

Advanced Fluid System
Valve & Actuator
Sanitary(Hygiene) / Vacuum / Biotech



www.dowvalve.co.kr



주식회사 다우밸브
DOW Valve Co., Ltd.

(주)다우밸브는 1985년 설립된 회사로서 Stainless Steel 재질로 만들어진 산업용밸브 전문업체로서 생명공학(BT), 식음료, 제약, 약품, 의료, 화장품, 반도체, 태양광, 태양열, 석유화학 및 진공 특수분야에 다양하게 사용되는 밸브로서 작동방식은 수동식, 공압식 및 전동식 밸브를 공급하고 있습니다.

산업용 기계설비와 장치에 필수품인 밸브의 응용범위가 점점 확대되고 고도의 정밀성과 신뢰성을 요하는 시대적요구에 부응하기 위하여 당사는 전직원이 기술개발과 응용에 대한 연구개발에 정진하고 있으며, 유체제어의 선도자로서 풍부한 경험과 기술을 바탕으로 다양한 유체제어시스템의 최적 솔루션을 제공할 수 있도록 노력하고 있습니다.

앞으로도 지속적인 수출을 통하여 국가발전에 기여하며 끊임없는 연구개발과 재투자 및 인재육성을 통해 보다 향상된 제품으로 고객에게 다가서는 회사가 되겠습니다.

대표이사 박상기

Advanced Fluid System

DOW Valve

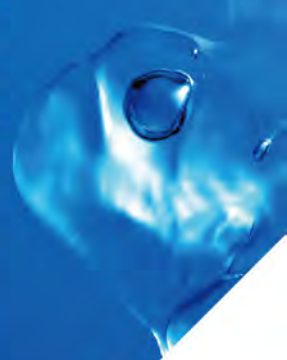
Industrial Valve & Actuator

Established in 1985, DOW Valve Co., Ltd. is a company specialized in industrial stainless steel valves applied variously to the special fields of biotechnology (BT), food and beverage, pharmaceuticals, medicine, medical treatment, cosmetics, semiconductor, solar cell, solar thermal energy, petrochemicals and vacuum. We are supplying not only manual valves but also pneumatic or electric control valves.

In order to meet the demand of the times requiring the high precision and reliability of a valve as well as the application range of a valve being expanded gradually as a necessity in industrial equipment and system, all staffs of our company have devoted themselves to research and development for new technologies and applications, and furthermore, our company as a leader of fluidic control system, has made efforts to provide optimal solutions for various fluidic control systems based on a wealth of experience and technology.

We promise to be a company contributing to national development through steady growth of export and going closer to customers with more advanced products through research and development, reinvestment and development of human resources.

CEO Michael, Park



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Industrial Valve, Actuator & Fittings



유체제어의 선두주자 _DOW

다우밸브는 유체제어의 선두자로서 풍부한 경험과 실적을 통해서 다양한 분야에 적합한 밸브 선정을 통해서 시스템의 최적화, 안정화 및 에너지 절약을 제1목표로 매진하고 있습니다.

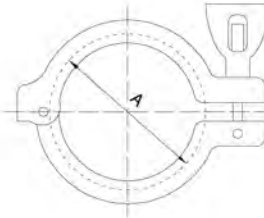
최근 시스템의 정밀고도화, 안정성 및 신뢰성을 동시에 요구되기 때문에 초기 밸브 선정에서 시스템에 맞는 적합한 재질과 사양선택이 중요하며 또한 부품 공급으로 지속적인 유지보수를 통해서 사고 예방과 최적의 시스템이 운영되도록 노력하고 있습니다.

Sanitary Fittings

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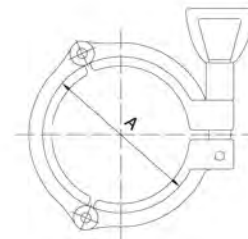
Sanitary Fittings

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SF-01 Heavy Duty Clamp (2-Segment)

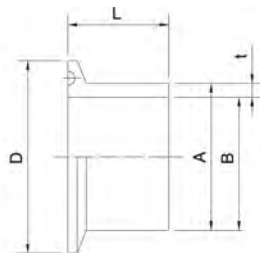
Unit:mm

Size	A	WT(Kg)
1/2 ^S	28.6	0.12
3/4 ^S	28.6	0.12
1 ^S	53.9	0.26
1.5 ^S	53.9	0.26
2 ^S	67.4	0.31
2.5 ^S	80.9	0.38
3 ^S	94.4	0.38
3.5 ^S	109.2	0.47
4 ^S	122.4	0.53
4.5 ^S	133.2	0.65

SF-02 Heavy Duty Clamp (3-Segment)

Unit:mm

Size	A	WT(Kg)
1 ^S	53.9	0.24
1.5 ^S	53.9	0.24
2 ^S	67.4	0.29
2.5 ^S	80.9	0.32
3 ^S	94.4	0.37
3.5 ^S	109.2	0.50
4 ^S	122.4	0.54
4.5 ^S	133.2	0.66
5 ^S	171	1.04
6 ^S	193	1.10
8 ^S	248	1.70
10 ^S	310	3.10
12 ^S	363	3.60

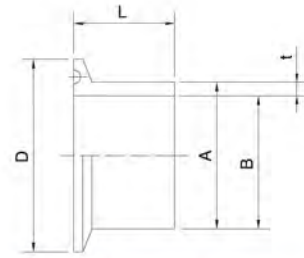
SF-03 Ferrule (Welding)

Unit:mm

Size	L	A	B	D	t	WT(g)
1/2 ^S	12.7(28.6)	12.7	10.2	25	1.24	15(23)
3/4 ^S	12.7(28.6)	19.05	16.6	25	1.65	13(23)
1 ^S	20	25.4	23	50.5	1.2	65
1.5 ^S	20	38.1	35.7	50.5	1.2	45
2 ^S	22	50.8	47.8	64	1.5	80
2.5 ^S	26	63.5	60.5	77.5	1.5	110
3 ^S	28	76.3	72.3	91	2	170
3.5 ^S	28	89.1	83.1	106	3	250
4 ^S	28	101.6	97.6	119	2	250
4.5 ^S	28	114.3	108.3	130	3	330
5 ^S	30	139.8	133.8	163.5	3	640
6 ^S	30	165.2	159.2	185	3	700
8 ^S	30	216.3	210.3	240	3	900
10 ^S	40	267.4	259.4	296	4	1800
12 ^S	40	318.5	309.5	350	4.5	2200

* Option : 1/2^S, 3/4^S = able to L=21.5

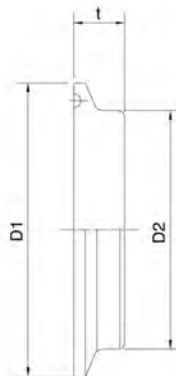
SF-04 Ferrule (Expanding)



Unit:mm

Size	L	A	B	D	t	WT(g)
1 ^s	20	29.5	25.7	50.5	2	70
1.5 ^s	20	42.5	38.4	50.5	2	55
2 ^s	22	56	51.1	64	2.5	89
2.5 ^s	26	69	63.8	77.5	2.5	124
3 ^s	28	82	76.6	91	2.7	178
4 ^s	28	101.6	101.9	119	2.5	232

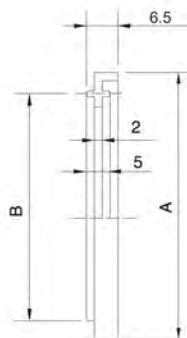
SF-05 Blank Ferrule



Unit:mm

Size	D1	D2	t	WT(g)
1/2 ^s	25.4	19.1	5	15
3/4 ^s	25.4	19.1	5	15
1 ^s	50.5	38.1	8	110
1.5 ^s	50.5	50.8	8	110
2 ^s	64	63.5	8	180
2.5 ^s	77.5	76.3	8	285
3 ^s	91	89.1	8	460
3.5 ^s	104.5	101.6	8	515
4 ^s	119	114.3	8	830
4.5 ^s	130	139.8	11	920
5 ^s	163.5	165.2	11	1600
6 ^s	185	216.3	11	2100
8 ^s	240	165.2	11	3400
10 ^s	296	273	11	5900
12 ^s	350	324	11	7900

SF-06 Ferrule Gasket (Silicone, Viton) Flange Type

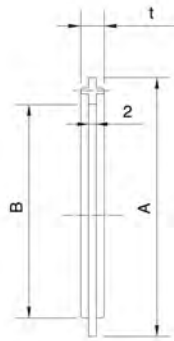


Unit:mm

Size	A	B	WT(g)	
			Silicone	Viton
1 ^s	52	42	5.0	8.5
1.5 ^s	52	42	4.5	6.5
2 ^s	65	55	5.6	9.0
2.5 ^s	78	68	7.5	12.0
3 ^s	92	82	8.5	13.5
4 ^s	120	108	13.0	20.5

SF-07 Ferrule Gasket (Silicone, EPDM)

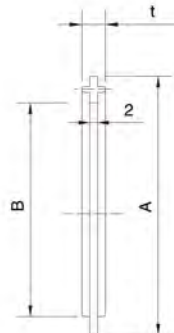
Unit:mm



Size	A	B	t	WT(g)
1/2 ^s	21.8	10.2	4.8	1.5
3/4 ^s	21.8	16.6	4.8	1.0
1 ^s	50.5	23	4.2	5.5
1.5 ^s	50.5	35.7	4.2	4.5
2 ^s	64	47.8	4.2	6.5
2.5 ^s	77.5	60.5	4.2	7.5
3 ^s	91	72.3	4.2	9.0
3.5 ^s	104.5	83.1	4.2	10.0
4 ^s	119	97.6	4.2	14.5
4.5 ^s	130	108.6	4.2	12.5
5 ^s	163.5	133.8	5.2	20
6 ^s	185	159.2	5.2	23.5
8 ^s	240	210.3	6.0	40.0
10 ^s	310	270	5.5	60
12 ^s	350	310.5	6.0	80.5

SF-08 Sealing Gasket (Teflon)

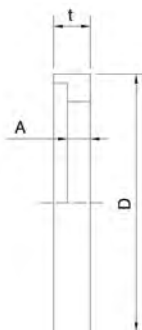
Unit:mm



Size	A	B	t	WT(g)
1/2 ^s	21.8	10.2	4.5	1.5
3/4 ^s	21.8	16.6	4.5	1.0
1 ^s	50.5	23.2	4.8	8.0
1.5 ^s	50.5	35.9	4.8	6.0
2 ^s	64	48	4.8	7.5
2.5 ^s	77.5	60.7	4.8	11
3 ^s	91	72.5	4.8	13
3.5 ^s	104.5	84.5	4.8	17
4 ^s	119	97.8	4.8	19.5
4.5 ^s	130	110	4.8	24.5
5 ^s	155	133.5	4.8	34.5
6 ^s	183	159	4.8	43
8 ^s	234	208	4.8	74

SF-09 Hexagon Gasket (Silicone)

Unit:mm



Size	D	A	t	WT(g)
1 ^s	32.5	4	6	2.5
1.5 ^s	46	4	6	4.0
2 ^s	59.5	4	6	5.8
2.5 ^s	73.2	4	6	8.5
3 ^s	86.2	4	6	10.5
4 ^s	112.5	4	6	15

SF-10 O-Ring (Silicone)



Unit:mm

Size	D	A	t	WT(g)
10 ^S	282	270	5.7	30
12 ^S	331	320	5.7	35

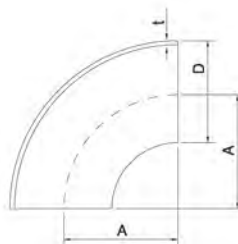
SF-11 Sanitray Pipe (Stainless Steel 304 & 316L)



Unit:mm

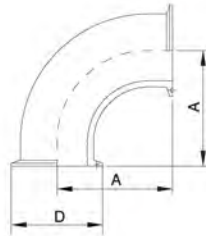
Size	L	A	B	t	WT(g)	
					304	316L
1/2 ^S	6000	12.7	10.2	1.24	-	2.2
3/4 ^S	6000	19.05	16.6	1.24	-	3.3
1 ^S	6000	25.4	23	1.2	4.34	4.37
1.5 ^S	6000	38.1	35.7	1.2	6.62	6.66
2 ^S	6000	50.8	47.8	1.5	11.06	11.13
2.5 ^S	6000	63.5	60.5	1.5	13.91	14
3 ^S	6000	76.3	72.3	2	22.22	22.35
4 ^S	6000	101.6	97.6	2	29.78	29.97

SF-12 90° Short Elbow (Welding)



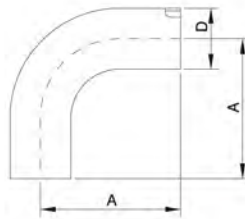
Unit:mm

Size	A	D	t	WT(g)
1 ^S	35	25.4	1.2	35
1.5 ^S	50	38.1	1.2	86
2 ^S	60	50.8	1.5	160
2.5 ^S	79	63.5	1.5	270.00
3 ^S	82	76.3	2	390
4 ^S	132	101.6	2	925

SF-13 90° Short Elbow (Ferrule)

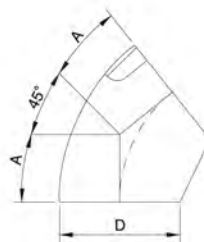
Unit:mm

Size	A	D	WT(Kg)
1 ^s	55	50.5	0.18
1.5 ^s	70	50.5	0.19
2 ^s	82	64	0.30
2.5 ^s	105	77.5	0.47
3 ^s	110	91	0.72
4 ^s	160	119	1.30

SF-14 90° Long Elbow (Welding)

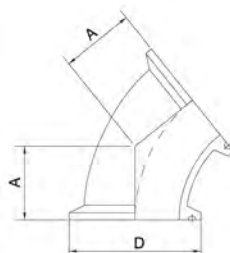
Unit:mm

Size	A	D
1 ^s	70	25.4
1.5 ^s	85	38.1
2 ^s	100	50.8
2.5 ^s	119	63.5
3 ^s	127	76.3
4 ^s	175	101.6

SF-15 45° Short Elbow (Welding)

Unit:mm

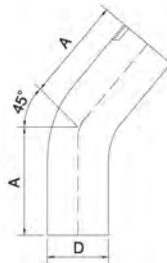
Size	A	D	WT(g)
1 ^s	14.5	25.4	18
1.5 ^s	20.7	38.1	43
2 ^s	24.9	50.8	80
2.5 ^s	32.7	63.5	135
3 ^s	34	76.3	195
4 ^s	53.8	101.6	463

SF-16 45° Short Elbow (Ferrule)

Unit:mm

Size	A	D	WT(Kg)
1 ^s	34.5	50.5	0.15
1.5 ^s	40.7	50.5	0.13
2 ^s	46.9	64	0.24
2.5 ^s	58.7	77.5	0.36
3 ^s	62	91	0.54
4 ^s	81.8	119	1.00

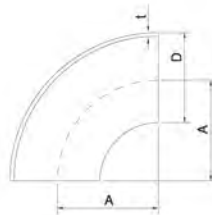
SF-17 45° Long Elbow (Welding)



