

COMMONLY USED STAINLESS STEEL CHEMICAL ELEMENT COMPOSITION TABLE

Type	Steel number	Chemical composition											
		C	Si	Mn	Cr	Ni	Mo	Cu	Ti	Nb	N	P	S
Austenitic type	S30408	≤0.08	≤1.00	≤2.00	18.00-20.00	8.00-10.50	-	-	-	-	-	≤0.035	≤0.020
	S30403	≤0.030	≤1.00	≤2.00	18.00-20.00	8.00-12.00	-	-	-	-	-	≤0.035	≤0.020
	S30409	0.4-0.10	≤1.00	≤2.00	18.00-20.00	8.00-10.50	-	-	-	-	-	≤0.035	≤0.020
	S32168	≤0.08	≤1.00	≤2.00	17.00-19.00	9.00-12.00	-	-	5xC-0.70	-	-	≤0.035	≤0.020
	S34779	0.04-0.10	≤1.00	≤2.00	17.00-19.00	9.00-12.00	-	-	-	8xC-1.10	-	≤0.035	≤0.020
	S31608	≤0.08	≤1.00	≤2.00	16.00-18.00	10.00-14.00	2.00-3.00	-	-	-	-	≤0.035	≤0.020
	S31603	≤0.030	≤1.00	≤2.00	16.00-18.00	10.00-14.00	2.00-3.00	-	-	-	-	≤0.035	≤0.020
	S31609	0.04-0.10	≤1.00	≤2.00	16.00-18.00	10.00-14.00	2.00-3.00	-	-	-	-	≤0.035	≤0.020
	S31668	≤0.08	≤1.00	≤2.00	16.00-18.00	10.00-14.00	2.00-3.00	-	5xC-0.70	-	-	≤0.035	≤0.020
	S31703	≤0.030	≤1.00	≤2.00	18.00-20.00	11.00-15.00	3.00-4.00	-	-	-	-	≤0.035	≤0.020
	S31008	0.04-0.08	≤1.00	≤2.00	24.00-26.00	19.00-22.00	-	-	-	-	-	≤0.035	≤0.020
	S39042	≤0.020	≤1.00	≤2.00	19.00-21.00	24.00-26.00	4.00-5.00	1.20-2.00	-	-	≤0.10	≤0.030	≤0.010
Austenitic ferritic form	S21953	≤0.030	1.30-2.00	1.00-2.00	18.00-19.50	4.50-5.50	2.50-3.00	-	-	-	0.05-0.12	≤0.030	≤0.020
	S22253	≤0.030	≤1.00	≤2.00	21.00-23.00	4.50-6.50	2.50-3.00	-	-	-	0.08-0.20	≤0.030	≤0.020
	S22053	≤0.030	≤1.00	≤2.00	22.00-23.00	4.50-6.50	3.00-3.50	-	-	-	0.14-1.10	≤0.030	≤0.020

09 COMPARISON TABLE OF MAIN AUSTENITIC STAINLESS STEELS AT HOME AND ABROAD

NO.	China		Japan	America		Korea	BSEN	IS	AS	CNS
	Old licence plate	New licence		ASTM	UNS					
1	1Cr17Mn6Ni5N	12Cr17Mn6Ni5N	SUS201	201	S20100	STS201	1.4372	10Cr17Mn6Ni4N ²⁰	201-2	201
2	1Cr18Mn8Ni5N	12Cr18Mn9Ni5N	SUS202	202	S20200	STS202	1.4373	-	-	202
3	1Cr17Ni17	12Cr17Ni7	SUS3014	301	S30100	STS301	1.4319	10Cr17Ni7	301	301
4	0Cr18Ni9	06Cr19Ni10	SUS304	304	S30400	STS304	1.4301	07Cr18Ni9	304	304
5	00Cr19Ni10	022Cr19Ni10	SUS304L	304L	S30403	STS304L	1.4306	02Cr18Ni11	304L	304L
6	0Cr19Ni9N	06Cr19Ni10N	SUS304N1	304N	S30451	STS304N1	1.4315	-	304N1	304N1
7	0Cr19Ni10NbN	06Cr19Ni9NbN	SUS304N2	XM21	S30452	STS304N2	-	-	304N2	304N2
8	00Cr18Ni10N	022Cr19Ni10N	SUS304LN	304LN	S30453	STS304LN	-	-	304LN	304LN
9	1Cr18Ni12	10Cr18Ni12	SUS305	305	S30500	STS305	1.4303	-	305	305

