



CSE GROUP

<http://www.csee.com.tw>



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Worldwide service:

New York | India | Thailand | China | Xiamen | Guangzhou | France



The Logo That You Can Trust.

The manufacture of Stainless Steel
for Semiconductor use.

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**CSE Group offer you
the best solution.**

- Valve
- Tube & Pipe
- Fitting
- Flange
- Components

About CSE Group

CSE Group has been dealing with purity hygienic stainless steel pipes, fittings and valves which use on food, dairy, pharmaceutical for more than 30 years.

Based on specialization and systematic process:

- ▶ R&D-3D/ CAD/ CAM...
- ▶ Basic materials- hot forging, lost wax casting, pipe making, cold drawn pipe
- ▶ Complete processing capabilities- CNC M/C, CNC lathe, forming, bending, welding, surface treatment, electrolytic polishing.
- ▶ Professional/ pure assembly, packaging, Q.C class 10000 clean room packaging.

So far, CSE Group has 3 factories that located in Taiwan, Thailand and China, and there are more than 700 employees in CSE Group able to provide all professional, technical and pure all-round services to meet all your requirements for Semi-Conductor, Pharmaceutical all of Vacuum, Gas, and also for requests to pure pipe line & tube, accessories and valves, as well as OEM, ODM services.



TAI WAN



THAILAND



CHINA

CSE has developed our semiconductor, vacuum pipe fittings and components based on its expertise in pharmacy, sanitary fittings, valves and more than 30 years of experience.

Our Vacuum and semiconductor range include.

- Clamp and claw clamp
 - Aluminum & stainless steel
- Available Flange, Center Ring
 - KFISO specification.
- Pipe & Pipe Elbow, TEE, Reducer
 - All of AP, BA, MP, EP Pipe(Tube) and Elbow, Tee, Reducer. Weld and Flange End ...
 - Surface - Blasted, Vibrate, Mechanical / Electric polish -
 - Ra$\leq 0.8\mu\text{m}$, M/P, and Ra$\leq 0.25\mu\text{m}$- E/P





Kinds of Ball Valve For SEMI-CONDUCTOR



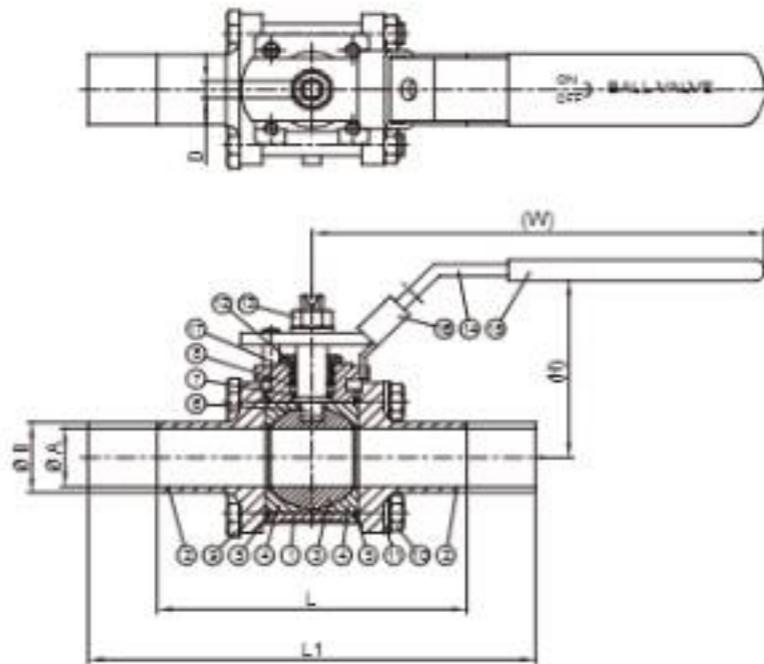
BALL VALVE FOR SEMI- CONDUCTOR AND CHEMICAL

CSE High Purity Ball Valve

- 3-pc 2-way or 4-pc 3-way or multi-port ball valve designed can be using under high pressure/ high temperature based on quality PTFE seats and be working for processing of flow temperature and fluid.
- It is also easy to maintain, replace repair kits and clean.
- Options of ISO 5211 mound plate High/ Low or extra neck design for your pneumatic valves of installing actuator or using for isolation control.
- Weld end, extension long weld end and KF Flange connect can be asked. Purge port design for gas clean if necessary.
- Q/C and Pack:
- Blow down with Nitrogen in Class 10,000 Cleanroom. CFOS degrease cleaning and purity pack.
- Surface:
- M/P – RA</=0.38um, E/P Ra</= 0.2um.

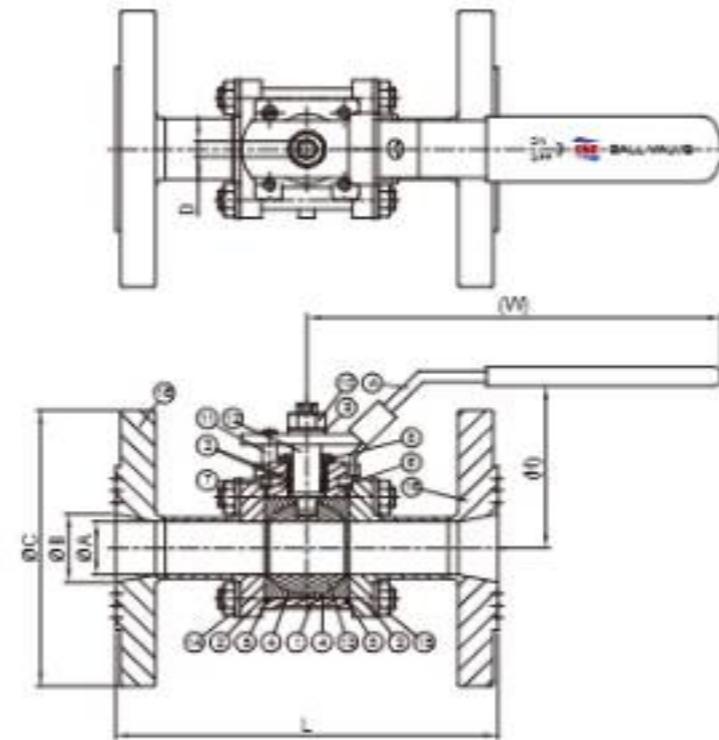


DN	BA	BB	BC	ISO	DA	DB	DC	D	(H)	L	L1	(W)
DN10	10	13	34	DN8	10.3	13.5	34	5	58.3	89	135	130
DN15	16	19	34	DN10	14	17.2	34	5	62.9	101	135	130
DN20	20	23	34	DN15	18.1	21.3	34	6.5	66.8	113.8	164.8	166.7
DN25	26	29	50.5	DN20	23.7	26.9	50.5	6.5	66.8	113.8	164.8	166.7
DN32	32	35	50.5	DN25	30.5	33.7	50.5	8.5	86.8	140	165	192.5
DN40	38	41	50.5	DN32	39.2	42.4	50.5	8.5	86.8	140	165	192.5
DN50	50	53	64	DN40	45.1	48.3	64	8.5	94.5	157.3	190	192.5
DN65	66	70	91	DN50	57.1	60.3	77.5	12	126.75	197	205	254
DN80	81	85	106	DN65	72.9	76.2	91	12	135	229	264.5	254
				DN80	85.7	88.9	106					
DN100	100	104	119	DN100	111.1	114.3	130	16	155.5	243.4	305.9	335



PARTS LIST			
Item	Parts name	QTY	Material
1	Body	1	ASTM-A351-CF8M
2	Cap	2	ASTM-A351-CF8M
3	Ball	1	A351-CF8M
4	Seat	2	PTFE
5	Gasket	2	PTFE
6	Stem	1	AISI 316
7	Thrust washer	1	PTFE
8	Stem packing	1	PTFE
9	Bolt	4	AISI 304
10	HEX Nut	4	AISI 304
11	Spring washer	5	AISI 304
12	Gland	1	AISI 304
13	Nut	1	AISI 304
14	Handle	1	AISI 304
15	Plastic cover	1	plastic
16	Lock device	1	AISI 304
17	Stop pin	1	AISI 304