Unit:mm

Size	A	D
1 ^s	49.5	25.4
1.5 ^s	55.7	38.1
2 ^s	64.9	50.8
2.5 ^s	72.7	63.5
3 ^s	79	76.3
4 ^s	98.8	101.6

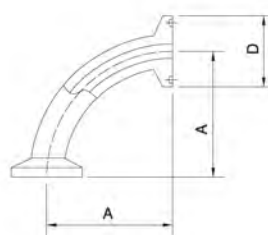
SF-18 Micro Elbow (Welding)



Unit:mm

Size	A	D	t	WT(g)
1/2 ^s	20	12.7	1.6	13.5
3/4 ^s	30	19.05	1.6	26.5

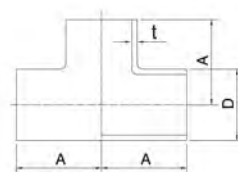
SF-19 Micro Elbow (Ferrule)



Unit:mm

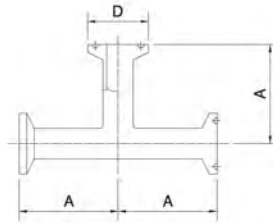
Size	A	D	WT(g)
1/2 ^s	40	25	54.5
3/4 ^s	40	25	54.5

SF-20 Micro Tee (Welding)



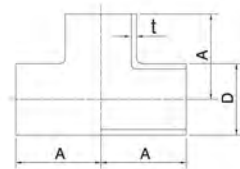
Unit:mm

Size	A	D	t	WT(g)
1/2 ^s	19	12.7	2.0	22.5
3/4 ^s	28.5	19.05	1.6	48.5

SF-21 Micro Tee (Ferrule)

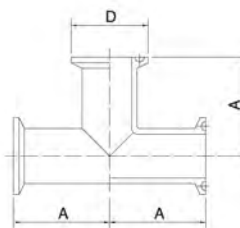
Unit:mm

Size	A	D	WT(g)
1/2 ^S	31.5	25	71.5
3/4 ^S	41.5	25	79.5

SF-22 Equal Tee (Welding)

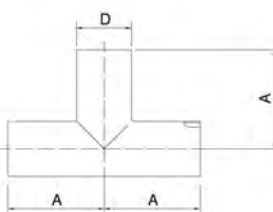
Unit:mm

Size	A	D	t	WT(g)
1 ^S	35	25.4	1.2	56
1.5 ^S	50	38.1	1.2	157
2 ^S	60	50.8	1.5	250
2.5 ^S	79	63.5	1.5	485
3 ^S	82	76.3	2	670
4 ^S	132	101.6	2	1400

SF-23 Equal Tee (Ferrule)

Unit:mm

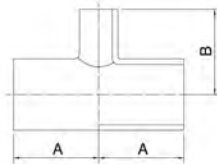
Size	A	D	WT(Kg)
1 ^S	55	50.5	0.24
1.5 ^S	70	50.5	0.3
2 ^S	82	64	0.45
2.5 ^S	105	77.5	0.78
3 ^S	110	91	1.08
4 ^S	160	119	2.1

SF-24 Long Tee (Welding)

Unit:mm

Size	A	D
1 ^S	65	25.4
1.5 ^S	70	38.1
2 ^S	80	50.8
2.5 ^S	99	63.5
3 ^S	102	76.3
4 ^S	130	101.6

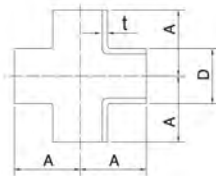
SF-25 Reducing Tee (Welding)



Unit:mm

Size	A	B
1.5 ^s × 1 ^s	50	40
2 ^s × 1.5 ^s	60	58.6
2 ^s × 1 ^s	60	47.6
2.5 ^s × 2 ^s	79	69.3
2.5 ^s × 1.5 ^s	79	63.3
2.5 ^s × 1 ^s	79	52.3
3 ^s × 2.5 ^s	82	90
3 ^s × 2 ^s	82	76
3 ^s × 1.5 ^s	82	70
4 ^s × 3 ^s	130	116
4 ^s × 2.5 ^s	130	113
4 ^s × 2 ^s	130	97

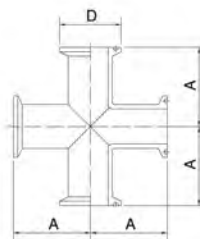
SF-26 Cross (Welding)



Unit:mm

Size	A	D	t	WT(Kg)
3/4 ^s	38	25	1.65	
1 ^s	35	25.4	1.2	0.07
1.5 ^s	50	38.1	1.2	0.15
2 ^s	60	50.8	1.5	0.28
2.5 ^s	79	63.5	1.5	0.72
3 ^s	82	76.3	2	0.88
4 ^s	130	101.6	2	1.74

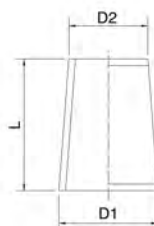
SF-27 Cross (Ferrule)



Unit:mm

Size	A	D	WT(Kg)
1 ^s	55	50.5	0.35
1.5 ^s	70	50.5	0.35
2 ^s	82	64	0.60
2.5 ^s	105	77.5	1.16
3 ^s	110	91	1.44
4 ^s	160	119	2.70

SF-28 Concentric Reducer (Welding)

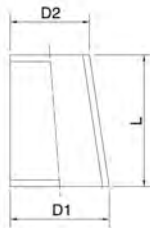


Unit:mm

Size	D1	D2	L	Size	D1	D2	L
3/4 ^s × 1/2 ^s	19	12.7	50	2.5 ^s × 2 ^s	63.5	50.8	67
1 ^s × 1/2 ^s	25.4	12.7	50	3 ^s × 1 ^s	76.3	25.4	67
1 ^s × 3/4 ^s	25.4	19	50	3 ^s × 1.5 ^s	76.3	38.1	67
1.5 ^s × 1/2 ^s	38.1	12.7	50	3 ^s × 2 ^s	76.3	50.8	67
1.5 ^s × 3/4 ^s	38.1	19	50	3 ^s × 2.5 ^s	76.3	63.5	67
1.5 ^s × 1 ^s	38.1	25.4	67	4 ^s × 1 ^s	101.6	25.4	103
2 ^s × 1 ^s	50.8	25.4	67	4 ^s × 1.5 ^s	101.6	38.1	103
2 ^s × 1.5 ^s	50.8	38.1	67	4 ^s × 2 ^s	101.6	50.8	103
2.5 ^s × 1 ^s	63.5	25.4	67	4 ^s × 2.5 ^s	101.6	63.5	103
2.5 ^s × 1.5 ^s	63.5	38.1	67	4 ^s × 3 ^s	101.6	76.3	103

SF-29 Eccentric Reducer (Welding)

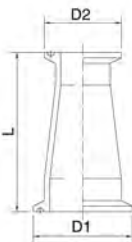
Unit:mm



Size	D1	D2	L	Size	D1	D2	L
3/4 ^s x 1/2 ^s	19	12.7	50	2.5 ^s x 2 ^s	63.5	50.8	67
1 ^s x 1/2 ^s	25.4	12.7	50	3 ^s x 1 ^s	76.3	25.4	67
1 ^s x 3/4 ^s	25.4	19	50	3 ^s x 1.5 ^s	76.3	38.1	67
1.5 ^s x 1/2 ^s	38.1	12.7	50	3 ^s x 2 ^s	76.3	50.8	67
1.5 ^s x 3/4 ^s	38.1	19	50	3 ^s x 2.5 ^s	76.3	63.5	67
1.5 ^s x 1 ^s	38.1	25.4	67	4 ^s x 1 ^s	101.6	25.4	103
2 ^s x 1 ^s	50.8	25.4	67	4 ^s x 1.5 ^s	101.6	38.1	103
2 ^s x 1.5 ^s	50.8	38.1	67	4 ^s x 2 ^s	101.6	50.8	103
2.5 ^s x 1 ^s	63.5	25.4	67	4 ^s x 2.5 ^s	101.6	63.5	103
2.5 ^s x 1.5 ^s	63.5	38.1	67	4 ^s x 3 ^s	101.6	76.3	103

SF-30 Concentric Reducer (Ferrule)

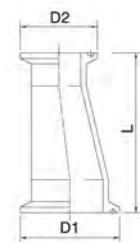
Unit:mm



Size	D1	D2	L	Size	D1	D2	L
3/4 ^s x 1/2 ^s	19	12.7	90	2.5 ^s x 2 ^s	63.5	50.8	115
1 ^s x 1/2 ^s	25.4	12.7	90	3 ^s x 1 ^s	76.3	25.4	115
1 ^s x 3/4 ^s	25.4	19	90	3 ^s x 1.5 ^s	76.3	38.1	115
1.5 ^s x 1/2 ^s	38.1	12.7	90	3 ^s x 2 ^s	76.3	50.8	117
1.5 ^s x 3/4 ^s	38.1	19	90	3 ^s x 2.5 ^s	76.3	63.5	121
1.5 ^s x 1 ^s	38.1	25.4	107	4 ^s x 1 ^s	101.6	25.4	151
2 ^s x 1 ^s	50.8	25.4	109	4 ^s x 1.5 ^s	101.6	38.1	151
2 ^s x 1.5 ^s	50.8	38.1	109	4 ^s x 2 ^s	101.6	50.8	153
2.5 ^s x 1 ^s	63.5	25.4	113	4 ^s x 2.5 ^s	101.6	63.5	157
2.5 ^s x 1.5 ^s	63.5	38.1	113	4 ^s x 3 ^s	101.6	76.3	159

SF-31 Eccentric Reducer (Ferrule)

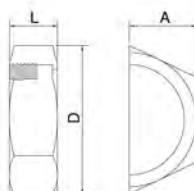
Unit:mm



Size	D1	D2	L	Size	D1	D2	L
3/4 ^s x 1/2 ^s	19	12.7	90	2.5 ^s x 2 ^s	63.5	50.8	115
1 ^s x 1/2 ^s	25.4	12.7	90	3 ^s x 1 ^s	76.3	25.4	115
1 ^s x 3/4 ^s	25.4	19	90	3 ^s x 1.5 ^s	76.3	38.1	115
1.5 ^s x 1/2 ^s	38.1	12.7	90	3 ^s x 2 ^s	76.3	50.8	117
1.5 ^s x 3/4 ^s	38.1	19	90	3 ^s x 2.5 ^s	76.3	63.5	121
1.5 ^s x 1 ^s	38.1	25.4	107	4 ^s x 1 ^s	101.6	25.4	151
2 ^s x 1 ^s	50.8	25.4	109	4 ^s x 1.5 ^s	101.6	38.1	151
2 ^s x 1.5 ^s	50.8	38.1	109	4 ^s x 2 ^s	101.6	50.8	153
2.5 ^s x 1 ^s	63.5	25.4	113	4 ^s x 2.5 ^s	101.6	63.5	157
2.5 ^s x 1.5 ^s	63.5	38.1	113	4 ^s x 3 ^s	101.6	76.3	159

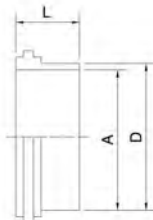
SF-32 Hexagon Nut

Unit:mm



Size	L	A	D	WT(Kg)
1 ^s	30	45	51.5	0.18
1.5 ^s	30	56	63.5	0.20
2 ^s	30	75	87	0.38
2.5 ^s	30	90	104.5	0.57
3 ^s	30	105	122	0.64
4 ^s	35	130	150	1.04

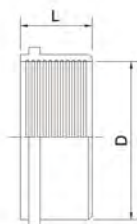
SF-33 Liner (Welding)



Unit:mm

Size	L	A	D	WT(g)
1 ^s	20	23	25.4	40
1.5 ^s	20	35.7	38.1	63
2 ^s	22	47.8	50.8	105
2.5 ^s	26	60.5	63.5	150
3 ^s	28	72.3	76.3	225
4 ^s	28	97.6	101.6	330

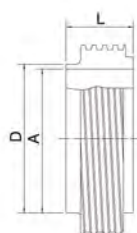
SF-34 Liner (Expanding)



Unit:mm

Size	L	D	WT(g)
1 ^s	20	25.7	35
1.5 ^s	20	38.4	52
2 ^s	22	51.1	75
2.5 ^s	26	63.8	122
3 ^s	28	76.6	183
4 ^s	28	102	290

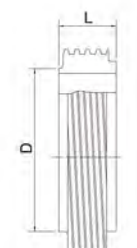
SF-35 Male (Welding)



Unit:mm

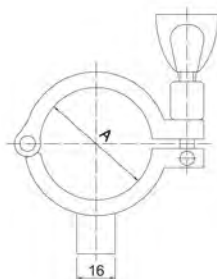
Size	L	A	D	WT(g)
1 ^s	20	23	25.4	67
1.5 ^s	20	35.7	38.1	95
2 ^s	22	47.8	50.8	173
2.5 ^s	26	60.5	63.5	215
3 ^s	28	72.3	76.3	312
4 ^s	28	97.6	101.6	480

SF-36 Male (Expanding)



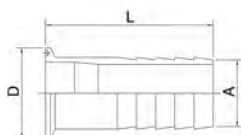
Unit:mm

Size	L	D	WT(g)
1 ^s	20	25.7	55
1.5 ^s	20	38.4	85
2 ^s	22	51.1	140
2.5 ^s	26	63.8	168
3 ^s	28	76.6	212
4 ^s	28	102	355

SF-37 Piper Hanger

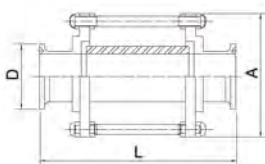
Unit:mm

Size	A	Size	A
1/2 ^S	12.7	15A	21.7
3/4 ^S	19	20A	27.2
1 ^S	25.4	25A	34
1.5 ^S	38.1	32A	42.7
2 ^S	50.8	40A	48.6
2.5 ^S	63.5	50A	60.5
3 ^S	76.3	65A	76.3
4 ^S	101.6	80A	89.1
		100A	114.3

SF-38 Hose Adapter

Unit:mm

Size	D	A	L
1/2 ^S	25	12.7	50
3/4 ^S	25	19	50
1.5 ^S x Ø12.7	50.5	12.7	60
1.5 ^S x Ø16	50.5	16	60
1.5 ^S x Ø19	50.5	19	60
1.5 ^S x Ø25.4	50.5	25.4	100
1.5 ^S x Ø31.8	50.5	31.8	100
1.5 ^S	50.5	38.1	100
2 ^S	64	50.8	100
2.5 ^S	77.5	63.5	100
3 ^S	91	76.3	100
4 ^S	101.6	101.6	120

SF-39 Sight Glass (Ferrule, Male & Socket)

Unit:mm

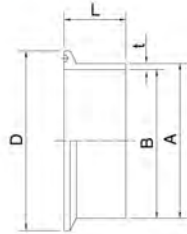
Size	L	A	D	WT(Kg)
1 ^S	170	80	50.5	1.1
1.5 ^S	170	100	50.5	1.3
2 ^S	190	120	64	2.0
2.5 ^S	190	125	77.5	2.6
3 ^S	240	140	91	3.7
4 ^S	240	170	119	4.9

SF-40 Tube Strainer (SI Type)