09 COMPARISON TABLE OF MAIN AUSTENITIC STAINLESS STEELS AT HOME AND ABROAD

NO.	China		Japan	America		Korea	BSEN	IS	AS	CNS
	Old licence plate	New licence		ASTM	UNS					
10	0Cr23Ni13	06Cr23Ni13	SUS309S	309S	S30908	STS309S	1.4833	—	309S	309S
11	0Cr25Ni20	06Cr25Ni20	SUS310S	310S	S31008	STS310S	1.4845	—	310S	310S
12	0Cr17Ni12Mo2	06Cr17Ni12Mo2	SUS316	316	S31600	STS316	1.4401	04Cr17Ni12Mo2	316	316
13	0Cr18Ni12Mo3Ti	06Cr17Ni12Mo2Ti	SUS316Ti	316Ti	S31635	—	1.4571	04Cr17Ni12MoTi ²⁰	316Ti	316Ti
14	00Cr17Ni14Mo2	022Cr17Ni12Mo2	SUS316L	316L	S31603	STS316L	1.4404	~02Cr17Ni12Mo2	316L	316L
15	0Cr17Ni12Mo2N	06Cr17Ni12Mo2N	SUS316N	316N	S31651	STS316N	—	—	316N	316N
16	00Cr17Ni13Mo2N	022Cr17Ni13Mo2N	SUS316LN	316LN	S31653	STS316LN	1.4429	—	316LN	316LN
17	0Cr18Ni14Mo2Cu2	06Cr18Ni12Mo2Cu2	SUS316J1	—	—	STS316J1	—	—	316J1	316J1
18	00Cr18Ni14Mo2Cu2	022Cr18Ni14Mo2Cu2	SUS316J1L	—	—	STS316J1L	—	—	—	316J1L
19	0Cr19Ni13Mo3	06Cr19Ni13Mo3	SUS317	317	S31700	STS317	—	—	317	317
20	00Cr19Ni13Mo3	022Cr19Ni13Mo3	SUS317L	317L	S31703	STS317L	1.4438	—	317L	317L
21	0Cr18Ni10Ti	06Cr18Ni11Ti	SUS321	321	S32100	STS321	1.4541	04Cr18Ni10Ti ²⁰	321	321
22	0Cr18Ni11Nb	06Cr18Ni11Nb	SUS347	347	S34700	STS347	1.455	04Cr18Ni10Nb ⁴⁰	347	347
23	0Cr26Ni5Mo2	—	SUS329J1	329	S32900	STS329J1	1.4477	—	329J1	329J1
24	00Cr18Ni5Mo3Si2	022Cr19Ni5Mo3Si2N	SUS329J3L	—	S31803	STS329J3L	1.4462	—	329J3L	329J3L
25	0Cr13Al	06Cr13Al	SUS405	405	S40500	STS405	1.4002	04Cr13	405	405
26	—	022Cr11Ti	SUH409	409	S40900	STS409	1.4512	—	409L	409L
27	00Cr12	022Cr12	SUS410L	—	—	STS410L	—	—	410L	410L
28	1Cr17	10Cr17	SUS430	430	S43000	STS430	1.4016	05Cr17	430	430
29	1Cr17Mo	10Cr17Mo	SUS434	434	S43400	STS434	1.4113	—	434	434
30	—	022Cr18NbTi	—	—	S43940	—	1.4509	—	439	439
31	00Cr18Mo2	019Cr19Mo2NbTi	SUS444	444	S44400	STS444	1.4521	—	444	444
32	1Cr12	12Cr12	SUS403	403	S40300	STS403	—	—	403	403
33	1Cr13	12Cr13	SUS410	410	S41000	STS410	1.4006	12Cr13	410	410
34	2Cr13	20Cr13	SUS420J1	420	S42000	STS420J1	1.4021	20Cr13	420	420J1
35	3Cr13	30Cr13	SUS420J2	—	—	STS420J2	1.4028	30Cr13	420J2	420J2
36	7Cr17	68Cr17	SUS440A	440A	S44002	STS440A	—	—	440A	440A

