



Stainless steel bar sections

Stainless steel bar comprises numerous products referred to by the shape, the section dimension, grade, condition and surface finish.

Shapes and section measurement



Round bar: measured across the diameter.



Square bar: measured across the flats (AF).



Hexagonal bar: measured across the flats (AF).



Flat bar: measured width x thickness.



Equal angle: measured length x width of external faces x material thickness.



Channels: measured flange x web x thickness.



Hollow bar: measured outside diameter (OD) x inside diameter (ID).

Grade

303, 304, 304L, 316, 316L, 321, 416, 431, 2205, 630.

Condition

H&T: Hardened and tempered.

ANN: Annealed.

PH: Precipitation hardened.

Surface finish

CD: Cold drawn.

BD: Bright drawn.

CG: Centreless ground.

CF: Cold finished.

P&T: Peeled and turned.

ST: Smooth turned.

P: Polished.

SRE: Slit rolled edge.

HF: Hot finished.

HRAP: Hot rolled annealed and pickled.

RT: Rough turned/peeled.

PR: Peeled and reeled.

Dimensional tolerances for bar

Form and condition: stainless steel sections				
Round			Square	Hexagonal
Precision ground	Cold drawn	Cold finished/smooth turned		
h8 or h9	h9	h10	h11	h11

ISO dimensional tolerances for bar																		
Nominal bar size (mm)	Tolerance number																	
	01	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
up to 3	0.3	0.5	0.8	1.2	2	3	4	6	10	14	25	40	60	100	140	250	400	600
over 3 to 6	0.4	0.6	1	1.5	2.5	4	5	8	12	18	30	48	75	120	180	300	480	750
over 6 to 10	0.4	0.6	1	1.5	2.5	4	6	9	15	22	36	58	90	150	220	360	580	900
over 10 to 18	0.5	0.8	1.2	2	3	5	8	11	18	27	43	70	110	180	270	430	700	1100
over 18 to 30	0.6	1	1.5	2.5	4	6	9	13	21	33	52	84	130	210	330	520	840	1300
over 30 to 50	0.6	1	1.5	2.5	4	7	11	16	25	39	62	100	160	250	390	620	1000	1600
over 50 to 80	0.8	1.2	2	3	5	8	13	19	30	46	74	120	190	300	460	740	1200	1900
over 80 to 120	1	1.5	2.5	4	6	10	15	22	35	54	87	140	220	350	540	870	1400	2200
over 120 to 180	1.2	2	3.5	5	8	12	18	25	40	63	100	160	250	400	630	1000	1600	2500
over 180 to 250	2	3	4.5	7	10	14	20	29	46	72	115	185	290	460	720	1150	1850	2900
over 250 to 315	2.5	4	6	8	12	16	23	32	52	81	130	210	320	520	810	1300	2100	3200
over 315 to 400	3	5	7	9	13	18	25	36	57	89	140	230	360	570	890	1400	2300	3600
over 400 to 500	4	6	8	10	15	20	27	40	63	97	155	250	400	630	970	1550	2500	4000

Tolerance values given in microns = x0.001mm
 h = all minus j = equal k = all plus

Examples:

25.40mm diameter bar to h9 = +nil, -0.052mm
 38.10mm hexagonal bar to j10 = +0.050mm, -0.050mm
 160mm hot rolled bar to k14 = +1.000mm, -nil

Common stainless steel bar specifications as per ASTM

ASTM A276: This specification covers hot or cold finished bar except bars for reworking (see spec. A314). Includes rounds, squares, hexagons, hot rolled or extruded shapes such as angles, flats, channels and commonly used grades of stainless steel, including 'improved machining'. Free machining grades such as 303 and 416 are not included (see spec. A582/A582M).

ASTM A479: This specification covers the same sections as ASTM A276, for use in pressure vessel construction. Also referred to in ASME boiler and pressure vessel code.

ASTM A582M: This specification covers hot or cold finished free-machining stainless steel bar except bars for forging (see spec. A314). Includes rounds, squares and hexagons in the more commonly used types of stainless steels designed for optimum machinability and general corrosion and high temperature service, primarily grades 303 and 416. Stainless steel bars other than the free-machining types are covered in other specifications.

ASTM A314: This specification covers stainless steel billets and bars intended only for forging.

ASTM A484: This specification covers general requirements that apply to stainless steel wrought bars, shapes, forgings and billets or other semi-finished material (except wire) for forging, under the latest revision of each ASTM specification.