Unit:mm

Size	L	A	D
1 ^S	350	76.3	50.5
1.5 ^S	350	76.3	50.5
2 ^S	400	101.6	64
2.5 ^S	400	101.6	77.5
3 ^S	450	114.3	91
4 ^S	500	165.2	119

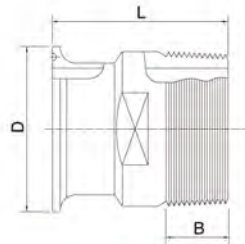
SF-41 Pipe Ferrule (Welding)



Unit:mm

Size	L	A	B	D	t	WT(Kg)
15A × 1.5 ^S	20	21.7	17.5	50.5	2.1	80
20A × 1.5 ^S	20	27.2	23	50.5	2.1	75
25A × 1.5 ^S	20	34	28.4	50.5	2.8	75
32A × 1.5 ^S	20	42.7	37.1	50.5	2.8	70
40A × 2 ^S	20	48.6	43	64	2.8	120
50A × 2.5 ^S	26	60.5	54.9	77.5	2.8	170
65A × 3 ^S	28	76.3	70.3	91	3.0	220
80A × 3.5 ^S	28	89.1	83.1	104.5	3.0	252
100A × 4.5 ^S	28	114.3	108.3	130	3.0	356

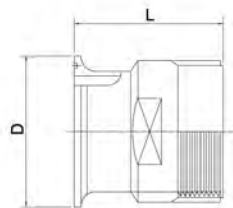
SF-42 Nipple/ Ferrule Adapter (Male)



Unit:mm

Size	L	B	D
10A × 1.5 ^S	35	13.5	50.5
15A × 1.5 ^S	42	20.5	50.5
20A × 1.5 ^S	42	21.5	50.5
25A × 1.5 ^S	42	21.5	50.5
32A × 1.5 ^S	42	21.5	50.5
40A × 1.5 ^S	50	22.5	50.5
40A × 2 ^S	50	22.5	64
50A × 2 ^S	50	22.5	64
50A × 2.5 ^S	50	22.5	77.5

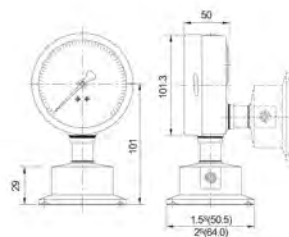
SF-43 Nipple/ Socket Adapter (Female)



Unit:mm

Size	L	D
8A × 1.5 ^S	20	50.5
10A × 1.5 ^S	20	50.5
15A × 1.5 ^S	20	50.5
20A × 1.5 ^S	20	50.5
25A × 1.5 ^S	20	50.5
32A × 1.5 ^S	32	50.5
40A × 1.5 ^S	34	50.5
40A × 2 ^S	34	64
50A × 2 ^S	36	64
50A × 2.5 ^S	36	77.5

SF-44 Sanitary Pressure Gage



- Clamp Type(IDF), Diameter 100mm
- Range 0~10BAR, Accuracy : ±1.0% of Full Scale
- Bottom Connection Direct Mounting
- Material Body : SS 316
- Diaphragm : SS316L
- Size : 1.5^S & 2.0^S

SF-45 Dip Nozzle



■Features

- Material : SS316L
- Surface Roughness : 400 Grit($0.6\mu\text{m}$)
- Electro Polishing



Industrial
Valve, Actuator & Fittings

Sanitary Valve (Manual)

5

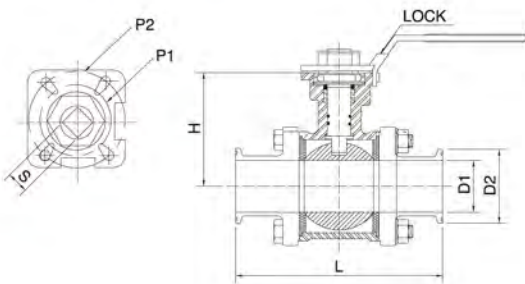
Sanitary Valve
(Manual)

Model	Item	Page
SV-01(D)	Sanitary 2 Way Ball Valve (ISO pad)	20
SV-01(M)	Sanitary 2 Way Ball Valve (Manual)	20
SV-02	Sanitary 3 Way Ball Valve	21
SV-03	Sanitary 3 Way Ball Valve (Bolted ends)	21
SV-04	Sanitary Butterfly Valve	22
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SV-06	Sanitary Relief Valve	23
SV-07	Tank Flush Ball Valve	23
SV-08	Diaphragm Valve	24
SV-09	Micro Valve	24

SV-01(D) Sanitary 2-Way Ball Valve (ISO Pad)**■Features**

- Clamp Ends, Body : SS316(CF8M), SS316L(CF3M)
- Seat : TFM-1600 (-40 to +180°C)
- Inside Polish $\leq$ Ra 0.4, Grit 240g(Ra 14~18 μ -in)
- ISO5211 Direct Mounting Pad
- With Locking Handle

* Option : Butt Weld Ends,
Cavity Filled Seat



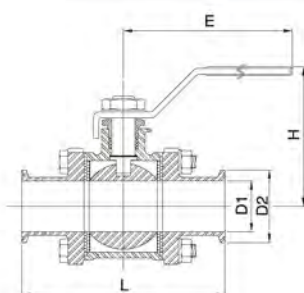
Unit:mm

Size	L $\pm$ 2.0	D1 $\pm$ 0.1	D2	H	P1	P2	S $\pm$ 1.0	WT(Kg)
1/2 ^S	89	9.5	25.4	37	36	42	9	0.54
3/4 ^S	101	15.9	25.4	47	36	42	9	0.76
1 ^S	114	22.2	50.5	57.2	42	50	11	1.2
1.5 ^S	140	35	50.5	78.2	50	70	14	2.4
2 ^S	156	47.6	64	86.2	50	70	14	3.4
2.5 ^S	197	60.3	77.5	109.2	70	102	17	8.6
3 ^S	229	73	91	117.7	70	102	17	10.8
4 ^S	241	97.4	119	141.2	102	125	22	20.3

SV-01(M) Sanitary 2-Way Ball Valve**■Features**

- Clamp Ends, Body : SS316(CF8M), SS316L(CF3M)
- Seat : TFM-1600 (-40 to +180°C)
- Inside Polish $\leq$ Ra 0.4, Grit 240g(Ra 14~18 μ -in)
- With Locking Handle

* Option : Butt Weld Ends,
Cavity Filled Seat



Unit:mm

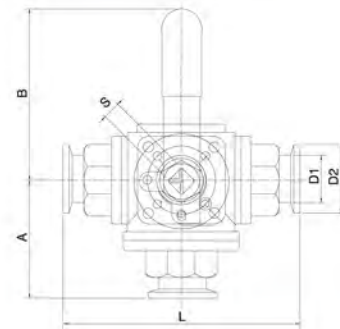
Size	L $\pm$ 2.0	D1 $\pm$ 0.1	D2	H	E	WT(Kg)
1/2 ^S	89	9.5	25.4	61	106	0.4
3/4 ^S	101	15.9	25.4	64	106	0.6
1 ^S	114	22.2	50.5	68	130	1.2
1.5 ^S	140	35	50.5	95	193	2.4
2 ^S	156	47.6	64	100	193	3.7
2.5 ^S	197	60.3	77.5	140	263	7.1
3.0 ^S	229	73	91	155	263	
4.0 ^S	241	97.4	119	180	285	

SV-02 Sanitary 3-Way Ball Valve

■Features

- Clamp Ends, Lor T-Position
- Body : SS316(CF8M), SS316L(CF3M)
- Seat : TFM-1600 (-40 to +180°C)
- Inside polish standard grit (Ra 18~23 μ -in)
- ISO5211 Direct Mounting Pad
- With Lever Handle

* Option : Cavity Filled Seat
 180° Operated Stop Plate
 PTFE/PFA Coating(40~70 μ m)



Unit:mm

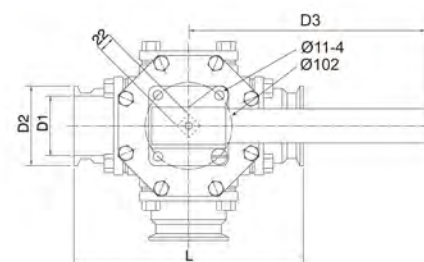
Size	L	D1	D2	A	B	S	WT(Kg)
1/2 ^s	133	9.6	25.4	66.5	130	9	0.91
3/4 ^s	142	15.8	25.4	70	130	9	1.02
1 ^s	160	22.1	50.5	80	165	11	1.94
1.5 ^s	182	34.8	50.5	91	205	14	3.82
2 ^s	216	47.5	64	108	205	14	6.38

SV-03 Sanitary 3-Way Ball Valve

■Features

- Clamp Ends, Lor T-Position, Bolted End Caps
- Body : SS316(CF8M), SS316L(CF3M)
- Seat : TFM-1600 (-40 to +180°C)
- Inside polish standard grit (Ra 18~23 μ -in)
- ISO5211 Direct Mounting Pad with Lever Handle

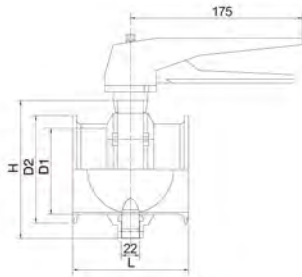
* Option : Cavity Filled Seat
 180° Operated Stop Plate
 PTFE/PFA Coating(40~70 μ m)
 ASME/BPE Standard for SS316L
 Low Ferrite (<3%)
 Low Sulphur(0.005% to 0.017%)



Unit:mm

Size	L	D1	D2	D3	WT(Kg)	
					L-port	T-port
2.1/2 ^s	241.3	60.2	77.5	400	20.3	19.8
3 ^s	279.4	72.9	91	500	26.4	25.0
4 ^s	330.2	97.4	119	600	47.6	45.6

SV-04 Sanitary Butterfly Valve



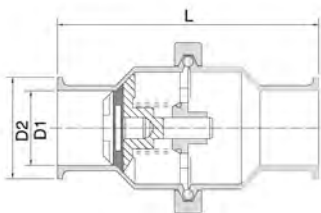
■Features

- Clamp Ends
- Body & Disc : SS304 & 316L
- Seat : Silicone
- 12 Position in the fully open to fully closed
- With Gripper Handle
- * Option : Male & Butt Weld Ends,
Stainless Steel Lever
Special Silicone Seat (Max. 250°C)

Unit:mm

Size	L	D1	D2	H	WT(Kg)
1 ^s	100	22.5	50.5	76	11
1.5 ^s	100	35.8	50.5	92	1.1
2 ^s	100	47.5	64	105	1.7
2.5 ^s	100	60	77.5	123	1.8
3 ^s	105	72	91	146	2.2
4 ^s	120	97	119	170	3.8

SV-05 Sanitary Check Valve



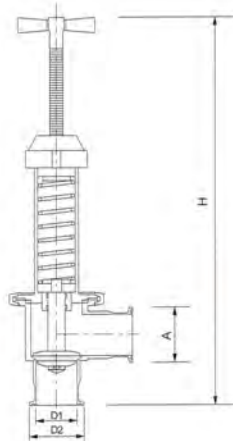
■Features

- Clamp Ends
- Body: SS304
- Disc Gasket : Silicone

Unit:mm

Size	L	D1	D2
1 ^s	130	25.7	50.5
1.5 ^s	137	38.4	50.5
2 ^s	165	51.1	64
2.5 ^s	195	63.8	77.5
3 ^s	200	76.6	91
4 ^s	240	101.9	119

SV-06 Sanitary Relief Valve



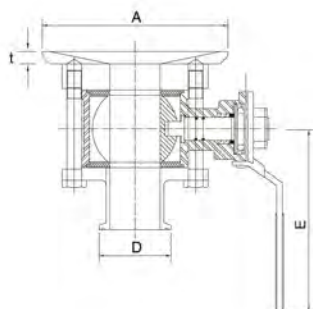
■Features

- Clamp Ends
- Body:SS304)

Unit:mm

Size	D1	D2	A	H
1.5 ^s	38.1	50.5	70	338.5
2 ^s	50.8	64	82	364.5
2.5 ^s	63.5	77.5	105	405
3 ^s	76.3	91	110	430.5
4 ^s	101.9	119	-	-

SV-07 Tank Flush Ball Valve



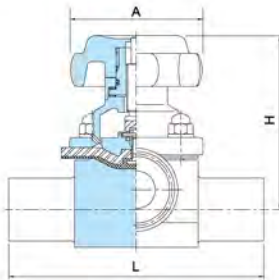
■Features

- Clamp End / Welding Plate
- Body : SS316 (CF8M)
- Seat : TFM-1600 (-40 to +180°C)
- with Locking Handle
- * Option : Cavity Filled Seat

Unit:mm

Size	A	D	E	t
1/2 ^s	60	25.4	143	20
3/4 ^s	80	25.4	143	20
1 ^s	80	25.4	160	20
1.5 ^s	120	50.5	187	20
2 ^s	150	64	187	20
2.5 ^s	170	77.5	310	20
3 ^s	200	91	310	20
4 ^s	200	119	400	20

SV-08 Diaphragm Valve



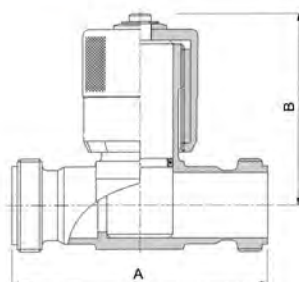
■Features

- Size ISO 1/2^s~2^s
- Connection : Weld, Clamp Ends
- Material Body : Forging STS316L
Bonnet : Casting STS304
Handwheel : M.C Nylon, STS304
- Diaphragm TFM - FDA, Single
TFM - FDA, Two piece
CFR21 Section 177.1550
- Surface Treatment Internal Ra ≤ 0.4 μ m
- Other : Electrolytic Polishing
- Working Temperature -5°C~150°C
- Working Pressure 6kg/cm²

Unit:mm

Size	L	A	H
1/2 ^s	60	34	49
3/4 ^s	80	43	74
1 ^s	115	80	93
1.5 ^s	140	95	121
2 ^s	160	110	145
2.5 ^s	215	200	188
3 ^s	222	200	194
4 ^s	300	250	230

SV-09 Micro Valve



■Features

- Material : SS304, 316, 316L
- Seal : PTFE, Silicone, NBR
- Surface Roughness : Grit 320 to 400

Unit:mm

Size	A	B
1 ^s	110	87
1.5 ^s	140	140.5
2 ^s	164	130
2.5 ^s	210	162
3 ^s	220	189

Sanitary Valve (Automatic)

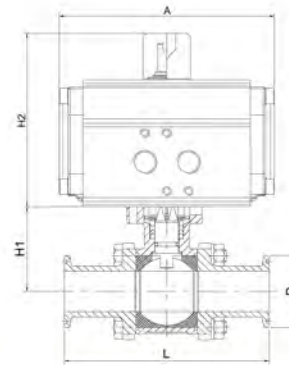
6

Sanitary Valve
(Automatic)

Model	Item	Page
SVP-01	Pneumatic Sanitary 2 Way Ball Valve (D/A)	26
SVP-02	Pneumatic Sanitary 2 Way Ball Valve (S/A)	26
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SVP-01 Pneumatic 2-Way Sanitary Ball Valve (Double Acting)

