NIPPON STEEL

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STAINLESS STEEL SHAPES
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NIPPON STEEL

STAINLESS STEEL SHAPES

NIPPON STEEL CORPORATION

Turning over a new leaf for the 21st century

In April, 2000, we started a new life
as a special manufacturer chiefly of special stainless steel
by integrated production starting from the electric furnace.

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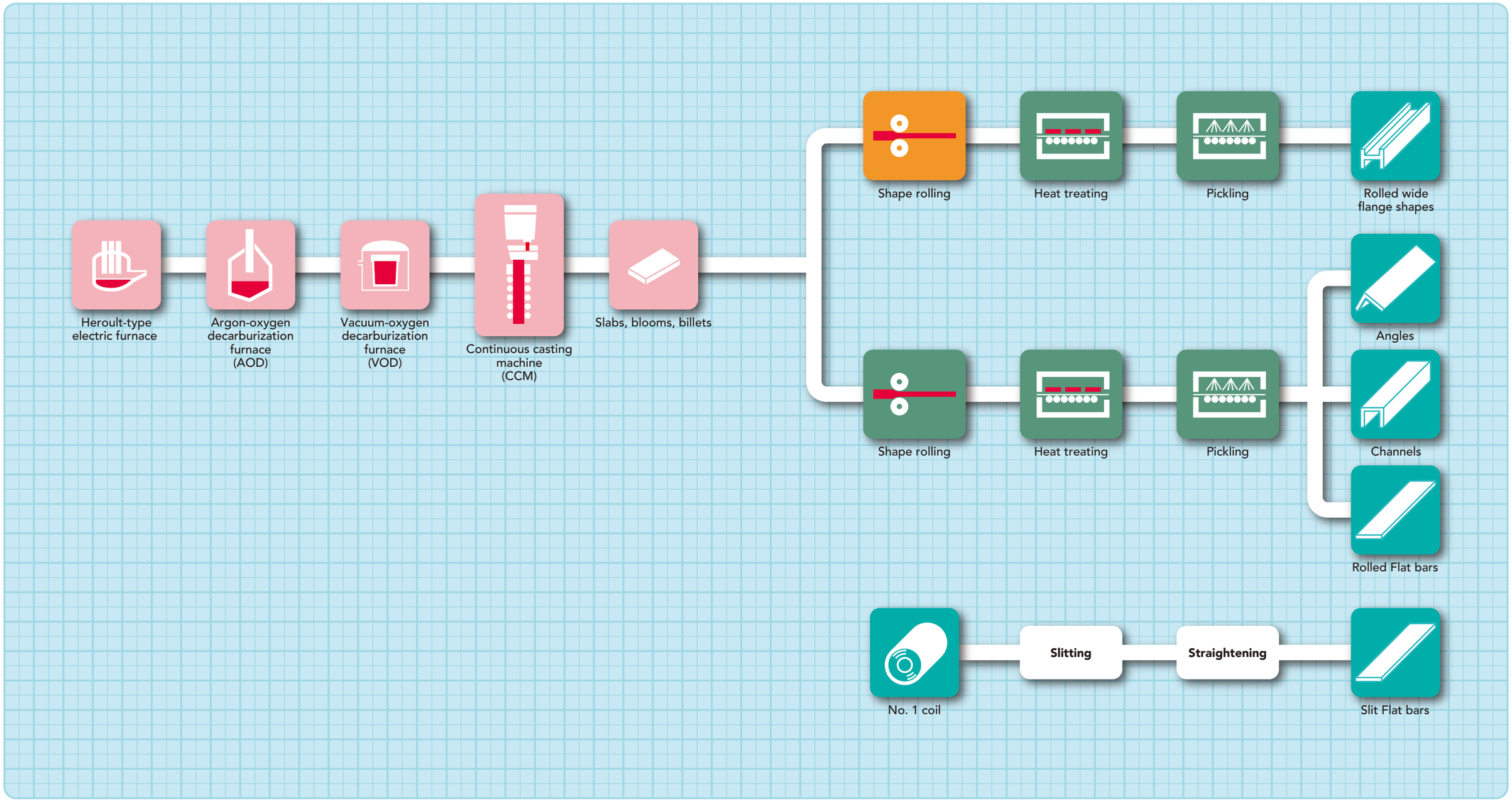
Process flow

Manufacturing of stainless steel shape



Angles

shows standard dimensions.
shows optional dimensions.
tolerance : ASTM MOD.
Products of dimensions other than mentioned above can also be manufactured on request.

