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

CUSTOM 455[®], UNS S45500

Strip, Coil, Foil, & Wire, AMS 5617, AMS 5860, ASTM A564, ASTM A693

Applications

Medical devices and instrument, needles, pins

Description

Custom 455[®] stainless steel, a martensitic age-hardenable stainless steel. It provides high strength with good corrosion resistance to atmospheric environments. This alloy is relatively soft and formable in the annealed condition. A single-step aging treatment develops exceptionally high yield strength with good ductility and toughness.

Chemistry Typical

Carbon: 0.05 max
Manganese: 0.50 max
Phosphorus: 0.040 max
Sulfur: 0.030 max
Silicon: 0.50 max
Chromium: 11.00-12.50
Nickel: 7.50-9.50
Molybdenum: 0.50 max
Copper: 1.50-2.50
Columbium + Tantalum: 0.10-0.50
Titanium: 0.080-1.40
Iron: Balance

Physical Properties

Density: 0.28 lbs/in³ 7.75 g/cm³

Electrical Resistivity: ohm-cir-mil/ft

At 70 °F, Condition A: 545.0

At 70 °F, Condition H 950: 456.0 Registered trademark of the Carpenter Technology Corp.

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Thermal Conductivity: BTU-in/hr-ft²-°F

At 212 °F : 125.0

At 392 °F : 137.0

At 572 °F : 148.0

At 752 °F : 162.0

At 932 °F : 172.0

Mean Coefficient of Thermal Expansion: in/in-°F

75-200 °F: 5.90 x 10⁻⁶

75-300 °F: 6.03 x 10⁻⁶

75-500 °F: 6.20 x 10⁻⁶

75-700 °F: 6.45 x 10⁻⁶

75-900 °F: 6.687 x 10⁻⁶

Modulus of Elasticity: ksi (MPa):

29 x 10³ (200 x 10³) in tension

Forms

Coil – Strip, Foil, Ribbon

Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

At gauge: 0.160 inches (4.06 mm)

Ultimate Tensile Strength: 160 KSI (1103 MPa)

Yield Strength: 135 KSI (930 MPa)

Elongation: 8%

Hardness: Rc 33

At gauge: 0.050 inches (1.27 mm)

Ultimate Tensile Strength: 160 KSI (1103 MPa)

Yield Strength: 150 KSI (1034 MPa)

Elongation: 6%

Hardness: Rc 34

Properties: Tempered

Custom 455® can be cold worked to various tempers. Contact Ulbrich Technical Service for additional information.

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Age Hardened: Typical

H900: At gauge: 0.160 inches (4.06 mm)

Ultimate Tensile Strength: 260 KSI (1792 MPa)

Yield Strength: 205 KSI (1724 MPa)

Elongation: 3%

Hardness: Rc 51

H900: At gauge: 0.050 inches (1.27 mm)

Ultimate Tensile Strength: 260 KSI (1792 MPa)

Yield Strength: 250 KSI (1724 MPa)

Elongation: 3%

Hardness: Rc 51

H950: At gauge: 0.160 inches (4.06 mm)

Ultimate Tensile Strength: 250 (1724 MPa)

Yield Strength: 240 (1655 MPa)

Elongation: 4%

Hardness: Rc 48

H950: At gauge: 0.050 inches (1.27 mm)

Ultimate Tensile Strength: 250 KSI (1724 MPa)

Yield Strength: 240 KSI (1655 MPa)

Elongation: 4%

Hardness: Rc 47

H1000 At gauge: 0.160 inches (4.06 mm)

Ultimate Tensile Strength: 220 KSI (1517 MPa)

Yield Strength: 210 KSI (1448 MPa)

Elongation: 6%

Hardness: Rc 46

H1000 At gauge: 0.050 inches (1.27 mm)

Ultimate Tensile Strength: 220 KSI (1517 MPa)

Yield Strength: 210 KSI (1448 MPa)

Elongation: 5%

Hardness: Rc 44

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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 455® 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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