Nilo 36 - Technical Specification

1. Product Description:-

Nilo 36, also known as Invar 36, is a nickel-iron alloy renowned for its exceptionally low coefficient of thermal expansion in the temperature range of -250°C to 200°C (-418°F to 392°F). This property makes it ideal for applications requiring dimensional stability, such as aerospace, electronics, and cryogenics.

2. Chemical Composition:-

Element	Percentage (%)
Nickel (Ni)	35.0–37.0
Iron (Fe)	Balance
Carbon (C)	0.05 max
Manganese (Mn)	0.80 max
Silicon (Si)	0.40 max
Phosphorus (P)	0.025 max
Sulfur (S)	0.025 max
Cobalt (Co)	0.50 max
Chromium (Cr)	0.25 max

3. Mechanical Properties:-

Property	Value
Tensile Strength	~70 ksi (482 MPa)
Yield Strength (0.2%)	~35 ksi (241 MPa)
Elongation	30–50%
Hardness (Rockwell)	~B80

4. Physical Properties:-

Property	Value
Density	8.1 g/cm³
Melting Range	1425–1450°C (2597–2642°F)
Thermal Expansion Coefficient	~1.2 × 10^{-6}/°C (20–100°C)
Thermal Conductivity	~10.5 W/m·K (at 20°C)
Electrical Resistivity	~0.78 µΩ·m (at 20°C)

5. Heat Treatment:- Nilo 36 is typically annealed at 830–900°C (1526–1652°F) followed by air cooling or controlled cooling to relieve stress and enhance dimensional stability.

6. Applications:-

- Aerospace: Precision components, fuel tank supports, and satellite instruments.
- Cryogenics: Containers, piping, and transfer lines for liquefied gases.
- Electronics: Shadow masks for cathode ray tubes and other electronic devices.
- Scientific Instruments: Precision measuring tools and optical devices.

7. Corrosion Resistance:-

- Good resistance to oxidation and corrosion in standard atmospheric conditions.
- Susceptible to rusting in marine and high-humidity environments unless properly protected.Seawater: Outstanding resistance to seawater and marine atmospheres.

- Acids: Resistant to sulfuric acid, hydrochloric acid, and other aggressive
- chemicals.
- Alkalis: Good resistance to alkalis and alkaline salts.
- Oxidation: Excellent resistance to oxidation at high temperatures.
- Stress Corrosion Cracking: Offers significant resistance to stress corrosion cracking in chloride environments, unlike many other alloys.
- Localized Corrosion: While resistant to most forms of corrosion, Monel K-500 can be susceptible to localized pitting in highly concentrated acids, especially hydrochloric acid.