

Designation	EN	ASTM	AISI	LMSA
X2CrNiMo18-14-3	1.4435	-	~ 316L	D310

Chemical composition (Weight %)

Fe	C	Cr	Ni	Mo	Mn	Si	P	S	N
Balance	≤ 0.03	17.0-19.0	12.5-15.0	2.5-3.0	≤ 2.0	≤ 1.0	≤ 0.045	≤ 0.015	≤ 0.110

In order to achieve maximum homogeneity and consistent quality, the actual tolerances on both alloy components and impurities are significantly tighter and more precisely defined than the standard composition indicated.

Upon request, we guarantee that the chemical composition and the degree of residual ferrite comply the standard for the chemical industry "Basler Norm 2, BN2".

Main technical properties and features

Among the steel types, austenitic steels are the most popular and are used most. Apart from a chromium content of 17 %, they contain nickel and perhaps molybdenum, titanium or niobium additives. The nickel content enables the austenitic structure that supports corrosion resistance. The missing second phase - e.g. strain included martensite or ferrite - promotes corrosion resistance. Grade 1.4435 is widely used in the chemical industry, it can often be found on the market with the supplement "BN2" and its relevant regulations. The significant presence of molybdenum in this grade enhances the resistance to chlorides, sulphuric acid and organic acids. This is the reason why stainless steel 1.4435, 316L, X2CrNiMo18-14-3 is often the best choice for applications demanding excellent corrosion resistance. In this alloy, the addition of certain alloying elements, such as nickel, the formation of δ -ferrite in the microstructure is reduced or completely eliminated. The absence of ferrite makes this steel non magnetic in soft temper, however, it may become magnetic with increasing cold working. Due to the higher molybdenum content, this grade provides a better pitting resistance than grade 1.4404. This steel can easily be welded by any conventional joining technique, except the oxyacetylene torch. Depending on the welding conditions, some residual ferrite may form along the welding line. There is no need for any post-weld heat treatment, when the alloy was welded in an annealed condition.

Typical manufacturing range

		Thickness (mm)	Width (mm)	Length (mm)
Rolled products	Strip in coils ¹⁾	0.010 - 1.000	1.5 - 200.0	-
	Strip as sheets ¹⁾	0.015 - 1.000	10.0 - 200.0	100 - 3000

1) Not all our production possibilities are presented here. Other dimensions are available upon request. Certain combinations of thicknesses and widths are not possible.



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Mechanical properties of strips

Temper	Rp0.2 (N/mm ²)	Rm (N/mm ²)	A50 (%)	HV
C550 ^{1), 2)} soft	>220	550-700	>40	150-200
C650 ^{1), 2)} soft	>220	650-850	>40	190-250
C680 ¹⁾ ¼ hard	<900	680-1000	>15	200-300
C950 ¹⁾ ½ hard	<1100	950-1150	>3	250-390
C1100 ¹⁾ hard	<1250	1100-1300	-	310-420
C1250 ¹⁾ extra hard	<1500	1250-1550	-	380-500

1) These tempers do not exactly correspond to the EN 10151 and EN 10088 and are only indicative.

2) Temper C550, soft is only available for thicknesses higher or equal to 0.1mm. For thicknesses < à 0.1mm, soft corresponds to the C650 temper.

Physical properties

Modulus of elasticity	kN/mm ²	200
Poisson ratio		0.33
Density	kg/dm ³	8.0
Melting point / Melting range	°C	1410
Linear dilatation coefficient (20-300°C)	/ °C	0.0000185
Thermal conductivity at 20°C	W/m °K	15
Electrical resistivity	μΩcm	75
Electrical conductivity	MS/m	1.35
Specific heat at 20°C	J/(kg K)	500
Magnetic properties		Non magnetic in sof temper ² μ = 1,005 (soft temper)

Typical uses

Frequently used to manufacture pressure gauges, various watch components, membranes for the chemical industry. Used for parts requiring a prolonged skin contact, and for parts who need to resist to corrosion (pitting).



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Tolerances

Thickness	Thickness (mm)		Lamineries MATTHEY SA		
	≥	<	LMSA standard	LMSA précision	LMSA extrême
		0.025		-	-
<p>The table shown is an outline of our typical thickness tolerances available, which are tighter than industry standards.</p> <p>Upon request: our "LMSA Precision" and "LMSA Extreme" tolerances are also available.</p>	0.025	0.050	± 0.003	± 0.002	± 0.0015
	0.050	0.065	± 0.004	± 0.003	± 0.002
	0.065	0.100	± 0.006	± 0.004	± 0.003
	0.100	0.125	± 0.008	± 0.006	± 0.003
	0.125	0.150	± 0.008	± 0.006	± 0.004
	0.150	0.250	± 0.010	± 0.008	± 0.004
	0.250	0.300	± 0.012	± 0.008	± 0.005
	0.300	0.400	± 0.012	± 0.009	± 0.005
	0.400	0.500	± 0.015	± 0.010	± 0.006
	0.500	0.600	± 0.020	± 0.012	± 0.007
	0.600	0.800	± 0.020	± 0.014	± 0.007
	0.800	1.000	± 0.025	± 0.015	± 0.009
	1.000	1.200	± 0.025	± 0.018	± 0.012
	1.200	1.250	± 0.030	± 0.020	± 0.012
	1.250	1.500	± 0.035	± 0.025	± 0.014

Width

Our width tolerance is + 0.2 -0.0 mm (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.

Camber	Width (mm)		Camber max. (mm/m)			
	>	≤	LMSA standard		LMSA extreme	
			≤ 0.5 mm	> 0.5 mm	≤ 0.5 mm	> 0.5 mm
<p>Our tolerance "standard" respects the EN Standard 1654 (Length of measurement 1000 mm).</p> <p>Other tolerances upon request.</p>	3	6	12	-	6	-
	6	10	8	10	4	5
	10	20	4	6	2	3
	20	250	2	3	1	1.5

Surface

Special surface qualities upon request

Flatness

Special requirement on the longitudinal or transversal flatness upon request