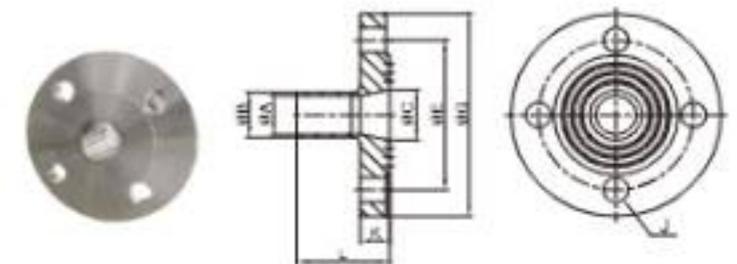
SIZE	ØA (Sch.10)	ØA (Sch.40)	ØB	D	ØE	L	L1	W
15A	17.12	15.8	21.34	5	58.3	89	135	130
20A	22.45	20.93	26.67	5	62.9	101	135	130
25A	27.86	26.64	33.4	6.5	66.8	113.8	164.8	166.7
40A	42.72	40.89	48.26	8.5	86.8	140	165	192.5
50A	54.79	52.5	60.33	8.5	94.5	157.3	190	192.5
65A	66.93	62.71	73.03	12	126.75	197	205	254
80A	82.8	77.93	88.9	12	135	229	264.5	254
100A	108.2	102.26	114.3	16	155.5	243.4	305.9	335



PARTS LIST			
Item	Parts name	QTY	Material
A	Handle	1	AISI 304
1	Body	1	CF3M AISI 316L
2	Cap	2	CF3M AISI 316L
3	Spring washers	2	AISI 304
4	Seat sealing ring	2	PTFE, FDA compliat
5	Flange sealing ring	2	PTFE, FDA compliat
6	Conical spindle seal	1	PTFE, FDA compliat
7	V-ring spindle packing	1	PTFE, FDA compliat
8	Gland	1	AISI 304
9	Washer	1	AISI 304
10	Upper spindle nut	1	AISI 304
11	stop pin	1	AISI 304
12	Spindel (Stem)	1	AISI 316L
13	Ball	1	CF3M AISI 316L
14	Bolt	4	AISI 304
15	Nut	8	AISI 304
16	Flange	2	AISI 316L
-	Antistatic device	2	AISI 316

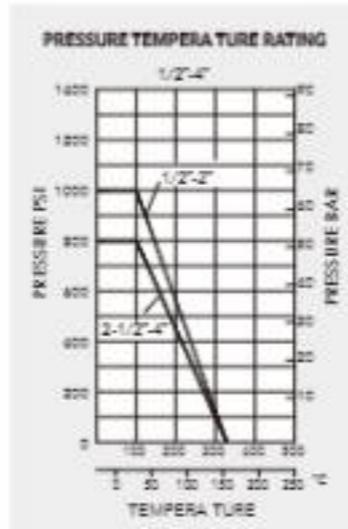
Option

other connection can be provided:
JIS 10K, KF, PN16, ANSI, other flanged type, etc...



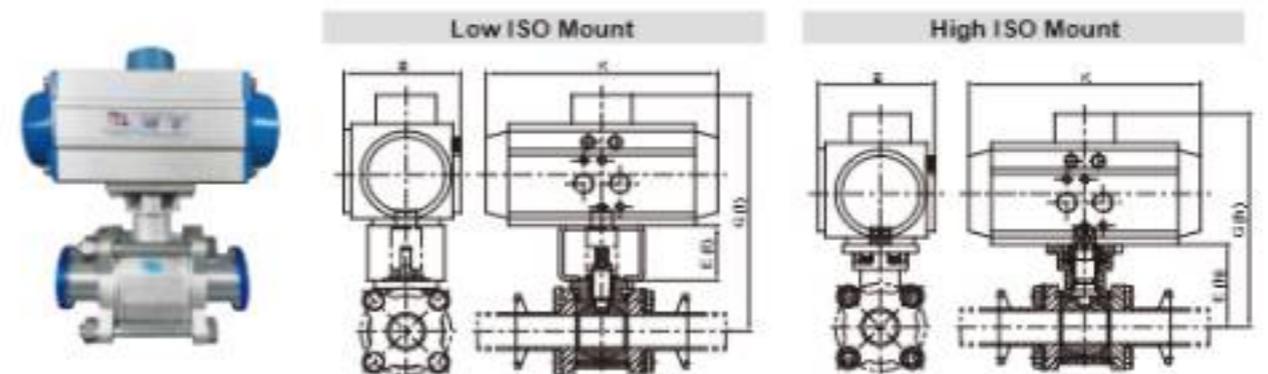
Ball valve Description

- The sanitary ball valves working pressure are all under 10 Bars. 800 or 1000 WOG identified outside of casting bodies are the pressure of bodies tested only.
- The working pressure and temperature of the ball valve are directly related to the temperature and refer to next table
*If you need high-pressure equipment, please replace the ball seat with high-pressure material
- Pay attention to the correct position of opening or closing to ensure normal flow rate.
- Try to use lock design valves and padlocks to ensure a safe position.
- When using a cylinder, the actuator must be tightened with an ISO5211 mounting plate.
- When cleaning the inner valve, be careful not to lose all washers and screws.
*Notice: avoid foreign material inside the tube because this causes the ball seat to wear and cause leakage.
- It cannot be used when the screw is loose or the bolt is insufficient.
*If there is dust or flammable gas in the operating environment, use anti-static devices to avoid danger.



Torque Figure for Bolt Tighten

Size	Bolt		Pressure Test		Handle +10% _L
	Body blot	Adapter blot	Air Pressure	Water Pressure	
1/2"~3/4"	10	10	6KG	22KG	12
1"	10	10			18
1.5"	20	13			25
2"	30	18			40
3"	40	21			50
4"	50	21			70



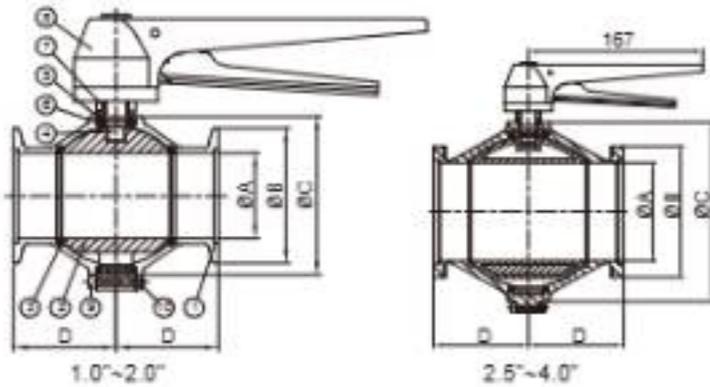
V type Size	B	K	Torque in.lbs	Low / High mount ISO-5211	E(I)	G(I)	E(N)	G(N)	Double Act. type	Single Act. type
1/2" DN15	70.5	154	90	F03/F04	38	157.8	38.2	128.2	VT050D	VT050 S11
3/4" DN20	70.5	154	100	F03/F04	38	162.1	47.5	137.5	VT050D	VT050 S11
1" DN25	70.5	154	140	F04/F05	38	192.9	57	177	VT050D	VT075 S08
1.5" DN40	89.5	189	240	F05/F07	51.5	230.05	78.55	211.55	VT065D	VT085 S10
2" DN50	102.5	210	480	F05/F07	51.5	261.48	86.5	424.5	VT075D	VT110 S10
2.5" DN65	112.5	229	650	F07/F10	51.5	317.75	109.2	300.2	VT085D	VT125 S08
3" DN80	138.5	226	1150	F07/F10	51.5	343	116.2	324.2	VT110D	VT140 S10
4" DN100	138.5	226	1400	F10/F12	61	372.7	133.5	341.5	VT110D	VT140 S10

(h)–High (l)–Low



Application:

High purity industries, Semiconductors and pharmaceutical fields



PARTS LIST			
Item	Parts name	QTY	Material
1	Body	2	ASTM-A351-CF8M
2	Ball	1	A351-CF8M
3	O-Ring	2	NBR
4	Stem	1	AISI 316
5	O-Ring	1	NBR
6	O-Ring	1	NBR
7	Sleeve	1	PEEK
8	Handle	1	AISI 304/plastic
9	Bolt	4	AISI 304
10	Nut	4	AISI 304

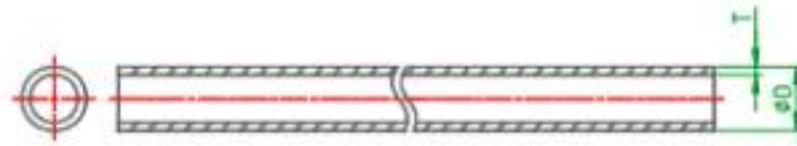
SIZE	øA	øB	øC	D
KF25	22.1	40.01	100	45
KF40	34.8	54.86	105	55
KF50	47.5	74.93	105	55
ISO63	60.2	95	145	65
ISO80	72.9	110.01	159	79
ISO100	97.4	130	198	91



