SÜDWESTFALEN
Edelstahlwerke Südwestfalen GmbH

C: **max. 0,03**
Cr: **16,5 - 18,5**
Ni: **11,0 – 14,0**
Mo: **2,5 – 3,0**
N: **0,12 – 0,22**

1.4429
X2CrNiMoN 17-13-3

1.4429

Stainless austenitic, chromium, nickel, molybdenum, nitrogen steel

Relevant current and obsolete standards:
- EN 10088-3 : 1.4429 X2CrNiMoN 17-13-3
- AISI : 316LN
- BS : 316 S63
- JIS : -
- AFNOR : Z7CND 18-12-03
- DIN : 1.4429
- SIS : 2375

Special grades for particular applications
- cold heading grade
- drawing grade

General properties
- corrosion resistance : very good
- mechanical properties : good
- forgeability : good
- weldability : excellent
- machinability : average

Special properties
- non-magnetic grade ($\mu_r \leq 1{,}10$)
- suited to cryogenic applications
- suitable for use up to 700°C
- approved for pressure vessel manufacture

Physical Properties
- density (kg/dm^3) : 8,0
- electrical resistivity at 20°C (Ω mm^2/m) : 0,75
- magnetisable : no
- thermal conductivity at 20°C (W/m K) : 15
- specific heat capacity at 20°C (J/kg K) : 500
- thermal expansion ($10^{-6}K^{-1}$)
  between 20 and 100°C : 16,0
  20 and 200°C : 16,5
  20 and 300°C : 17,0
  20 and 400°C : 17,5
  20 and 500°C : 18,0

Typical applications
- chemical industry
- petrochemical industry
- pulp and paper industry
- pharmaceutical industry
- textile industry
- production of artificial fibres

Processing properties
- automated machining : seldom
- machinable : average
- hammer and die forging : yes
- cold forming : yes
- cold heading : seldom
- suited to polishing : yes

Finished product forms and conditions
- wire rod
- peeled bars ∅ 20 - 60
- bright bar h9, h11 ∅ 2 – 60
- bright coils h9, ∅ 0,8 - 20
- solution annealed and quenched
- direct quenched
- pickled
- drawn
- straightened
- peeled
- ground

Demand tendency →

1.4429 is essentially a more highly alloyed version of **1.4436** and is specified when the corrosion resistance and/or mechanical properties of **1.4436** are no longer considered to be sufficient.

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Properties, applications and processing

Corrosion resistance (PRE = 26.67 to 31.92)

1.4429 is slightly more resistant to corrosion than **1.4436**, especially in chloride containing environments, due to the addition of nitrogen. This improved corrosion resistance is reflected by the slightly higher PRE values for **1.4429**.

1.4429 displays excellent resistance to corrosion in most natural waters (urban, rural and industrial), even at moderate chloride and salt contents. This grade of stainless steel is also resistant to corrosion in various acid environments.

Due to its low carbon content, **1.4429** is resistant to intergranular corrosion in both the delivered and welded conditions. Please note that **1.4429** is not resistant to sea water.

Heat treatment / mechanical properties

Optimal mechanical and fabrication properties are realised after solution annealing in the temperature range 1020 - 1120°C followed by rapid cooling in air or water.

In the solution annealed condition, the following mechanical properties may be attained when testing in the longitudinal direction:

Property	Specification	Typical
- yield strength (N/mm^2)	$R_{p0,2}$: ≥ 280	400
- tensile strength (N/mm^2)	R_m : 580 – 800	680
- tensile elongation (%)	A_5 : ≥ 40	45
- hardness	HB : ≤ 250	240
- impact energy (J) @ 25°C	ISO-V : ≥ 100	210

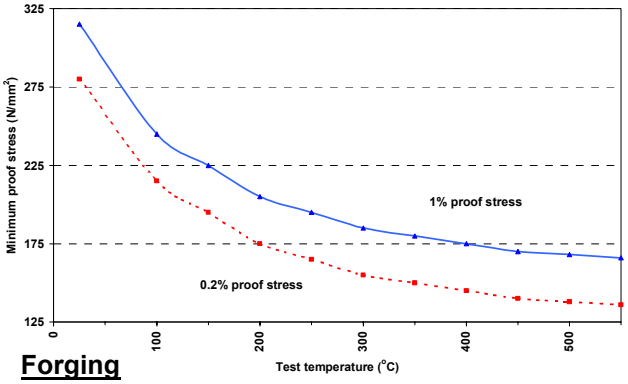
Weldability

1.4429 is readily weldable using all welding processes. Should a filler material be required, **Novonit® 4430**, can be used. Maximum interpass temperature during welding is 150°C. Heat treatment after welding is not necessary.

Any scale or heat tint that results from welding or high temperature processing must either be mechanically or chemically removed followed by a suitable passivating treatment to restore the corrosion resistance.

Elevated temperature properties

The following minimum tensile properties at various temperatures are specified in the EN 10088-3 : 1995 standard.



Forging

Work pieces are usually pre-heated to between 1150 - 1200°C with forging taking place between 1200 and 900°C. After forging, the forged component must be rapidly cooled in either air or water to avoid the formation of any undesirable phases which might adversely affect the corrosion and/or mechanical properties.

Machining

As a result of its higher alloy content, especially the due to the addition of nitrogen, **1.4429** is more difficult to machine than **1.4436** or **1.4435** (Nirocut® version). In addition to this, rapid work hardening and poor thermal conductivity require the use of adequate cooling and high quality cutting/machining tools. For applications which require machining and where corrosion properties are not of primary concern, the use of **NIROCUT® 4435** can be considered. When machining **1.4429**, the following cutting parameters can be used as a guideline when using coated hard metal cutting tools.

tensile strengths R_m in N/mm^2	depth of cut (mm) feed (mm/rev)		
	6 mm 0,5 mm/r	3 mm 0,4 mm/r	1 mm 0,2 mm/r
solution annealed (560 - 640)	100 m/min	125 m/min	165 m/min

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