

NILO™ Alloy 42



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Typical Analysis of Alloy 42	
Aluminum	.15%
Carbon	.05%
Chromium	.25%
Cobalt	1%
Iron*	55%
Manganese	.80%
Nickel	42%
Phosphorous	.025%
Silicon	.30%
Sulfur	.025%

*Iron content calculated as remainder

Alloy 42 is a nickel-iron controlled-expansion alloy containing 42% nickel. It has a low and nominally constant coefficient of thermal expansion from room temperature to about 570°F (300°C).

Used for semiconductor lead frames in integrated circuits, bi-metal thermostat strip, thermostat rods, for ceramic-to-metal seals with alumina ceramics, and various glass-to-metal seals such as the core of copper-clad wire for sealing into glass envelopes of electric bulbs, radio valves, television tubes, and florescent lights.

NILO™ Alloy 42 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>120 MPa</u> @Temperature 300 °C	<u>71100 psi</u> <u>17400 psi</u> @Temperature 572 °F	Annealed prior to test 0.2% offset; Annealed prior to test
Elongation at Break	<u>250 MPa</u> 42.00% 42.00% @Temperature 300 °C	<u>36300 psi</u> 42.00% 42.00% @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>0.0000610 ohm-cm</u>	<u>0.0000610 ohm-cm</u>	
Thermal Properties	Metric	English	Comments
CTE, linear	<u>4.50 - 6.50 µm/m-°C</u> @Temperature 20.0 - 300 °C	<u>2.50 - 3.61 µin/in-°F</u> @Temperature 68.0 - 572 °F	
	<u>5.30 µm/m-°C</u> @Temperature 20.0 - 100 °C	<u>2.94 µin/in-°F</u> @Temperature 68.0 - 212 °F	
Thermal Conductivity	<u>10.5 W/m-K</u>	<u>72.9 BTU-in/hr-ft²-°F</u>	
Melting Point	<u>1435 °C</u>	<u>2615 °F</u>	