



MATERIAL No.: 304/1.4301

DESCRIPTION

EN symbol (short)	X5CrNi18-10	Density kg/dm³	7,9
AISI	AISI 304	Hardness HB	160-190
UNS	S 30400 Grade 304	Composition	chromium nickel steel
AFNOR	NF EN 10088-1(06/2005) (FR)	Category	Stainless steels steel, resistant to rust and acids
BS	EN 10088-1 (06/2005) (GB)	Structure	austenitic
		Corrosion	resistance to intergranular corrosion against crevice corrosion
		Additional characteristics	chemically resistant high resistance to sulfurous gas in high temperatures to 5mm

Description This stainless austenitic chrome nickel steel 1.4301 shows high resistance to corrosion (especially in natural environments/sea water and those with low chlorine/salt concentration levels) and is well weldable.
Application areas involving acids require specific testing. Polishes well and is suited for deep drawing. Areas of use include chemical industry, mineral oil industry, petrochemistry and automobile industry.

CHEMICAL COMPOSITION

		C	Mn	P	S	Cr	Si	N	Ni
1.4301	Min %					17,50			8,00
	Max %	0,07	2,00	0,045	0,015	19,50	1,00	0,110	10,50

(Key to steel 2010) DIN-Norms may deviate in some aspects due to different product types

AISI 304	Min %					18,00			8,00
S 30400	Max %	0,08	2,00	0,045	0,030	20,00	1,00		11,00

ASTM A 312-(S 30400) TP 304

PHYSICAL PROPERTIES

Property	Value
Density: kg/dm³	7,9

Hardness: HB	160-190				
Rockwell Hardness Number max..	B90 (TP 304-ASTM A 249)				
Magnetizability	No (may change by cold forming)				
polishable	Yes				
Temperature T °C/F (°C/F)	Specific heat J / kgK (Btu / lb °F)	Thermal conductivity W/mK (Btu-in / ft²·h·°F)	Electric resistance μΩ · cm (Ω circ mill / ft)	Modulus of elasticity kN/mm² (10³ ksi)	Expansion rate from 70°F bis T 10⁻⁶ / K (10⁻⁶ / °F)
20° / 68°	500 (-)	15,0 (-)	0,73 (-)	200 (-)	
100° / 212°		16,0 (-)		194 (-)	16,0 (-)
400° / 752°		17,5 (-)		172 (-)	17,5 (-)
500° / 932°		18,0 (-)		165 (-)	18,0 (-)
600°/1112°		18,5 (-)			
700° / 1292°		18,5 (-)			
800° / 1472°		19,0 (-)			
Temperature °C / °F	0.2% Yield strength in high temperatures Rp 0,2 MPa / ksi	1.0 % Yield strength in high temperatures Rp 1,0 MPa / ksi	Tensile strength in high temperatures Rm MPa / ksi		
100 / 212	>=155 / >=22,5	>=190 / >=27,55	450 / 65,3		
200 / 392	>=127 / >=18,4	>=155 / >=22,5	400 / 58,0		
300 / 572	>=110 / >= 16,0	>=135 / >=19,6	380 / 55,1		
400 / 752	>=98 / >= 14,2	>=125 / >=18,1	380 / 55,1		
500 / 932	>=92 / >= 13,3	>=120 / >=17,4			

ksi value calculated
Deviations possible between different pre-treatments

MECHANICAL PROPERTIES (20°C / 68°F)

Yield strength Rp 1,0 (ksi)	36.2	
Yield strength (ksi/Mpa)	30 / 205	TP 304 (ASTM A 249)
0.2% Yield strength Rp 0,2	>=230 N/mm ²	
Tensile strength (Mpa) / (ksi)	500-700 / 72,5-101,5	
Tensile strength ksi (Mpa)	75 (515)	TP 304 (ASTM A 249)
Elongation (A5) %	35	
Elongation %	35 in 2 in. or 50mm	TP 304 (ASTM A 249)

Notched impact strength ISO-V	60 J	<=75 mm transverse
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TEMPERATURE INFORMATION