* Option : Electro/Pneumatic Positioner



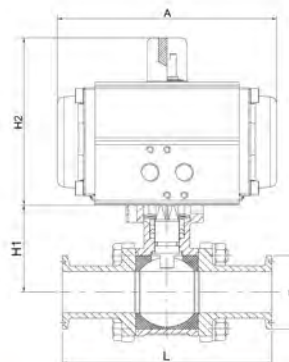
Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^s	89	25.4	RP-050RD	119	37	90	10	1.02
3/4 ^s	101	25.4	RP-050RD	119	47	90	11	1.12
1 ^s	114	50.5	RP-065RD	131	57.2	106.5	14	1.43
1.5 ^s	140	50.5	RP-080RD	189	78.2	126	27	2.75
2 ^s	156	64	RP-080RD	189	86.2	126	54	5.51
2.5 ^s	197	77.5	RP-090RD	188	109.2	136	74	7.55
3 ^s	229	91	RP-115RD	264	116.2	163	130	13.26
4 ^s	241	119	RP-115RD	264	133.5	163	158	16.12

SVP-02 Pneumatic 2-Way Sanitary Ball Valve (Single Acting / Spring Return)

Normally Closed(N.C), Fail to Close

* Option : Electro/Pneumatic Positioner

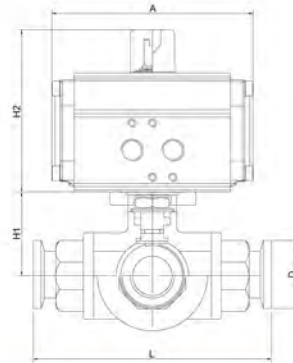


Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^s	89	25.4	RP-065RS11	154	37	106.5	10	1.02
3/4 ^s	101	25.4	RP-080RS5	220	47	126	11	1.12
1 ^s	114	50.5	RP-0080RS7	220	57.2	126	14	1.43
1.5 ^s	140	50.5	RP-090RS10	223	78.2	136	27	2.75
2 ^s	156	64	RP-115RS10	302	86.2	163	54	5.51
2.5 ^s	197	77.5	RP-125RS10	330	109.2	174	74	7.55
3 ^s	229	91	RP-140RS12	389	116.2	192	130	13.26
4 ^s	241	119	RP-160RS10	416	133.5	216	158	16.12

SVP-03 Pneumatic 3-Way Sanitary Ball Valve (Double Acting)

* Option : Electro/Pneumatic Positioner



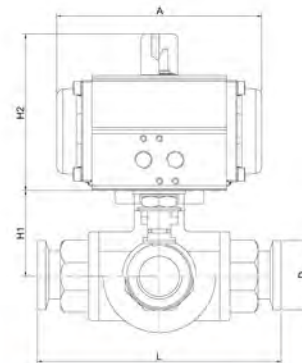
Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^S	133	25.4	RP-050RD	119	37.5	90	9	0.92
3/4 ^S	142	25.4	RP-050RD	119	37.5	90	11	1.12
1 ^S	160	50.5	RP-050RD	119	49	90	13	1.33
1.5 ^S	182	50.5	RP-080RD	189	63	126	43	4.39
2 ^S	216	64	RP-080RD	189	74	126	53	5.41

SVP-04 Pneumatic 3-Way Sanitary Ball Valve (Single Acting / Spring Return)

Normally Closed(N.C), Fail to Close

* Option : Electro/Pneumatic Positioner

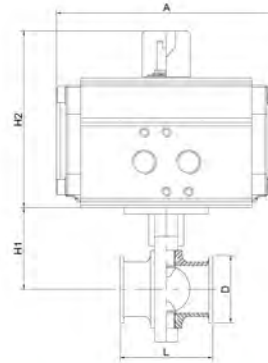


Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^S	133	25.4	RP-065RS11	154	37.5	106.5	9	0.92
3/4 ^S	142	25.4	RP-080RS5	220	37.5	106.5	11	1.12
1 ^S	160	50.5	RP-080RS6	220	49	126	13	1.33
1.5 ^S	182	50.5	RP-100RS11	256	63	148	43	4.39
2 ^S	216	64	RP-115RS10	302	74	163	53	5.41

SVP-05 Pneumatic Sanitary Butterfly Valve (Double Acting)

* Option : Electro/Pneumatic Positioner



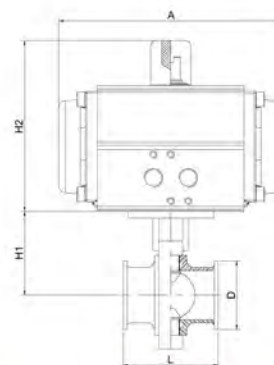
Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1 ^S	100	50.5	RP-050RD	119	76	90	6	0.61
1.5 ^S	100	50.5	RP-050RD	119	92	90	13	1.33
2 ^S	100	64	RP-065RD	131	105	106.5	14	1.43
2.5 ^S	100	77.5	RP-080RD	189	123	126	32	3.26
3 ^S	100	91	RP-080RD	189	146	126	40	4.08
4 ^S	120	119	RP-080RD	189	170	126	58	5.92

SVP-06 Pneumatic Sanitary Butterfly Valve (Single Acting / Spring Return)

Normally Closed(N.C) Fail to Close

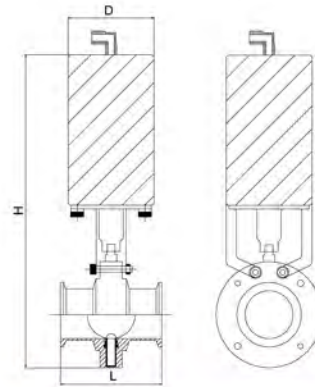
* Option : Electro/Pneumatic Positioner



Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1 ^S	100	50.5	RP-050RS12	133	76	90	6	0.61
1.5 ^S	100	50.5	RP-080RS6	220	92	126	13	1.33
2 ^S	100	64	RP-080RS7	220	105	126	14	1.43
2.5 ^S	100	77.5	RP-090RS12	223	123	136	32	3.26
3 ^S	100	91	RP-100RS10	256	146	148	40	4.08
4 ^S	120	119	RP-115RS11	302	170	163	58	5.92

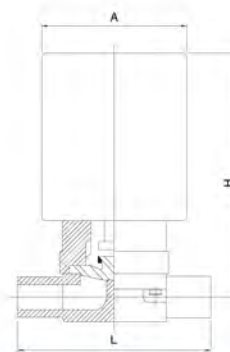
SVP-07 Pneumatic Sanitary Butterfly Valve (Single Acting) Vertical Type



Unit:mm

Size	L	ØD	H
1 ^s	100	85	280
1.5 ^s	100	85	297
2 ^s	100	85	309
2.5 ^s	100	85	328
3 ^s	100	85	349
4 ^s	120	108	408

SVP-08 Pneumatic Diaphragm Valve Butt Weld Ends, Double Acting or Single Acting

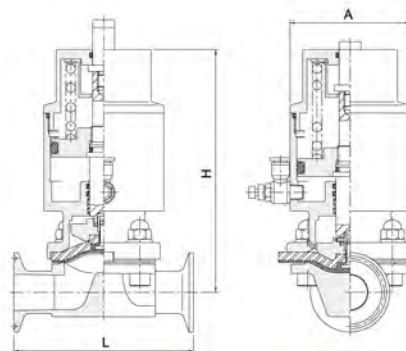


Unit:mm

Size	A	L	H
1/2 ^s	52	60	80
3/4 ^s	59	80	96
1 ^s	87	115	154
1.5 ^s	113	140	206
2 ^s	139	160	235
2.5 ^s	215	215	295
3 ^s	215	222	295
4 ^s	265	300	352

SVP-09 Pneumatic Diaphragm Valve

Clamp Ends, Double Acting or Single Acting

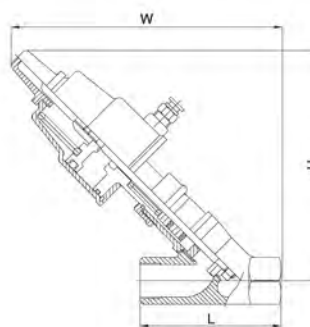


Unit:mm

Size	A	L	H
1/2 S	52	60	80
3/4 S	59	80	96
1 S	87	115	154
1.5 S	113	140	206
2 S	139	160	235
2.5 S	215	215	295
3 S	215	222	295
4 S	265	300	352

SVP-10 Pneumatic Angle Seat Valve (Y-Globe)

Single acting, Enter below seat, Normal Closed(N.C), Fail to Close, Internal Thread



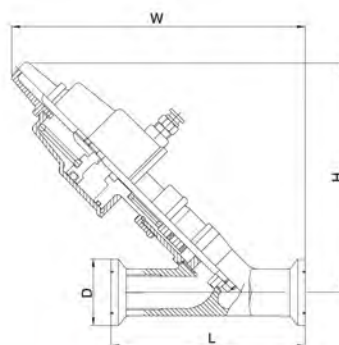
Unit:mm

SIZE		L	H	W	Actuator(Ø)
Inch	mm				
1/2	15A	96	174	192	55
3/4	20A	101	174	203	55
1	25A	105	175	207	55
1-1/4	32A	140	211	263	80
1-1/2	40A	143	211	263	80
2	50A	172	240	293	100
2-1/2	65A	196	259	309	110
3	80A	228	311	367	125

SVP-11 Pneumatic Angle Seat Valve (Y-Globe)

Single acting, Enter below seat, Normal Closed(N.C), Fail to Close, Clamp ends

* Option : Flanged ends(JIS10K, ANSI 150LBS)



Unit:mm

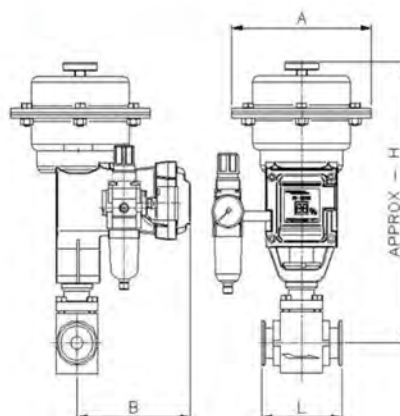
SIZE	L	H	D	W	Actuator(Ø)
1/2 ^S	145	174	50.5	217	55
3/4 ^S	149	174	50.5	227	55
1 ^S	157	175	50.5	233	55
1.5 ^S	202	211	50.5	293	80
2 ^S	230	240	64	322	100

SVP-12 2-Way Micro Flow Globe Valve



■Features

- Size range : 1^S~2^S(Ferrule), PT 1/4"~2"(Thread)
- Body materials : SUS304, 316, 316L stainless steel
- Seat : SUS316/304 Stellite
- Gasket : RTFE, Graphite
- Maximum fluid pressure : JIS 10~40K, ANSI Class 125~600
- Standard working temperature : -20~150°C
- Actuator : Diaphragm pneumatic actuator



Unit:mm

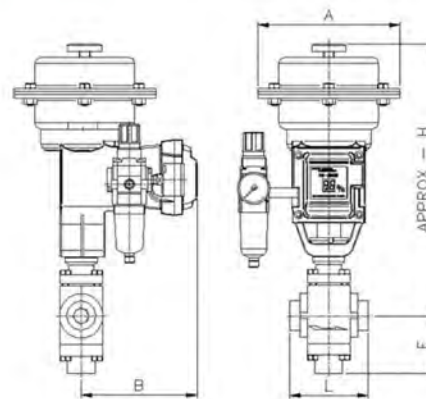
SIZE	Type	A	L	B	H
1 ^S ~ 2 ^S	Ferrule	165	95	135	315
1/4" ~ 2"	Thread	165	95	135	315

SVP-13 3-Way Micro Flow Globe Valve



■Features

- Size range : 1^S~2^S(Ferrule), PT 1/4"~2"(Thread)
- Body materials : SUS304, 316, 316L stainless steel
- Seat : SUS316/304 Stellite
- Gasket : RTFE, Graphite
- Maximum fluid pressure : JIS 10~40K, ANSI Class 125~600
- Standard working temperature : -20~150°C
- Actuator : Diaphragm pneumatic actuator

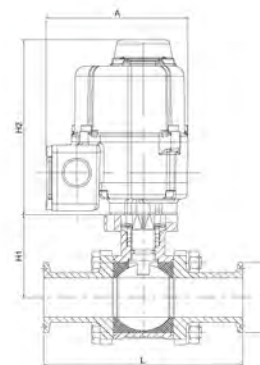


Unit:mm

SIZE	Type	A	L	B	H
1 ^S ~ 2 ^S	Ferrule	165	95	135	315
1/4" ~ 2"	Thread	165	95	135	315

SVE-14 Electric 2-Way Sanitary Ball Valve

* Option : Modulating Controller(4 to 20mA, 0 to 10VDC)



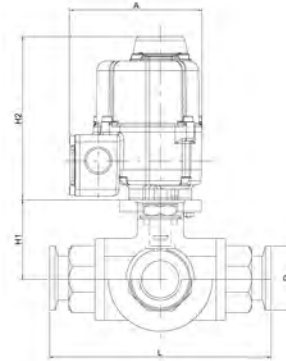
- Power : 110/220VAC, 1PH, 24VDC (DE-002~DE-010)
- 110/220VAC, 1PH, 380/440VAC 3PH, 24VDC (DE-016~DE-028)

Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^S	89	25.4	DE-002	105.3	37	104.2	10	1.02
3/4 ^S	101	25.4	DE-002	105.3	47	104.2	11	1.12
1 ^S	114	50.5	DE-002	105.3	57.2	104.2	14	1.43
1.5 ^S	140	50.5	DE-004	116.5	78.2	123.8	27	2.75
2 ^S	156	64	DE-008	125.3	86.2	155.5	54	5.51
2.5 ^S	197	77.5	DE-010	163.4	109.2	132.5	74	7.55
3 ^S	229	91	DE-016	170.5	116.2	190	130	13.26
4 ^S	241	119	DE-028	208.9	133.5	208	158	16.12

SVE-15 Electric 3-Way Sanitary Ball Valve

* Option : Modulating Controller(4 to 20mA, 0 to 10VDC)



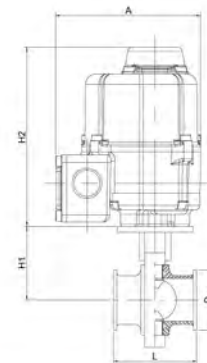
■ Power : 110/220VAC, 1PH, 24VDC (DE-002~DE-008)

Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1/2 ^s	133	25.4	DE-002	105.3	37.5	104	9	0.92
3/4 ^s	142	25.4	DE-002	105.3	37.5	104	11	1.12
1 ^s	160	50.5	DE-002	105.3	49	104	13	1.33
1.5 ^s	182	50.5	DE-006	122	63	134.5	43	4.39
2 ^s	216	64	DE-008	125.3	74	155.5	53	5.41

SVE-16 Electric 2-Way Sanitary Ball Valve

* Option : Modulating Controller(4 to 20mA, 0 to 10VDC)

