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# ALLOY 52, UNS N14052

## Strip, Coil, Foil & Wire, ASTM F30

### Applications

Applications for Alloy 52 include magnetic reed switches and seals that need controlled linear expansion to approximately 977 °F (525 °C).

### Description

Alloy 52 is a 50.50% nickel-iron alloy developed for glass-to-metal seals for some of the soft glasses and some ceramics. The alloy's rate of thermal expansion is virtually constant to a temperature of about 1050 °F (565 °C).

### Chemistry Typical

Carbon: 0.05 max  
Silicon: 0.30 max  
Manganese: 0.60 max  
Nickel: 50.5 nom  
Chromium: 0.25 max  
Iron: Balance  
Phosphorus: 0.025 max  
Sulfur: 0.025 max  
Aluminum: 0.10 max

### Physical Properties

Density: 0.30 lb/in<sup>3</sup>, 8.30 g/cm<sup>3</sup>

Electrical Resistivity: ohm-cir-mil/ft, microhm-cm:  
At 68 °F (20 °C): 258 (43)

Thermal Conductivity: BTU-in/hr-ft<sup>2</sup>-°F (W/m•K):  
68 - 212 °F (20 - 100 °C): 97 (140)

Mean Coefficient of Thermal Expansion:  $\mu\text{in/in-}^\circ\text{F}$  ( $\mu\text{m/m-}^\circ\text{C}$ ):  
77 - 842 °F (25 - 450 °C): 5.4 (9.8)

Melting Range: 2600 °F (1430 °C)

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## Forms

Coil – Sheet, Strip, Ribbon

Wire – Profile, Round, Flat, Square

## Mechanical Properties at Room Temperature

### Properties: Annealed Typical

Ultimate Tensile Strength: 78 KSI nom (536 MPa nom)

Yield Strength: 35 KSI nom (240 MPa nom)

Elongation: 30% nom

Hardness: Rb 73 nom

### Properties: Tempered

Alloy 52 can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

## Additional Properties

### Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

### Finishes

#1 – Hot rolled annealed and descaled. It is available in strip, foil and ribbon. It is used for applications where a smooth decorative finish is not required.

#2D – Dull finish produced by cold rolling, annealing and descaling. Used for deep drawn parts and those parts that need to retain lubricants in the forming process.

#2B – Smooth finish produced by cold rolling, annealing and descaling. A light cold rolling pass is added after anneal with polished rolls giving it a brighter finish than 2D.

#BA – Bright annealed cold rolled and bright annealed

#CBA – Course bright annealed cold rolled matte finish and bright anneal

#2 – Cold Rolled

#2BA – Smooth finish produced by cold rolling and bright annealing. A light pass using highly polished rolls produces a glossy finish. A 2BA finish may be used for lightly formed applications where a glossy finish is desired in the formed part.

Polished – Various grit finish for specific polish finished requirements.

*\* Not all finishes are available for all alloys – Consult Sales for applicable finishes.*

### Wire Finishes

XC – Extra clean. Bright annealed or bright annealed and cold rolled

Grease – Ultra bright finish for decorative applications

Soap – Soap is not removed from tempered wire to act as a lubricant.

*\* Contact Ulbrich Wire with special finish requests.*

### Heat Treatment

Alloy 52 is non hardenable by heat treatment.

### Welding

For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".

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