Application area		
Operation temperature	-454 °F to 1112 °F	max.
Explanation report	Due to chromium carbide dispersion tendencies, thoroughly test operation temperatures from 840°F-1560°F (DIN EN 10088-3)	
Solution heat treatment		
Working temperature	1886 °F to 2030 °F	
Explanation report	air/ water *	
Processing information	adequate cool down duration	
Working temperature	1832 °F to 2012 °F	period:~5 min/mm thickness
Solution heat treatment		
Working temperature	1562 °F to 2102 °F	
Explanation report	cool down air/water	

STANDARDS / INFORMATION

Standards	Description
ASTM A 182	Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-Temperature Service
ASTM A 213	Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes
ASTM A 249	Standard Specification for Welded austenitic steel boiler, Superheaters, heat-exchangers, and condenser Tubes
ASTM A 269	Standard Specification for Seamless and welded, austenitic, and stainless steel tubing for general purposes
ASTM A 312	Standard Specification for Seamless and welded austenitic stainless steel pipes
ASTM A 403	Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
DIN EN 10028-7 (02/2008)	flat products made from steel for pressure tanks Part 7: Stainless steel
DIN EN 10088-1 (09/2005)	Stainless steels Part 1: List of stainless steels
DIN EN 10088-2 (09/2005)	stainless steel; sheet metal and ribbons out of corrosion resistant steel for general purposes
DIN EN 10088-3 (09/2005)	stainless steels Technical delivery conditions for semi-finished products, bars, rods, wire selection and bright products of corrosion resisting steels for general and construction purposes
DIN EN 10088-4 (08/2009)	stainless steel Building industry: Technical transport conditions for corrosion

	resistant sheet metal and ribbons
DIN EN 10216-5 (11/2004+B1)	Seamless steel tubes under compression load Stainless steel tubes
DIN EN 10217-7 (05/2005)	Welded steel tubes under compression load. Stainless steel tubes
DIN EN 10296-2 (02/2006)	welded circular steel pipes for machine construction and general technical applications, stainless steel
DIN EN 10297-2 (02/2006)	seamless circular steel pipes for machine construction and general technical applications, stainless steel
SEW 310 (08/1992)	physical properties of steel

PROCESS INFORMATION

Chip removing process	solidification danger - choose depth of cut so solidification area will be cut
Welding	
- Material classification acc. CEN ISO/TR 15608	8.1
- Type	well weldable
- Add. material	1.4302;1.4316;1.14551
- Hints	special post heat treating not required

MAIN FIELDS OF APPLICATION

Details of application	This steel is well suited for inside and outside applications, due to it's resistance to organic/inorganic weak acids, water and moisture. It's polishable and fit for deep drawing. Please do a test run before using this material with strong acids. Not suited for application areas involving sea water.
Certifications	Certified for purchase obligating pressure containers in accordance to PED Delivery conditions according to Specifications
Chemical Industry	Detergent production and soap making
Environmental technology	clarification plants
petrochemical industry	
building industry	hand rail construction
cellulose/paper industry	devices chemical digestion containers bleaching containers

RANGE OF PRODUCTS

Product type	Product
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Processing / Construction	from sheets from pipes, fittings, flanges (welded) from bar steel (turning, milling)
Plates / Sheets	plates/sheets plate/sheet cuts
Fittings	welded elbows welded reductions Welded T-pieces seamless reductions seamless T-pieces Other Fittings, Nipples
Flanges / Collars / Flared tube ends	flared tube end collars various flanges (weld neck flange, blind flange etc.) weld neck flange/blind flange
Bumped boiler ends / caps / round blanks	from sheets from bar steel
Pipes / Tubes	welded pipes/tubes welded square pipes/tubes Hollow bar seamless pipes/tubes
Round bar	forged raw
Bar steel	flat steel section steel round bar steel hexagon steel

[Pipe/Tube/Fitting/Flange/Valve/Plate](#)

Stainless Steel/Nickel Alloy/Duplex