- Stainless steel pipes
- Seamless and welded austemetic stainless steel pipes
- Inch size stainless steel pipes
- Elbow and reducer fitting
- Tee fittings
- Multi-tees fittings
- Vacuum Components

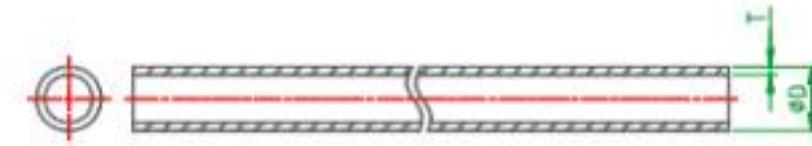
TUBE & FITTINGS

304/304L/316/316L



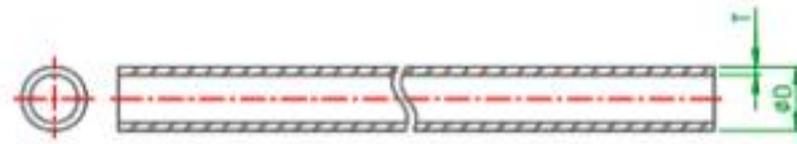
size	(ϕ D) Outside diameter	SCH. 5S	SCH. 10S
		wall thickness (T)	
1/8"	3.18	0.7	
1/4"	6.35	0.89/1.0	
3/8"	9.53	0.89/1.0	
1/2"	12.7	1.0/1.24	1.24
5/8"	15.88	1.0/1.24	1.65
3/4"	19.05	1.24/1.65	1.65
1.0"	25.4	1.24/1.65	2.8
1.5"	38.1	1.65	2.8
2.0"	50.8	1.65	2.8
2.5"	63.5	1.65	2.8
3.0"	76.2	1.65/2.11	3.0
4.0"	101.6	2.11	3.0
5.0"	127	2.77/3.05	
6.0"	152.4	2.77/3.05	

304/304L/316/316L



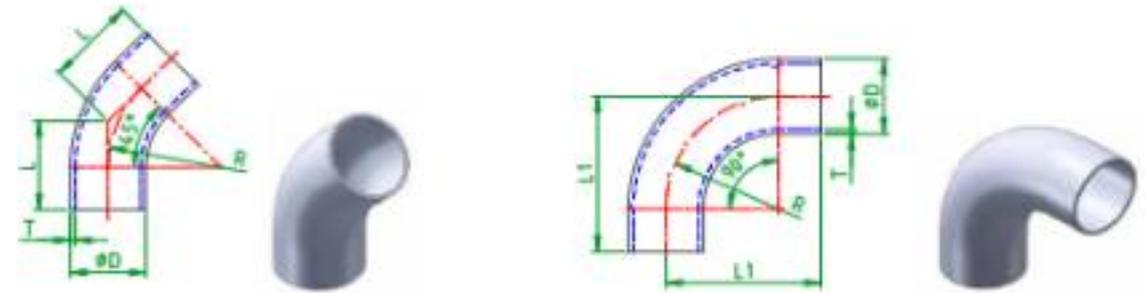
size	(ϕ D) Outside diameter	SCH. 5S	SCH. 10S	SCH. 40S	SCH. 80S
		wall thickness (T)			
1/8"	10.29		1.24	1.73	2.41
1/4"	13.72		1.65	2.24	3.02
3/8"	17.15		1.65	2.31	3.2
1/2"	21.34	1.65	2.11	2.77	3.73
3/4"	26.67	1.65	2.11	2.87	3.91
1.0"	33.4	1.65	2.77	3.38	4.55
1.5"	48.26	1.65	2.77	3.68	5.08
2.0"	60.33	1.65	2.77	3.91	5.54
2.5"	73.03	2.11	3.05	5.16	7.01
3.0"	88.9	2.11	3.05	5.49	7.62
3.5"	101.6	2.11	3.05	5.74	8.08
4.0"	114.3	2.11	3.05	6.02	8.56
5.0"	141.3	2.77	3.4	6.55	9.52
6.0"	168.28	2.77	3.4	7.11	10.97
8.0"	219.08	2.77	3.76	8.18	12.7
10"	273.05	3.4	4.19	9.27	12.7
12"	323.85	3.96	4.57	9.52	12.7

304/304L/316/316L



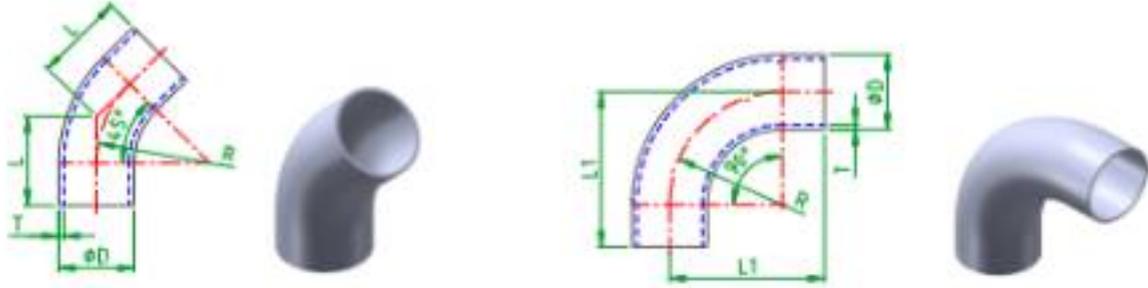
A size	B size	(φD) outside diameter	SCH. 5S SCH. 10S SCH. 20S SCH. 40 SCH. 80 SCH. 120 SCH. 160						
			wall thickness (T)						
6A	1/8"	10.5	1	1.2	1.5	1.7	2.4		
8A	1/4"	13.8	1.2	1.65	2	2.2	3		
10A	3/8"	17.3	1.2	1.65	2	2.3	3.2		
15A	1/2"	21.7	1.65	2.1	2.5	2.8	3.7		4.7
20A	3/4"	27.2	1.65	2.1	2.5	2.9	3.9		5.5
25A	1.0"	34	1.65	2.8	3	3.4	4.5		6.4
32A	1 1/4"	42.7	1.65	2.8	3	3.6	4.9		6.4
40A	1.5"	48.6	1.65	2.8	3	3.7	5.1		7.1
50A	2.0"	60.5	1.65	2.8	3.5	3.9	5.5		8.7
65A	2.5"	76.3	2.1	3	3.5	5.2	7		9.5
80A	3.0"	89.1	2.1	3	4	5.5	7.6		11.1
90A	3.5"	101.6	2.1	3	4	5.7	8.1		12.7
100A	4.0"	114.3	2.1	3	4	6	8.6	11.1	13.5
125A	5.0"	139.8	2.8	3.4	5	6.6	9.5	12.7	15.9
150A	6.0"	165.2	2.8	3.4	5	7.1	11	14.3	18.2
200A	8.0"	216.3	2.8	4	6.5	8.2	12.7	18.2	23
250A	10"	267.4	3.4	4	6.5	9.3	15.1	21.4	28.6
300A	12"	318.5	4	4.5	6.5	10.3	17.4	25.4	33.3

304/304L/316/316L



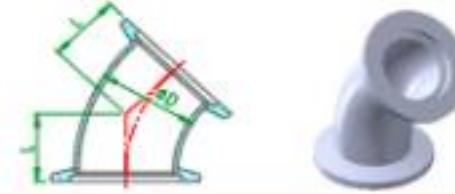
size	(φD) outside diameter	R	L	L1	T	
					5S	10S
1/4"	6.35	20	38	49	0.89/1.0	
3/8"	9.53	23	39	52	0.89/1.0	
1/2"	12.7	25	40	54	1.0/1.24	1.24
5/8"	15.88	28	48	64	1.0/1.24	1.65
3/4"	19.05	30	49	66	1.24/1.65	1.65
1.0"	25.4	33	50	69	1.24/1.65	2.8
1.5"	38.1	57.2	70	104	1.65	2.8
2.0"	50.8	76.2	78	123	1.65	2.8
2.5"	63.5	95.3	91	147	1.65	2.8
3.0"	76.2	95.3	91	147	1.65/2.11	3.0
4.0"	101.6	133.4	107	185	2.11	3.0
5.0"	127	190.5	140	250	2.77/3.05	
6.0"	152.4	228.6	155	290	2.77/3.05	

