

NI-SPAN-C® Alloy 902

UNS N09902

NI-SPAN-C® Alloy 902 is a precipitation hardenable nickel-iron-chromium alloy with a thermoelastic coefficient that can be controlled by the amount of cold work and heat treatment temperature to fit a specific application's needs. Alloy 902 also has low magnetostrictive properties appropriate for specific applications and has been successfully utilized at cryogenic temperatures.

Applications include: Precision instruments, Resonant vibrating systems, Tuning forks, Springs
Industries supplied include: Precision Equipment Manufacturing

Nominal Composition

| | C | Mn | Si | S | P | Ni+Co | Cr | Ti | Cr+(Ti-4C) | Al | Fe |
|-----|------|------|------|------|------|-------|------|------|------------|------|--------|
| min | - | - | - | - | - | 41.0 | 4.90 | 2.20 | 7.10 | 0.30 | 45 Bal |
| max | 0.06 | 0.80 | 1.00 | 0.04 | 0.04 | 43.5 | 5.75 | 2.75 | 8.10 | 0.80 | - |

Physical Properties

| | At 70°F | At 20°C |
|---------------------------|-----------------------------|------------------------|
| Density | 0.291 lb/in ³ | 8.05 g/cm ³ |
| Modulus of Elasticity (E) | 24-29 x 10 ³ ksi | 165-200 GPa |
| Modulus of Rigidity (G) | 10.2 x 10 ³ ksi | 70.3 GPa |
| Coefficient of Expansion | 4.2 µin/in/°F (70-212°F) | 7.6 µm/m/°C (20-100°C) |
| Electrical Resistivity | 40 µohm-in | 101.6 µohm-cm |
| Thermal Conductivity | 9.0 Btu-in./ft.2hr.-oF | 12.1 W/m-K |

Applicable Specifications

| | |
|------------|---------------------------|
| Wire & Bar | AMS 5221, AMS 5225, HS261 |
|------------|---------------------------|

Typical Mechanical Properties – Spring Applications

| Condition | Heat Treatment | Tensile Strength | Suggested Operating Conditions |
|----------------------|-----------------------------------|-----------------------------|--|
| Annealed | Per Specifications | 85-95 ksi (585-655 MPa) | -50 to 150°F (-45 to 65 °C) For constant modulus |
| Spring Temper | None | 140-160 ksi (965-1105 MPa) | -50 to 150 °F (-45 to 65 °C) For constant modulus |
| Spring Temper + Aged | 1225-1300°F (663-704°C) 3-3.5 hrs | 200-220 ksi (1380-1515 MPa) | -50 to 150 °F (-45 to 65 °C) For constant modulus |

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