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

CUSTOM 450®, UNS S45000

Strip, Coil, Foil & Wire, AMS5763, AMS 5773, AMS 5863, ASTM A 564, ASTM A693, ASTM A 959

Applications

Pulp and paper, aircraft, power generation, chemical processing, nuclear applications, medical devices

Description

Custom 450® stainless is a martensitic age-hardenable stainless steel which exhibits very good corrosion resistance with moderate strength. Although the alloy a yield strength higher than 100 Ksi (689 MPa) in the annealed condition, it is easily fabricated. A single-step aging treatment develops higher strength with good ductility and toughness. Generally supplied in the annealed condition, requiring no heat treatment by the user for many applications. Because it has corrosion resistance like Type 304 stainless but three times the yield strength, it has been used in applications where Type 304 was not strong enough. On the other hand, it has also replaced Type 410 stainless directly on a strength basis where Type 410 had insufficient corrosion resistance. Mechanical properties will depend on the aging temperature selected. *

** Information supplied by Carpenter Technology Corp.*

Chemistry Typical

Carbon: 0.05 max
Manganese: 1.00 max
Phosphorus: 0.030 max
Sulfur: 0.030 max
Silicon: 1.00 max
Chromium: 14.00-16.00
Nickel: 5.00-7.00
Molybdenum: 0.50-1.00
Copper: 1.25-1.75
Columbium: 8 x Carbon min
Iron: Balance

Physical Properties

Density: 0.28 lbs/in^3 7.75 g/cm^3

Electrical Resistivity: ohm-cm: At 68 °F (20 °C): 0.0000992

Specific Heat: BTU/lb-°F (J/g-°C):
73 - 216 °F (23 - 102 °C): 0.114 (0.477)

Thermal Conductivity: BTU-in/hr-ft^2-°F (W/m-K): Condition H900
At 70 °F (21 °C): 104 (15.0)
At (200 °C): 18.2 W/m-K
At (500 °C): 24.4 W/m-K

Mean Coefficient of Thermal Expansion: in/in-°F
75 - 200 °F: 5.88 x 10^{-6}
75 - 300 °F: 5.62 x 10^{-6}
75 - 400 °F: 5.68 x 10^{-6}
75 - 500 °F: 5.80 x 10^{-6}
75 - 600 °F: 5.91 x 10^{-6}
75 - 700 °F: 5.98 x 10^{-6}
75 - 800 °F: 6.09 x 10^{-6}
75 - 900 °F: 6.13 x 10^{-6}
75 - 1100 °F: 6.17 x 10^{-6}

Modulus of Elasticity: ksi (MPa):
28 - 29 x 10^3 (193 - 200 x 10^3) in tension

Forms

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

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 142 KSI (979 MPa)
Yield Strength: 118 KSI (814 MPa)
Elongation: 13%
Hardness: Rc 28

Properties: Tempered

Custom 450® can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

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Age Hardened: Typical

H900
Ultimate Tensile Strength: 196 KSI (1351 MPa)
Yield Strength: 188 KSI (1296 MPa)
Elongation: 14%
Hardness: Rc 42.5

H950
Ultimate Tensile Strength: 187 KSI (1289 MPa)
Yield Strength: 184 KSI (1269 MPa)
Elongation: 16%
Hardness: Rc 41.5

H1000
Ultimate Tensile Strength: 173 KSI (1193 MPa)
Yield Strength: 169 KSI (1165 MPa)
Elongation: 17%
Hardness: Rc 39

H1050
Ultimate Tensile Strength: 160 KSI (1103 MPa)
Yield Strength: 152 KSI (1048 MPa)
Elongation: 20%
Hardness: Rc 37

H1150
Ultimate Tensile Strength: 142 KSI (979MPa)
Yield Strength: 92 KSI (634 MPa)
Elongation: 23%
Hardness: Rc 28

Additional Properties

Corrosion Resistance

Refer to NACE (National Association 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

Custom 450® can be hardened by cold working and with a heat treatment.

Welding

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

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