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Austenitic Stainless Mechanical Properties

Minimum room-temperature tensile and yield strengths, elongation, reduction of area and hardness for the wrought austenitic stainless steels, quoted for each product form and condition with the ASTM specification that carries the requirement. Reference summary of the published ASM table and not an Aobo Steel standard.

Reference only. Aobo Steel does not set these values as a company standard. The ASTM specification named in each row carries the requirement for that product form and condition. Verify the values below against the applicable standard and the material test certificate.

Type	UNS	Form	Condition	Tensile MPa	Tensile ksi	Yield 0.2% MPa	Yield 0.2% ksi	Elong. %	Red. of area, %	Hardness HRB	ASTM
Type 301	S30100	B	Annealed	620	90	205	30	40	—	95 max	A 666
Type 301	S30100	B, P, Sh, St	Annealed	515	75	205	30	40	—	92 max	A 167
Type 301	S30100	B, P, Sh, St	1/4 hard	860	125	515	75	25	—	—	A 666
Type 301	S30100	B, P, Sh, St	1/2 hard	1030	150	760	110	18	—	—	A 666
Type 301	S30100	B, P, Sh, St	3/4 hard	1210	175	930	135	12	—	—	A 666
Type 301	S30100	B, P, Sh, St	Full hard	1280	185	965	140	9	—	—	A 666
Type 302	S30200	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 302	S30200	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 302	S30200	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 302	S30200	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 302	S30200	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 302	S30200	P, Sh, St	Annealed	515	75	205	30	40	—	92 max	A 167, A 240, A 666
Type 302	S30200	B, P, Sh, St	High tensile, 1/4 hard	860	125	515	75	10	—	—	A 666
Type 302	S30200	B, P, Sh, St	High tensile, 1/2 hard	1030	150	760	110	10	—	—	A 666
Type 302	S30200	B, P, Sh, St	High tensile, 3/4 hard	1205	175	930	135	6	—	—	A 666
Type 302	S30200	B, P, Sh, St	Full hard	1275	185	965	140	4	—	—	A 666
Type 302B	S30215	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 302B	S30215	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 302B	S30215	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 302B	S30215	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 302B	S30215	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 302B	S30215	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167
Type 302Cu	S30430	W (e)	Annealed	550	80	—	—	—	—	—	A 493
Type 302Cu	S30430	W (e)	Lightly drafted	585	85	—	—	—	—	—	A 493
Types 303 and 303Se	S30300, S30323	F	Annealed	515	75	205	30	40	50	—	A 473
Types 303 and 303Se	S30300, S30323	W	Annealed	585–860	85–125	—	—	—	—	—	A 581
Types 303 and 303Se	S30300, S30323	W	Cold worked	790–1000	115–145	—	—	—	—	—	A 581
Type 304	S30400	B, F (f)	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 304	S30400	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 304	S30400	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 304	S30400	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 304	S30400	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 304	S30400	P, Sh, St	Annealed	515	75	205	30	40	—	92 max	A 167
Type 304	S30400	B, P, Sh, St	1/8 hard	690	100	380	55	35	—	—	A 666
Type 304	S30400	B, P, Sh, St	1/4 hard	860	125	515	75	10	—	—	A 666
Type 304	S30400	B, P, Sh, St	1/2 hard	1035	150	760	110	7	—	—	A 666
Type 304L	S30403	F	Annealed	450	65	170	25	40	50	—	A 473
Type 304L	S30403	B	Hot finished and annealed	480	70	170	25	40	50	—	A 276
Type 304L	S30403	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 304L	S30403	B	Cold finished(c) and annealed	480	70	170	25	30	40	—	A 276
Type 304L	S30403	W	Annealed	480	70	170	25	35 (d)	50 (d)	—	A 580
Type 304L	S30403	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 304L	S30403	P, Sh, St	Annealed	480	70	170	25	40	—	88 max	A 167, A 240
Type 304B4	S30424	P, Sh, St grade A	Annealed	515	75	205	30	27	—	95 max	A 887
Type 304B4	S30424	P, Sh, St grade B	Annealed	515	75	205	30	16	—	95 max	A 887
Type 305	S30500	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 305	S30500	B	Cold finished(b) and annealed	260	90	310	45	30	40	—	A 276
Type 305	S30500	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 305	S30500	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 305	S30500	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 305	S30500	P, Sh, St	Annealed	480	70	170	25	40	—	88 max	A 167
Type 305	S30500	B, W	High tensile (d)	1690	245	—	—	—	—	—	—
Cronifer 18-15 LCSi	S30600	P, Sh, St	Annealed	540	78	240	35	40	—	—	A 167, A 240
Type 308	S30800	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 308	S30800	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 308	S30800	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 308	S30800	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 308	S30800	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 308	S30800	P, Sh, St	Annealed	515	75	205	30	40	—	88 max	A 167

Part 1 of 3, covering Type 301 to Type 308. ASM Handbook, Vol 1 (10th ed.), Wrought Stainless Steels, Table 7.

