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# **HAYNES® 25 (L-605), UNS R30605**

**Strip, Coil, Foil, Wire, AMS 5537**

## **Applications**

Jet Engine Parts: turbine blades, combustion chambers, after burner parts, and turbine rings  
Industrial Furnaces: mufflers and turbine rings

## **Description**

Haynes® 25 (L-605) is a cobalt based alloy that combines good forming and excellent high temperature properties. The alloy is resistant to oxidation and carburization to 1900 °F. Alloy 25 can only be hardened significantly by cold working. Cold working will increase creep strength up to 1800 °F and stress rupture strength up to 1500 °F. Strain aging at 700 - 1100 °F improves creep and stress rupture strengths below 1300 °F.

## **Chemistry Typical**

Cobalt: Remainder  
Chromium: 19.00-21.00  
Nickel: 9.00-11.00  
Tungsten: 14.00-16.00  
Manganese: 1.00-2.00  
Iron: 3.00 max  
Silicon: 1.00 max  
Carbon 0.05-0.15  
Sulfur: 0.03  
Phosphorus: 0.03 max

## **Physical Properties**

Density: 0.330 lbs/in<sup>3</sup>, 9.13 g/cm<sup>3</sup>

Electrical Resistivity: micro-ohm-in, (micro-ohm-cm)

75 °F (24 °C): 34.9 (89)

*Haynes® 25 (L-605) is a registered trademark of Haynes Alloys*

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

70 - 200 °F (21 - 93 °C): 6.8 (12.3)

70 - 400 °F (21 - 204 °C): 7.2 (12.9)

70 - 600 °F (21 - 316 °C): 7.6 (13.5)

70 - 800 °F (21 - 427 °C): 7.8 (13.9)

70 - 1000 °F (21 - 538 °C): 8.0 (14.4)

70 - 1200 °F (21 - 649 °C): 8.2 (14.8)

70 - 1400 °F (21 - 760 °C): 8.6 (15.5)

70 - 1600 °F (21 - 871 °C): 9.1 (16.2)

70 - 1800 °F (21 - 982 °C): 9.4 (17.7)

Thermal Conductivity: BTU-in/ft-°F (watt-cm./cm.<sup>2</sup>-°C)

300°F (200°C): 82(.130)

500°F (300°C): 97(.147)

700°F (400°C): 112(.166)

900°F (500°C): 127(.185)

1100°F (600°C): 142(.204)

1300°F (700°C): 157(.224)

1500°F (800°C): 172(.244)

1700°F (900°C): 191(.265)

Modulus of Elasticity: ksi (MPa)

$32.6 \times 10^3$  ( $224 \times 10^3$ ) in tension

Melting Point: 2425-2570°F (1329-1410°C)

## Forms

Coil – Strip, Foil, Ribbon

Wire – Profile, Round, Flat, Square

## Mechanical Properties at Room Temperature

### Properties: Annealed

Ultimate Tensile Strength: 130 KSI min (896 MPa min)

Yield Strength (0.2% offset):

Gauges: less than 0.003 inches: 55 KSI min (379 MPa min)

Gauges: 0.003 inches and greater: 55 - 80 KSI (379 - 552 MPa)

Elongation: Consult Ulbrich Technical Services

### Properties: Tempered

Haynes® 25 (L-605) can be cold rolled to various tempers. Contact Ulbrich Technical Service for additional information.

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## 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 in all alloys – Contact Ulbrich Sales for more information.*

### 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 for custom finishes.*

### Cold Forming

Haynes® 25 (L605) may be cold or hot-formed by various techniques.

### Welding

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

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