

NIROSTA® H400

Ultrahigh-strength austenitic stainless steel



NIROSTA®

A company
of ThyssenKrupp
Stainless

ThyssenKrupp NiROSTA



ThyssenKrupp

NIROSTA® H400



Properties and applications

The unstable austenitic microstructure of NIROSTA® H400 gives it a strong work hardening tendency, allowing significant strength increases to be achieved even after only minor deformation. These work hardening characteristics also give the material a high capacity for crash energy absorption.

NIROSTA® H400's properties make it ideal for use in road and rail vehicles and provide wide scope for weight reduction.



Welding

Weldability:

NIROSTA® H400 can be welded by all common techniques. When welding with filler materials, 1.4316 (EN 12 072: JE-308L, AWS 5.9: ER 308L) should be used for welds with similar materials and 1.4370 (EN 12 072: G 188 Mn, AWS 5.9: ER 307 mod.) for welds with unalloyed steels. No preheating or post-welding heat treatment is required.

Temper colors or scaling resulting from heat treatment or welding can be detrimental to corrosion resistance. For applications in particularly critical conditions, they should therefore be removed either chemically (e.g. by pickling) and/or mechanically (e.g. by grinding or blasting with iron and sulfur-free quartz sand).



Fabrication

NIROSTA® H400 shows good hot and cold forming properties. All common cold forming processes can be used, such as bending, deep-drawing, spinning or profiling.

However, the increased yield strength of the material requires higher forming forces than typical chromium-nickel steels, while a higher degree of springback must also be taken into account.

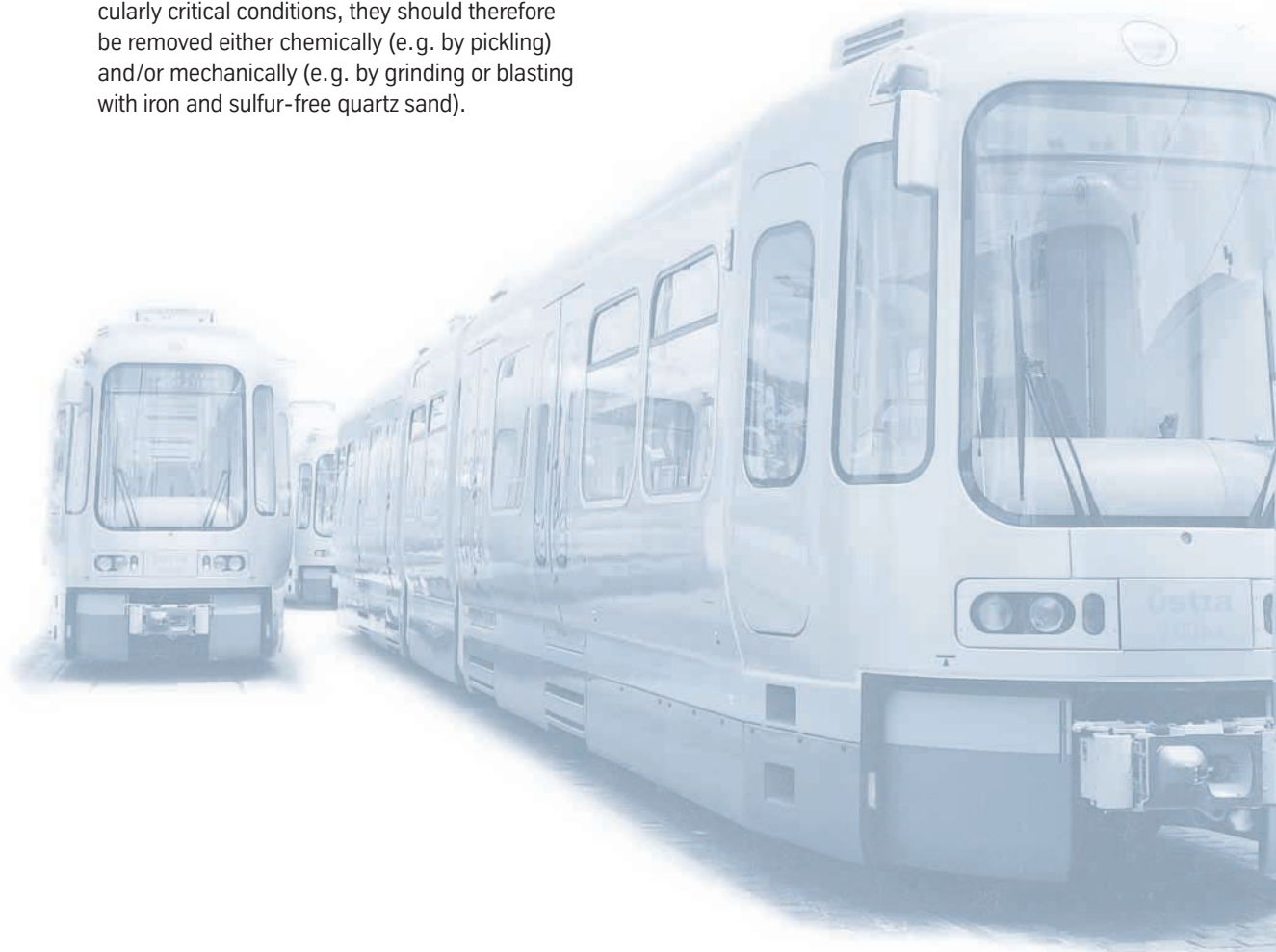
Regarding the material's work hardening tendency and relatively low thermal conductivity, high-quality tool steel or hard metal tools should be used for machining.

