging from 1900°F to 2000°F (1038°C to 1093°C) and then quenched in water.
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6. Applications:-

- Chemical Processing: Used in heat exchangers, reactors, and piping systems exposed to sulfuric acid, phosphoric acid, and other corrosive chemicals.
- Food Processing: Equipment in the food industry due to its non-reactivity.
- Pharmaceuticals: Used in reactors and vessels due to resistance to corrosion in aggressive environments.
- Marine Applications: Parts exposed to seawater, such as pumps and valves.

7. Corrosion Resistance:-

- Sulfuric Acid: Excellent resistance, particularly in concentrations up to 70% at room temperature.
- Chlorides: Good resistance to chloride-induced stress corrosion cracking.
- Oxidizing Acids: Resistant to a range of oxidizing acids, including nitric acid.
- Pitting & Crevice Corrosion: Alloy 20 exhibits good resistance to pitting and crevice corrosion, especially in environments containing chloride.