



Alloy 29-17 (Kovar®), UNS K94610

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated
Specifications: ASTM F-15

Alloy 29-17 (Kovar®) Alloy Description

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Alloy 29-17 is iron-nickel-cobalt, low expansion alloy whose chemical composition is controlled within narrow limits to assure precise uniform thermal expansion properties. The alloy is vacuum melted and with extensive quality control the uniform physical and mechanical properties allow for ease in deep drawing, coining, stamping and machining.

Applications

Used for making hermetic seals with the harder Pyrex glasses and ceramic materials

Application where high reliability is a necessity

Power tubes, microwave tubes, transistors, diodes, inter-grated circuits and has been used for the flat pack and the dual-in-line package.

Chemistry: Typical

Carbon: 0.02 max

Silicon: 0.20 max

Manganese: 0.30 max

Nickel: 29.0 max *

Cobalt: 17.0 max *

Iron: Balance *

* Iron, nickel and cobalt requirements listed may be adjusted so that the alloy meets the specified requirements for coefficient of thermal expansion

Physical Properties

Density: 0.302 lb/in³, 8.60 g/cm³

Electrical Resistivity: ohm-cir-mil/ft, microhm-mm:

At 68°F (20°C): 259(43)

At 212°F (100°C): 331(55)

At 392°F (200 °C): 433(72)

At 572°F (300°C): 529(88)

At 752°F (400°C): 602(100)

At 932°F (500°C): 656(109)

At 1112°F (600°C): 686(114)

Thermal Conductivity: BTU-in/hr-ft²-°F (W/m•K)

At 68°F (20°C): 116(16.7)

Mean Coefficient of Thermal Expansion: $\mu\text{in/in-}^\circ\text{F}$ ($\mu\text{m/m-}^\circ\text{C}$)

68-212°F (20-100 °C): 3.3(6.0)

68-202°F (20-150 °C): 3.2(5.8)

68-392°F (20-200 °C): 3.1(5.5)

68-482°F (20-250 °C): 2.9(5.3)

68-572°F (20-300°C): 2.8 (5.1)

68-662°F (20-350°C): 2.7 (4.9)

68-752°F (20-400°C): 2.7 (4.9)

68-842°F (20-450°C): 2.9 (5.3)

68-932°F (20-500°C): 3.4 (6.2)

Modulus of Elasticity: KSI (MPa)

20×10^3 (138×10^3) in tension

Melting Point: 2640°F (1450°C)

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 75 KSI nom (517 MPa nom)

Yield Strength: 49 KSI nom (340 MPa nom)

Elongation: 42% min

Properties Tempered

Alloy 29-17 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

Additional Properties

Corrosion Resistance

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

Standard Wire Finishes

Extra Clean: (XC) Extra clean is also referred to as “bright annealed” or “bright annealed and cold rolled”

Grease (round wire only): Drawn in a heavy grease produces an “Ultra bright” finish for decorative applications

Soap (round wire only): Soap is used as a lubricant in the drawing process and is not removed. It acts as a lubricant during customer part forming operation. A soap finish is available in tempered products.

Plated: Many plating options are available.

*Special finishes are available: Contact Ulbrich Wire Sales with special finish and plating requests.

Forms

Continuous Coils

Cut to lengths

Precision cutting

Heat Treatment

Alloy 29-17 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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