304/304L/316/316L

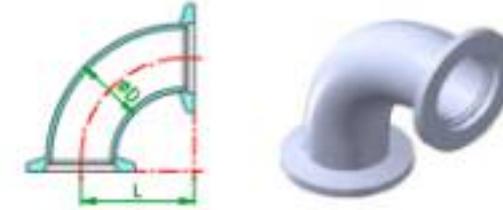


size	(φ D) outside diameter	R	L	L1	T	
					5S	10S
8A	13.8	25.4	40	55	1.2	1.65
10A	17.3	25.4	47	62	1.2	1.65
15A	21.7	38.1	52	75	1.65	2.1
20A	27.2	38.1	52	75	1.65	2.1
25A	34	38.1	52	75	1.65	2.8
32A	42.7	47.6	66	94	1.65	2.8
40A	48.6	52.7	70	104	1.65	2.8
50A	60.5	76.2	78	123	1.65	2.8
65A	76.3	95.3	91	147	2.1	3
80A	89.1	114.3	99	166	2.1	3
100A	114.3	152.4	115	204	2.1	3
125A	139.8	190.5	145	250	2.8	3.4
150A	165.2	228.6	155	290	2.8	3.4
200A	216.3	304.8	195	375	2.8	4

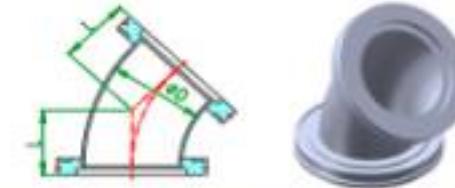
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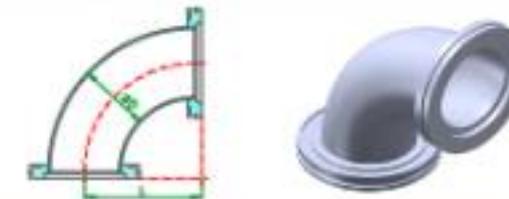
size	(φ D) outside diameter	L
KF-25	25.4	19.59
KF-40	38.1	27.5
KkF-50	50.8	35.37



size	(φ D) outside diameter	L
KF-25	25.4	41.91
KF-40	38.1	61.01
KkF-50	50.8	80.01

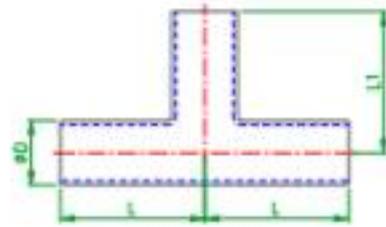


size	(φ D) outside diameter	L
ISO-63	63.5	46.05
ISO-80	76.2	53.94
ISO-100	101.6	69.73



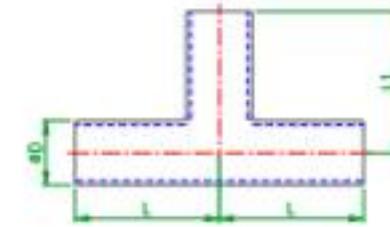
size	(φ D) outside diameter	L
ISO-63	63.5	101.85
ISO-80	76.2	120.9
ISO-100	101.6	159

304/304L/316/316L



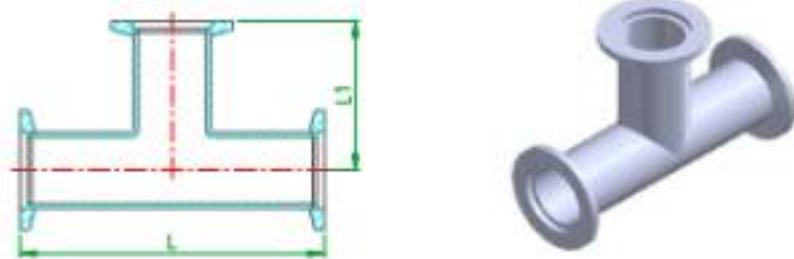
ϕD	L	L1
1/4"	35	35
3/8"	37	37
1/2"	39	39
5/8"	49	49
3/4"	52	52
1.0"	55	55
1.5"	74	74
2.0"	77	77
2.5"	90	90
3.0"	97	97
4.0"	110	110
5.0"	140	140
6.0"	160	160

304/304L/316/316L



ϕD	long		short	
	L	L1	L	L1
8A	42	42	/	/
10A	49	49	/	/
15A	59	59	52	52
20A	65	65	55	55
25A	68	68	59	59
32A	88	88	74	74
40A	95	95	77	77
50A	102	102	83	83
65A	121	121	97	97
80A	130	130	103	103
100A	145	145	116	116
125A	160	160	/	/
150A	170	170	/	/
200A	190	190	/	/

304/304L/316/316L

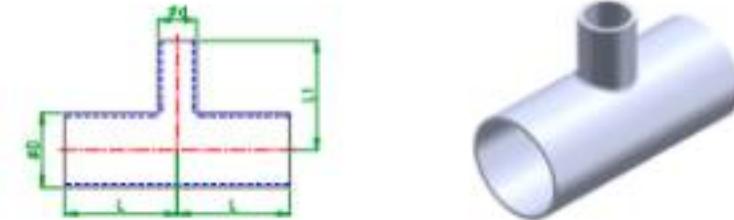


size	L	L1
KF10	63.5	31.75
KF16	58.4	29.2
KF25	102.8	51.6
KF40	122	61
KF50	160	80



304/304L/316/316L

(inch*inch)



$\phi D \cdot \phi d$	L	L1
3/8" * 1/4"	37	37
1/2" * 1/4"	39	39
1/2" * 3/8"	39	39
5/8" * 1/4"	47	44
5/8" * 3/8"	47	44
5/8" * 1/2"	47	44
3/4" * 1/4"	47	44
3/4" * 3/8"	47	44
3/4" * 1/2"	47	44
3/4" * 5/8"	52	52
1.0" * 1/4"	47	47
1.0" * 3/8"	47	47
1.0" * 1/2"	47	47
1.0" * 5/8"	55	55
1.0" * 3/4"	55	55
1.5" * 1/4"	57	54
1.5" * 3/8"	57	54
1.5" * 1/2"	57	54
1.5" * 5/8"	68	62

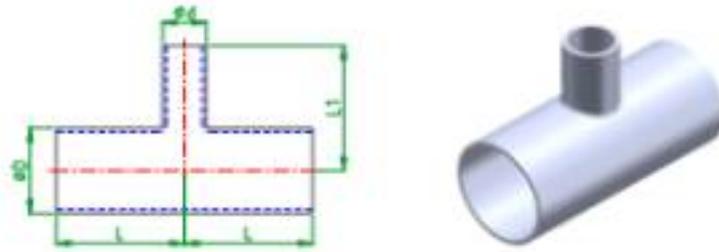
$\phi D \cdot \phi d$	L	L1
1.5" * 3/4"	68	62
1.5" * 1.0"	68	62
2.0" * 1/4"	57	57
2.0" * 3/8"	57	57
2.0" * 1/2"	57	57
2.0" * 5/8"	68	65
2.0" * 3/4"	68	65
2.0" * 1.0"	68	65
2.0" * 1.5"	77	77
2.5" * 1/4"	61	63
2.5" * 3/8"	61	63
2.5" * 1/2"	61	63
2.5" * 5/8"	72	71
2.5" * 3/4"	72	71
2.5" * 1.0"	72	71
2.5" * 1.5"	90	83
2.5" * 2.0"	90	83
3.0" * 1/4"	61	71

$\phi D \cdot \phi d$	L	L1
3.0" * 3/8"	61	71
3.0" * 1/2"	61	71
3.0" * 5/8"	72	79
3.0" * 3/4"	72	79
3.0" * 1.0"	72	79
3.0" * 1.5"	90	90
3.0" * 2.0"	90	90
3.0" * 2.5"	97	97
4.0" * 1/4"	61	87
4.0" * 3/8"	61	87
4.0" * 1/2"	61	87
4.0" * 5/8"	72	95
4.0" * 3/4"	72	95
4.0" * 1.0"	72	95
4.0" * 1.5"	90	105
4.0" * 2.0"	90	105
4.0" * 2.5"	110	110
4.0" * 3.0"	110	110

other diemension Can be requirement

304/304L/316/316L

(inch*JIS G3459)



