

NIROSTA® 4462 (UNS S 31803/UNS S 32205)

Ferritic-austenitic duplex steel with high strength and corrosion resistance



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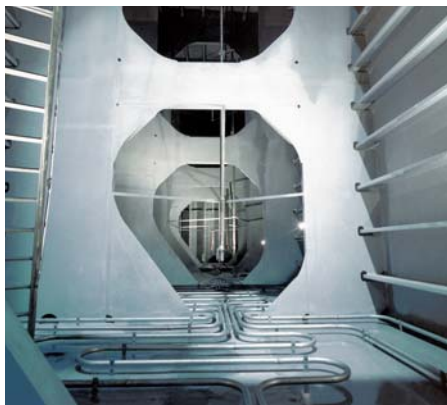


Properties and uses

NIROSTA® 4462 is a duplex stainless steel with a microstructure containing roughly equal amounts of ferrite and austenite. Thanks to its two-phase microstructure, the steel displays high strength and good resistance to stress corrosion cracking, corrosion fatigue and erosion. Its high chromium and molybdenum contents provide good resistance to general corrosion and local corrosion such as pitting, crevice corrosion and stress corrosion cracking in chloride- and H₂S-containing media. The addition of nitrogen has a positive effect on strength, increases resistance to local corrosion, prevents ferritization in the weld area – previously a problem with ferritic-austenitic steels – and retards the precipitation of carbides and intermetallic phases in heat-affected areas.

Thanks to its good corrosion resistance and mechanical properties, NIROSTA® 4462 is mainly used in applications with high corrosion loads.

These include: pipe systems in chemical tankers, storage and transport containers for aggressive media, seawater desalination plants and offshore applications, e.g. for sour gas pipelines and load-bearing structures. For specific applications we recommend consulting our technical customer support service.



Welding properties

The duplex steel NIROSTA® 4462 can be welded by all known methods, including:
Manual TIG welding
TIG plasma welding
TIG orbital welding
Electron beam welding and
Laser beam welding.

To form an adequate ferritic-austenitic structure in the weld, filler materials containing higher amounts of nickel (approx. 8 % - 9 %) are usually used. Particularly suitable filler materials are Thermanit 22/09 and Thermanit 25/07 Cu T.

Welding is usually carried out without pre-heating; the interpass temperature should not exceed 150 °C. To achieve a good ferrite-to-austenite ratio, heat input should be between 0.5 and 2.0 kJ/mm depending on plate thickness and the weld should not be subjected to accelerated cooling.

Welding to austenitic and unalloyed steels is possible.



Product range

Hot- and cold-rolled coil

Hot-rolled coil

Thickness 4.00 to 8.00 mm*)

Width max. 1,350 mm

Coil weight max. 22 t

Finish 1D (hot-rolled, heat-treated, descaled)

*) depending on width

Cold-rolled coil

Thickness 1.00 to 4.00 mm

Width max. 1,350 mm

Coil weight max. 22 t

Finish 2B (cold-rolled, annealed, pickled, skin-passed)

Cut-to-length sheet from hot- and cold-rolled coil and other sizes on request.

Typical chemical composition (mass %)

C	Cr	Ni	Mo	N
0.025	22 – 23	4.5 – 6.5	3.0 – 3.5	0.10 – 0.20

Mechanical properties for cold-rolled sheets (solution annealed)

Strength properties

at RT		Typical values	at elevated temperatures						
			cold-rolled						
			T (°C)	50	100	150	200	250	280
R _{p0,2}	≥ 480 MPa		R _{p0,2}	410	360	335	310	295	285
R _m	680 – 880 MPa		min. (MPa)						
A ₅	≥ 25 %		hot-rolled						
			T (°C)	50	100	150	200	250	280
			R _{p0,2}	410	360	335	310	295	285
			min. (MPa)						

Physical properties

Density (g/cm ³)	Modulus of elasticity at 20°C (10 ³ MPa)	Thermal conductivity at 20°C (W/m · K)	Specific heat at 20°C (J/g · K)
7.8	200	16	0.45
Thermal expansion between 20°C and 100°C (10 ⁻⁶ m/m · K)		Electrical resistivity at 20°C (Ω · mm ² /m)	Magnetic
	200°C 300°C	0.80	Yes
12.0	12.5 13.0		

Heat treatment

All product forms are usually supplied in the solution annealed condition.

Hot forming

°C	Cooling
900-1200	Air

Heat treatment

°C	Holt time after reaching core temperature approx 2 min/mm wall thickness	Cooling
1050-1100		Water or air at adequate speed

Mechanical structure after heat treatment: ferritic-austenitic (ferrite content 40 – 60 %)

Standards

NIROSTA® 4462 meets The requirements of German and foreign standards in relation to composition and properties	Germany¹⁾:	EN 10088-2	1.4462
	Europe:	EN 10088-2	1.4462
	USA:	ASTM/UNS	S 31803/S 32205

1) For requirement AD W2, technical specification VdTÜV Wb 418.

