



Austenitic Stainless Steels 301, 302, 304, 304L, 305, 316, 316L, 321, 347

This group of alloys contain nickel to improve workability such as cold rolling, drawing and welding. They are not hardenable by heat treatment and are non-magnetic in the annealed condition.

Characteristics

- Contain nickel as alloying element
- Not hardenable by heat treatment
- Non-magnetic if annealed
- Better workability than ferritic and martensitic alloys

Typical end use

- 301 high strength uses like flat sound springs, snap disks
- 302/304 in chemical process equipment, shims, welded tubes, hypodermic needles
- 321/347 high temperature corrosion resistant applications
- 316/316L where maximum corrosion resistance is necessary

Nominal Chemical Composition						
Stainless Steel	C	Cr	Ni	Mn	Mo	N
301	0.15	17	7	2 max.		
302	0.15	18	9	2 max.		
304	0.08	19	9.25	2 max.		0.10 max.
304L	0.03	19	10	2 max.		0.10 max.
305	0.12	18	11.75	2 max.		
316	0.08	17	12	2 max.	2.5	
316L	0.03	17	12	2 max.	2.5	
321	0.08	18	10.5	2 max.		0.10 max.
347						

Applicable Specifications					
	EU	USA		Germany	France
Stainless Steel	European Designation	ASTM	AMS Spec. No.	DIN	AFNOR
301	X12CrNi177	A666	5517-5519	1.4310	Z12CN17.07
302	X10CrNi18.8	A666	5516	1.4300	Z12CN18.09
304	X5CrNi1810	A666	5513	1.4301	Z6CN18.09
304L	X2CrNi1911	A666	5511	1.4306	Z2CN18.10
305	X5CrNi1812E	A167	5514		Z8CN18.12
316	X5CrNiMo17122	A666	5524	1.4401	Z6CND17.11
316L	X2CrNiMo17132	A666	5507	1.4404	Z2CND17.12
321		A167	5510		
347			5512	1.4550	Z2CND19.15

Mechanical Properties				
Stainless Steel	Temper	Tensile Strength	Yield Strength	Elongation (% in 50.8mm)
301	Annealed	621-793N/mm ²	207N/mm ² min.	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ² min.	40% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ² min.	25% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ² min.	15% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ² min.	10% min.
	Full Hard	1276N/mm ² min.	966N/mm ² min.	8% min.
302	Annealed	517-759N/mm ²	207-414N/mm ²	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ² min.	35% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ²	10% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ²	9% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ²	5% min.
	Full Hard	1276N/mm ² min.	966N/mm ²	3% min.
304	Annealed	517-690N/mm ²	207N/mm ²	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ²	35% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ²	10% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ²	6% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ²	3% min.
	Full Hard	1276N/mm ² min.	966N/mm ²	1% min.
304L	Annealed	483-690N/mm ²	172N/mm ² min.	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ² min.	35% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ² min.	8% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ² min.	5% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ² min.	2% min.
	Full Hard	1276N/mm ² min.	966N/mm ² min.	1%
305	Annealed	483-690N/mm ²	172N/mm ²	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ²	20% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ² min.	6% min.
316	Annealed	517-690N/mm ²	207N/mm ² min.	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ² min.	30% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ² min.	10% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ² min.	6% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ² min.	3% min.
	Full Hard	1276N/mm ² min.	966N/mm ² min.	1% min.
316L	Annealed	483-690N/mm ²	172N/mm ² min.	40% min.
	1/8 Hard	690-862N/mm ²	379N/mm ² min.	25% min.
	1/4 Hard	862-1034N/mm ²	517N/mm ² min.	8% min.
	1/2 Hard	1034-1207N/mm ²	759N/mm ² min.	5% min.
	3/4 Hard	1207-1379N/mm ²	931N/mm ² min.	2% min.
	Full Hard	1276N/mm ² min.	966N/mm ² min.	1% min.
321	Annealed	517-758N/mm ²	207N/mm ² min.	40% min.
347	Annealed	517-793N/mm ²	207N/mm ² min.	40% min.

Physical Properties			Thermal Properties	
Stainless Steel	Density	Modulus of Elasticity	Thermal Conductivity	Coefficient of Expansion 0-100°C x 10 ⁶ K ⁻¹
301	8.03 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	16.9
302	7.94 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	17.3
304	7.94 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	17.3
304L	7.94 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	17.3
305	8.03 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	17.3
316	7.92 gcm ³	193 Gpa	16.3 Wm ⁻¹ K ⁻¹	16
316L	7.92 gcm ³	193 Gpa	16.1 Wm ⁻¹ K ⁻¹	16
321	7.89 gcm ³	193 Gpa	16.1 Wm ⁻¹ K ⁻¹	16.7
347	8.03 gcm ³	193 Gpa	16.1 Wm ⁻¹ K ⁻¹	16.7

Electrical Properties	
Stainless Steel	Electrical Resistivity uOhm cm
301	72
302	72
304	72
304L	72
305	72
316	74
316L	74
321	72
347	72

If you have any questions regarding the above alloys, or to discuss your requirements, please contact us:

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