Ulbrich Stainless Steels & Special Metals, Inc. • 153 Washington Avenue • North Haven, CT 06473 USA • 800-243-1676 • ULBRICH.com

ALLOY 46, UNS K94600

Strip, Coil, Foil & Wire, ASTM F-30

Applications

Electrical resistors

Description

Alloy 46 is a nickel-iron controlled expansion alloy containing 46: nickel. It has a fairly constant coefficient of thermal expansion from room temperature up to 932 °F (500 °C).

Chemistry Typical

Carbon: 0.05 max
Silicon: 0.30 max
Manganese: 0.80 max
Nickel: 46 nom
Chromium: 0.25 nom
Iron: Balance
Phosphorus: 0.025 max
Sulfur: 0.025 max
Aluminum: 0.10 max

Physical Properties

Density: 0.295 lb/in^3, 8.2 g/cm^3

Electrical Resistivity: ohm-cir-mil/ft, microhm-cm:
At 68 °F (20 °C): 277 (47)

Thermal Conductivity: BTU-in/hr-ft^2-°F (W/m•K):
77 - 212 °F (25 - 100 °C): 79.2 (11)

Mean Coefficient of Thermal Expansion: µin/in-°F (µm/m-°C):
Contact Ulbrich Technical Service for information.

Melting Range: 2600 °F (1430 °C)

Forms

Coil – Sheet, Strip, Ribbon
Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 74 KSI nom (510 MPa nom)
Yield Strength: 36 KSI nom (247 MPa nom)
Elongation: 30% nom
Hardness: Rb 73 nom

Properties: Tempered

Alloy 46 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 46 is non hardenable by heat treatment.

Welding

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