Standard dimension and tolerance

Leg A X B (in.)	Thickness (t) and tolerance (in.)						
	1/8	3/16	1/4	5/16	3/8	1/2	3/5
3/4 × 3/4	± 1/8	± 1/8					
1 × 1	± 1/8	± 1/8	± 1/8				
1 1/4 × 1 1/4	± 1/8	± 1/8	± 1/8				
1 1/2 × 1 1/2	± 1/8	± 1/8	± 1/8				
2 × 2	± 1/8	± 1/8	± 1/8	± 1/8	± 1/8	± 1/8	
2 1/2 × 2 1/2		± 1/8	± 1/8	± 1/8	± 1/8	± 1/8	
3 × 3		± 1/8	± 1/8	± 1/8	± 1/8	± 1/8	
3 1/2 × 3 1/2			± 1/8	± 1/8	± 1/8	± 1/8	
4 × 4			± 1/8	± 1/8	± 1/8	± 1/8	± 1/8
5 × 5				± 1/8	± 1/8	± 1/8	± 1/8
6 × 6					± 1/4	± 1/4	± 1/4

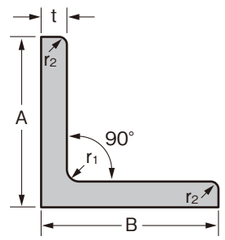
Unit weight lb/ft: Accordance with ASTM
(1) Standard length: Random length of 20-22 feet.
(2) For the sizes and lengths other than above, please consult us.
(3) Size tolerances are in accordance with ASTM.
For other sizes, specifications and tolerances, please contact us.

(Unit:mm)

Leg A × B (mm)	Leg tolerance	Thickness (t) and tolerance (mm)									
		3	4	5	6	7	8	9	10	12	15
20 × 20	± 1.5	± 0.4	± 0.4	± 0.4	± 0.4						
25 × 25	± 1.5	± 0.5	± 0.5	± 0.5	± 0.5						
30 × 30	± 2.0	± 0.5	± 0.5	± 0.5	± 0.5						
40 × 40	± 2.0	± 0.6	± 0.6	± 0.6	± 0.6						
50 × 50	± 2.0	± 0.6	± 0.6	± 0.6	± 0.6	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
60 × 60	± 3.0			± 0.6	± 0.6	± 0.7	± 0.7	± 0.7	± 0.8		
65 × 65	± 3.0			± 0.6	± 0.6	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
70 × 70	± 3.0			± 0.7	± 0.7	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
75 × 75	± 3.0			± 0.7	± 0.7	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
80 × 80	± 3.0				± 0.7	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
90 × 90	± 3.0				± 0.7	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
100 × 100	± 4.0				± 0.7	± 0.7	± 0.7	± 0.7	± 0.8	± 0.8	
125 × 125	± 4.0						± 0.7	± 0.7	± 0.8	± 0.8	± 1.0
150 × 150	± 4.0							± 0.8	± 1.0	± 1.0	± 1.0

Unit weight kg/m: Accordance with JIS
(1) Standard length: 6m and 4m.
(2) For the sizes and lengths other than above, please consult us.
(3) Size tolerances are in accordance with JIS.
For other sizes, specifications and tolerances, please contact us.

Shape accuracy



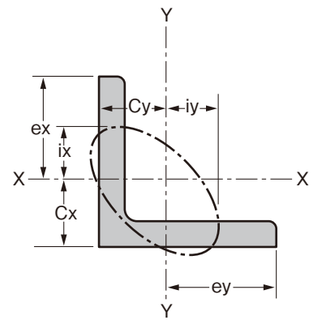
Squareness	90°±2°
Straightness	less than 3mm per 1m, less than [3mm X overall length(m)/1m] per overall length
length	+40, −0mm

Weight tolerance (ASTM)

For angles of 6 lb/ft (9.0kg/m) or less, the weight tolerances shall not exceed ± 7½%. For angles over 6 lb/ft (9.0kg/m), the weight tolerances shall not exceed ± 4½%.

