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ALLOY 36, UNS K93600

Strip, Coil, Foil and Wire, ASTM F1684

Applications

Standards of length, measuring devices, laser components, bi-metal, thermostat strip, piping for storing and transporting liquefied gases

Description

Alloy 36 is a nickel-iron alloy containing 36% nickel. It maintains constant dimensions over the range of normal atmospheric conditions. The alloy has a low coefficient of thermal expansion up to 500 °F (260 °C).

Chemistry Typical

Nickel: 35.00-37.00
Iron: Balance
Carbon: 0.10 max
Silicon: 0.350 max
Manganese: 0.60 max
Cobalt: 1.00 max
Chromium: 0.50 max
Phosphorus: 0.025 max
Sulfur: 0.025 max
Molybdenum: 0.50 max
Copper: 0.50 max

Physical Properties

Density: 0.293 lb/in³, 8.11 g/cm³
Thermal Conductivity: BTU-in/hr-ft²-°F (W/m•K)
At 68 °F (20 °C): 69.3 (10.0)

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

At 68 °F (20 °C): 481 (80)

At 212 °F (100 °C): 517 (89)

At 392 °F (200 °C): 583 (97)

At 572 °F (300 °C): 632 (105)

At 752 °F (400 °C): 668 (111)

At 932 °F (500 °C): 704 (117)

At 1112 °F (600 °C): 728 (121)

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

-328 - 68 °F (-200 - 20 °C): 0.8 (1.5)

-148 - 68 °F (-100 - 20 °C): 0.7 (1.3)

68 - 212 °F (20 - 100 °C): 0.8 (1.5)

68 - 302 °F (20 - 150 °C): 1.1 (2.0)

68 - 392 °F (20 - 200 °C): 1.4 (2.6)

68 - 482 °F (20 - 250 °C): 1.9 (3.5)

68 - 572 °F (20 - 300 °C): 3.1 (5.5)

68 - 662 °F (20 - 350 °C): 4.0 (7.2)

68 - 752 °F (20 - 400 °C): 4.7 (8.4)

68 - 842 °F (20 - 450 °C): 5.2 (9.3)

68 - 932 °F (20 - 500 °C): 5.6 (10.1)

Modulus of Elasticity: KSI (MPa)

20.3×10^3 (140×10^3) in tension

Melting Range: 2605 °F (1430 °C)

Forms

Coil – Sheet, Strip, Ribbon

Wire – Profile, Round, Flats, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 71 KSI nom (490 MPa nom)

Yield Strength: 35 KSI nom (241 MPa nom)

Elongation: 42% nom

Properties: Tempered

Alloy 36 can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

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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 36 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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