NiSPAN-C®902 (Alloy 902), UNS N09902

AMS 5221, AMS 5223, AMS 5225

Alloy 902 Wire Description

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Alloy 902is a precipitation hardenable nickel-iron with a controllable thermoplastic coefficient which is the alloy's outstanding characteristic. The alloy can be processed to have a constant modulus of elasticity at temperatures from -50 to 150°F. The addition of titanium to the nickel-iron-chromium alloy makes it hardenable by precipitation.

Applications

Precision apparatus where elastic members are subject to temperature fluctuations.
Tuning forks and vibrating reeds
Leaf springs
Helical springs

Chemistry Typical

Iron: Remainder
Nickel + Cobalt: 41.00- 43.50
Chromium: 4.90-5.75
Titanium: 2.20-2.75
Aluminum: 0.30-0.80
Carbon: 0.06 max
Manganese: 0.80 max
Silicon: 1.00 max
Phosphorus: 0.040 max,

Sulfur: 0.040 max

Physical Properties

Density: 0.291 lbs/in^3 8.05 g/cm^3

Electrical Resistivity: microhm-cm
At 68°F: 51.0

Mean Coefficient of Thermal Expansion: in/in/°F (mm/m/°C):
70-212°F (20-100°C): 4.2 x 10^{-}6 (7.6)

Specific Heat, (32-212°F),Btu/lb•°F (0-100°C), J/kg•°C:
0.12 (500)

Thermal Conductivity: BTU-ft/h-ft^2-°F BTU/h-ft-°F (W/m-°K)
70°F (21°C) : 9.0 (12.1)

Modulus of Elasticity: KSI (MPa) (Process dependent)
24-29 x 10^3(165-200 x 10^3)

Melting Range: 2650-2700°F (1450-1480°C)

Mechanical Properties at Room Temperature

Properties: Annealed
Ultimate Tensile Strength: 85 KSI min (586 MPa min)
Yield Strength (0.2% offset): 35 KSI min (241 MPa min)
Elongation: 30% min

Properties: Tempered
Alloy 902 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

Typical Tempered Products:

10% Reduction

Ultimate Tensile Strength: 90-110 KSI (621-728 MPa)

Elongation: 15% min

Hardness: Rb 83-98

50% Reduction

Ultimate Tensile Strength:

125-140 KSI (862-965 MPa) gauges > 0.020 inches

125-150 KSI (862-1034 MPa) gauges ≤ .020 inches

Elongation:

3% min: gauges > 0.020 inches

1% min gauges ≤ .020 inches

Hardness: Rc 24-32

Typical Heat Treat Capabilities

1300°F – Air cool

Ultimate Tensile Strength: 150 KSI min (1034 MPa min)

Hardness: Rc 27-35.

10% Reduction + 1300°F

Ultimate Tensile Strength: 165 KSI min (1138 MPa min)

Yield Strength (0.2% offset): 120 KSI min (827 MPa min)

Elongation: 10% min

Hardness: Rc 34-41

50% Reduction + 1300°F

Ultimate Tensile Strength: 190 KSI min (1310 MPa min)

Yield Strength (0.2% offset): 165 KSI min (1138 MPa min)

Elongation: 5% min

Hardness: Rc 39-46.

Additional Properties

Corrosion Resistance

Alloy 902 has fairly good corrosion resistance due to its nickel-chromium content. However the chromium content is too low to put it in the same category of stainless steels, but in

corrosion resistance it is superior to the non-stainless alloy steels. 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 902can be hardened by cold rolled and by hardened heat treating

Welding

For best results refer to: SSINA’s “Welding of Stainless Steels and Other Joining Methods”

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