Ulbrich Stainless Steels & Special Metals, Inc. • 153 Washington Avenue • North Haven, CT 06473 USA • 800-243-1676 • ULBRICH.com

ULTIMET®, UNS R31233

Strip, Foil, Wire, ASTM B-815, ASTM B-818

Applications

Agitators, blenders, bolts, dies, extruders, fan blades, filters, glass plungers, nozzles, pumps, rolls, screw conveyors, and valve parts

Description

ULTIMET® is a cobalt-based alloy with exceptional resistance to galling, cavitation erosion, slurry erosion, liquid droplet impact. Ideal welding material with exceptional ductility and resistance to weld cracking, very easy to apply as an overlay, multiple layers appliable with little to no preheat.

Chemistry Typical

Cobalt: Balance
Chromium: 26 nominal
Nickel: 9 nominal
Molybdenum: 5 nominal
Tungsten: 2 nominal
Manganese: 0.8 nominal
Silicon: 0.3 nominal
Nitrogen: 0.08 nominal
Carbon: 0.06 nominal

Physical Properties

Density: 0.306 lb/in³, 8.47 g/cm³

Electrical Resistivity: µohm-in (µohm-m)
At 73 °F (23 °C): 34.2 (0.87)
At 212 °F (100 °C): 35.4 (0.89)
At 392 °F (200 °C): 36.6 (0.93)
At 572 °F (300 °C): 38.1 (0.96)
At 752 °F (400 °C): 39.3 (1.00)
At 932 °F (500 °C): 40.5 (1.03)
At 1112 °F (600 °C): 41.3 (1.05)

Specific Heat: BTU/lb-°F (J/Kg-K):
At 73 °F (23 °C): 0.109 (456)
At 212 °F (100 °C): 0.112 (470)
At 392 °F (200 °C): 0.115 (482)
At 572 °F (300 °C): 0.121 (504)
At 752 °F (400 °C): 0.126 (525)
At 932 °F (500 °C): 0.130 (545)
At 1112 °F (600 °C): 0.137 (573)

Thermal Conductivity: BTU-in/hr-ft²-°F (W/m•K)
At 73 °F (23 °C): 85 (12.3)
At 212 °F (100 °C): 96 (13.8)
At 392 °F (200 °C): 108 (15.6)
At 572 °F (300 °C): 121 (17.5)
At 752 °F (400 °C): 134 (19.4)
At 932 °F (500 °C): 149 (21.5)
At 1112 °F (600 °C): 166 (23.9)

Mean Coefficient of Thermal Expansion: µin/in-°F (m/m-K)):
78 – 200 °F (26 – 93 °C): 7.2 (13.0×10^{-6})
78 – 400 °F (26 – 204 °C): 7.5 (13.5×10^{-6})
78 – 600 °F (26 – 316 °C): 7.8 (14.0×10^{-6})
78 – 800 °F (26 – 427 °C): 8.0 (14.5×10^{-6})
78 – 1000 °F (26 – 538 °C): 8.2 (14.8×10^{-6})
78 – 1200 °F (26 – 649 °C): 8.4 (15.1×10^{-6})
78 – 1400 °F (26 – 760 °C): 8.8 (15.9×10^{-6})
78 – 1600 °F (26 – 871 °C): 9.1 (16.4×10^{-6})
78 – 1800 °F (26 – 982 °C): 9.4 (16.9×10^{-6})

Modulus of Elasticity:KSI (MPa)
31.2×10^3 (215×10^3) in tension

Melting Range: 2430 - 2470 °F (1332 - 1354 °C)

Forms

Coil – Sheet, Strip, Foil
Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 138 KSI min (951 MPa min)
Yield Strength: 72 KSI min (496 MPa min)
Elongation: 42% min

Properties: Tempered

ULTIMET® can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

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 for all alloys – Consult Sales for applicable finishes.*

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 with special finish requests.*

Heat Treatment

ULTIMET® is hardenable by cold working. Inquire with Ulbrich Technical Service for heat treat responses.

Welding

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