Custom 455®, UNS S45500
Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated
Specifications: AMS 5617, AMS 5860, ASTM A313  ASTM A564, ASTM A693

Custom 455® Alloy Description

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

Applications
Medical devices
Medical instrument
Needles
Pins

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: 0.280 lb/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

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

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 rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

**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

**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
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”.

Custom 455® is a registered trademark of the Carpenter Technology Corp.

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