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Austenitic Stainless Mechanical Properties Reference · Aobo Steel

Type	UNS	Form	Condition	Tensile MPa	Tensile ksi	Yield 0.2% MPa	Yield 0.2% ksi	Elong. %	Red. of area, %	Hardness HRB	ASTM
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Types 309, 309S, 310 and 310S	S30900, S30908, S31000, S31008	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167
310Cb	S31040	P, Sh, St	Annealed	515	75	205	30	40	—	95	A 167, A 240
310Cb	S31040	B, Shapes	Hot finished and annealed	515	75	205	30	40	50	—	A 276
310Cb	S31040	B, Shapes	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
310Cb	S31040	B, Shapes	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
310Cb	S31040	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
310Cb	S31040	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 314	S31400	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 314	S31400	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 314	S31400	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 314	S31400	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 314	S31400	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 316	S31600	B, F (f)	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 316	S31600	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 316	S31600	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 316	S31600	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	—
Type 316	S31600	W	Cold finished	620	90	310	45	40 (d)	40	—	A 580
Type 316	S31600	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167, A 240
Type 316L	S31603	F	Annealed	450	65	170	25	40	50	—	A 473
Type 316L	S31603	B	Hot finished and annealed	480	70	170	25	40	50	—	A 276
Type 316L	S31603	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 316L	S31603	B	Cold finished(c) and annealed	480	70	170	25	30	40	—	A 276
Type 316L	S31603	W	Annealed	480	70	170	25	35 (d)	50 (d)	—	A 580
Type 316L	S31603	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 316L	S31603	P, Sh, St	Annealed	485	70	170	25	40	—	95 max	A 167, A 240
Type 316Cb	S31640	P, Sh, St	Annealed	515	75	205	30	30	—	95	A 167, A 240
Type 316Cb	S31640	B, Shapes	Hot finished and annealed	515	75	205	30	40	50	—	A 276
Type 316Cb	S31640	B, Shapes	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 316Cb	S31640	B, Shapes	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 316Cb	S31640	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 316Cb	S31640	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 317	S31700	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Type 317	S31700	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Type 317	S31700	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Type 317	S31700	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Type 317	S31700	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Type 317	S31700	P, Sh, St	Annealed	515	75	205	30	35	—	95 max	A 167, A 240
Type 317L	S31703	B	Annealed	585 (g)	85 (g)	240 (g)	35 (g)	55 (g)	65 (g)	85 max (g)	—
Type 317L	S31703	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167
Type 317LM	S31725	B, P	Annealed	515	75	205	30	40	—	—	A 276
Type 317LM	S31725	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167
Types 321 and 321H	S32100, S32109	B, F	Hot finished and annealed	515	75	205	30	40	50	—	A 276, A 473
Types 321 and 321H	S32100, S32109	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Types 321 and 321H	S32100, S32109	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Types 321 and 321H	S32100, S32109	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Types 321 and 321H	S32100, S32109	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Types 321 and 321H	S32100, S32109	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167, A 240
Types 347 and 348	S34700, S34800	B, F	Hot finished and annealed	515	75	205	30	40	50		A 276, A 473
Types 347 and 348	S34700, S34800	B	Cold finished(b) and annealed	620	90	310	45	30	40	—	A 276
Types 347 and 348	S34700, S34800	B	Cold finished(c) and annealed	515	75	205	30	30	40	—	A 276
Types 347 and 348	S34700, S34800	W	Annealed	515	75	205	30	35 (d)	50 (d)	—	A 580
Types 347 and 348	S34700, S34800	W	Cold finished	620	90	310	45	30 (d)	40	—	A 580
Types 347 and 348	S34700, S34800	P, Sh, St	Annealed	515	75	205	30	40	—	92 max	A 167, A 240
18-18-2	S38100	P, Sh, St	Annealed	515	75	205	30	40	—	95 max	A 167, A 240
Type 384	S38400	W (e)	Annealed	550	80	—	—	—	—	—	A 493
Type 384	S38400	W (e)	Lightly drafted	585	85	—	—	—	—	—	A 493

Part 2 of 3, covering Types 309, 309S, 310 and 310S to Type 384. ASM Handbook, Vol 1 (10th ed.), Wrought Stainless Steels, Table 7.

Austenitic against martensitic

The 300 series cannot be hardened by heat treatment and these minimums are reached by annealing or by cold work. The martensitic grades are hardened by quenching and tempering instead.

Yield is quoted at 0.2% offset

Austenitic stainless has no sharp yield point, so the standard uses the stress that produces 0.2 % permanent strain. Two suppliers quoting yield without saying which offset are not quoting the same number.

Cold work instead of alloy

Quarter hard 301 reaches about twice the yield strength of annealed 301 with no change in chemistry. That is the cheapest strength increase available in the 300 series and the reason spring and strip grades are ordered cold worked.