$\phi D * \phi d$	L	L1
5/8" * 8A	47	44
3/4" * 8A	47	44
3/4" * 10A	52	52
1.0" * 8A	47	47
1.0" * 10A	55	55
1.0" * 15A	55	55
1 1/4" * 8A	47	50
1 1/4" * 10A	59	59
1 1/4" * 15A	59	59
1 1/4" * 20A	59	59
1.5" * 8A	57	54
1.5" * 10A	68	62
1.5" * 15A	68	62
1.5" * 20A	68	62
1.5" * 25A	68	62
2.0" * 8A	57	57
2.0" * 10A	68	65

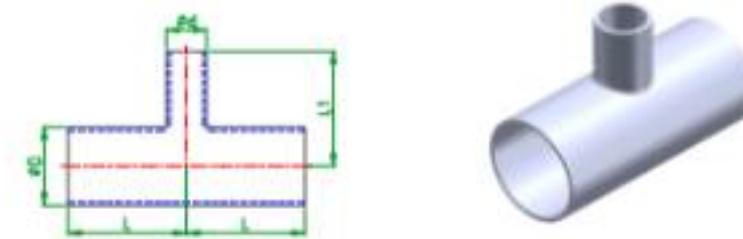
$\phi D * \phi d$	L	L1
2.0" * 15A	68	65
2.0" * 20A	68	65
2.0" * 25A	68	65
2.0" * 32A	77	77
2.0" * 40A	77	77
2.5" * 8A	61	63
2.5" * 10A	72	71
2.5" * 15A	72	71
2.5" * 20A	72	71
2.5" * 25A	72	71
2.5" * 32A	90	83
2.5" * 40A	90	83
2.5" * 50A	90	83
3.0" * 8A	61	71
3.0" * 10A	72	79
3.0" * 15A	72	79

$\phi D * \phi d$	L	L1
3.0" * 20A	72	79
3.0" * 25A	72	79
3.0" * 32A	90	90
3.0" * 40A	90	90
3.0" * 50A	90	90
3.0" * 65A	97	97
4.0" * 8A	61	87
4.0" * 10A	72	95
4.0" * 15A	72	95
4.0" * 20A	72	95
4.0" * 25A	72	95
4.0" * 32A	90	105
4.0" * 40A	90	105
4.0" * 50A	90	105
4.0" * 65A	110	110
4.0" * 80A	110	110

other dimension Can be requirement .

304/304L/316/316L

(JIS G3459*JIS G3459)



$\phi D * \phi d$	L	L1
10A * 8A	47	44
15A * 8A	47	44
15A * 10A	52	52
20A * 8A	47	47
20A * 10A	55	55
20A * 15A	55	55
25A * 8A	47	50
25A * 10A	59	59
25A * 15A	59	59
25A * 20A	59	59
32A * 8A	57	54
32A * 10A	68	62
32A * 15A	68	62
32A * 20A	68	62
32A * 25A	68	62
40A * 8A	57	57
40A * 10A	68	65
40A * 15A	68	65
40A * 20A	68	65

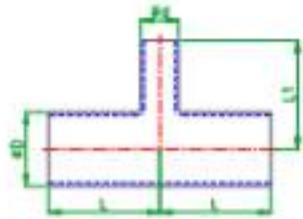
$\phi D * \phi d$	L	L1
40A * 25A	68	65
40A * 32A	77	77
50A * 8A	57	63
50A * 10A	68	71
50A * 15A	68	71
50A * 20A	68	71
50A * 25A	68	71
50A * 32A	83	83
50A * 40A	83	83
65A * 8A	61	71
65A * 10A	72	79
65A * 15A	72	79
65A * 20A	72	79
65A * 25A	72	79
65A * 32A	88	90
65A * 40A	88	90
65A * 50A	88	90
80A * 8A	61	77

$\phi D * \phi d$	L	L1
80A * 10A	72	85
80A * 15A	72	85
80A * 20A	72	85
80A * 25A	72	85
80A * 32A	88	96
80A * 40A	88	96
80A * 50A	88	96
80A * 65A	103	103
100A * 8A	61	90
100A * 10A	72	98
100A * 15A	72	98
100A * 20A	72	98
100A * 25A	72	98
100A * 32A	88	109
100A * 40A	88	109
100A * 50A	88	109
100A * 65A	116	116
100A * 80A	116	116

other dimension Can be requirement .

304/304L/316/316L

(JIS G3459*inch)



$\phi D \cdot \phi d$	L	L1
8A*1/4"	42	42
8A*3/8"	42	42
8A*1/2"	42	42
10A*1/4"	47	44
10A*3/8"	47	44
10A*1/2"	47	44
15A*1/4"	47	44
15A*3/8"	47	44
15A*1/2"	47	44
15A*5/8"	52	52
15A*3/4"	52	52
20A*1/4"	47	47
20A*3/8"	47	47
20A*1/2"	47	47
20A*5/8"	55	55
20A*3/4"	55	55
20A*1.0"	55	55
25A*1/4"	47	50
25A*3/8"	47	50
25A*1/2"	47	50
25A*5/8"	59	59
25A*3/4"	59	59
25A*1.0"	59	59
32A*1/4"	57	54
32A*3/8"	57	54

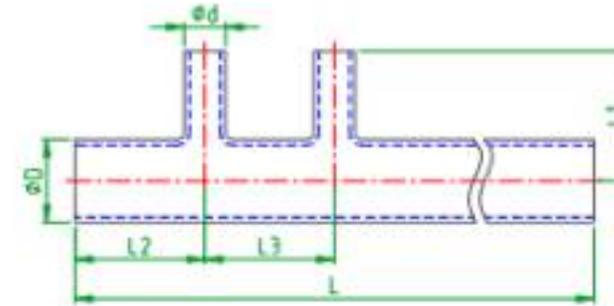
$\phi D \cdot \phi d$	L	L1
32A*1/2"	57	54
32A*5/8"	68	62
32A*3/4"	68	62
32A*1.0"	68	68
40A*1/4"	57	57
40A*3/8"	57	57
40A*1/2"	57	57
40A*5/8"	68	65
40A*3/4"	68	65
40A*1.0"	68	65
40A*1.5"	77	77
50A*1/4"	57	63
50A*3/8"	57	63
50A*1/2"	57	63
50A*5/8"	68	71
50A*3/4"	68	71
50A*1.0"	68	71
50A*1.5"	83	83
50A*2.0"	83	83
65A*1/4"	61	71
65A*3/8"	61	71
65A*1/2"	61	71
65A*5/8"	72	79
65A*3/4"	72	79
65A*1.0"	72	79

$\phi D \cdot \phi d$	L	L1
65A*1.5"	88	90
65A*2.0"	88	90
65A*2.5"	97	97
80A*1/4"	61	77
80A*3/8"	61	77
80A*1/2"	61	77
80A*5/8"	72	85
80A*3/4"	72	85
80A*1.0"	72	85
80A*1.5"	88	96
80A*2.0"	88	96
80A*2.5"	103	103
80A*3.0"	103	103
100A*1/4"	61	90
100A*3/8"	61	90
100A*1/2"	61	90
100A*5/8"	72	98
100A*3/4"	72	98
100A*1.0"	72	98
100A*1.5"	88	109
100A*2.0"	88	109
100A*2.5"	116	116
100A*3.0"	116	116
100A*4.0"	116	116

other dimension Can be requirement .

