



Hastelloy® X (Alloy X), UNS N06002

Shaped, Flat, Square, Round, Fine Wire, Plated and Bare Wire
ASTM B572, ASTM B435, AMS 5536, AMS 5754, ASM 5798,
MIL-I-45208, MSRR7158, GE B50TF25

Alloy X Alloy Description

 [Get A Quote](#)

Alloy X is a nickel-chromium-iron-molybdenum alloy that possesses an exceptional combination of oxidation resistance, formability and high temperature strength. It has also been found to be exceptionally resistant to stress-corrosion cracking in petrochemical applications. Alloy X has excellent resistance to reducing and carburizing atmospheres, making it suitable for furnace components. Due to its high molybdenum content, Alloy X may be subject to catastrophic oxidation at 2200°F.

Applications

Gas turbine seal rings and vanes
Furnace and chemical process components
Nuclear applications

Chemistry Typical

Nickel: Balance
Iron: 17.00-20.00
Chromium: 20.50-23.00
Molybdenum: 8.00-10.00
Cobalt: 0.50-2.50
Tungsten: 0.20-1.00

Carbon: 0.05-0.15 max
Manganese: 1.00 max
Silicon: 1.00 max
Aluminum: 0.50 max
Phosphorus: 0.04 max
Sulfur: 0.08 max
Boron: 0.010 max
Titanium: 0.15 max
Copper: 0.03 max

Physical Properties

Density, 0.297 lbs/in³, 8.22 g/cm³

Mean Coefficient of Thermal Expansion: in/in/°F (mm/m/°C):
70-212°F (20-100°C): 7.7×10^{-6} (13.9)

Thermal Conductivity: BTU-in/h-ft-°F (W/m-°K):
70°F (21°C): 63 (9.1)

Modulus of Elasticity:KSI (MPa)
 29.7×10^3 (205×10^3) in tension

Magnetic Permeability: H = 200 Oersteds: Annealed: 1.002.

Melting Point: 2470°F (1355°C)

Mechanical Properties at Room Temperature

Annealed Typical

Ultimate Tensile Strength: 95 KSI min (655 MPa min)

Yield Strength: (0.2% offset): 35 KSI min (240 MPa min)

Elongation: 35% min

Properties Tempered

Alloy X can be cold rolled to achieve the temper properties required by specific customers

and/or manufacturing requirements. Contact Ulbrich Wire for details.

Typical Tempered Properties

Nominal 10% Reduction

Ultimate Tensile Strength: 130 KSI nom (896 MPA nom)

Yield Strength: (0.2% offset): 105 KSI nom (724 MPA nom)

Elongation: 22% nom

Hardness: Rc 22 nom

Nominal 30% Reduction

Ultimate Tensile Strength: 170 KSI nom (1172 MPA nom)

Yield Strength: (0.2% offset): 145 KSI nom (1000 nom)

Elongation: 7% nom

Hardness: Rc 37 nom

Nominal 50% Reduction

Ultimate Tensile Strength: 205 KSI nom (1413 MPA nom)

Yield Strength: (0.2% offset): 190 KSI nom (1310 MPA nom)

Elongation: 3% nom

Hardness: Rc 39 nom

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

Heat Treatment

Alloy X cannot be hardened heat treating

Welding

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

HASTELLOY® X is a registered trademark of Haynes Alloys

Limitation of Liability and Disclaimer of Warranty: In no event will Ulbrich Stainless Steels and Special Metals, Inc., be liable for any damages arising from the use of the information included in this document or that it is suitable for the 'applications' noted. We believe the information and data provided to be accurate to the best of our knowledge but, all data is considered typical values only. It is intended for reference and general information and not recommended for specification, design or engineering purposes. Ulbrich assumes no implied or express warranty in regard to the creation or accuracy of the data provided in this document.

Copyright© January 2014 Ulbrich Stainless Steels & Special Metals, Inc. – Revision 6.1.2015