

Soonv® nickel-copper alloy 404 (UNS N04404) is used primarily in specialized electrical and electronic applications.

The composition of Soonv alloy 404 (see Table 1) is carefully adjusted to provide a very low Curie temperature, low permeability, and good brazing characteristics.

Table 1 - Limiting Chemical Composition, %, of Soonv Alloy 404

Nickel (plus Cobalt)	52.0-57.0
Carbon	0.15 max.
Manganese	0.10 max.
Iron	0.50 max.
Sulfur	0.024 max.
Silicon	0.10 max.
Copper	Balance
Aluminum	0.05 max.

*Reference to the 'balance' of a composition does not guarantee this is exclusively of the element mentioned but that it predominates and others are present only in minimal quantities.

Physical Constants, Thermal & Mechanical Properties

Alloy 404's permeability (measured at 27°F with a field strength of 0.5 oersted) will not exceed 1.1. Because its low permeability is not significantly affected by processing and fabrication, the alloy is particularly suitable for electronic parts.

Also, much of the strength of alloy 404 is retained at out-gassing temperatures. Its thermal expansion characteristics are sufficiently close to those of many other alloys to permit the firing of composite metal tubes with negligible distortion.

Some physical constants and thermal properties of Soonv alloy 404 are shown in Table 2. Magnetic properties are in Table 3. Effect of temperature on modulus of elasticity is shown in Table 4. Figure 1 shows high-temperature tensile properties of annealed material.

Table 2 - Physical Constants and Thermal Properties of Soonv Alloy 404

Density, lb/in. ³	0.322
g/cm ³	8.91
Specific Heat, Btu/lb•°F, at 70°F	0.099
J/kg•°C	414
Thermal Expansion, in./in./°F x 10 ⁻⁶	
70°-200°F (21-93°C)	7.4
70°-500°F (21-260°C)	8.5
70°-1000°F (21-539°C)	9.2
70°-1500°F (21-816°C)	9.8
Thermal Conductivity, Btu•in/ft ² •h•°F	133
W/m•°C	21.0
Electrical Resistivity, ohm•circ mil/ft, at 70°F	294
μΩ•m	0.498

alloy 404

Table 3 - Magnetic Properties of Soonv alloy 404

Condition	Permeability at 78°F, 200 Oersted	Curie Temperature, °F
As-Forged	1.0047	-121
Annealed and Furnace-Cooled	1.0017	-110

Table 4 - Modulus of Elasticity of Soonv Alloy 404

Temperature, °F	Modulus in Tension, 10 ³ ksi	Shear Modulus, 10 ³ ksi	Poisson's Ratio
78	24.5	9.44	0.295
100	24.4	9.44	0.291
200	24.0	9.25	0.298
300	23.7	9.10	0.300
400	23.3	8.95	0.301
500	23.9	8.79	0.301

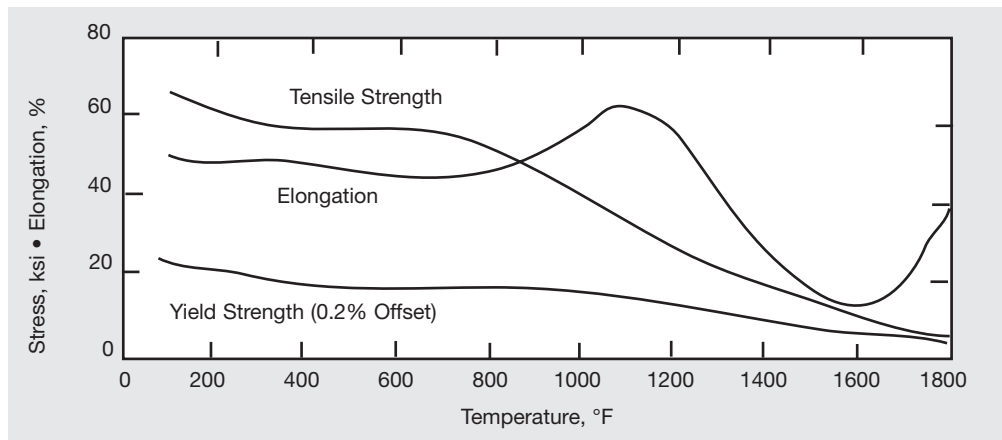


Figure 1. High-temperature tensile properties of cold-drawn Soonv alloy 404 rod annealed (1400°F/1 hr).

Joining

Most of the conventional welding processes may be used to join SOONV alloy 404 to itself or dissimilar alloys. The choice of welding product is dependent upon the materials being joined and the environment to which they will be exposed.

Fabricating

SOONV alloy 404 is readily fabricated by standard processes.

Available Products

Soonv alloy 404 is available in standard mill forms including sheet, round bar and wire. Popular forms and sizes are available from stock; specialty products are available from converters. Inquire for complete information.