TABLE OF OUTER DIAMETER AND WALL THICKNESS

Diameter		Outside diameter	ANSI B36.10, B36.19																
mm	in		sch5s	sch10s	sch10	sch20	sch30	sch40s	STD	Sch40	Sch60	Sch80s	XS	Sch80	Sch100	Sch120	Sch140	Sch160	XXS
6	1/8	10.29	-	1.24	-	-	-	1.73	1.73	1.73	-	2.41	2.41	2.41	-	-	-	-	-
8	1/4	13.72	-	1.65	-	-	-	1.73	1.73	1.73	-	3.02	3.02	3.02	-	-	-	-	-
10	3/8	17.14	-	1.65	-	-	-	2.31	2.31	2.31	-	3.20	3.20	3.20	-	-	-	-	-
15	1/2	21.34	1.65	2.11	-	-	-	2.77	2.77	2.77	-	3.73	3.73	3.73	-	-	-	4.78	7.47
20	3/4	26.67	1.65	2.11	-	-	-	2.87	2.87	2.87	-	3.91	3.91	3.91	-	-	-	5.56	7.82
25	1	33.40	1.65	2.77	-	-	-	3.38	3.38	3.38	-	4.55	4.55	4.55	-	-	-	6.35	9.09
32	1 1/4	42.16	1.65	2.77	-	-	-	3.56	3.56	3.56	-	4.85	4.85	4.85	-	-	-	6.35	9.70
40	1 1/2	48.26	1.65	2.77	-	-	-	3.68	3.68	3.68	-	5.08	5.08	5.08	-	-	-	7.14	10.16
50	2	60.32	1.65	3.05	-	-	-	3.91	3.91	3.91	-	5.54	5.54	5.54	-	-	-	8.14	11.07
65	2 1/2	73.02	2.11	3.05	-	-	-	5.16	5.16	5.16	-	7.01	7.01	7.01	-	-	-	9.52	14.02
80	3	88.90	2.11	3.05	-	-	-	5.49	5.49	5.49	-	7.62	7.62	7.62	-	-	-	11.12	15.24
90	3 1/2	101.60	2.11	3.40	-	-	-	5.74	5.74	5.74	-	8.08	8.08	8.08	-	-	-	-	-
100	4	114.30	2.11	3.40	-	-	-	6.02	6.02	6.02	-	8.56	8.56	8.56	-	11.12	-	13.49	17.12
125	5	141.30	2.77	3.76	-	-	-	6.55	6.55	6.55	-	9.53	9.53	9.53	-	12.70	-	15.88	19.05
150	6	168.28	2.77	4.57	-	6.35	7.04	7.11	7.11	7.11	-	10.97	10.97	10.97	-	14.27	-	18.26	21.94
200	8	219.08	2.77	4.78	-	6.35	7.80	8.18	8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.22
250	10	273.05	3.40	4.78	-	6.35	8.38	9.27	9.27	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40
300	12	323.85	3.96	4.78	6.35	7.92	9.52	9.52	9.52	10.31	14.27	12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40
350	14	355.60	3.96	5.54	6.35	7.92	9.52	*9.52	9.52	11.31	15.09	12.70	12.70	19.05	23.83	27.79	31.75	35.71	-
400	16	406.40	4.19	5.54	6.35	7.92	11.12	*9.52	9.52	12.70	16.66	12.70	12.70	21.44	26.19	30.96	36.52	40.49	-
450	18	457.20	4.78	6.35	6.35	9.52	12.70	*9.52	9.52	14.27	19.05	12.70	12.70	23.82	29.36	34.92	39.47	45.24	-
500	20	508.00	5.54	*7.92	6.35	9.52	14.27	*9.52	9.52	15.09	20.62	12.70	12.70	26.19	32.54	38.10	44.45	50.01	-
550	22	558.8	-	*7.92	7.92	9.52	-	*9.52	9.52	-	22.22	12.70	12.70	28.58	34.92	41.28	47.62	53.98	-
600	24	609.6	-	*7.92	7.92	12.70	15.88	*9.52	9.52	17.48	24.61	12.70	12.70	30.96	38.89	46.02	52.37	59.54	-
650	26	660.4	6.35	*7.92	7.92	1.70	15.88	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
700	28	711.2	-	*7.92	7.92	12.70	15.88	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
750	30	762.0	-	*7.92	7.92	12.70	15.88	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
800	32	812.0	-	*7.92	7.92	12.70	-	*9.52	9.52	17.48	-	12.70	12-70	-	-	-	-	-	-
850	34	863.6	-	*7.92	7.92	12.70	-	*9.52	9.52	17.48	-	12.70	12-70	-	-	-	-	-	-
900	36	914.4	-	*7.92	7.92	-	-	*9.52	9.52	19.05	-	12.70	12-70	-	-	-	-	-	-
950	38	965.2	-	*7.92	7.92	-	-	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
1000	40	1016.0	-	*7.92	7.92	-	-	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
1050	42	1066.8	-	*7.92	7.92	-	-	*9.52	9.52	-	-	12.70	12-70	-	-	-	-	-	-
1100	44	1117.6	-	-	7.92	-	-	-	*9.52	-	-	12.70	12-70	-	-	-	-	-	-
1150	46	1168.4	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1200	48	1219.2	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1300	52	1320.8	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1350	54	1371.6	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1400	56	1422.4	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1500	60	1524.0	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1600	64	1625.6	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1700	68	1727.2	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1800	72	1828.8	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
1900	76	1930.4	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-
	80	2032.0	-	-	-	-	-	-	*9.52	-	-	-	12-70	-	-	-	-	-	-