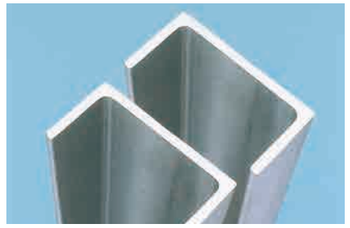
Section modulus

Geometrical moment of inertia: $I=ai^2$
Radius of gyration of area: $i=\sqrt{(I/a)}$
Section modulus: $Z=I/e$
(a=cross-section area)



Standard cross-sectional dimensions (mm)				Cross-section area (cm^2)	Center of Gravity (cm)		Geometrical moment of inertia (cm^4)		Radius of gyration of area (cm)		Section modulus (cm^3)	
Leg A = B	Thick-ness t	r_1	r_2	a	Cx	Cy	Ix	Iy	ix	iy	Zx	Zy
20	3	4	2	1.127	0.595	0.595	0.388	0.388	0.587	0.587	0.276	0.276
25	3	4	2	1.427	0.719	0.719	0.797	0.797	0.747	0.747	0.448	0.448
30	3	4	2	1.727	0.844	0.844	1.42	1.42	0.908	0.908	0.661	0.661
40	3	4.5	2	2.336	1.09	1.09	3.53	3.53	1.23	1.23	1.21	1.21
40	5	4.5	3	3.755	1.17	1.17	5.42	5.42	1.20	1.20	1.91	1.91
50	4	6.5	3	3.892	1.37	1.37	9.06	9.06	1.53	1.53	2.49	2.49
50	6	6.5	4.5	5.644	1.44	1.44	12.6	12.6	1.50	1.50	3.54	3.54
65	6	8.5	4	7.527	1.81	1.81	29.4	29.4	1.98	1.98	6.26	6.26
65	9	8.5	6	10.89	1.92	1.92	37.1	37.1	1.85	1.85	6.23	6.23
75	6	8.5	4	8.727	2.06	2.06	46.1	46.1	2.30	2.30	8.47	8.47
75	9	8.5	6	12.69	2.17	2.17	64.4	64.4	2.25	2.25	12.1	12.1
100	10	10	7	19.00	2.82	2.82	175	175	3.03	3.03	24.4	24.4
125	9	10	6	21.75	3.41	3.41	324	324	3.86	3.86	35.6	35.6
125	12	10	7	28.56	3.53	3.53	416	416	3.82	3.82	46.4	46.4
125	15	10	7	35.25	3.65	3.65	505	505	3.78	3.78	57.0	57.0
150	12	12	7	34.66	4.15	4.15	739	739	4.62	4.62	68.1	68.1
150	15	12	10	42.63	4.25	4.25	888	888	4.56	4.56	82.5	82.5

Channels



● shows welded channels. Other products are rolled.

Standard sizes of channels

(Unit: mm)

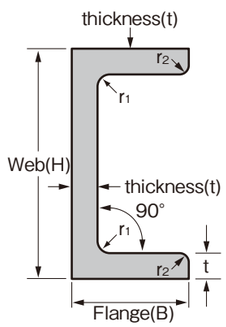
Dimensions Thickness × Flange × Web (t) × (B) × (H)	Flange tolerance			Standard length (Tolerance)
	Thickness	Flange	Web	
5 × 40 × 80	± 0.6	± 1.5	± 1.5	6m (+40m −0mm)
4 × 50 × 100	± 0.6	± 2.0	± 2.0	
5 × 50 × 100	± 0.6	± 2.0	± 2.0	
6 × 50 × 100	± 0.6	± 2.0	± 2.0	
6 × 65 × 130	± 0.6	± 2.0	± 2.0	
6 × 75 × 150	± 0.7	± 2.0	± 2.0	
9 × 75 × 150	± 0.8	± 2.0	± 2.0	
● 10 × 100 × 200	± 1.0	± 3.0	± 3.0	

Unit weight kg/m: Accordance with JIS

(1) Standard length: 6m and 4m.