304/304L/316/316L

(total length fixed)



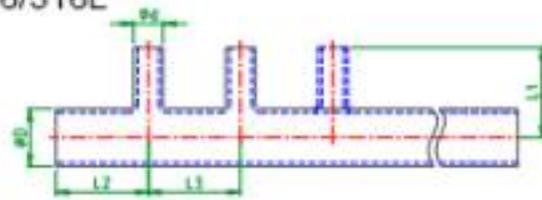
INCH-SIZE *INCH-SIZE

INCH-SIZE	ϕD	1/4"	3/8"	1/2"	5/8"	3/4"	1.0"	1.5"	2.0"	2.5"	3.0"	4.0"
INCH-SIZE	ϕd	1/4" - 3/8" - 1/2"										
L	2 branch	304.8	304.8	304.8	304.8	304.8	304.8	304.8	304.8	304.8	304.8	304.8
	3 branch	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2
	4 branch	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6
	5 branch	762	762	762	762	762	762	762	762	762	762	762
L1		35	37	39	44	44	47	54	57	63	71	87
L2		76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2
L3		152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4

JIS G3459*INCH-SIZE

JIS G3459	ϕD	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A
INCH-SIZE	ϕd	1/4" - 3/8" - 1/2"										
L	2 branch	245	245	245	245	245	245	245	245	285	285	285
	3 branch	370	370	370	370	370	370	370	370	430	430	430
	4 branch	495	495	495	495	495	495	495	495	575	575	575
	5 branch	620	620	620	620	620	620	620	620	720	720	720
L1		42	44	44	47	50	54	57	63	71	77	90
L2		60	60	60	60	60	60	60	60	70	70	70
L3		125	125	125	125	125	125	125	125	145	145	145

304/304L/316/316L



(pitch fixed)

INCH-SIZE * INCH-SIZE

INCH-SIZE ϕD	1/4"	3/8"	1/2"	5/8"		3/4"			1.0"			
INCH-SIZE ϕd	1/4"	1/4" ~ 3/8"	1/4" ~ 1/2"	1/4" ~ 1/2"	5/8"	1/4" ~ 1/2"	5/8"	3/4"	1/4" ~ 1/2"	5/8"	3/4"	1.0"
L1	35	37	39	44	49	44	52	52	47	55	55	55
L2	21	21	21	27	27	30	30	30	33	33	33	33
L3	45	45	45	55	57	55	57	59	55	57	59	62

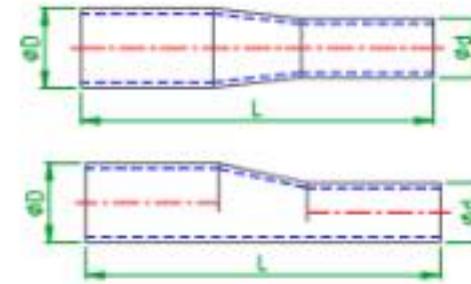
INCH-SIZE ϕD	1.5"					2.0"					
INCH-SIZE ϕd	1/4" ~ 1/2"	5/8" ~ 3/4"	3/4"	1.0"	1.5"	1/4" ~ 1/2"	5/8" ~ 3/4"	3/4"	1.0"	1.5"	2.0"
L1	54	62	62	62	74	57	65	65	65	77	77
L2	45	45	45	45	45	50	50	50	50	50	50
L3	55	57	59	62	73	60	62	64	67	75	83

INCH-SIZE ϕD	2.5"						
INCH-SIZE ϕd	1/4" ~ 1/2"	5/8" ~ 3/4"	3/4"	1.0"	1.5"	2.0"	2.5"
L1	63	71	71	71	83	83	90
L2	65	65	65	65	65	65	65
L3	63	65	68	70	78	86	94

INCH-SIZE ϕD	3.0"							
INCH-SIZE ϕd	1/4" ~ 1/2"	5/8" ~ 3/4"	3/4"	1.0"	1.5"	2.0"	2.5"	3.0"
L1	71	79	79	79	90	90	97	97
L2	68	68	68	68	68	68	68	68
L3	67	68	71	74	82	90	98	104

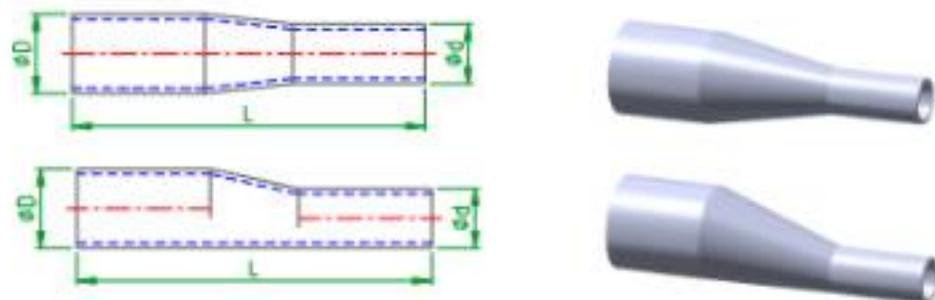
INCH-SIZE ϕD	4.0"								
INCH-SIZE ϕd	1/4" ~ 1/2"	5/8" ~ 3/4"	3/4"	1.0"	1.5"	2.0"	2.5"	3.0"	4.0"
L1	87	95	95	95	105	105	110	110	110
L2	86	86	86	86	86	86	86	86	86
L3	80	85	89	92	100	103	110	120	130

304/304L/316/316L



size		concentric	eccentric
ϕD (inch-size)	ϕd (A size / inch-size)	L3	
1/4"	1/8"	70	
3/8"	1/4"	70	80
1/2"	1/4" ~ 3/8"	75	85
5/8"	8A 1/4" ~ 1/2"	90	
3/4"	8A ~ 10A 1/4" ~ 5/8"	100	
1.0"	8A ~ 15A 1/4" ~ 3/4"	105	
1.5"	8A ~ 25A 1/4" ~ 1 1/4"	125	
2.0"	8A ~ 40A 1/4" ~ 1.5"	130	
2.5"	8A ~ 50A 1/4" ~ 2.0"	140	
3.0"	8A ~ 50A 1/4" ~ 2.5"	165	
4.0"	8A ~ 80A 1/4" ~ 3.0"	175	
5.0"	8A ~ 100A 1/4" ~ 4.0"	230	
6.0"	8A ~ 125A 1/4" ~ 5.0"	250	

304/304L/316/316L



size		concentric	eccentric
ϕD (inch-size)	ϕd (A size / inch-size)	L3	
8A	1/4" ~ 1/2"	80	85
10A	8A 1/4" ~ 1/2"	90	
15A	8A ~ 10A 1/4" ~ 3/4"	100	
20A	8A ~ 15A 1/4" ~ 1.0"	105	
25A	8A ~ 20A 1/4" ~ 1 1/4"	120	
32A	8A ~ 25A 1/4" ~ 1.5"	125	
40A	8A ~ 32A 1/4" ~ 1.5"	130	
50A	8A ~ 40A 1/4" ~ 2.0"	140	
65A	8A ~ 50A 1/4" ~ 2.5"	165	
80A	8A ~ 65A 1/4" ~ 3.0"	170	
100A	8A ~ 80A 1/4" ~ 4.0"	180	
125A	8A ~ 100A 1/4" ~ 5.0"	250	
150A	8A ~ 125A 1/4" ~ 6.0"	260	
200A	8A ~ 150A 1/4" ~ 6.0"	280	

Conical reducer

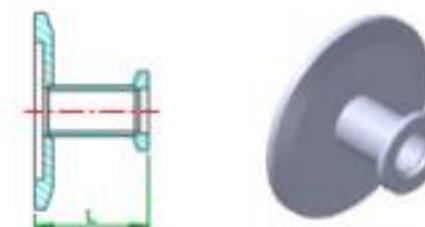
304/304L/316/316L



size	L
KF25* KF16	39.9
KF40* KF16	39.9
KF40* KF25	39.9
KF50* KF16	39.9
KF50* KF25	39.9
KF50* KF40	39.9

Straight reducer

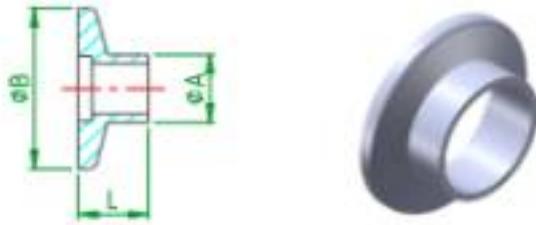
304/304L/316/316L



size	L
KF25* KF16	39.9
KF40* KF16	39.9
KF40* KF25	39.9
KF50* KF16	39.9
KF50* KF25	39.9
KF50* KF40	39.9

Weld flange

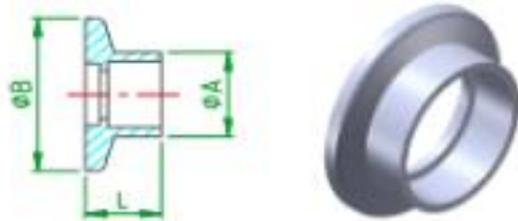
304/304L/316/316L



size	φ A	φ B	L
KF10	12.7	30	12.7
KF16	19.05	30	12.7
KF25	25.4	40	12.7
KF40	38.1	55	19.1
KF50	50.8	75	19.1