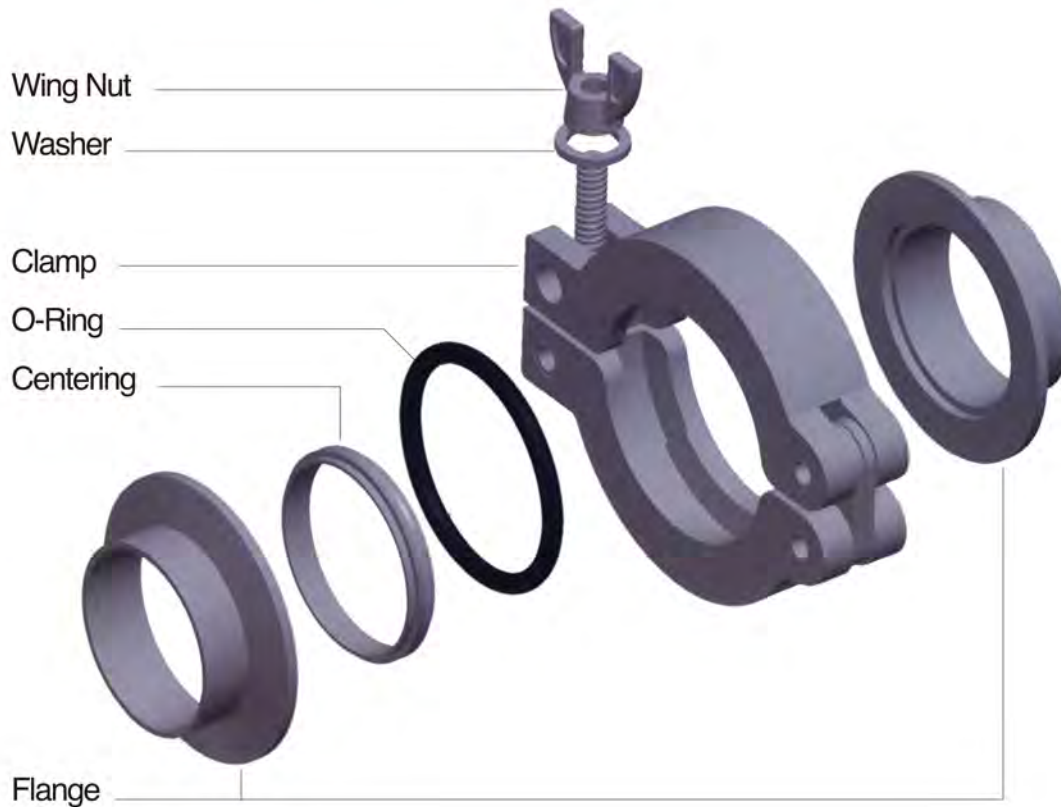


■ Power : 110/220VAC, 1PH, 24VDC (DE-002~DE-008)

Unit:mm

Size	L	D	Actuator	A	H1	H2	TORQUE	
							N.m	Kg.m
1 ^s	100	50.5	DE-002	105.3	76	104	6	0.61
1.5 ^s	100	50.5	DE-002	105.3	92	104	13	1.33
2 ^s	100	64	DE-002	105.3	105	104	14	1.43
2.5 ^s	100	77.5	DE-004	116.5	123	123.8	32	3.26
3 ^s	100	91	DE-005	123.1	146	126.4	40	4.08
4 ^s	120	119	DE-008	125.3	170	155.5	58	5.92

KF FLANGE CONNECTION WITH CLAMPS



Characteristic :

- Easy Assembly and Quick Disassembly manually without tools-KF or NW assembly comprises two flanges, a center-rings, an O-ring and an aluminum clamp or stainless steel clamp with a wingnut fastener for quick and fast connection.
- Uniform Pressure to Effect Vacuum Seal Connection-15° taper surface of KF or NW flange allows uniform pressure to compress an O-ring, which is held in place by metal center-ring, by the clamp to generate a vacuum seal.

Material and Size

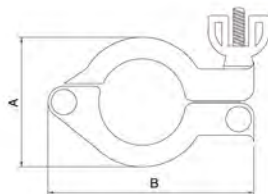
- Flanges, Blanks, Fitting : Material S.S.304
- Clamps : Material Aluminum or S.S.304
- O-ring : Material Viton
- Sizes : KF-10~KF160, JIS Standard : NW10~NW100
- Material S.S304, 304L, 316L and Sizes can be customized per customers' designs and requirements.

Vacuum Fittings

7

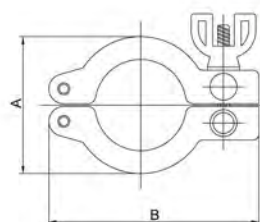
Vacuum Fittings

Model	Item	Page
VF-01(SA)	KF Hinged Clamp (AL, Single Pin)	36
VF-01(DA)	KF Hinged Clamp (AL, Double Pin)	36
VF-01(SS)	KF Hinged Clamp (SUS304, Single Pin)	36
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VF-23	Flexible Tubes	42
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VF-01(SA) KF Hinged Clamp (Single Pin) material : Aluminum

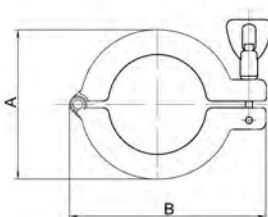
Unit:mm

Size	A	B	WT(g)	Material
NW16	42.5	63	63	AL
NW25	54	72	78	
NW40	70	90	98	
NW50	90	114	165	

VF-01(DA) KF Hinged Clamp (Double Pin) Material : Aluminum

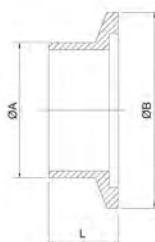
Unit:mm

Size	A	B	WT(g)	Material
NW16	45	61	66	AL
NW25	55	72	78	
NW40	70	90	103	
NW50	95	123	182	

VF-01(SS) KF Hinged Clamp (Single Pin) Material : Stainless Steel 304

Unit:mm

Size	A	B	WT(g)	Material
NW16	42.5	63	114	SS304
NW25	54	72	161	
NW40	70	90	193	
NW50	90	114	324	

VF-02 KF Flange (Short Weld)

Unit:mm

Size	ØA	ØB	L
NW16	* 19.05	30	20
	21.7	30	20
	25.4	30	20
NW25	* 25.4	40	20
	27.2	40	20
	34	40	20
NW40	* 38.1	55	20
	42.7	55	20
	48.6	55	20
NW50	* 50.8	75	20
	60.5	75	20
NW63	* 63.5	95	20
	76.3	95	20
NW80	* 76.3	114	20
	89.1	114	20
NW100	* 101.6	134	20
	114.3	134	20

VF-03 Centering Ring



Unit:mm

Size	ØA	ØB	C
NW16	16.8	3.9	8
NW25	25.9	3.9	8
NW40	40.9	3.9	8
NW50	51.9	3.9	8
ISO63	69.9	3.9	8
ISO80	82.9	3.9	8
ISO100	101.7	3.9	8
ISO125	126.9	3.9	8
ISO160	152.5	3.9	8
ISO200	211.9	3.9	8
ISO250	260.8	3.9	8
ISO320	317	5.6	13

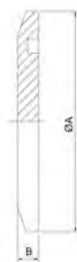
VF-04 O-Ring



Unit:mm

Size	DASH ØA	ØB	WT(g)
NW16	AS314	18.42	3
NW25	AS320	27.94	4.5
NW40	AS326	40.64	6
NW50	AS330	53.35	7.5
ISO63	AS336	75.57	10.4
ISO80	AS341	88.27	12
ISO100	AS347	107.32	14.6
ISO125	AS356	135.89	18.8
ISO160	AS362	158.12	20.9
ISO200	AS371	215.27	29.4
ISO250	AS378	266.07	36.1
ISO320	AS454	316.87	74.2

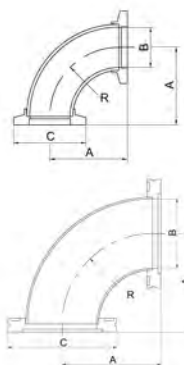
VF-05 KF Blank Flange



Unit:mm

Size	ØA	B
NW16	30	5
NW25	40	5
NW40	55	5
NW50	75	5
NW63	95	12
NW80	114	12
NW100	134	12
NW125	160	12
NW160	190	12

VF-06 90° Elbow



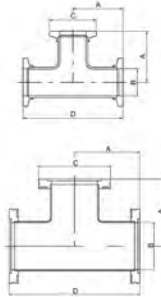
(1) KF 90° ELBOW

Unit:mm

Size	A	B	C	R
NW16	32	19.05	30	28.5
NW25	38.5	25.4	40	35
NW40	53.5	38.1	55	50
NW50	63.5	50.8	75	60
NW63	86	63.5	95	79
NW80	89	76.3	114	82
NW100	137	101.6	134	130

(2) ISO-k 90° ELBOW

Size	A	B	C	R
ISO63	86	63.5	95	79
ISO80	89	76.3	110	82
ISO100	137	101.6	130	130

VF-07 KF Tee

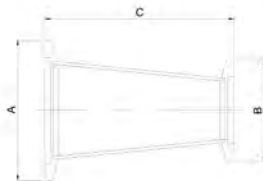
(1) KF 90° TEE

Unit:mm

Size	A	B	C	D
NW16	32	19.05	30	64
NW25	38.5	25.4	40	77
NW40	53.5	38.1	55	107
NW50	63.5	50.8	75	127
NW63	86	63.5	95	172
NW80	89	76.3	114	178
NW100	137	101.6	134	274

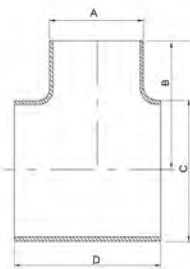
(2) ISO-k 90° TEE

Size	A	B	C	D
ISO63	86	63.5	95	172
ISO80	89	76.3	110	178
ISO100	137	101.6	130	274

VF-08 KF Conical Reducer

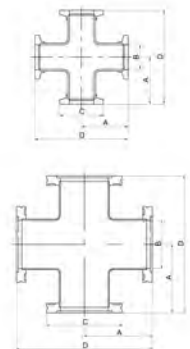
Unit:mm

Size	A	B	C
NW25-16	40	30	57.0
NW40-16	55	30	57.0
NW40-25	55	40	74.0
NW50-40	75	55	74.0
NW63-25	95	40	77.5
NW63-40	95	55	77.5
NW63-50	95	75	77.5
NW80-40	114	55	77.5
NW80-50	114	75	77.5
NW80-63	114	95	81.0
NW100-50	134	75	113.5
NW100-63	134	95	117.0
NW100-80	134	114	117.0

VF-09 T-Body(Bow) * Custom Made

Unit:mm

Size	A	B	C	D
NW16	19.05	42.4	40	1.5
NW25	25.4	42.4	40	1.5
NW40	38.1	56	53	1.5
NW50	50.8	66.5	63.5	1.5
NW63	63.5	79.5	76	2
NW80	76.3	92.5	89	2
NW100	101.6	134	127	2

VF-10 KF Cross

(1) KF 90° CROSS

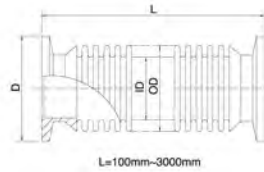
Unit:mm

Size	A	B	C	D
NW16	32.0	19.05	30	64
NW25	38.5	25.4	40	77
NW40	53.5	38.1	55	107
NW50	63.5	50.8	75	127
NW63	86.0	63.5	95	172
NW80	89.0	76.3	114	178
NW100	137.0	101.6	134	274

(2) ISO-k 90° CROSS

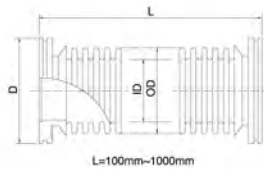
Size	A	B	C	D
ISO63	86	63.5	95	172
ISO80	89	76.3	110	178
ISO100	137	101.6	130	274

VF-11 KF Formed Bellows



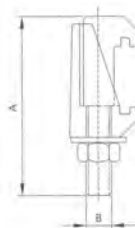
Unit:mm			
Size	I.D	O.D	D
NW16	20.0	28.5	30
NW25	25.3	35.5	40
NW40	37.7	54	55
NW50	49.8	67.5	75

VF-12 ISO-LF Bellows



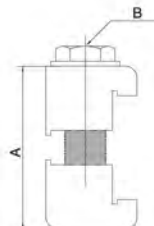
Unit:mm			
Size	I.D	O.D	D
ISO63	66	86.5	95
ISO80	78.1	101	110
ISO100	100	126.5	130
ISO125	127.2	155	155
ISO160	148.6	175.5	180
ISO200	200.2	235	240
ISO250	250.3	293	290
ISO320	300	345	370

VF-13 ISO Double Claw Clamp

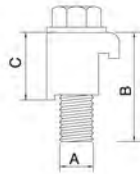


Unit:mm			
Size	Material	A	B
ISO63-250	SS304	61.5	M10
ISO320-500		76	M12
ISO63-250	Steel+Zn	61.5	M10
ISO320-500	Plated	76	M12

VF-14 ISO Double Wall Clamp

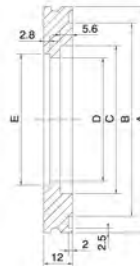


Unit:mm			
Size	Material	A	B
ISO63-100	Aluminum	45	M8
ISO160-250		45	M10
ISO320-500		60	M12

VF-15 ISO Single Wall Clamp

Unit:mm

Size	Material	A	B	C
ISO63-100	Aluminum	M8	35	23.5
ISO160-250	Aluminum	M10	35	23.5
ISO320-500	Aluminum	M12	50	30
ISO63-100	304S.S.	M8	35	23
ISO160-250	304S.S.	M10	35	23
ISO320-500	304S.S.	M12	50	30
ISO63-100	Steel+Zn Plated	M8	35	23
ISO160-250	Steel+Zn Plated	M10	35	23
ISO320-500	Steel+Zn Plated	M12	50	30

VF-16 Large Flange ISO LF (Claw Clamp)

Unit:mm

Size	A	B	C	D	E	WT(Kg)
ISO63	95	80	63.7	60.2	70.2	0.35
ISO80	110	94	76.5	73	83.3	0.44
ISO100	130	115	101.9	98.3	102.2	0.55
ISO160	180	164.8	153	148	153.2	0.77
ISO200	240	225	203.7	197	213.2	1.06
ISO250	290	275	254.5	247.6	261.3	1.37

VF-17 Rotatable Bolt Ring

Unit:mm

Size	L	D	A	B	N-E	WT(Kg)
ISO63	12	130	110	95.5	4-9	0.56
ISO80	12	145	125	110.5	8-9	0.63
ISO100	12	165	145	130.5	8-9	0.73
ISO160	16	225	200	180.7	8-11	1.29
ISO200	16	285	260	240.7	12-11	1.67
ISO250	16	335	310	290.7	12-11	1.99

VF-18 Retaining Ring

Unit:mm

Size	A	B	WT(Kg)
ISO63	91	3	16
ISO80	106	3	19
ISO100	126	3	23
ISO160	174	5	87
ISO200	234	5	116
ISO250	284	5	140

VF-19 Large Flange ISO LF (Bolt Style)



