

Wire Products - Divisions

of Ulbrich Stainless Steels & Special Metals, Inc.

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# Haynes® 188 Wire, Alloy 188 Wire, UNS R30188

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated AMS 5608, AMS 5772, AMS 5801, PWA 1042, GE B50TF59-S4

## Haynes® 188 or Alloy 188 Description Wire Description



Alloy 188 is a cobalt-nickel-chromium-tungsten super alloy combining excellent high-temperature strength with very good resistance to oxidizing environments up to 2100°F (1095°C) It is readily fabricated and formed by conventional techniques.

## **Applications**

Seal rings for gas turbine.

Packing for gas turbines

## **Chemistry Typical**

Nickel: 20.00-24.00

Chromium: 20.00-24.00

Tungsten: 13.00-16.00

Iron: 3.00 max

Cobalt: Balance

Lanthanum: 0.02-0.12

Boron: 0.015 max Carbon: 0.05-0.15

Manganese: 1.25max

Silicon: 0.2-0.5

Phosphorus: 0.02 max

Sulfur: 0.015 max

## **Physical Properties**

Density, 0.324 lbs/in<sup>3</sup>, 8.98 g/cm<sup>3</sup>

Electrical Resistivity: µohm-in, (µohm-cm)

400°F (200°C): 41.5(105.0)

800°F (400°C): 43.8(110.5)

1000°F (600°C): 44.7(114.8)

1200°F (700°C): 45.6(116.4)

1400°F (800°C): 46.1(117.5)

1600°F (900°C): 46.5(118.3)

1800°F (1000°C): 46.7(119.1)

Mean Coefficient of Thermal Expansion: µin/in-°F (µm/m-°C)

70-800°F (20-500°C): 7.8(14.5)

70-1000°F (20-600°C): 8.2(15.2)

70-1200°F (20-700°C): 8.6(15.8)

70-1400°F (20-800°C): 9.0(16.5)

70-1600°F (20-900°C): 9.4(17.1)

70-1800°F (20-1000°C): 9.9(17.9)

Thermal Conductivity: BTU-in/ft-°F (W/m-°K)

800°F (400°C): 125(17.5)

1000°F (600°C): 138(21.1) 1200°F (700°C): 152(23.0) 1400°F (800°C): 167(24.8) 1600°F (900°C): 174(25.5) 1800°F (1000°C): 189(27.6)

Modulus of Elasticity: KSI (MPa)  $33.6 \times 10^3 (23.2 \times 10^3)$  in tension

Melting Range: 2400-2570°F (1315-1410°C)

## **Mechanical Properties at Room Temperature**

Properties: Annealed (Typical)

Ultimate Tensile Strength: 130 KSI min (896 MPa min) Yield Strength (0.2% offset): 60 KSI min (414 MPa min)

Elongation: 45% min

Hot Tensile 1200°F (Typical)

Ultimate Tensile Strength: 90 KSI min (620 MPa min)

Yield Strength (0.2% offset): 35 KSI min (243 MPa min):

Elongation:

Gauges up to 0.020 inches: 35% min Gauges over 0.020 inches: 20% min

## **Properties Tempered**

Alloy 188 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: (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** 

### Welding

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

\*Haynes® Alloy 188 is a registered trademark of Haynes Alloys

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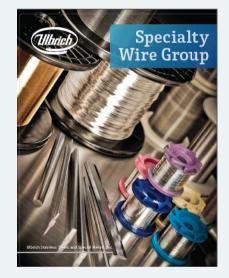
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