(2) Size tolerance are in accordance with JIS.

Shape accuracy



Squareness	90°±2°
Straightness	less than 3mm per 1m, less than [3mm X overall length(m)/1m] per overall length
length	+40, −0mm

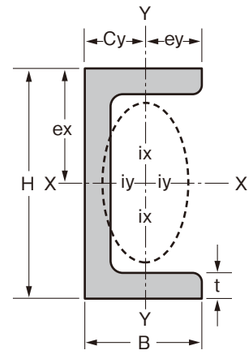
Section modulus

Geometrical moment of inertia: $I=ai^2$

Radius of gyration of area: $i=\sqrt{(I/a)}$

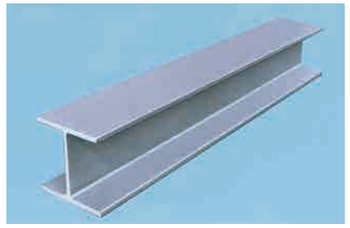
Section modulus: $Z=I/e$

(a=cross-section area)



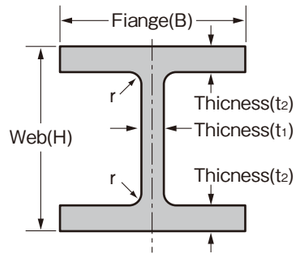
Standard cross-sectional dimensions (mm)			Cross-section area (cm^2)	Center of Gravity (cm)		Geometrical moment of inertia (cm^4)		Radius of gyration of area (cm)		Section modulus (cm^3)	
Thickness × Flange × Web (t) × (B) × (H)	r_1	r_2	a	Cx	Cy	Ix	Iy	ix	iy	Zx	Zy
4 × 50 × 100	6.5	3	7.823	0	1.36	121	18.2	3.93	1.52	24.2	4.99
5 × 40 × 80	4.5	3	7.548	0	1.16	71.1	10.9	3.07	1.20	17.8	3.83
5 × 50 × 100	6.5	3	9.643	0	1.40	146	22.1	3.89	1.52	29.2	6.15
6 × 50 × 100	6.5	4.5	11.37	0	1.43	168	25.3	3.85	1.49	33.7	7.09
6 × 65 × 130	8.5	4	15.12	0	1.80	390	58.9	5.08	1.97	60.0	12.5
6 × 75 × 150	8.5	4	17.52	0	2.05	609	92.3	5.89	2.30	81.2	16.9
9 × 75 × 150	8.5	6	25.54	0	2.16	850	129	5.77	2.25	113	24.2
10 × 100 × 200	10.0	7	38.22	0	2.81	2308	351	7.77	3.03	231	48.8

Rolled wide flange shapes

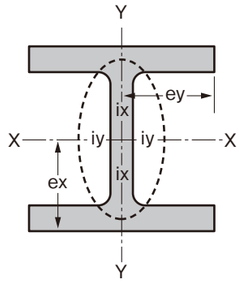


Standard sizes and characteristics of rolled wide flange shapes

Shape accuracy



Section modulus



Geometrical moment of inertia: $I=ai^2$
Radius of gyration of area: $i=\sqrt{(I/a)}$
Section modulus: $Z=I/e$
(a=cross-section area)

Standard cross-sectional dimensions (mm)					Cross-section area (cm^2)	Weight (kg/m)	Geometrical moment of inertia (cm^4)		Radius of gyration of area (cm)		Section modulus (cm^3)	
dimension Web × Flange	(H) × (B)	t_1	t_2	r	a	TP 304	Ix	Iy	ix	iy	Zx	Zy
100 × 100	100 × 100	6	8	8	21.59	17.1	378	134	4.18	2.49	75.6	26.7
125 × 125	125 × 125	6.5	9	8	30.00	23.8	839	293	5.29	3.13	134	46.9
148 × 100	148 × 100	6	9	8	26.35	20.9	1000	150	6.17	2.39	135	30.1
150 × 150	150 × 150	7	10	8	39.65	31.4	1620	563	6.40	3.77	216	75.1
200 × 100	200 × 100	5.5	8	8	26.67	21.1	1810	134	8.23	2.24	181	26.7
200 × 200	200 × 200	8	12	13	63.53	50.4	4720	1600	8.62	5.02	472	160
250 × 250	250 × 250	9	14	13	91.43	72.5	10700	3650	10.8	6.32	860	292

Unit weight kg/m: Accordance with JIS.
(1) Stardand length: 6m.
(2) Size tolerance are in accordance with JIS.