Chemical resistance

Corrosion resistance is comparable with NIROSTA® 4301 (AISI 304).

In both as-delivered and welded condition, NIROSTA® H400 is resistant to intergranular corrosion in accordance with DIN 50 914.

Our brochure "*Chemical resistance of NIROSTA® steels*" contains resistance tables providing a guideline to the usability of the materials.



Chemical composition (in weight %)

	C	Si	Mn	P	S	Cr	Ni	N
min.	–	–	6.0	–	–	17.0	–	–
max.	0.10	1.0	9.0	0.045	0.015	19.5	4.5	0.30

Delivery forms

Cold-rolled sheet and strip, gauges 0.7 to 4.0 mm, widths up to 1,550 mm
Hot-rolled strip/sheet in 1D finish, gauges from 4.0 to 6.0 mm, widths up to 1,550 mm
Other sizes on request

Mechanical properties**at room temperature**

0.2 % Yield strength ($R_{p0.2}$) min. N/mm ²	1.0 % Yield strength ($R_{p1.0}$) min. N/mm ²	Tensile strength (R_m) N/mm ²	Elongation (A_{80}) min. % longitudinal transverse	
400	420	600 – 900	40	40

at elevated temperatures

	100 °C	200 °C	300 °C	400 °C	500 °C	600 °C	700 °C	800 °C
0.2 % Yield strength ($R_{p0.2}$) min. N/mm ²	350	290	260	230	200	160	120	60

Hot forming, Heat treatment, Microstructure

Hot forming	Cooling	Heat treatment	Cooling	Microstructure
1,150 to 750 °C	air	1,020 to 1,100 °C	water, air, sufficiently quickly	austenitic

Physical properties

Density at 20 °C kg/dm ³	Modulus of elasticity in kN/mm ² at 20 °C	Thermal conductivity at 20 °C W · m ⁻¹ · K ⁻¹	Specific heat at 20 °C J · g ⁻¹ · K ⁻¹	Electrical resistivity at 20 °C Ω · mm ²
7.9	200	15.0	500	0.73
Thermal expansion in 10 ⁻⁶ · K ⁻¹ between 20 °C and				
100 °C	200 °C	300 °C	400 °C	500 °C
16.0	16.5	17.0	17.5	18.0

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All ThyssenKrupp
Nirosta's plants are certified
acc. to ISO 9001.



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