

2205 is a duplex (austenitic-ferritic) stainless steel containing about 40 - 50% ferrite in the annealed condition. 2205 has been a practical solution to chloride stress corrosion cracking problems experienced with 304/304L or 316/316L stainless. The high chromium, molybdenum and nitrogen contents provide corrosion resistance superior to 316/316L and 317L stainless in most environments. 2205 is not suggested for operating temperatures above 600°F

The design strength of 2205 is significantly higher than 316/316L, often permitting lighter wall construction. 2205 has good notch impact toughness down to temperatures below - 40°F. 2205 is welded with E2209 or ER2209 fillers.

**Specifications**

**UNS:** S31803 S32205 **W. Nr./EN:** 1.4462 **ASTM:** A 240, A 276, A 479, A 789, A 790, A 182 (Grade F51), A 923  
**ASME:** SA-240, SA-276, SA-479, SA-789, SA-790, SA-182 (Grade F51), SA-923, Pgroup 10H **NACE:** ISO 15156 / MRO175

**Chemical Composition, %**

	Ni	Cr	Mo	Mn	Si	C	N	S	P	Fe
MIN	4.5	22.0	3.0	—	—	—	0.14	—	—	—
MAX	6.5	23.0	3.5	2.0	1.0	0.03	0.2	0.02	0.03	balance

**Features**

- High resistance to chloride stress corrosion cracking
- Chloride pitting and crevice corrosion resistance superior to 317L stainless
- Good general corrosion resistance
- High strength
- Good sulfide stress corrosion resistance
- Useful up to 600°F

**Applications**

- Chemical process vessels, piping, and heat exchangers
- FGD scrubber systems
- Pulp mill digesters, bleach washers, chip presteaming vessels
- Food process equipment
- Oil field piping, heat exchangers

**Physical Properties**

**Density:** 0.278 lb/in<sup>3</sup> **Melting Range:** 2525-2630°F **Poisson's Ratio:** 0.3 **Electrical Resistivity:** 481 Ohm-circ mil/ft

Temperature, °F	70	212	392	572
Coefficient* of Thermal Expansion, in/in°F x 10 <sup>-6</sup>	—	7.5	7.8	8.1
Thermal Conductivity, Btu • ft/ft <sup>2</sup> • hr • °F	8.1	8.7	9.9	10.5
Modulus of Elasticity Dynamic, psi x 10 <sup>6</sup>	27.6	26.1	25.4	24.9

\* 70°F to indicated temperature.

## Mechanical Properties

## Minimum Specified Properties, ASTM A 240

Ultimate Tensile Strength, ksi	95
0.2% Yield Strength, ksi	65
Elongation, %	25
Hardness MAX, Brinell	290

## Minimum Elevated Tensile Properties, Plate

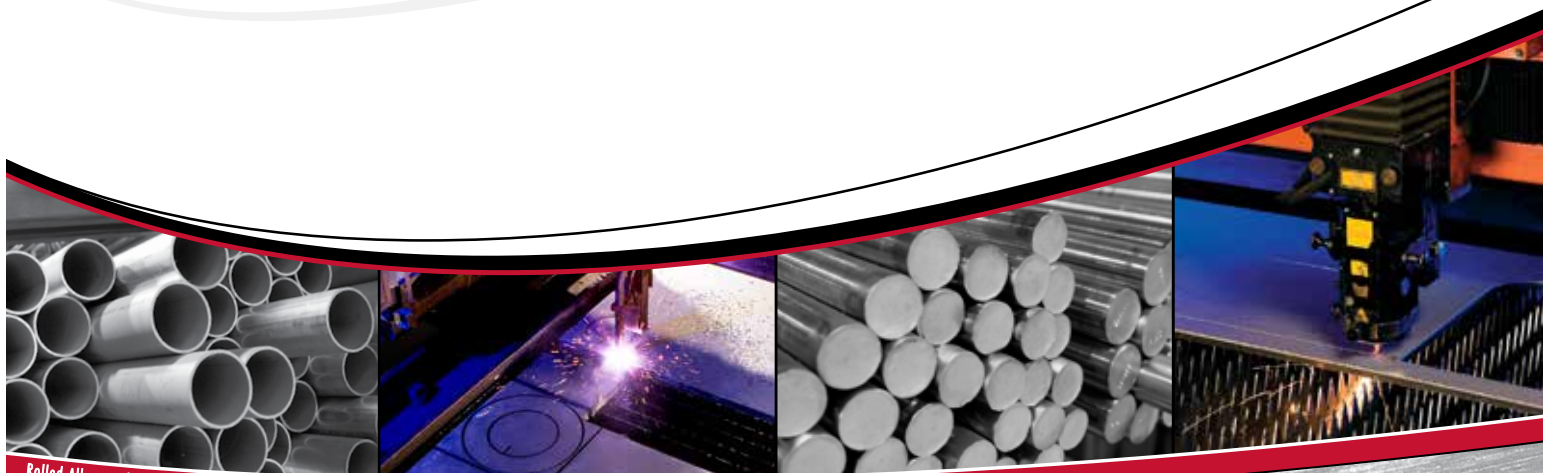
Temperature, °F	212	302	392	482
Ultimate Tensile Strength, ksi	85.5	82.6	79.7	78.3
0.2% Yield Strength, ksi	52.2	48.5	45.6	43.5

## Corrosion Resistance

	PRE <sub>N</sub>	Critical Pitting Temperature, CPT
2205	35	130°F
316/316L	24	62°F

$PRE_N = \%Cr + 3.3 \%Mo + 16 \%N$

CPT; ASTM 6150 (5.8% NaCl)



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