Dimensional tolerance

Item		Range	Tolerance
Flange (B)			± 3.0
Web (H)		H<400	± 3.0
Thick-ness	Flange t_2	t_2<16	± 1.0
	Web t_1	t_1<16	± 1.5
Length		6000	+ 40, − 0

(Unit: mm)

Item	Range	Tolerance
Squareness	H≦300	Less than [1.2% of B] min. 2.0mm
Straightness	H≦300	Less than [2.0% of L]
Variation of center	H≦300	± 3.0

Stainless steel shapes with remarkable diversification and function

Mechanical and physical properties

East Nippon Works Naoetsu area supplies a wide variety of stainless steel shapes to meet the growing demands from all fields of the industrial world such as manufacturers of industrial plants and equipment, building constructors, etc. These products are manufactured through a totally computerized ingredient blending and manufacturing system so that they can completely satisfy various applications. All our stainless steel shapes have passed the strict quality contorol system, and are ready for any designated application.

Classification/ Type	Chemical composition(%)										Mechanical properties			
Code	C	Si	Mn	P	S	Cr	Ni	Mo	N	Others	Yield strength 0.2% offset KSI	Tensile strength KSI	Elonga-tion %	Reduction of area %
TP 304	≦0.08	≦1.00	≦2.00	≦0.045	≦0.030	18.00～20.00	8.00～10.50		≦0.10		≧30	≧75	≧40	≧50
TP 304L	≦0.030	≦1.00	≦2.00	≦0.045	≦0.030	18.00～20.00	8.00～12.00		≦0.10		≧25	≧70	≧40	≧50
TP 316	≦0.08	≦1.00	≦2.00	≦0.045	≦0.030	16.00～18.00	10.00～14.00	2.00～3.00	≦0.10		≧30	≧75	≧40	≧50
TP 316L	≦0.030	≦1.00	≦2.00	≦0.045	≦0.030	16.00～18.00	10.00～14.00	2.00～3.00	≦0.10		≧25	≧70	≧40	≧50

Classification/ Type	Physical properties							Heat treatment	properties	Applications
Code	Specific heat J/kg·℃	Melting point ℃	Heat con-ductivity W/m·℃	Expansion coefficient 0-100℃ $\times 10^{-6}$/℃	Specific electrical resistance μΩcm	Modulus elas-ticity 10^5Nmm²	Specific gravity			
TP 304	500	1399～1454	16.3	17.3	72	1.93	7.93	1010～1150℃ with accelerated cooling	Multi-purpose with excellent anti-corrosive and welding properties, generally know as"18Cr-8Ni steel"	Chemical plant facili-ties, construction ma-terials, kitchenwares, etc.
TP 304L	500	1399～1454	16.3	17.3	72	1.93	7.93	1010～1150℃ with accelerated cooling	Super low-carbon 304 that prevents intergranular cor-rosion, usable as welded	Chemical plant facili-ties, construction ma-terials, food process-ing facilities, etc.
TP 316	500	1371～1399	16.3	16.0	74	1.93	7.98	1010～1150℃ with accelerated cooling	Improved anti-corrosive and acid-resistant properties through the addition of mo-lybdenum, also excellent in heat-resistance properties	Chemical plant facili-ties, food processing facilities, construction materials, etc.
TP 316L	500	1371～1399	16.3	16.0	74	1.93	7.98	1010～1150℃ with accelerated cooling	Super low-carbon version of 316 to prevent inter-granular corrosion, usable as welded	Chemical industries, food processing, tex-tile industry facilities, etc.

Corresponding Standards

Standards					
AISI					
ASTM	A276	A479			
ASME	SA-479				
AMS	5639	5647	5648	5653	QQ-S-763