

## **XM-19 Technical Specification**

**1. Product Description:-** XM-19 is a high-strength, austenitic stainless steel with superior resistance to corrosion, especially in chloride-rich environments. It combines high levels of nitrogen, chromium, molybdenum, and nickel, providing excellent resistance to pitting, crevice corrosion, and stress corrosion cracking, making it ideal for demanding industrial applications.

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

Element	Composition (%)
Nickel (Ni)	19.0-21.0
Chromium (Cr)	20.0-22.0
Molybdenum (Mo)	2.5-3.0
Nitrogen (N)	0.10-0.30
Iron (Fe)	Balance
Manganese (Mn)	1.0 max
Silicon (Si)	0.75 max
Carbon (C)	0.03 max
Phosphorus (P)	0.045 max
Sulfur (S)	0.03 max

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

Property	Value
Yield Strength (0.2% offset)	70,000–90,000 psi (485–620 MPa)
Ultimate Tensile Strength	95,000–120,000 psi (655–830 MPa)
Elongation (in 8")	30% min
Hardness (Rockwell B)	90 max
Modulus of Elasticity	28,000 ksi (193 GPa)

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

Property	Value
Density	7.9 g/cm <sup>3</sup>
Melting Point	1375°C to 1425°C (2507°F to 2597°F)
Electrical Resistivity	0.00096 ohm-cm
Thermal Conductivity	16.0 W/m·K
Specific Heat	0.13 cal/g°C

## 5. Heat Treatment :-

- **Solution Annealing:** Typically performed at 1010°C to 1100°C (1850°F to 2012°F), followed by rapid cooling (quenching) to lock in the material's corrosion-resistant properties.
- **Post-Weld Heat Treatment:** Not always necessary, but it is recommended for parts exposed to high temperatures and aggressive chemical environments.

## 6. Applications:-

- **Chemical Processing:** Ideal for equipment like heat exchangers, reactors, and vessels used to handle aggressive chemicals (such as acids, chlorides, and sulfur compounds).
- **Marine Applications:** Used in seawater environments, such as in desalination plants, offshore oil rigs, and seawater cooling systems.
- **Oil and Gas:** Components like valves, pumps, and pipelines exposed to harsh conditions and chemicals.
- **Power Generation:** Components in flue gas desulfurization (FGD) systems and other pollution control equipment.
- **Food and Beverage:** Equipment for food processing and storage due to its resistance to corrosion in acidic environments.

## 7. Corrosion Resistance:-

- **Chloride-Induced Stress Corrosion:** Excellent resistance to stress corrosion cracking in chloride environments, making it suitable for marine applications.
- **Pitting and Crevice Corrosion:** Very resistant to pitting and crevice corrosion in chloride-rich environments.
- **General Corrosion:** Superior resistance to general corrosion, including in acids like sulfuric and hydrochloric acids.
- **Oxidizing Acids:** Good resistance to oxidation in environments containing oxidizing acids, such as phosphoric and nitric acid.