



# Haynes® HR-120® (Alloy HR-120), UNS N08120

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated  
ASTM B407, ASTM B408, ASTM B409

## Alloy HR-120 Description

Alloy HR-120 alloy is a solid-solution-strengthened heat-resistant alloy that provides excellent strength at elevated temperature, combined with resistance to carburizing and sulfidizing environments. Its oxidation resistance is comparable to other widely used Fe-Ni-Cr materials, such as alloys 330 and 800H, but its strength at temperatures up to 2000 deg. F (1095 deg. C) is significantly higher.



## Applications

- Heat treating baskets
- Wire mesh furnace belts and basket liners
- Recuperators
- Heat treating fixtures

## Chemistry Typical

- Nickel: 37.0 nom
- Chromium: 25.0 nom
- Cobalt: 3.0 max
- Molybdenum: 2.5 max
- Tungsten: 2.5 max
- Columbium: 0.7 nom

Aluminum: 0.01 nom

Manganese: 0.7nom

Silicon: 0.06 nom

Carbon: 0.05 nom

Boron: 0.004 nom

Nitrogen: 0.50 nom

Iron: Balance

## **Physical Properties**

Density: 0.291 lb/in<sup>3</sup>, 8.07 g/cm<sup>3</sup>

Electrical Resistivity:  $\mu\text{ohm-in}$ , ( $\mu\text{ohm-cm}$ )

At 70°F (20°C): 41.4 (105.2)

At 200°F (100°C): 42.4 (107.8)

At 400°F (200°C): 44.4 (112.5)

At 600°F (300°C): 45.4 (114.9)

At 800°F (400°C): 46.3 (116.7)

At 1000°F (500°C): 47.3 (119.3)

At 1200°F (600°C): 48.2 (121.4)

At 1400°F (700°C): 48.8 (123.1)

At 1600°F (800°C): 49.4 (124.5)

At 1800°F (900°C): 50.0 (125.7)

At 2000°F (1000°C): 50.3 (126.6)

At 2200°F (1100°C): 50.7 (127.8)

Specific Heat: BTU/lb-°F (J/Kg-°K):

At 70°F (20°C): .112 (467)

At 200°F (100°C): .116 (483)

At 400°F (200°C): .121 (500)

At 600°F (300°C): .125 (522)

At 800°F (400°C): .130 (531)

At 1000°F (500°C): .135 (558)

At 1200°F (600°C): .144 (607)

At 1400°F (700°C): .152 (647)

At 1600°F (800°C): .159 (655)

At 1800°F (900°C): .164 (660)

At 2000°F (1000°C): .167 (663)

At 2200°F (1100 °C): .169 (667)

Thermal Conductivity: BTU-in/hr-ft<sup>2</sup>-°F (W/m-K)

At 70°F (20°C): 78 (11.4)

At 200°F (100°C): 84 (12.7)

At 400°F (200°C): 96 (14.1)

At 600°F (300°C): 108 (15.4)

At 800°F (400°C): 121 (17.1)

At 1000°F (500°C): 134 (18.7)

At 1200°F (600°C): 150 (21.0)

At 1400°F (700°C): 168 (23.3)

At 1600°F (800°C): 180 (24.59)

At 1800°F (900°C): 191 (26.2)

At 2000°F (1000°C): 205 (28.0)

At 2200°F (1100 °C): 216 (29.6)

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

78-200°F (25-100°C): 7.95 (14.3 x 10<sup>-6</sup>)

78-400°F (25-200°C): 8.29 (14.9 x 10<sup>-6</sup>)

78-600°F (25-300°C): 8.56 (15.3 x 10<sup>-6</sup>)

78-800°F (25-400°C): 8.80 (15.8 x 10<sup>-6</sup>)

78-1000°F (25-500°C): 8.98 (16.1 x 10<sup>-6</sup>)

78-1200°F (25-900°C): 9.24 (16.4 x 10<sup>-6</sup>)

78-1400°F (25-700°C): 9.52 (16.9 x 10<sup>-6</sup>)

78-1600°F (25-800°C): 9.72 (17.3 x 10<sup>-6</sup>)

78-1800°F (25-900°C): 9.87 (17.6 x 10<sup>-6</sup>)

Modulus of Elasticity: KSI (MPa)

28.6 x 10<sup>3</sup> (197 x 10<sup>3</sup>) in tension

Melting Range: 2375-2600°F (est.), (1300-1425°C):

## **Mechanical Properties at Room Temperature**

## **Properties: Annealed Typical**

Ultimate Tensile Strength: 106.5 KSI (735 MPa)

Yield Strength: 45.6 KSI (375 MPa)

Elongation: 50%

## **Properties: Tempered**

Alloy HR-120 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:** 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

### **Welding**

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

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