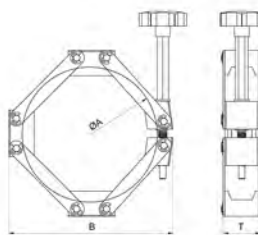
Unit:mm						
Size	L	D	A	B	N-E	WT(Kg)
ISO63	12	130	110	70.2	4-9	0.9
ISO80	12	145	125	83.3	8-9	1.1
ISO100	12	165	145	102.2	8-9	1.3
ISO160	16	225	200	153	8-11	2.1
ISO200	16	285	260	213	12-11	2.8
ISO250	16	335	310	261.1	12-11	3.4

VF-20 Outer Ring Material : Aluminium & Stainless Steel



Unit:mm				
Size	A	B	C	D
NW16	32	28.27	29.42	4.0
NW25	40	38.27	39.35	3.9
NW40	55	52.72	53.80	3.9
NW50	75	65.42	66.50	3.9

VF-21 Chain Clamp



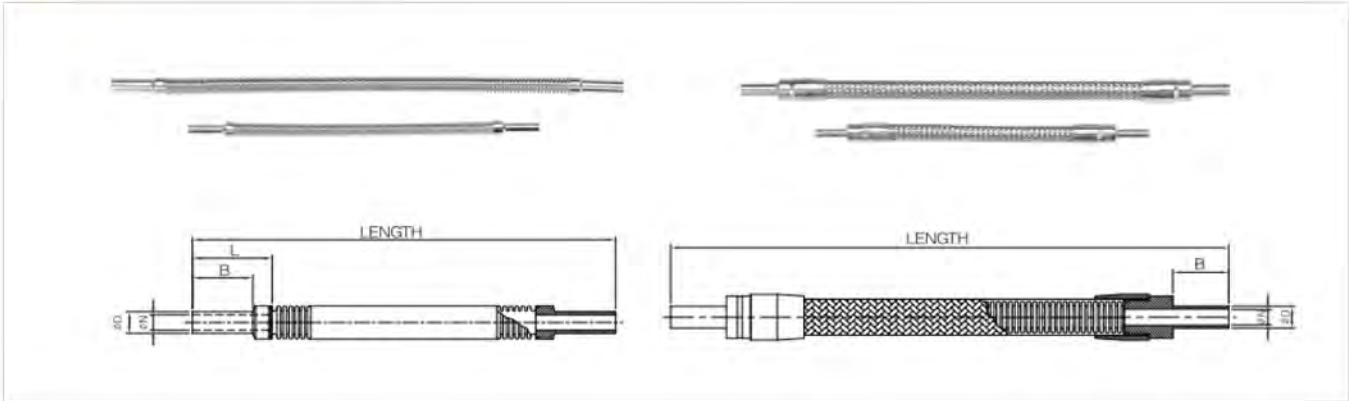
Unit:mm			
Size	ØA	B	T
NW63	116	145.82	33
NW80	116.6	147.04	33
NW100	134	165.5	33
NW125	166.08	191.15	33

VF-22 KF Bored Blank Flange



Unit:mm				
Size	A	B	C	D
NW16	30	17.2	5	19.3
NW25	40	26.2	5	25.7
NW40	55	41.2	5	38.4
NW50	75	52.2	5	51.0
NW63	87	70	5	63.7
NW80	114	83	11	76.4
NW100	134	102	11	101.8
NW160	190	153	11	152.9

VF-23 Flexible Tubes



Material

- Bellows : SUS321, SUS316L, etc.

- Braid : SUS304

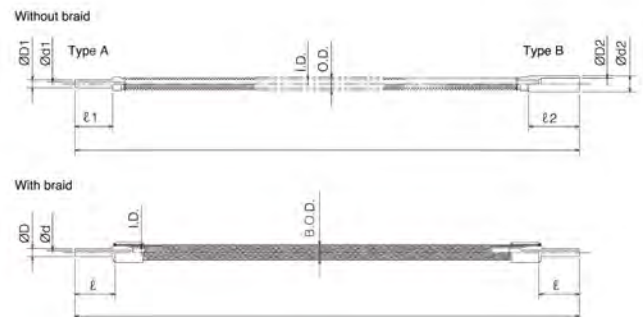
Differential Pressure : <1.2bar without braid

He Gas Leak Rate : <5.0 x 10⁻⁹ std cc/sec

Unit:mm			
Flange	I.D	O.D	ØD
1/4"	6.2	9.5	6.35
3/8"	10.2	14.5	9.52
1/2"	12.5	16.7	12.7
3/4"	16.4	21.7	19.05
1"	20.5	27	25.4

VF-24 High Vacuum Flexible Tubes & Bellows

3A(1/8") Super Mini Flexible



Standard Specifications

Material : Hose SUS 316L)
Tube end SUS 316L
Braid SUS 304

Working pressure : Without Braid(Vacuum ~ 0.5 MPa)
With Braid(Vacuum ~ 3.78MPa)

Allowable Leak Rate : 1.33 x 10⁻¹⁰ pa·m³/sec or less

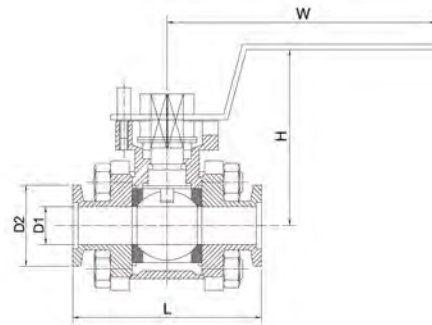
We Can Supply From **OSAKA RASENKAN KOGYO CO., LTD.** of Japan

Vacuum Valve (Manual)

8

Vacuum Valve
(Manual)

Model	Item	Page
VV-01	Vacuum 2-Way Ball Valve	44
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VV-04	Vacuum In-Line Valve	46
VV-05	Vacuum Check Valve	47
VV-06	Vacuum Butterfly Valve(Handle)	47
VV-07	Vacuum Butterfly Valve(Gear)	47

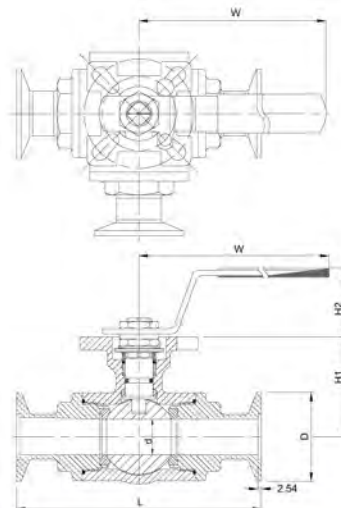
VV-01 Vacuum 2-Way Ball Valve**■Features**

- NW Ends, 3-Piece Body
- Body : SS316(CF8M)
- Seat : PTFE(NW16~NW50), TFM-1600(NW100)
- ISO5211 Direct Mounting Pad
- with Lever Handle
- Vacuum rate : 1×10^{-5} Torr
- Leakage Helium Test : 1×10^{-9} atm cc/sec

Unit:mm

Size	L	D1	D2	H	W	Stem/ISO5211	WT(Kg)
NW16	90	15	30	65	131	9mm/F03,04	0.7
NW25	97.6	25	40	87	157	11mm/F04,05	1.2
NW40	115.2	38	55	112	190	14mm/F05,07	2.5
NW50	115.2	38	75	112	190	14mm/F05,07	2.6
NW100	240	102.2	130	167	394	22mm/F10,12	21.0

* Certificate of Patent : 특허 제10-1020126

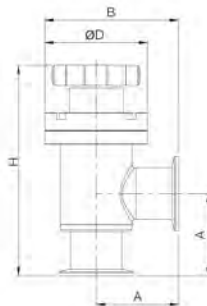
VV-02 Vacuum 3-Way Ball Valve**■Features**

- NW Ends, L or T-Position
- Body : SS316(CF8M)
- Seat : PTFE
- ISO5211 Direct Mounting Pad
- with Lever Handle
- Vacuum rate : 1×10^{-5} Torr
- Leakage Helium Test : 1×10^{-9} atm cc/sec

Unit:mm

SIZE	L	d	D	H1	H2	W	Stem/ISO5211
NW16	100	15	30	44	26	143	9mm/F03,04
NW25	130	25	40	63.5	34	160	11mm/F04,05
NW40	155	38.1	55	87.5	42	187	14mm/F05,07
NW50	190	38.1	75	87.5	42	187	14mm/F05,07

VV-03 Vacuum Right Angle Valve



■Features

- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-Ring : Viton Black
 - Handle : Aluminium
 - Bellow : SUS316L, SUS316 Ti, etc.
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

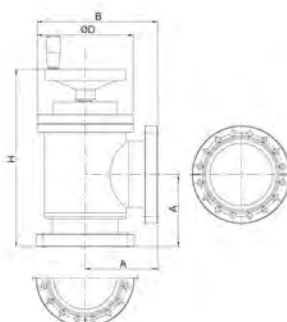
(1) KF Right Angle Valve

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
NW16	19.05	54.6	83.6	58	130.8	None
NW25	25.4	51.6	80.6	58	125.8	
NW40	38.1	61	99	76	156	
NW50	50.8	86.4	130.9	89	189.6	
NW63	63.5	88	146	116	236.5	
NW80	76.3	90	149.5	119	245	
NW100	101.6	108	182.5	149	282.5	
NW160	152.4	138	237.5	199	370	

Manual

Vacuum Valve



■Features

- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-Ring : Viton Black
 - Handle : Aluminium
 - Bellow : SUS316L, SUS316 Ti, etc.
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

(2) ISO-K Right Angle Valve

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
MF63	63.5	88	146	116	236.5	None
MF80	76.3	90	149.5	119	245	
MF100	101.6	108	182.5	149	282.5	
MF160	152.4	138	237.5	199	370	

VV-04 Vacuum Right In-Line Valve



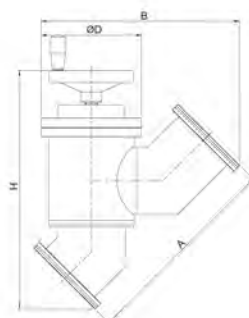
■Features

- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-Ring : Viton Black
 - Handle : Aluminium
 - Bellow : SUS316L, SUS316 Ti, etc.
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

(1) KF In-Line Valve

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
NW16	19.05	101.6	101	58	134.9	None
NW25	25.4	106.7	150.3	58	137	
NW40	38.1	130	135	76	173.3	
NW50	50.8	178	176.8	89	206	
NW63	63.5	209	214.8	116	277	
NW80	76.3	268	254.6	119	314.8	
NW100	101.6	305	296.8	149	368.8	
NW160	152.4	420	406.8	199	497	



■Features

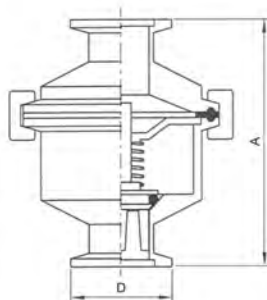
- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-Ring : Viton Black
 - Handle : Aluminium
 - Bellow : SUS316L, SUS316 Ti, etc.
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

(2) ISO-K Right Angle Valve

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
MF63	63.5	209	214.7	116	277	None
MF80	76.3	268	253	119	313.1	
MF100	101.6	305	295.2	149	367	
MF160	152.4	420	403.1	199	493.2	

VV-05 Vacuum Check Valve



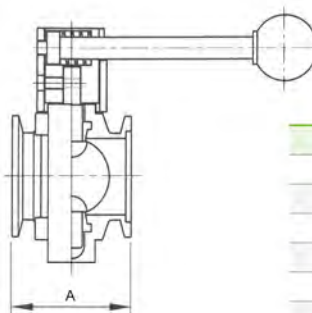
■Features

- KF Flange Ends
- Body: SS304, Sealing: Silicone, EPDM & Viton
- Max. working Temp. : 80~15°C
- Vacuum level : 2.0×10^{-8} std. cc/sec

Unit:mm

Size	For Tubing O.D.	A	D
NW25	1"	94	40
NW40	1-1/2"	95	55
NW50	2"	103	75

VV-06 Vacuum Butterfly Valve (Handle type)



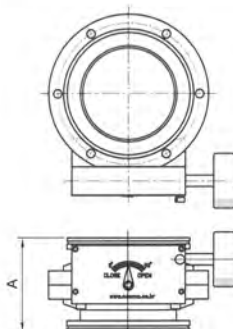
■Features

- Stainless Steel 304
- EPDM seal standard

Unit:mm

Size	For Tubing O.D.	A
NW25	1"	50
NW40	1-1/2"	50
NW50	2"	60
NW63	2-1/2"	80
NW80	3"	100
NW100	4"	140
NW160	6"	200

VV-07 Vacuum Butterfly Valve (Gear type)



■Features

- Stainless Steel 304
- EPDM seal standard

Unit:mm

Size	For Tubing O.D.	A
NW25	1"	50
NW40	1-1/2"	50
NW50	2"	60
NW63	2-1/2"	80
NW80	3"	100
NW100	4"	140
NW160	6"	200

ISO Flange Connection With Clamp



Characteristic :

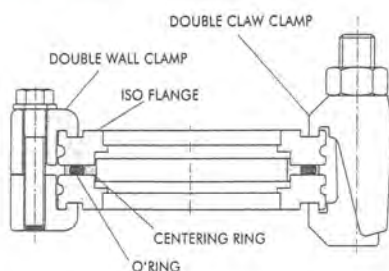
- ISO Flange series are in accordance with International Standards Operation Standard, which are compatible to other makers' standard.
- ISO Flange assembly :
 - a. ISO Clamp type-comprises two ISO flanges, a Center Ring with O-ring, and a double wall clamp or a double claw clamp.
 - b. ISO Bolt type-comprises two ISO bolted flanges, a Center Ring with O-ring, bolt screws, washers and nuts.

Material and Size

- Flanges, Blanks, Fitting : Material S.S.304
- Clamps : Material Aluminum or S.S.304
- O-ring : Material Viton
- Sizes : ISO63~ISO160
- Material S.S304, 304L, 316L and Sizes can be customized per customers' designs and requirements.

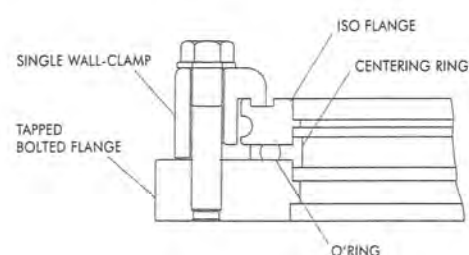
Double Wall-Clamp or Double Claw Clamp

Illustrates the double wall(claw)clamp assembly to connect pairs of ISO flanges. Ease of use and economic make this the most commonly used configuration.



Single Wall Clamp

Single wall clamps are used to join an ISO flange to a tapped flange on a pump or gate valve.

