HONGCHEN METAL
INDUSTRIAL METAL MATERIALS

PRODUCT DATA SHEET
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PRODUCT SPECIFICATIONS · BAR

Duplex Steel F51 Round Bar

Chemical composition, mechanical properties and material characteristics

Features

- F51 is a 2205 duplex stainless steel alloy combining 22% chromium, 2.5% molybdenum, and 4.5% nickel with nitrogen.
- It provides high strength, good impact toughness, and strong resistance to stress-corrosion cracking and localized corrosion in demanding environments.

Typical Applications

- Commonly selected for offshore platforms, chemical pressure vessels, desalination plants, oil & gas pipelines, FGD equipment and heat exchangers—where chloride resistance and higher strength than typical 300-series austenitic grades are needed. Confirm medium, temperature and crevice geometry against the project specification.

Product Parameters

Product Name	F51 Bar
Type	Duplex Stainless Steel
Standard	UNS S31803 / S32205; EN 1.4462; ASTM A240, A789/A790, A276/A479, A182.
Surface	No.1 / 1D, 2D, 2B, pickled, sandblasted or shot-blasted; ground finish on request.
Delivery Condition	Solution annealed and pickled (or equivalent condition per order).
Scope of Application	Commonly selected for offshore platforms, chemical pressure vessels, desalination plants, oil & gas pipelines, FGD equipment and heat exchangers—where chloride resistance and higher strength than typical 300-series austenitic grades are needed. Confirm medium, temperature and crevice geometry against the project specification.
Certificate	EN 10204 3.1 mill test certificate as standard; 3.2, PMI, ferrite, ASTM A923 / G48 and impact tests available on request. NACE MR0175 / ISO 15156 compliance available when specified.
Production Technology	Hot- or cold-worked, then solution annealed to restore the balanced ferrite–austenite microstructure and corrosion resistance. Cutting, leveling, slitting and end finishing available. Hot-rolled, forged or cold-drawn routes depending on size; cut-to-length available.
Edge Processing	Cut ends as standard; chamfering, deburring, peeling or centerless grinding available on request.
Round Bar	4–500 mm
Hexagon Bar	18–57 mm (11/16 in–2-3/4 in)
Square Bar	18–47 mm (11/16 in–1-3/4 in)
Flat Steel	1/2–10 in; thickness 2–150 mm; custom sizes.
Length	1–6 m; custom lengths.

Chemical Composition

C	Si	Mn	Cr	Ni	Mo	S	P
≤ 0.03	≤ 1.0	≤ 2.0	21.0～23.0	4.5～6.5	2.5～3.5	≤ 0.02	≤ 0.03

Mechanical Properties

Tensile Strength Kb (MPa)	Yield Strength σ0.2 (MPa)	Elongation D5 (%)	Hardness
≥620	≥450	≥25	≤293HB

Physical Performance

Density(g/cm³)	Modulus of Elasticity(Gpa)	Coefficient of Thermal Expansion(10 -6 /°C)	Coefficient of Thermal Conductivity(W/m * K)	Resistivity(MΩ. cm)
7.88	190	13.7	19.0	80

Selection note: verify PREN, toughness and welding procedure against the chloride service and design code.

Related Properties

Corrosion Resistance	Offers stronger resistance to chloride pitting, crevice corrosion and stress-corrosion cracking than many 300-series austenitic grades in process, marine and brine duties. Final suitability still depends on chloride level, temperature, pH and whether stagnant crevices are present.
Strength Advantage	Yield and tensile strength are typically higher than common austenitic stainless of similar thickness, which can allow thinner wall or higher allowable stress where the design code permits. Confirm mechanical values against the ordered condition and product form.
Weldability	Can be welded with GTAW, GMAW and SMAW when heat input, interpass temperature and duplex-matched filler are controlled to keep a balanced ferrite–austenite weld microstructure. Poor practice may reduce toughness or corrosion resistance in the HAZ.
Forming & Fabrication	Cold forming is feasible but needs higher force and springback allowance than 304/316 because of the higher strength. Hot forming and subsequent solution annealing should follow the grade procedure to restore corrosion performance.
Service Window	Best suited to chloride-bearing aqueous service inside a limited temperature window. Prolonged holding in the 300–550 °C embrittlement range should be avoided unless the grade data explicitly allow it.

Material guidance for your next project

Send your grade, size and application requirements to our team.

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