MECHANICAL PROPERTIES OF FORGINGS

Designation	Material grade	Thickness	Heat treatment condition	Tensile property			HBW
				Rm/MPa	Rp0.2/MPa	A/%	
				No less than			
S11306	06Cr13	≤150	A(800~900缓冷)	410	205	20	110~163
S11348	06Cr13A1	≤150	A(800~900缓冷)	415	170	20	110~160
S30408	06Cr19Ni10	≤150	S(1010~1150快冷)	520	220	35	139~192
		▷ 150~300		500	220	35	131~192
S30403	022Cr19Ni10	≤150	S(1010~1150快冷)	480	210	35	128~187
		▷ 150~300		460	210	35	121~187
S30409	07Cr19Ni10	≤150	S(1010~1150快冷)	520	220	35	≤180 ^a
		▷ 150~300		500	220	35	—
S30453	022Cr19Ni10N	≤150	S(1010~1150快冷)	520	205	40	≤201
S30458	06Cr19Ni10N	≤150	S(1010~1150快冷)	550	240	30	≤201
S32168	06Cr18Ni11Ti	≤150	S(920~1150快冷)	520	205	35	139~187
		▷ 150~300		500	205	35	131~187
S32169	07Cr19Ni11Ti	≤150	S(1010~1150快冷)	520	205	40	≤187 ^a
S34778	06Cr18Ni11Nb	≤150	S(1010~1150快冷)	520	205	40	≤201
S34779	07Cr18Ni11Nb	≤150	S(1050~1180快冷)	520	205	35	≤187 ^a
		▷ 150~300		500	205	35	—
S31608	06Cr17Ni12Mo2	≤150	S(1010~1150快冷)	520	220	35	139~187
		▷ 150~300		500	220	35	131~187
S31603	022Cr17Ni12Mo2	≤150	S(1010~1150快冷)	480	210	35	128~187
		▷ 150~300		460	210	35	121~187
S31609	07Cr17Ni12Mo2	≤150	S(1010~1150快冷)	520	220	35	139~187
		▷ 150~300		500	220	35	131~187
S31653	022Cr17Ni12Mo2N	≤150	S(1010~1150快冷)	520	210	40	≤217
S31658	06Cr17Ni12Mo2N	≤150	S(1010~1150快冷)	550	240	35	≤217
S31668	06Cr17Ni12Mo2Ti	≤150	S(1010~1150快冷)	520	210	35	139~187
		▷ 150~300		500	210	35	131~187
S31703	022Cr19Ni13Mo3	≤150	S(1010~1150快冷)	480	195	35	128~187
		▷ 150~300		460	195	35	121~187
S31008	06Cr25Ni20	≤150	S(1030~1180快冷)	520	205	35	—
		▷ 150~300		500	205	35	—
S39042	015Cr21Ni26Mo5Cu2	≤300	S(1050~1180快冷)	490	220	35	—
S31252	015Cr20Ni18Mo6CuN	≤300	S(1150以上快冷)	650	300	35	—
S21953	022Cr19Ni5Mo3Si2N	≤150	S(950~1050快冷)	590	390	25	—
S22253	022Cr22Ni5Mo3N	≤150	S(1020~1100快冷)	620	450	25	—
S22053	022Cr23Ni5Mo3N	≤150	S(1020~1100快冷)	620	450	25	—
S23043	022Cr23Ni4MoCuN	≤150	S(1020~1100快冷)	600	400	25	—
S25073	022Cr25Ni7Mo4N	≤150	S(1020~1100快冷)	800	550	25	—
S25554	03Cr25Ni6Mo3Cu2N	≤150	S(1020~1100快冷)	760	550	15	—
S51740	05Cr17Ni4Cu4Nb	≤200	S(1020~1060快冷) +Aq (620空冷)	930	725	15	≥277