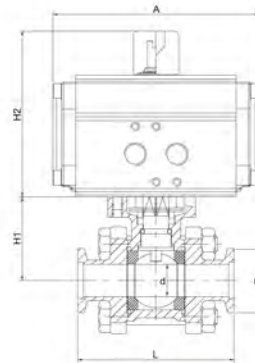


Vacuum Valve (Automatic)

9

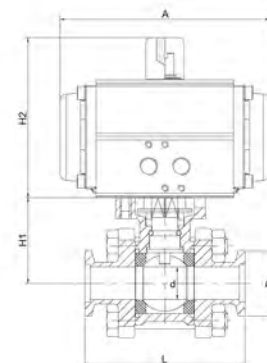
Vacuum Valve
(Automatic)

Model	Item	Page
VVP-01	Pneumatic Vacuum 2 Way Ball Valve(D.A)	50
VVP-02	Pneumatic Vacuum 2 Way Ball Valve(S.A)	50
VVP-03	Pneumatic Vacuum 3 Way Ball Valve(D.A)	51
VVP-04	Pneumatic Vacuum 3 Way Ball Valve(S.A)	51
VVP-05	Pneumatic Vacuum Butterfly Valve	52
VVP-06	Pneumatic KF Right Angle Valve	52
VVP-07	Pneumatic KF In-Line Valve	53
VVP-08	Pneumatic ISO-K Right Angle Valve	53
VVE-09	Electric Vacuum 2 Way Ball Valve	54
VVE-10	Electric Vacuum 3 Way Ball Valve	54

VVP-01 Pneumatic 2-Way Vacuum Ball Valve (Double Acting)

Unit:mm

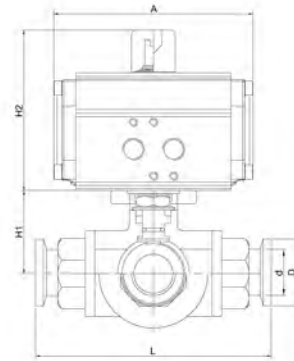
Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	90	15	30	119	35.9	90	RP-050RD	9mm/F03,04	7.7	0.79
NW25	97.6	25	40	131	49.8	106.5	RP-065RD	11mm/F04,05	21	2.14
NW40	115.2	38	55	189	70.1	126	RP-080RD	14mm/F05,07	39	3.98
NW50	115.2	38	75	189	70.1	126	RP-080RD	14mm/F05,07	39	3.98

VVP-02 Pneumatic 2-Way Vacuum Ball Valve (Single Acting / Spring Return)
Normally Closed(N.C), Fail to Close

Unit:mm

Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	90	15	30	154	35.9	106.5	RP-065RS9	9mm/F03,04	7.7	0.79
NW25	97.6	25	40	220	49.8	126	RP-080RS10	11mm/F04,05	21	2.14
NW40	115.2	38	55	256	70.1	148	RP-100RS10	14mm/F05,07	39	3.98
NW50	115.2	38	75	256	70.1	148	RP-100RS10	14mm/F05,07	39	3.98

VVP-03 Pneumatic 3-Way Vacuum Ball Valve (Double Acting)

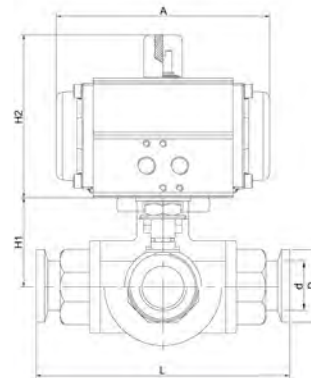


Unit:mm

Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	100	15	30	119	44	90	RP-050RD	9mm/F03,04	11	1.12
NW25	130	25	40	131	63.5	106.5	RP-065RD	11mm/F04,05	24	2.45
NW40	155	38	55	189	87.5	126	RP-080RD	14mm/F05,07	53	5.41
NW50	190	38	75	189	87.5	126	RP-080RD	14mm/F05,07	53	5.41

VVP-04 Pneumatic 3-Way Vacuum Ball Valve (Single Acting / Spring Return)

Normally Closed(N.C), Fail to Close

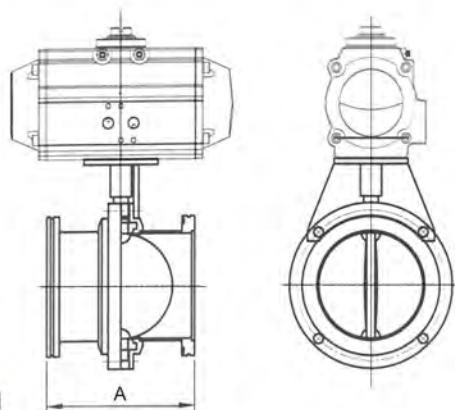


Unit:mm

Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	100	15	30	220	44	126	RP-080RS5	9mm/F03,04	11	1.12
NW25	130	25	40	220	63.5	126	RP-080RS11	11mm/F04,05	24	2.45
NW40	155	38	55	302	87.5	163	RP-115RS10	14mm/F05,07	53	5.41
NW50	190	38	75	302	87.5	163	RP-115RS10	14mm/F05,07	53	5.41

VVP-05 Pneumatic Vacuum Butterfly Valve

- Stainless Steel 304
- EPDM seal standard



Unit:mm

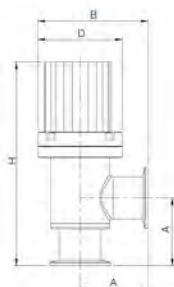
Size	For Tubing O.D	A
NW25	1"	50
NW40	1-1/2"	50
NW50	2"	60
NW63	2-1/2"	80
NW80	3"	100
NW100	4"	140
NW160	6"	200

VVP-06 KF Right Angle Valve (Double acting or Single acting)

■ Features

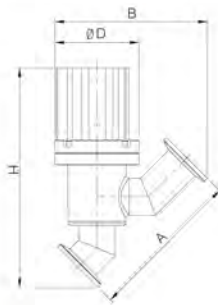
- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-ring : Viton Black
- Cylinder side O-ring : NBR
 - Actuator : AL6061, Anodized
 - Bellow : SUS316L, SUS316 Ti, etc.
- Required Air Pressure : 4 ~ 6 bar
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

Unit:mm



Size	Port OD	A	B	øD	H	Air Pilot Port
NW16	ø19.05	54.6	83.6	58	145.6	PT 1/8"
NW25	ø25.4	51.6	80.6	58	140.6	
NW40	ø38.1	61	99	76	183.5	
NW50	ø50.8	86.4	130.9	89	223.4	PT 1/4"
NW63	ø63.5	88	146	116	251.5	
NW80	ø76.3	90	149.5	119	260	PT 3/8"
NW100	ø101.6	108	182.5	149	310	
NW160	ø152.4	138	237.5	199	420	

VVP-07 KF In-Line Valve (Double acting or Single acting)



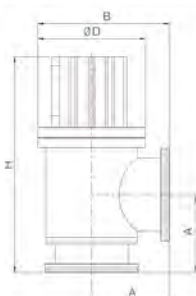
■Features

- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-ring : Viton Black
 - Cylinder side O-ring : NBR
 - Actuator : AL6061, Anodized
 - Bellow : SUS316L, SUS316 Ti, etc.
- Required Air Pressure : 4 ~ 6 bar
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
NW16	ø19.05	101.6	101	58	147.4	PT 1/8"
NW25	ø25.4	106.7	105.3	58	151.8	
NW40	ø38.1	130	135	76	201.1	
NW50	ø50.8	178	176.8	89	239.7	
NW63	ø63.5	209	214.8	116	292	PT 1/4"
NW80	ø76.3	268	254.6	119	339.8	
NW100	ø101.6	305	296.8	149	396	PT 3/8"
NW160	ø152.4	420	403.1	199	543.2	

VVP-08 ISO-K Right Angle Valve (Double acting or Single acting)



■Features

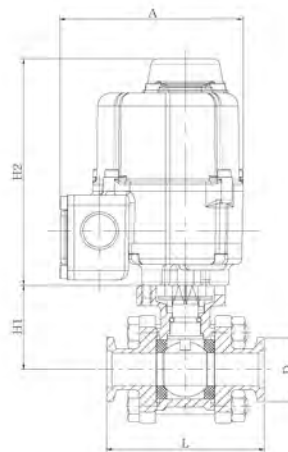
- Material:
 - Body & Flanges : SUS304, Mechanical Polishing & Electro-polishing
 - Vacuum Side O-ring : Viton Black
 - Cylinder side O-ring : NBR
 - Actuator : AL6061, Anodized
 - Bellow : SUS316L, SUS316 Ti, etc.
- Required Air Pressure : 4 ~ 6 bar
- Differential Pressure : < 1.2bar
- Max. working Temp. : < 60°C
- He Gas Leak Rate : < 5.0×10^{-9} std. cc/sec

Unit:mm

Size	Port OD	A	B	øD	H	Air Pilot Port
ISO63	ø63.5	88	146	116	251.5	PT 1/4"
ISO80	ø76.3	90	149.5	119	260.0	
ISO100	ø101.6	108	182.5	149	310.0	PT 3/8"
ISO160	ø152.4	138	237.5	199	420.0	
ISO200	ø216.3	175	303	256	630	PT 1/2"
ISO250	ø267.4	220	375	310	720.0	
ISO320	ø318.5	260	445	370	837	

VVE-09 Electric 2-Way Vacuum Ball Valve

* Option : Modulating Controller(4 to 20mA, 0 to 10VDC)



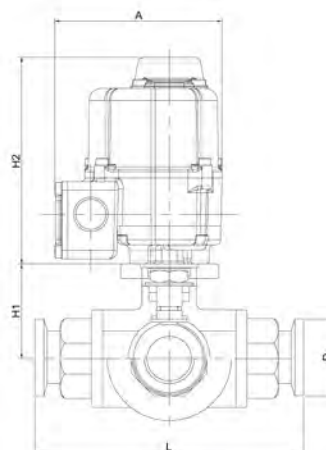
● Power : 110/220VAC1ph, 24VDC

Unit:mm

Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	90	15	30	105.3	35.9	104	DE-002	9mm/F03,04	7.7	0.79
NW25	97.6	25	40	116.5	49.8	123.8	DE-004	11mm/F04,05	21	2.14
NW40	115.2	38	55	123.1	70.1	126.4	DE-005	14mm/F05,07	39	3.98
NW50	115.2	38	75	123.1	70.1	126.4	DE-005	14mm/F05,07	39	3.98

VVE-10 Electric 3-Way Vacuum Ball Valve

* Option : Modulating Controller(4 to 20mA, 0 to 10VDC)



● Power : 110/220VAC1ph, 24VDC

Unit:mm

Size	L	d	D	A	H1	H2	Actuator	Stem/ ISO5211	TORQUE	
									N.m	Kg.m
NW16	100	15	30	105.3	44	104.2	DE-002	9mm/F03,04	11	1.12
NW25	130	25	40	116.5	63.5	123.8	DE-004	11mm/F04,05	24	2.45
NW40	155	38	55	125.3	87.5	155.5	DE-008	14mm/F05,07	53	5.41
NW50	190	38	75	125.3	87.5	155.5	DE-008	14mm/F05,07	53	5.41

Reference Data



16

Reference Data

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- (5) Inches to Metric Vacuum Conversion Table

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1. Conversion Tables

(1) Fahrenheit to Celsius Conversion Table

Celsius °C = (°F - 32) ÷ 1.8 To Fahrenheit °F = (°C × 1.8) + 32

NOTE : The number in the center column refer to the temperature either in degrees Celsius or Fahrenheit when it is desired to convert into either scale. If converting from Fahrenheit degrees to Celsius degrees the equivalent temperature will be found in the column, while if converting from degrees Celsius to degrees Fahrenheit, the answer will be found in the column on the right.

°C.	↓	°F.	°C.	↓	°F.	°C.	↓	°F.	°C.	↓	°F.	°C.	↓	°F.
-45.6	-50	-58	-26.1	-15	5.0	-6.67	20	68.0	12.8	55	131.0	32.2	90	194.0
-45	-49	-56.2	-25.6	-14	6.8	-6.11	21	69.8	13.3	56	132.8	32.8	91	195.8
-44.4	-48	-54.4	-25	-13	8.6	-5.56	22	71.6	13.9	57	134.6	32.3	92	196.7
-43.9	-47	-52.6	-24.4	-12	10.4	-5.00	23	73.4	14.4	58	136.4	33.9	93	199.4
-43.3	-46	-50.8	-23.9	-11	12.2	-4.44	24	75.2	15.0	59	138.2	34.4	94	201.2
-42.8	-45	-49	-23.3	-10	14.0	-3.89	25	77.0	15.6	60	140.0	35.0	95	203.0
-42.2	-44	-47.2	-22.8	-9	15.8	-3.33	26	78.8	16.1	61	141.8	35.6	96	204.8
-41.7	-43	-45.4	-22.2	-8	17.6	-2.78	27	80.6	16.7	62	143.6	36.1	97	206.6
-41.1	-42	-43.6	-21.7	-7	19.4	-2.22	28	82.4	17.2	63	145.4	36.7	98	208.4
-40.6	-41	-41.8	-21.1	-6	21.2	-1.67	29	84.2	17.8	64	147.2	37.2	99	210.2
-40	-40	-40	-20.6	-5	23.0	-1.11	30	86.0	18.3	65	149.0	37.8	100	212
-39.2	-39	-38.2	-20	-4	24.8	-0.56	31	87.8	18.9	66	150.8	38.4	101	214
-38.9	-38	-36.4	-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	39.0	102	216
-38.3	-37	-34.6	-18.9	-2	28.4	0.56	33	91.4	20.0	68	154.4	39.6	103	218
-37.8	-36	-32.8	-18.3	-1	30.2	1.11	34	93.2	20.6	69	156.2	40.2	104	220
-37.2	-35	-31.0	-17.8	0	32	1.67	35	95.0	21.1	70	158.0	40.8	105	222
-36.7	-34	-29.2	-17.2	1	33.8	2.22	36	96.8	21.7	71	158.8	41.4	106	224
-36.1	-33	-27.4	-16.7	2	35.6	2.78	37	98.6	22.2	72	161.6	42.0	107	226
-35.6	-32	-25.6	-16.1	3	37.4	3.33	38	100.4	22.8	73	163.4	42.6	108	228
-35	-31	-23.8	-15.6	4	39.2	3.89	39	102.2	23.3	74	165.2	43.2	109	230
-34.4	-30	-22	-15.0	5	41.0	4.44	40	104.0	23.9	75	167.0	43.8	110	232
-33.9	-29	-20.2	-14.4	6	42.8	5.00	41	105.8	24.4	76	168.8	44.4	111	234
-33.3	-28	-18.4	-13.9	7	44.6	5.56	42	107.6	25.0	77	170.6	45.0	112	236
-32.8	-27	-16.6	-13.3	8	46.4	6.11	43	109.4	25.6	78	172.4	45.6	113	238
-32.2	-26	-14.8	-12.8	9	48.2	6.67	44	111.2	26.1	79	174.2	46.2	114	240
-31.7	-25	-13.0	-12.2	10	50.0	7.22	45	113.0	26.7	80	176.0	46.8	115	242
-31.1	-24	-11.2	-11.7	11	51.8	7.78	46	114.8	27.2	81	177.8	47.4	116	244
-30.6	-23	-9.4	-11.1	12	53.6	8.33	47	116.6	27.8	82	179.6	48.0	117	246
-30.0	-22	-7.6	-10.6	13	55.4	8.89	48	118.4	28.3	83	181.4	48.6	118	248
-29.4	-21	-5.8	-10.0	14	57.2	9.44	49	120.2	28.9	84	183.2	49.2	119	250
-28.9	-20	-4.0	-9.44	15	59.0	10.0	50	122.0	29.4	85	185.0	49.8	120	252
-28.3	-19	-2.2	-8.89	16	60.8	10.6	51	123.8	30.0	86	186.8	50.4	121	254
-27.8	-18	-0.4	-8.33	17	62.6	11.1	52	125.6	30.6	87	188.6	51.0	122	256
-27.2	-17	1.4	-7.78	18	64.4	11.7	53	127.4	31.1	88	190.4	51.6	123	258
-26.7	-16	3.2	-7.22	19	66.2	12.2	54	129.2	31.7	89	192.2	52.2	124	260