Socket weld flange

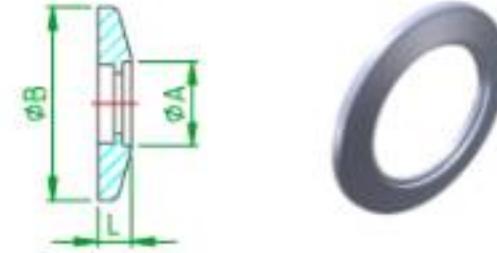
304/304L/316/316L



size	φ A	φ B	L
KF10	16.5	30	12.7
KF16	20.5	30	12.7
KF25	29	40	12.7
KF40	44.7	55	12.7
KF50	57.4	75	12.7

Bored flange

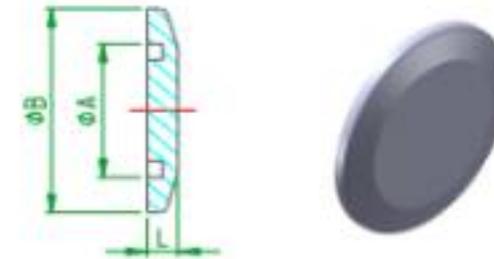
304/304L/316/316L



size	φ A	φ B	L
KF25	25.7	40	5.1
KF40	38.4	55	5.1
KF50	51.1	75	5.1

Blank flange

304/304L/316/316L



size	φ A	φ B	L
KF10	12.2	30	5.1
KF16	17.2	30	5.1
KF25	26.2	40	5.1
KF40	41.2	55	5.1
KF50	52.2	75	5.1

Bored flange

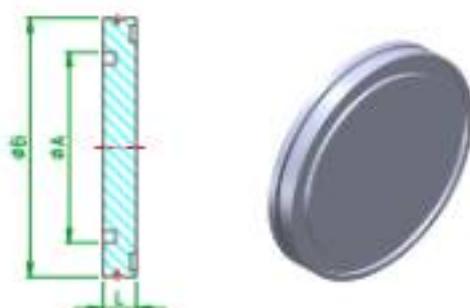
304/304L/316/316L



size	ϕA	ϕB	L
ISO63	63.7	95	12
ISO80	76.4	110	12
ISO100	101.8	130	12
ISO160	152.9	180	12
ISO200	203.7	240	12
ISO250	254.5	290	12

Blank flange

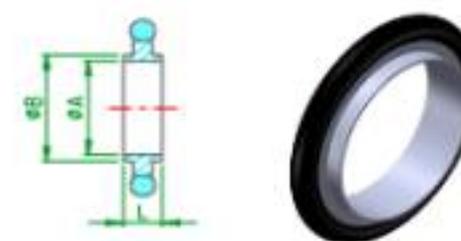
304/304L/316/316L



size	ϕA	ϕB	L
ISO63	70	95	12
ISO80	83	110	12
ISO100	102	130	12
ISO160	153	180	12
ISO200	213	240	12
ISO250	261	290	12

KF type

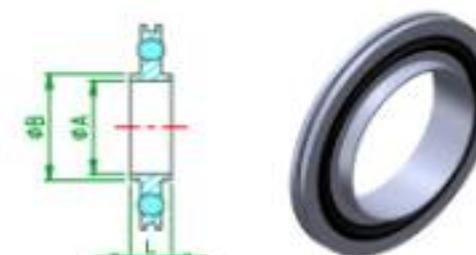
304/304L/316/316L



size	ϕA	ϕB	L
KF10	10	12	8
KF16	16	17	8
KF25	25	26	8
KF40	40	41	8
KF50	50	52	8

ISO type

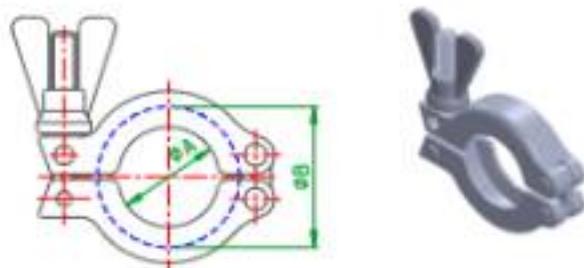
304/304L/316/316L



size	ϕA	ϕB	L
ISO63	66.8	69.6	8
ISO80	79.75	82.6	8
ISO100	98.8	101.6	8
ISO160	149.86	152.6	8
ISO200	207.8	212.6	8
ISO250	257.5	260.4	8

KF clamp

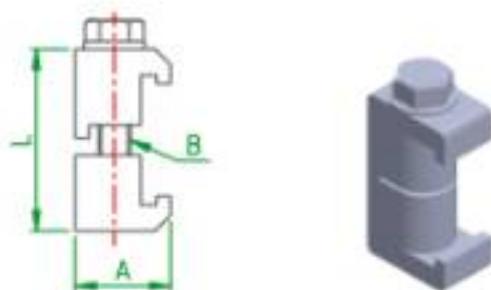
304/ALU



size	ϕ A	ϕ B
KF10~16	22	35
KF20~25	32	45
KF32~40	47	60
KF50	66	80

ISO double claw clamp

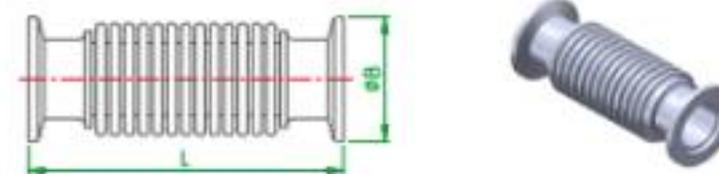
304/ALU



size	A	B	L
ISO63~100	24.1	M8 or 5/16"	50.3
ISO160~250	27.9	M10 or 5/16"	52.1
ISO320~500	34	M12 or 7/16"	65

KF type

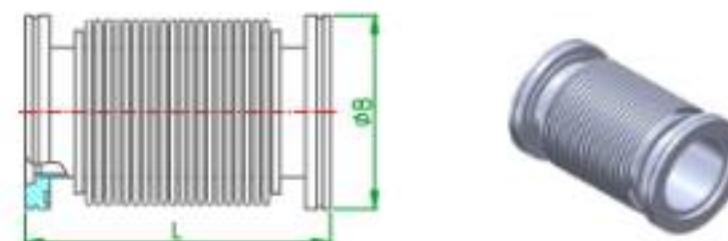
304/304L/316/316L



size	ϕ B	L
KF16	30	250 / 500 / 750 / 1000
KF25	40	250 / 500 / 750 / 1000
KF40	55	250 / 500 / 750 / 1000
KF50	75	250 / 500 / 750 / 1000

ISO type

304/304L/316/316L



size	ϕ B	L
ISO63	95	250 / 500 / 750 / 1000
ISO80	110	250 / 500 / 750 / 1000
ISO100	130	250 / 500 / 750 / 1000

pipe fitting

unit : mm

size	(ϕD · ϕd) outside diameter	(T) wall thickness
1/4"~3/4"	±1%	±10%
15A~65A		±10%
80A~200A		±10%
250A		+15% / -12.5%
300A~800A		+15% / -12.5%

elbow

size	(R) bend radius	(L · L1) center to end
1/4"~3/4"	±0.8	±0.8
15A~65A	±1.6	±1.6
80A~200A	±1.6	±1.6
250A		+20 / -5
300A~800A		+20 / -5

tee

size	(L · L1) center to end
1/4"~3/4"	±0.8
15A~65A	±1.6
80A~200A	±1.6
250A	+20 / -5
300A~800A	+20 / -5

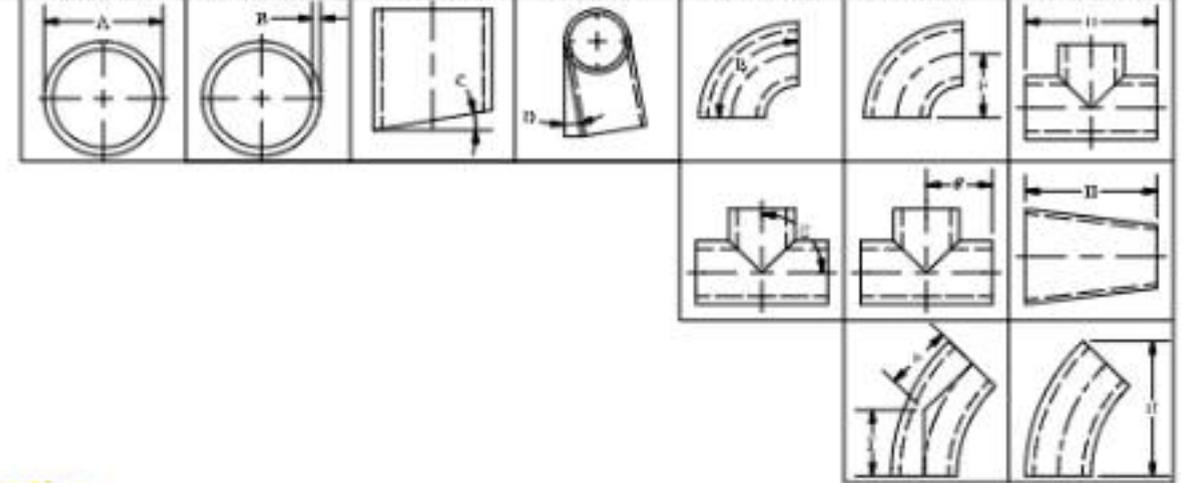
reducer

size	(L) over all length
1/4"~3/4"	±0.8
15A~65A	±1.6
80A~200A	±1.6
250A	+20 / -5
300A~800A	+20 / -5

multi-tees

size	(L) total length	(L1) center to end	(L2) length at end	(L3) branch pitch	verticality	levelness
1/4"~3/4"	+5 / -0	±0.8	±1.6	±1.6	±1°	±1°
15A~65A		±1.6	±1.6	±1.6		
80A~200A		±1.6	±1.6	±3.2		
250A		+20		±3.2		
300A~800A		-5				

