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

CARPENTER 20 CB-3® STAINLESS, UNS N08020

Strip, Coil, Foil, Wire, UNS NO 8020, ASTM B463

Applications

Synthetic rubber processing, gasoline, solvents, explosives, plastics, synthetic fibers, chemicals, agricultural products, pharmaceutical, fans, tanks, agitators, heat exchangers, tubing caps, washers, pickling racks, gas scrubber parts, pumps, fasteners and valves

Description

Type 20 CB-3® is an austenitic stainless steel possessing excellent resistance to hot sulfuric acid and many other aggressive environments which could readily attack Type 316 stainless. 20 CB-3® stainless is also stabilizes to limit inter-granular attack, even in the sensitized condition. Important advantages of 20 CB-3® stainless are its excellent mechanical properties and comparative ease of fabrication. The presence of Columbium in the alloy minimizes the precipitation of carbides during welding.

Chemistry Typical

Carbon: 0.070 max
Manganese: 2.00 max
Copper: 3.00-4.00
Chromium: 19.00-21.00
Nickel: 32.50-38.00
Molybdenum: 2.00-3.00
Silicon: 1.00 max
Sulfur: 0.035 max
Columbium + Tantalum: 8 x C min-1.00 max
Phosphorus: 0.035 max
Iron: Balance

Physical Properties

Density: 0.292 lbs/in^3, 9.01 g/cm^3

Carpenter 20 CB-3® is a registered trademark of Carpenter Technologies

Electrical Resistivity: microhm-in, (microhm-cm): 68 °F (20 °C) – 28.4 (72)

Specific Heat: BTU/lb/°F (kJ/kg•K):
32 - 212 °F (0 - 100 °C) – 0.12 (0.50)

Thermal Conductivity: BTU/hr/ft²/ft/°F (W/m•K):
At 212 °F: 7.57
At 752 °F: 10.5

Mean Coefficient of Thermal Expansion: in/in/°F
77 - 212 °F – 8.16×10^{-6}
77 - 600 °F – 8.84×10^{-6}
77 - 1652 °F – 9.53×10^{-6}

Modulus of Elasticity: ksi (MPa)
29.0×10^3 (200×10^3) in tension
11.0×10^3 (0.78×10^3) in torsion

Magnetic Permeability: H = 200: Annealed < 1.02

Forms

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

Mechanical Properties at Room Temperature

Properties: Annealed

Ultimate Tensile Strength: 80 KSI min (551 MPa min)
Yield Strength (0.2% offset): 35 KSI min (241 MPa min)
Elongation: 30% min (gauges > .015 inches)
Hardness: Rb 95 max

Properties: Tempered

Type 20 CB-3® can be cold rolled to various tempers. Contact Ulbrich Technical Service for additional information.

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 on all alloys – Contact Ulbrich Sales for more information.*

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 for custom wire finishes.*

Cold Forming

Type 20 CB-3® stainless steel can be readily blanked, deep drawn, formed and upset.

Heat Treatment

Type 20 CB-3® is not hardenable by heat treatment.

Welding

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