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DUPLEX ALLOY 2205, UNS S31803, UNS S32205

Strip, Coil, Foil, Wire, ASTM A 240, ASTM A 276, ASTM A 479,
ASTM A 790

Applications

Welded pipe, tubular components, chemical processing, transport and storage, pulp and paper digesters, liquor tanks and paper machines, oil and gas exploration and processing equipment

Description

Duplex Alloy 2205 is a two-phase, ferritic, austenitic 22% chromium, 3% molybdenum, 5 to 6% nickel alloyed stainless steel. It is the most widely used duplex stainless steel grade and is characterized by high yield strength, double that of the standard austenitic stainless steel grades. It demonstrates good fatigue strength, as well as outstanding resistance to stress-corrosion cracking, crevice, pitting, erosion and general corrosion in severe environments.

Chemistry Typical

Carbon: 0.30 max
Silicon: 1.0 max
Manganese: 2.00 max
Molybdenum: 2.50 – 3.50
Nickel: 4.50 – 6.50
Chromium: 21.00 – 23.00
Phosphorus: 0.03 max
Sulfur: 0.020 max
Nitrogen: 0.08 – 0.20
Iron: Balance

Physical Properties

Density: 0.285 lbs/in³ 7.88 g/cm³

Thermal Conductivity: BTU-ft/hr/ft²/°F (W/m-°K):
At 68 - 212 °F (20 - 100 °C): 11.0 (19.0)

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Mean Coefficient of Thermal Expansion: in/in/°F (µm/m•K):
32 - 212 °F: 7.6×10^{-6} (13.7)

Modulus of Elasticity: ksi (MPa):
 27.5×10^3 (190×10^3) in tension

Forms

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

Mechanical Properties at Room Temperature

Annealed Typical:

Ultimate Tensile Strength: 90 KSI min (620 MPa min)
Yield Strength: (0.2% offset): 65 KSI min (448 MPa min)
Elongation: 25% min
Hardness: Rc 32 max

Tempered

Duplex Alloy 2205 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 for All Alloys - Consult Sales for Applicable Finishes.*

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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

Duplex Alloy 2205 cannot be hardened by heat treatment.

Welding

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

For Reference Only

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