NOMINAL SIZE	O.D. BORE TOLERANCE	WALL THICKNESS	END SQUARENESS	DRY PLANK	ANGULARITY	CENTER TO END	END TO END
1/2"	+/- .015"	.050"-.071"	.010" MAX	+/- 1°	+/- 1/2°	+/- .030"	+/- .045"
3/4"	+/- .015"	.050"-.071"	.010" MAX	+/- 1°	+/- 1/2°	+/- .030"	+/- .045"
1"	+/- .015"	.050"-.071"	.010" MAX	+/- 1°	+/- 1/2°	+/- .030"	+/- .045"
1-1/2"	+/- .015"	.050"-.071"	.015" MAX	+/- 1°	+/- 1/2°	+/- .030"	+/- .045"
2"	+/- .015"	.050"-.071"	.015" MAX	+/- 1°	+/- 1/2°	+/- .030"	+/- .045"
2-1/2"	+/- .020"	.050"-.071"	.020" MAX	+/- 1°	+/- 1/2°	+/- .045"	+/- .060"
3"	+/- .031"	.050"-.071"	.030" MAX	+/- 1-1/2°	+/- 1°	+/- .050"	+/- .060"
4"	+/- .040"	.066"-.091"	.030" MAX	+/- 1-1/2°	+/- 1°	+/- .050"	+/- .060"
6"	+/- .050"	.094"-.115"	.050" MAX	+/- 1-1/2°	+/- 1-1/2°	+/- .060"	+/- .075"
8"	+/- .050"	.105"-.126"	.060" MAX	+/- 1-1/2°	+/- 1-1/2°	+/- .060"	+/- .075"



JIS specification

Grade	C	Mn	P	S	Si	Cr	Ni	Mo
SUS304TP	≦0.08	≦2.00	≦0.045	≦0.030	≦1.00	18.0-20.0	8.0-11.0	/
SUS304LTP	≦0.030	≦2.00	≦0.045	≦0.030	≦1.00	18.0-20.0	9.0-13.0	/
SUS316TP	≦0.08	≦2.00	≦0.045	≦0.030	≦1.00	16.0-18.0	10.0-14.0	2.00-3.00
SUS316LTP	≦0.030	≦2.00	≦0.045	≦0.030	≦1.00	16.0-18.0	12.0-16.0	2.00-3.00

unit : %

ASTM specification

Grade	C	Mn	P	S	Si	Cr	Ni	Mo
TP304	≦0.08	≦2.00	≦0.045	≦0.030	≦1.00	18.0-20.0	8.0-11.0	/
TP304L	≦0.035	≦2.00	≦0.045	≦0.030	≦1.00	18.0-20.0	8.0-13.0	/
TP316	≦0.08	≦2.00	≦0.045	≦0.030	≦1.00	16.0-18.0	10.0-14.0	2.00-3.00
TP316L	≦0.035	≦2.00	≦0.045	≦0.030	≦1.00	16.0-18.0	10.0-14.0	2.00-3.00

unit : %

EP grade

visual exam. of internal pipe	surface roughness measurement (SEMI F19-0304)	oil residue measurement	pure-water resistivity measurement
no visible scratch or contamination on the surface	ultra high purity grade $Ra \leq 0.125\mu\text{m} (5\mu\text{in})$ for $OD \leq 4'' (100A)$	Max. $< 0.01\text{mg}/\text{ft}^2$	$\geq 17.5\text{M}\Omega_{\text{cm}}$
	high purity grade $Ra \leq 0.25\mu\text{m} (10\mu\text{in})$		

particle count	Lon leaching check sealed water ion chromatography	Cr/Fe ratio (SEMI F19-0304)	CrO / FeO ratio (SEMI F19-0304)	oxide layer thickness (SEMI F19-0304)
0.1 μm particle · less than 1 per cfm	5 ng/cm ² 以下	≥ 1.5	≥ 2.0	$\geq 15\text{\AA}$

BA / MPEP / MPS grade

visual exam. of internal pipe	surface roughness measurement (SEMI F19-0304)	oil residue measurement	pure-water resistivity measurement
no visible scratch or contamination on the surface	$Ra \leq 0.3\mu\text{m} (12\mu\text{in})$ for $OD \leq 4'' (100A)$	Max. $< 0.1\text{mg}/\text{ft}^2$	/
	$Ra \leq 0.5\mu\text{m} (20\mu\text{in})$ for $OD \geq 5'' (125A)$		

particle count	Lon leaching check sealed water ion chromatography	Cr/Fe ratio (SEMI F19-0304)	CrO / FeO ratio (SEMI F19-0304)	oxide layer thickness (SEMI F19-0304)
0.3 μm particle · less than 10 per cfm	10 ng/cm ² 以下	MPEP ≥ 1.0	MPEP ≥ 1.0	MPEP $\geq 15\text{\AA}$

the different of EP & MP

What is EP ?

EP is surface condition processing technology, which can be applied on various metal (stainless steel, alloy steel etc) for obtaining high clean quality on surface. EP process on stainless steel metal can obtain an advantage on metal surface with smooth, clean, bacteria free and superior corrosion resistance finished.



semi-finished goods



products processed



cleaning the finished



inspect

mechanical polishing (MP) & electro-polishing (EP)



Smoother Metal Surface



Although mechanical polishing (MP) is able to reduce the roughness from Smoother stainless surface rapidly, there are still some defects :

- 1 - Surface roughness (Ra) is only approx. 0.3-0.5 μm that still has great possibility of adhering particles.
- 2 - The passivation layer must be destroyed after MP and caused rust easily.
- 3 - During MP, the particle adhering problems on the interior surface is too tough to meet.

Perfect purity even if after high purity cleaning product.



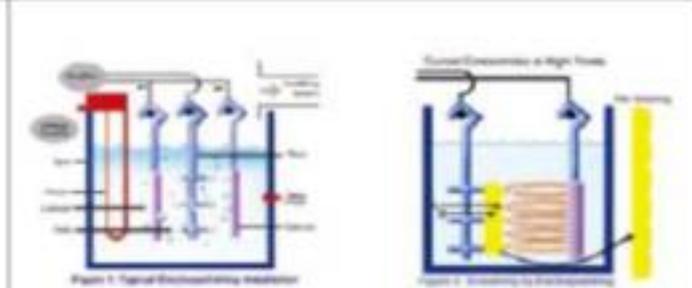
The performance of electro-polishing is able to smooth away all the defects of MP.

The features of EP are as following :

- 1 - The stainless surface is dissolved by EP liquid to remove all the particles and reduce roughness (Ra) to 0.05 μm .
- 2 - During EP process, iron separates out first of all and let a passivation layer (Cr2O3) be created on the stainless surface for higher resistance of corrosion.



Perfect mirror finished surface without any impurities.



Advantage of EP

- 1 - Superior performance in polishing : it can dramatically improve the surface roughness on metal to Ra 0.05 μm .
- 2 - High purity : EP can remove particle, metal fatigue and oxidized metal from work piece. As well make surface smoothly, on which bacteria can not survived, smooth surface will help to solve the problem of particle adherent.
- 3 - High resistance of corrosion : passivation layer is a very important product, which is created on the surface of stainless steel during EP process, stainless steel work piece processed with EP can obtain around 10 times corrosion resistance superior than no-EP one.