Forging grade, inspection items and inspection quantity

Forging grade	Inspection item	Inspection quantity
I	Hardness (HBW)	Progressive test
II	Stretch (R _m , R _{p0.2} , A)	A batch of forgings similar to the smelting furnace number, heat treatment in the same furnace, forging process, forging ratio and nominal thickness shall be formed, and the one with the largest nominal thickness shall be selected for each batch
III	Stretch (R _m , R _{p0.2} , A)	
	Ultrasonic detection	Progressive test
IV	Stretch (R _m , R _{p0.2} , A)	Progressive test
	Ultrasonic detection	Progressive test

THE ROLE OF STAINLESS STEEL CHEMICAL ELEMENTS

Carbon: The higher the carbon content, the higher the hardness of the steel, but the worse its plasticity and toughness. **Sulfur:** It is harmful debris in steel, and steel with high sulfur content is easy to be brittle when it is processed under pressure at high temperature, usually called hot brittleness.

Phosphorus: can make the plasticity and toughness of steel significantly decreased, especially at low temperatures more serious, this phenomenon is called cold brittleness. In high-quality steel, sulfur and phosphorus should be strictly controlled. However, on the other hand, the low carbon steel contains higher sulfur and phosphorus, which can make it easy to cut, and it is advantageous to improve the machinability of steel.

Manganese: can improve the strength of steel, can reduce and eliminate the adverse effects of sulfur, and can improve the hardenability of steel, high alloy steel with high manganese content (b) high manganese steel) Feng has good wear resistance and other physical properties.

Silicon: It can improve the hardness of steel, but the plasticity and toughness decline, electrical steel contains a certain amount of silicon, can improve the soft magnetic properties.

Tungsten: can improve the red hardness and thermal strength of steel, and can improve the wear resistance of steel.

Ming: Can improve the hardenability and wear resistance of steel, can improve the corrosion resistance and oxidation resistance of steel.

Sail: can refine the grain structure of steel, improve the strength of steel, toughness and wear resistance. When it is fused into austenite at high temperature, it can increase the hardenability of the steel; On the contrary, when it is present in the carbide form, it will reduce its hardenability.

Molybdenum: can obviously improve the hardenability and thermal strength of steel, prevent tempering brittleness, improve remanence and jiao jiao.