Austenitic Stainless Mechanical Properties Reference · Aobo Steel

Type	UNS	Form	Condition	Tensile MPa	Tensile ksi	Yield 0.2% MPa	Yield 0.2% ksi	Elong. %	Red. of area, %	Hardness HRB	ASTM
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	B, W	Annealed	550	80	240	35	30	50	—	B 473
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	Shapes	Annealed	550	80	240	35	15	50	—	B 473
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	B, W	Annealed and strain hardened	620	90	415	60	15	40	—	B 473
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	W	Annealed and cold finished	620–830	90–120	—	—	—	—	—	B 473
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	P, Sh, St	Annealed	550	80	240	35	30	—	95 max	B 463
20Cb-3, 20Mo-4, and 20Mo-6	N08020, N08024, N08026	Pi, T	Annealed	550	80	240	35	30	—	—	B 464, B 468, B 474, B 729
Sanicro 28	N08028	P, Sh, St	Annealed	500	73	215	31	40	—	70-90 (g)	B 709
Sanicro 28	N08028	Seamless Tube	Annealed	500	73	215	31	40	—	—	B 668
Type 330	N08330	B	Annealed	485	70	210	30	30	—	—	B 511
Type 330	N08330	P, Sh, St	Annealed	485	70	210	30	30	—	70-90 (g)	B 536
Type 330	N08330	Pi	Annealed	485	70	210	30	30	—	70-90 (g)	B 535, B 546
AL-6X	N08366	B, W	Annealed	515	75	210	30	30	—	—	B 691
AL-6X	N08366	P, Sh, St	Annealed	515	75	240	35	30	—	95 max	B 688
AL-6X	N08366	Pi, T	Annealed	515	75	210	30	30	—	—	B 675, B 676, B 690
AL-6X	N08366	Welded T	Cold worked	515	75	210	30	10	—	—	B 676
JS-700	N08700	B, W	Annealed	550	80	240	35	30	50	—	B 672
JS-700	N08700	P, Sh, St	Annealed	550	80	240	35	30	—	75-90 (g)	B 599
Type 332	N08800	Pi, T	Annealed	515	75	210	30	30	—	—	B 163, B 407, B 514, B 515
Type 332	N08800	Seamless Pi, T	Hot finished	450	65	170	25	30	—	—	B 407
Type 332	N08800	B	Hot worked	550	80	240	35	25	—	—	B 408
Type 332	N08800	B	Annealed	515	75	210	30	30	—	—	B 408
Type 332	N08800	P	Hot rolled	550	80	240	35	25	—	—	B 409
Type 332	N08800	P, Sh, St	Annealed	515	75	210	30	30	—	—	B 409
Type 904L	N08904	B	Annealed	490	71	220	31	35	—	—	B 649
Type 904L	N08904	W	Cold finished	620–830	90–120	—	—	—	—	—	B 649
Type 904L	N08904	Pi, T	Annealed	490	71	220	31	35	—	—	B 673, B 674, B 677
Type 904L	N08904	P, Sh, St	Annealed	490	71	220	31	35	—	70-90 (g)	B 625

Part 3 of 3, covering 20Cb-3, 20Mo-4, and 20Mo-6 to Type 904L. ASM Handbook, Vol 1 (10th ed.), Wrought Stainless Steels, Table 7.

Table notes

- Two values in the source table look like printing defects and are reproduced as printed rather than corrected. Type 205 in bar, plate, sheet and strip is given a hardness of 10 max HRB, where the annealed condition of every sibling type sits at 90 HRB or above.
- Type 202 cold-worked sheet and strip cite ASTM A 660 where every neighbouring row cites A 666. Types 347 and 348 in the hot finished and annealed condition carry no hardness value in the source table, and that cell is left blank here rather than filled in.
- The values above are minimum acceptance values, not typical properties. A heat is tested against the minimum for its product form, so a certificate showing 620 MPa tensile on a type with a 515 MPa minimum is normal and not a different grade. Product form codes are B for bar, P for plate, Sh for sheet, St for strip, and W for wire. A type can carry different minimums in different forms, which is why the same steel appears more than once in the table.
- Cold-worked conditions are given in quarters of hard, from quarter hard to full hard. Tensile and yield strength rise with the amount of cold work and elongation falls. Hardness is given as a maximum for the soft conditions and is often not specified for the cold-worked ones, where the strength minimums already control the condition.
- Composition data is for general reference only. Actual values vary by standard, mill, and heat number. Confirm against the material test certificate (MTC) or contact Aobo Steel.

Aobo Steel, tool steel supplier

Aobo Steel supplies forged tool steel and free-cutting engineering steels from Huangshi, Hubei, China, where the local supply chain covers ESR melting, vacuum degassing and LF refining, forging, hot rolling, turned and peeled bar, heat treatment and third party inspection. We have worked in steel since 2003 and supply to order in cold work grades such as D2, D3 and O1, hot work grades such as H10 and H13, and stainless grades 420, 440C and 4Cr13.

Reference data compiled from ASM Handbook, Vol 1 (10th ed.), Wrought Stainless Steels, Table 7, and from the Aobo Steel austenitic stainless mechanical properties table.

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