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204CU STAINLESS STEEL, UNS S20430

Strip, Coil, Foil and Wire, ASTM A313

Applications

Hinge pins and baskets use in the tobacco industry. Fasteners where higher strength, non-magnetic behaviour and galling resistance over 304 or 304HQ is required.

Description

Alloy 204CU is a chromium-magnesium austenitic stainless steel with an addition of 2-4% copper and nitrogen of 0.05-0.25%. Due to the addition of copper the alloy has better formability than 201 and 304. The copper improves corrosion and resistance to stress corrosion cracking in certain media. 204CU bridges the cost-property gap between 200 and 300 series stainless. Alloy 204CU is slightly after cold working but can be minimized.

Chemistry Typical

Carbon: 0.15 max
Phosphorus: 0.060 max
Silicon: 1.00 max
Nickel: 1.50-3.50
Chromium: 15.50-17.50
Manganese: 6.5-9.0
Copper: 2.00-4.00
Molybdenum: 1.00 max
Sulfur: 0.030 max
Nitrogen: 0.05-0.25
Iron: Balance

Physical Properties

Density: 0.282 lb/in³ 7.81 g/cm³

Electrical Resistivity: ohm-inch (microhms-m): 30.039 (0.763)

Mean Specific Heat: BTU/lb-°F (J/g-°C):

At 73 - 212 °F (23 - 100 °C): 0.119 (.511)

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Thermal Conductivity: BTU-in/hr-ft²-°F (W/m•K)

At 122 °F (50 °C): 93.79 (13.52)

At 212 °F (100 °C): 104.02 (14.99)

At 392 °F (200 °C): 118.31 (17.00)

At 572 °F (300 °C): 131.18 (18.91)

At 752 °F (400 °C): 142.44 (20.53)

At 932 °F (500 °C): 154.43 (22.26)

Mean Coefficient of Thermal Expansion: $\mu\text{in/in-}^\circ\text{F}$ ($\mu\text{m/m-}^\circ\text{C}$)

77 - 212 °F (25 - 100 °C): 9.50 (17.1)

77 - 302 °F (25 - 150 °C): 9.61 (17.3)

77 - 392 °F (25 - 200 °C): 9.77 (17.6)

77 - 482 °F (25 - 250 °C): 9.94 (17.9)

77 - 572 °F (25 - 300 °C): 10.05 (18.1)

77 - 662 °F (25 - 350 °C): 10.16 (18.3)

77 - 752 °F (25 - 400 °C): 10.33 (18.6)

77 - 842 °F (25 - 450 °C): 10.44 (18.8)

77 - 932 °F (25 - 500 °C): 10.55 (19.0)

77 - 1022 °F (25 - 550 °C): 10.66 (19.2)

77 - 1112 °F (25 - 600 °C): 10.77 (19.4)

77 - 1202 °F (25 - 650 °C): 10.83 (19.5)

77 - 1292 °F (25 - 700 °C): 10.77 (19.4)

Modulus of Elasticity: KSI (MPa)

29 x 10³ (200 x 10³) in tension

Magnetic Permeability, H = 200 Oersteds: Annealed: 1.02 max*

** Alloy 204CU is slightly after cold working but can be minimized. For wire products contact Ulbrich Technical Services for details.*

Melting Range: 2552 - 2642 °F (1400 - 1450 °C)

Forms

Coil - Strip, Foil, Ribbon

Wire - Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 92 KSI (635MPa)

Yield Strength: 42 KSI (290 MPa)

Elongation: 75%

Reduction in Area: 77%

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Properties: Tempered Typical5% Cold Worked

Ultimate Tensile Strength: 97 KSI (669 MPa)

Yield Strength: 63 KSI (435 MPa)

Elongation: 69%

Reduction in Area: 77%

10% Cold Worked

Ultimate Tensile Strength: 108 KSI (745 MPa)

Yield Strength: 81 KSI (559 MPa)

Elongation: 49%

Reduction in Area: 65%

20% Cold Worked

Ultimate Tensile Strength: 123 KSI (849 MPa)

Yield Strength: 104 KSI (718 MPa)

Elongation: 34%

Reduction in Area: 54%

30% Cold Worked

Ultimate Tensile Strength: 149 KSI (1026MPa)

Yield Strength: 133 KSI (910 MPa)

Elongation: 26%

Reduction in Area: 66%

40% Cold Worked

Ultimate Tensile Strength: 160 KSI (1104 MPa)

Yield Strength: 150 KSI (1035 MPa)

Elongation: N/A

Reduction in Area: N/A

50% Cold Worked

Ultimate Tensile Strength: 175 KSI (1208 MPa)

Yield Strength: 170 KSI (1173 MPa)

Elongation: 27%

Reduction in Area: 64%

60% Cold Worked

Ultimate Tensile Strength: 208 KSI (1435 MPa)

Yield Strength: 176 KSI (1214 MPa)

Elongation: 18%

Reduction in Area: 62%

Properties: Tempered

Alloy 204CU can be cold worked to additional tempers. Contact Ulbrich Wire Technical Service for additional information.

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Additional Properties

Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

Finishes

1 – Hot rolled annealed and de-scaled. 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 de-scaling. 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.*

Standard 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

Alloy 204CU is non hardenable by heat treatment.

Welding

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

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