Datasheet:

EN 1.4401/316 – Austenite
Hot rolled Sheets - Stainless Steel

Alumeco ApS
21-11-2024

Internal alloy name:	**1.4401**
Alloy type:	**Acid-resistance Austenite**
Chemical Symbol:	**X5CrNiMo17-12-2**
EN:	**EN 1.4401**
AISI:	**316**
UNS:	**S31600**
SS:	**2347**
JIS:	**SUS316**
GB:	**S31608**

Main usage:

- Food processing industry.
- Brewery, chemical & petrochemical equipment.
- Boat fittings, nuts & bolts, springs.
- Building and Construction sector
- Overland transport tankers

Main properties:

- Great weldability
- High corrosion resistance to non-oxidising acids and chlorine-containing materials
- Good formability, both cold and hot
- Higher thermal expansion and lower heat conductivity compared to other carbon steels

Important norms and literature:

General Standards:
EN 10088-1: List of stainless Steel

Product standards:
EN 10088-2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes

EN 10088-3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes

EN 10028-7: Flat products made of steels for pressure purposes - Part 7: Stainless steels

Geometric Tolerance:
EN 9444-2: Continuously hot-rolled stainless steel – Tolerances on dimensions and form – Part 2: Wide strip and plate/sheet

Bending Tolerance:
DIN 6935:2011-10: Cold bending of flat rolled steel

Surface condition:
EN 10088-2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes

Chemical composition in %: EN 10088-1

C	Si	Mn	P	S	Cr	Mo	Ni	Remarks	Rest
≤ 0,07	≤ 1,00	≤ 2,00	≤ 0,045	≤ 0,030*	16,5-18,5	2,0-2,5	10,0-13,5	N ≤ 0,10	Fe

*** For machinability, a controlled sulfur content of 0,015%-0,030% is recommended & permitted. For weldability a controlled sulfur content of 0,008%- 0,030% is recommended & permitted. For polishability, a controlled sulfur content of 0,015% is recommended.**

Mechanical properties: EN 10088-3

Dim. range (mm)	Temper	Rm MPa	$Rp_{0,2}$ MPa	$Rp_{1,0}$ MPa	Elongation (Longitudinal) A%	Impact energy (Longitudinal) KV_2	Hardness* HB
3-12	Hot rolled	530 - 680	Min. 220	Min. 260	40	100	Max. 215

*** Information values only;**

Physical properties:

Density g/cm³	Electrical resistivity Ω mm² / m	Thermal conductivity W/m K	Thermal expansion (µm m^{-1} K^{-1})	Specific heat (J kg^{-1} K^{-1})	E - modulus (N / mm²)	Magnetizable	PREN (Min.)
8,0	0,75	15	16,0	500	200.000	No	16,5

Typical Alumeco products with this alloy

- **Hot rolled - Dim: 3-12 mm x Length 1000/1250/1500/(2000) mm**

Surface definition: Hot rolled (HR) – 1D

Surface finish	Free of scale
Type of process route	Hot rolled, heat treated, pickled.
Notes	Usually standard for most steel types to ensure good corrosion resistance; also common finish for further processing. It is permissible for grinding marks to be present. Not as smooth as 2D or 2B.
Typical Roughness *Ra*	3,26 µm

Tolerances for cold rolled sheets for EN 1.4401:

Tolerances on specified thickness for hot-rolled wide strip and sheet/plate		
Specified thickness *t* **(mm)**	**Tolerances on specified thickness for nominal width of**	
	w ≤ 1400	1400 < *w* ≤ 2500
t ≤ 2,0	± 0,22	± 0,27
2,0 < *t* ≤ 2,5	± 0,23	± 0,30
2,5 < *t* ≤ 3,0	± 0,26	± 0,31
3,0 < *t* ≤ 4,0	± 0,29	± 0,34
4,0 < *t* ≤ 5,0	± 0,31	± 0,36
5,0 < *t* ≤ 6,0	± 0,34	± 0,38
6,0 < *t* ≤ 8,0	± 0,38	± 0,40
8,0 < *t* ≤ 10,0	± 0,42	± 0,44
10,0 < *t* ≤ 13,0	± 0,46	± 0,48
t > 13,0	The tolerances have to be agreed upon at the time of enquiry and order	

* Values are referred from Table 1 of EN 9444-2

Permitted thickness differences within one coil for hot-rolled wide strip intended for cold rolling			
Specified thickness *t* **(mm)**	**Permitted thickness differences for width of strip**		
	w ≤ 1200	1200 < *w* ≤ 1500	1500 < *w* ≤ 2500
t ≤ 2,0	0,20	0,24	0,28
2,0 < *t* ≤ 3,0	0,22	0,27	0,33
3,0 < *t* ≤ 13,0	0,28	0,32	0,40

* Values are referred from Table 2 of EN 9444-2

Tolerance on width for hot-rolled wide strip and sheet/plate with mill (as rolled) or with trimmed (slit) edges	
Tolerance (mm)	
Mill edges	Trimmed edges
+ 20 0	+ 5 0

* Values are referred from Table 3 of EN 9444-2

Length tolerances for sheet/plate	
Specified length *l* **(mm)**	**Tolerances (mm)**
l ≤ 2000	+ 10 0
2000 ≤ *l* < 20000	+ 0,005 * *l* 0
l ≥ 20000	To be agreed

* Values are referred from Table 4 of EN 9444-2

Tolerances on flatness for sheet/plate		
Specified thickness *t* **(mm)**	**Specified width** *w*	**Tolerances on flatness**
t ≤ 13,0	600 ≤ *w* ≤ 1200	23
	1200 ≤ *w* ≤ 1500	30
	w > 1500	38

* Values are referred from Table 5 of EN 9444-2

Cold bending of flat rolled steel according to DIN 6935:2011

To obtain uniform bends on bending rails, it is recommended that only bending radii from the series below be selected. The values printed in bold are to be preferred. (Dimensions in millimetres)

r	**1**	1,2	**1,6**	2	**2,5**	3	4	5	**6**	8	**10**	12	**16**	**20**	**25**	28	**32**	36	**40**	45	**50**	**63**	**80**	**100**

* Values are referred from DIN 6935:2011-10

Minimum permissible bending radius *r* according to DIN 6935:2011

Steel Grades	**For bending transverse or parallel to the rolling direction**	**Minimum permissible bending radius *r* for thicknesses *s* *(mm)***														
		$s \leq 1$	$1 < s \leq 1{,}5$	$1{,}5 < s \leq 2{,}5$	$2{,}5 < s \leq 3$	$3 < s \leq 4$	$4 < s \leq 5$	$5 < s \leq 6$	$6 < s \leq 7$	$7 < s \leq 8$	$8 < s \leq 10$	$10 < s \leq 12$	$12 < s \leq 14$	$14 < s \leq 16$	$16 < s \leq 18$	$18 < s \leq 20$
S 355 J2	Transverse	1,6	2,5	4	5	6	8	10	12	16	20	25	32	36	45	50
	Parallel	1,6	1,6	4	5	8	10	12	16	20	25	32	36	40	50	63

* Values are referred from Table 1 of DIN 6935:2011-10 (S = Structual; XXX = Min. yield strength in MPa; J2 = Steel sub-grade).

Permissible deviations for minimum bending radii *r* according to DIN 6935:2011

Steel Grades	**Permissible deviations for minimum bending radii *r* for thicknesses *s***		
	≤ 3	$3 < s \leq 8$	$8 < s \leq 20$
S 355 JR	+ 1 0	+ 2 0	+ 3 0

* Values are referred from Table 2 of DIN 6935:2011-10