2205 Duplex Stainless Steel Sheet

OMEGA STEEL CO.
Istanbul · Dilovası plant

1.4462 · S32205 · Duplex 2205 (EN 1.4462, UNS S32205) is the ferritic-austenitic stainless steel that solves the two problems of 316L at once: with 22 % chromium, 3 % molybdenum and 0.17 % nitrogen it has a pitting index (PREN) around 35 against 316L's 24, so it survives brackish and sea water, and its 50/50 ferrite-austenite structure gives a yield strength of 450–500 MPa — twice 316L — so tanks and vessels can be built 30–40 % thinner. It is the material of desalination plants, brine and produced-water systems, chemical tankers, pulp digesters, pressure vessels in the Gulf and offshore structures. We supply 1.5–30 mm sheet and plate to order from EU and Asian mills, 2B and 1D, with 3.1 or 3.2 certificates, cut to size at Dilovası.

1.4462 · S32205 | PREN ≈ 35 | Yield ≥ 450 MPa | Chloride-SCC resistant | 1.5–30 mm to order

When 316L pits in the brine and 304 is out of the question, the answer is not more nickel but a different structure: duplex 2205 is stronger, cheaper per unit of strength and does not crack in chloride — which is why every desalination plant in the Gulf is full of it.

CHEMICAL COMPOSITION

Element	C	Si	Mn	P	S	Cr	Ni	Mo	N
max. % (ladle)	≤ 0.030	≤ 1.00	≤ 2.00	≤ 0.035	≤ 0.015	21.0–23.0	4.5–6.5	2.5–3.5	0.10–0.22

S32205 (modern, dual-certified): Cr 22.0–23.0, Ni 4.5–6.5, Mo 3.0–3.5, N 0.14–0.20 → PREN ≥ 34. S31803 allows the wider range and a PREN as low as 30.

MECHANICAL PROPERTIES

Property	Requirement (EN 10088-2)	Typical value	Note
Yield strength Rp0.2	≥ 450 MPa (sheet) / ≥ 460 (plate)	480–560 MPa	about 2 × 316L
Tensile strength Rm	650–880 MPa	700–780 MPa	
Elongation A	≥ 25 %	28–35 %	
Hardness	≤ 270 HB / 31 HRC	240–260 HB	NACE limit 28 HRC for sour service
Impact at −40 °C	≥ 60 J (plate)	100–200 J	not for use below −50 °C
PREN	≥ 34 (S32205)	35–36	Cr + 3.3 Mo + 16 N
Max. continuous service temperature	—	250–300 °C	475 °C embrittlement above

EQUIVALENT GRADES

System	Grade	Note
EN 10088	1.4462	material number
EN	X2CrNiMoN22-5-3	name
UNS / ASTM A240	S32205 (S31803)	dual-certified
JIS G4304	SUS 329J3L	
GB/T 3280	022Cr23Ni5Mo3N	
Trade names	SAF 2205, Uranus 45N, 2205 Code Plus Two	mill brands
Super duplex	1.4410 / S32750 (2507)	PREN ≥ 40, on request

DUPLEX 2205 VS 316L VS SUPER DUPLEX

	316L (1.4404)	2205 duplex (1.4462)	2507 super duplex (1.4410)
Yield strength	220–300 MPa	450–560 MPa	550–620 MPa
PREN	≈ 24	≈ 35	≥ 40
Chloride SCC	cracks above ≈ 50 °C	resistant	resistant
Sea water, ambient	crevice corrosion	OK	OK, warm sea water
Design temperature	−196 to 500 °C	−50 to 250 °C	−50 to 250 °C
Weldability	easy	good, controlled heat input	good, tighter control
Formability	excellent	moderate — 2 × the springback	moderate
Price per ton (index)	1.00	≈ 1.15–1.30	≈ 1.6–1.9
Price per unit of strength	1.00	≈ 0.6	≈ 0.8
Choose for	food, pharma, general chemical	brine, desalination, tanks, structures	hot sea water, oil & gas

STANDARDS

EN 10088-2 — 1.4462 (X2CrNiMoN22-5-3) · ASTM A240 / A240M — UNS S32205 / S31803 · EN 10028-7 (pressure) — 1.4462 · NACE MR0175 / ISO 15156 — sour service limits · EN 10204 3.1 / 3.2