Titanium: can refine the grain structure of steel, thereby improving the strength and toughness of steel, in stainless steel, titanium can eliminate or reduce the intergranular corrosion of steel.

Nickel: can improve the strength and toughness of steel, improve hardenability. When the content is high, some physical properties of steel and alloy can be significantly changed, and the corrosion resistance of steel can be improved.

Boron: When the steel contains a trace amount of (0.001-0.005%) boron, the hardenability of the steel can be increased exponentially.

Aluminum: can refine the grain structure of steel, inhibit the aging of low carbon steel. Improve the toughness of steel at low temperature, but also improve the oxidation resistance of high steel, improve the wear resistance and fatigue strength of steel.

Copper: Its outstanding role is to improve the atmospheric corrosion resistance of ordinary low alloy steel, especially when used with phosphorus.

Theoretical Weight Of Steel

Weight (kg)= Thickness (mm)x width (mm)x length (mm)x density value Density steel grade

7.93201, 202, 301, 302, 304, 304L, 305, 321

7.75405, 410, 420

7.98309S, 310S, 316S, 316L, 347

Stainless steel rod, steel wire, theoretical calculation formula

★ Diameter X diameter X0.00609=kg/m for 410 420 420j2 430 431)

For example: $\phi 50$ 50x50x0.00609=15.23kg/ m

★ Diameter X diameter X0.00623kg/m(applicable to 301 303 304 316 316L 321)

For example: $\phi 50$ 50x50x0.00623=15.575kg/ m

VARIOUS STAINLESS STEEL ADJUSTMENT FORMULAS

Stainless steel plate

Thickness X width X length x 7.93

Such as 2.0x1.22x2.44x7.93=47.2kg/ sheet

Stainless steel pipe

(Outer diameter - wall thickness)x wall thickness X0.02491

For example, (57-3.5)x3.5x0.02491=4.66kg/ m

Stainless steel round steel

Diameter X diameter X0.00623

For example, 18x18x0.00623=2.02kg/ m

Stainless steel Angle

Side length X side length X7.8x0.000198

For example, 40x40x7.8x0.000198=2.47kg/ m

(Side width + side width - side thickness)x side thickness X0.00793

For example, (40+40-3)x3x0.00793=1.83kg/ m

Stainless steel flat steel

Thickness X width X0.00793

For example, 8x80x0.00793=5.08kg/ m

Stainless steel square tube

(Side width X4+3.14- thickness)x thickness X0.02491

For example, (40x4+3.14-3) x3x0.2491 =3.58kg/ m

Hexagonal steel

Opposite side X opposite side x 0.00686

Square steel

Side width X side width X0.00793

Round tube specification : $\Phi 12$ -830mmx1-60mm(outer diameter X wall thickness)

Square tube size : $\Phi 2$ -250mmx2-20mm(side length X wall thickness)

Material:

1Cr17Ni7(301), 0Cr18Ni9(304),

00Cr19Ni10(304L), 0Cr25Ni20(310S),

0Cr17Ni12No2(316), 00Cr17Ni14Mo2(316L),

0Cr18Ni12Mo2Ti(316Ti),

1Cr18Ni9Ti, 0Cr18Ni10Ti(321)

00Cr19Ni13Mo3(317L)等。

Stainless steel profile, theoretical calculation formula

hex bar opposite side X opposite side X0.00686=kg/ m

Bar side width X side width X0.00793=kg/ m

Stainless steel tube, theoretical calculation formula

0(outer diameter - wall thickness)x wall thickness X0.02491=kg/ m

For example $\square 57$ x3.5(57 3.5)x3.5x0.02491 4.66kg/ m

Stainless steel pipe weight calculation formula

Pipe (outer diameter - wall thickness)x wall thickness X0.02491= weight per meter

Round steel outer diameter X outer diameter X0.00623= weight per meter

The calculation formula of the square tube is :0.0246615* (side length *4+3.14- thickness)* thickness

Rectangular tube formula :0.0246615*((length + width)*2+3.14- thickness)* thickness