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Invar 36® / NILO™ Alloy 36

Typical Analysis of Invar 36	
Carbon	.04%
Manganese	.35%
Silicon	.12%
Nickel	36.0%
Iron	Balance

Invar®, also known as NILO™ Alloy 36 and generically as FeNi36 (64FeNi in the US), is a nickel steel alloy notable for its uniquely low coefficient of thermal expansion (CTE or α). It has the lowest thermal expansion of metals and alloys at temperatures ranging from room temperature to more than 200 degrees Celsius.

Invar® is used in a vast number of temperature-sensitive devices. In today's home, for instance, you'll find Invar in toasters, irons, and gas stoves, as well as in CRT computer monitors and TV sets. Its use is growing in applications such as electronics, precise optical equipment, and cryogenic piping.

*Invar 36® is a registered trademark of Carpenter Technology Corporation.
NILO™ Alloy 36 is a trademark of the manufacturer, Specialty Metals.*

Physical Properties	Metric	English	Comments
Density	<u>8.11 g/cc</u>	<u>0.293 lb/in³</u>	
Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	<u>430 MPa</u> @Temperature 300 °C	<u>62400 psi</u> @Temperature 572 °F	Annealed prior to test
Tensile Strength, Yield	<u>490 MPa</u> <u>110 MPa</u> @Temperature 300 °C	<u>71100 psi</u> <u>16000 psi</u> @Temperature 572 °F	Annealed prior to test 0.2% offset; Annealed prior to test
Elongation at Break	<u>240 MPa</u> 42.00% 50.00% @Temperature 300 °C	<u>34800 psi</u> 42.00% 50.00% @Temperature 572 °F	0.2% offset; Annealed prior to test Annealed prior to test. Annealed prior to test.
Electrical Properties	Metric	English	Comments
Electrical Resistivity	<u>0.0000800 ohm-cm</u>	<u>0.0000800 ohm-cm</u>	
Thermal Properties	Metric	English	Comments
CTE, linear	<u>1.50 $\mu\text{m}/\text{m}\cdot\text{°C}$</u> @Temperature 20.0 - 100 °C	<u>0.833 $\mu\text{in}/\text{in}\cdot\text{°F}$</u> @Temperature 68.0 - 212 °F	
	<u>2.60 $\mu\text{m}/\text{m}\cdot\text{°C}$</u> @Temperature 20.0 - 200 °C	<u>1.44 $\mu\text{in}/\text{in}\cdot\text{°F}$</u> @Temperature 68.0 - 392 °F	
Thermal Conductivity	<u>10.0 W/m-K</u>	<u>69.4 BTU-in/hr-ft²-°F</u>	
Melting Point	<u>1430 °C</u>	<u>2610 °F</u>	