(2) Torque Conversion Ratios

oz · in	lb · in	lb · ft	g · cm	kg · cm	kg · m	mN · m	cN · m	N · m
1	0.0625	0.005	72	0.072	0.0007	7.062	0.706	0.007
16	1	0.083	1152.1	1.152	0.0115	113	11.3	0.113
192	12	1	13826	13.83	0.138	1356	135.6	1.356
0.014	0.0009	0.00007	1	0.001	0.00001	0.098	0.01	0.0001
13.89	0.868	0.072	1000	1	0.01	98.07	9.807	0.098
1389	86.8	7.233	100000	100	1	9807	980.7	9.807
0.142	0.009	0.0007	10.2	0.01	0.0001	1	0.1	0.001
14.16	0.088	0.007	102	0.102	0.001	10	1	0.01
141.6	8.851	0.738	10197	10.20	0.102	1000	100	1

(3) Pressure Conversion Table

Pa	Kpa	Mpa	bar	kgf / cm ²	atm	mmH ₂ O	mmHg(Torr)
1	1×10 ⁻³	1×10 ⁻⁶	1×10 ⁻⁵	1.019 72×10 ⁻⁵	9.869 23×10 ⁻⁶	1.019 72×10 ⁻¹	7.500 62×10 ⁻³
1×10 ³	1	1×10 ⁻³	1×10 ⁻²	1.019 72×10 ⁻²	9.869 23×10 ⁻³	1.019 72×10 ²	7.500 62
1×10 ⁶	1×10 ³	1	1×10	1.019 72×10	9.869 23	1.019 72×10 ⁵	7.500 62×10 ³
1×10 ⁹	1×10 ⁶	1×10 ³	1×10 ³	1.019 72	9.869 23×10 ⁻¹	1.019 72×10 ⁸	7.500 62×10 ⁶
9.806 65×10 ⁴	9.806 65×10	9.806 65×10 ⁻²	9.806 65×10 ⁻¹	1	9.678 41×10 ⁻¹	1×10 ⁴	7.355 59×10 ²
1.013 25×10 ⁵	1.013 25×10 ²	1.013 25×10 ⁻¹	1.013 25	1.033 23	1	1.033 23×10 ⁴	7.600 00×10 ²
9.806 65	9.806 65×10 ⁻³	9.806 65×10 ⁻⁶	9.806 65×10 ⁻⁵	1×10 ⁻⁴	9.678 41×10 ⁻⁵	1	7.355 59×10 ⁻²
1.333 22×10 ²	1.333 22×10 ⁻¹	1.333 22×10 ⁻⁴	1.333 22×10 ⁻³	1.359 51×10 ⁻³	1.315 79×10 ⁻³	1.359 51×10	1

(NOTE) 145PSI = 10Bar = 10.2Kg/cm² = 1MPa = 1000KPa
1Bar = 14.503PSI

(4) Vacuum Range & Characteristics

	Rough Vacuum	Midium Vacuum	High Vacuum	UHV
Pressure range (Torr)	atm ~1 Torr	1Torr~10 ⁻³ Torr	10 ⁻³ Torr ~10 ⁻⁷ Torr	←10 ⁻⁷ Torr
Particle number Density (cm ⁻³)	10 ¹⁹ ~10 ¹⁶	10 ¹⁶ ~10 ¹³	10 ¹³ ~10 ⁹	←10 ⁹
Mean free Path(cm)	←10 ⁻²	10 ⁻² ~10	10 ~10 ⁴	→10 ⁴
Impingement rate (ea/cm ² /s)	10 ²³ ~10 ²⁰	10 ²⁰ ~10 ¹⁷	10 ¹⁷ ~10 ¹³	←10 ¹³
Monolayer time (second)	←10 ⁻⁵	10 ⁻⁵ ~10 ⁻²	10 ⁻² ~100	→100
Type of gas flow	Viscous flow	Knudsen flow	Molecular flow	Molecular flow

※ 1 atm (Atmosphere) = 760Torr = 76cmHg = 760mmHg = 1013hPa (Hectopascal)
1 torr = 1mmHg=133.332N/m²(뉴턴 퍼 제곱미터)=133.332Pa(파스칼)=1.333224mbar(밀리바)

(5) Inches to Metric Vacuum Conversion Table

Inches Hg	↓	Kpa	Inches Hg	↓	Kpa	Inches Hg	↓	Kpa	Inches Hg	↓	Kpa	Inches Hg	↓	Kpa
0	0	0	1.481	5	16.88	2.961	10	33.77	11.85	40	135.06	26.65	90	303.9
.2961	1	3.377	1.777	6	20.26	4.442	15	50.65	14.81	50	168.83	29.61	100	337.7
.5923	2	6.754	2.073	7	23.64	5.923	20	67.54	17.77	60	202.6			
.8884	3	10.13	2.369	8	27.02	7.403	25	84.42	20.73	70	236.37			
1.185	4	13.51	2.665	9	30.39	8.880	30	101.30	23.69	80	270.13			

2. Valve Seat Material Selection Guide

Seat Material		Working Pressure (Kg/cm ²)	Working Temperature (°C)		Description
			Min.	Max.	
PTFE	Poly Tetra Fluoro Ethylene	70	-60	160	torque low/ good elasticity / good in seal up, but no good in high temp. or high pressure
15% GF	5% glass filled + 85% PTFE	100	-60	180	grinding working or high pressure working is better than PTFE, not suit for high temp. fluid
20% GF	20% glass filled + 80% PTFE	100	-60	180	
25% GF	25% glass filled + 75% PTFE	100	-60	180	grinding or high pressure working is good/ good in seal up, but not suit to use low temp.
TFM 4215	25% carbon + 75% PTFE	120	-60	220	heat conduction good/ hardness high, good condition to work high temp.
MG 1241	20% glass filled + 5% graphite	120	-60	200	
GRAFOIL	High temp. graphite	300	-100	600	good in high pressure working / brittle / better for stem packing, seal (as like pcolciy / gasket)
TFM 1600	PTFE+PFA	100	-100	180	better in vapor fluid, but not goods in other high tem. Fluid
MG 2030	15% graphite + 85% PTFE	120	-60	180	
50% S.S.	50% S/S + 50% PTFE	150	-60	220	heat conduction good / hardness high/ good condition to work high temp. & high pressure, but torque high
MG 1431	15% glass filled + 5% MoS ₂ + 80% PTFE	120	-60	180	
5% MOS + 55% S.S			-60	220	
POM	Delrin (ACETAL)	400	-40	100	Poly Oxy Methylene
PEEK	Polyether Ether Ketone	400	-60	260	good in high temp. or high pressure working, but expensive
NYLON		350	-40	100	
UHMW-PE	Ultra High Molecular Weight Polyethylense	350	-30	80	초고밀도 폴리에틸렌
PCTFE(KEL-F)	Poly Chloro Tri Fluoro Ethylene	150	-180	150	PTFCE
Polyamide	Nylon	350	-40	110	good for high temp. but not suitable in low temp. or high acid or alkali value fluid
ETFE	Ethylene Tetrafluoro Ethylene		-185	150	High Corrosion Resistance and Strength Over a Wide Temperature

3. Super Alloy Ball Valve

(1) Applicable Standard

Valves Design & Thickness		ASME B16.34 / API 608
Material		As per. MATERIALS LIST
Pressure - Temperature Rating		ASME B16.34
Pressure Testing		API 598 / API 6D
Fire Safe		API 607 / API 6FA / BS 5755
End Connection	Threaded	ANSI B1.20.1 (NPT) / ISO 228 / ISO 7-1 / DIN 2999 / BS21(BSPF / BSPT)
	Socket weld	ANSI B16.11
	Butt weld	ANSI B16.25
	Flanged	ANSI B16.5 / EN 1092
Valves Length	Threaded	Mfg. Std. / DIN 3202 M3
	Socket weld	Mfg. Std. / DIN 3202 M3
	Butt weld	Mfg. Std. / DIN 3202 S13 / ANSI B16.10
	Flanged	ANSI B16.10 / DIN 3202 F1 / F4 / F5

(2) Materials List

MATERIAL NAME	CASTING	DIN	UNS
1. Austenitic Stainless Steel Castings			
304L	A351 Gr. CF3	1.4306	J92500
304	A351 Gr. CF8	1.4308	J92600
316L	A351 Gr. CF3M	1.4404	J92800
316LN	A351 Gr. CF3MN	1.4435	S31653
316	A351 Gr. CF8M	1.4408	J92900
347	A351 Gr. CF8C	1.4552	J92710
317L	A351 Gr. CG3M	-	J92999
317	A351 Gr. CG8M	-	J93000
ALLOY 20	A351 Gr. CN7M	1.4536	J95150
904L	No cast grade	1.4539	N08904
2. Super Austenitic Grades Castings			
	A351 CK-3MCuN	-	J93254
3. Nickel Based Alloy Castings			
Nickel CZ100	A494 CZ-100	-	N02100
Alloy 400	A494 M-35-1	2.4365	N24135
Hastelloy B	A494 N-12MV	2.4686	N30012
Hastelloy B2	A494 N-7M	2.4617	N30007
Inconel 600	A494 CY-40	2.4816	N06040
Hastelloy C	A494 CW-12MW	2.4686	N30002
Hastelloy C276	A494 CW-6M	2.4819	N10276
Inconel 625	A494 CW-6MC	2.4856	N26625
Hastelloy C22	A494 CX2MW	2.4602	N26022
4. Duplex Stainless Steel Castings			
329	None	1.4460	S32900
CD4MCu	A995 1A / A744 CD4MCu		
CD4MCuN	A995 1B		
	A995 2A / A351 CE8MN		
2205	A995 4A CD3MN	1.4462	S32205 / S31803
5. Super Duplex Grades			
2507	A890 5A CE3MN	1.4410	S32750
Z100	A995 6A / A351 CD3MWCuN	1.4468	J93380
Ferrallium 255	A995 1C	Ferrallium 255	S32550
6. Titanium Grades			
Titanium C2	B367 C2	3.7035	R50400
Titanium C5	B367 C5	3.7165	R50400

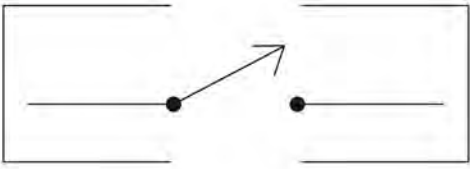
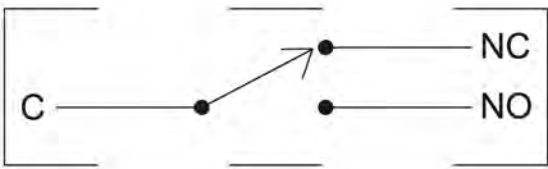
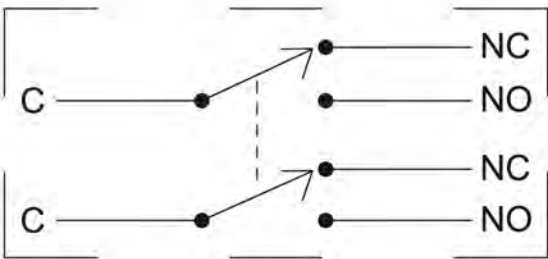
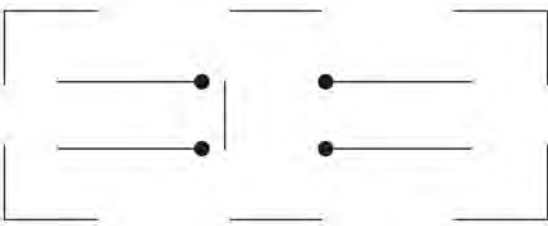
※ Any metal materials other than the above listed can be offered upon request.

4. IP (Ingress Protection) Classification

Handy Reference Table for I.P. Ratings

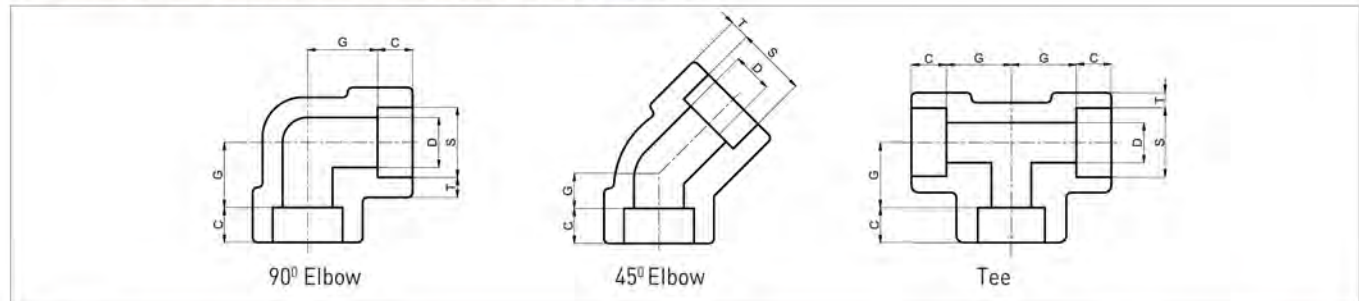
First Characteristic Numeral				Second Characteristic Numeral			
Protection against solid foreign objects			Degree of protection for people against access to hazardous parts with :	Protection against harmful ingress of water			Degree of protection from water
I.P	Example	TESTS		I.P	Example	TESTS	
0		Non protection	Non-protected	0		Non protection	Non-protected
1		Full penetration of 50mm diameter of sphere not allowed. Contact with hazardous parts not permitted.	Back of hand	1		Protected against vertically falling drops of water	Vertically dripping
2		Full penetration of 12.5mm diameter of sphere not allowed. The jointed test finger shall have adequate clearance from hazardous parts.	Finger	2		Protected against vertically falling drops of water with enclosure tilted 15° from the vertical.	Dripping up to 15° from the vertical
3		The access probe of 2.5mm diameter shall not penetrate.	Tool	3		Protected against sprays to 60° from the vertical.	Limited spraying
4		The access probe of 1mm diameter shall not penetrate.	Wire	4		Protected against water splashed from all directions - limited ingress permitted	Splashing from all directions
5		Limited ingress of dust permitted (no harmful deposit).	Dust protected	5		Protected against low pressure jets of water from all directions - limited ingress permitted	Hosing jets from all directions
6		No ingress of dust.	Dust tight	6		Protected against strong jets of water eg for use on ship decks - limited ingress permitted	Strong hosing jets from all directions
IP 6 7 Code Letters First Characteristic numeral Second Characteristic numeral				7		Protected against the effects of immersion between 150mm and 1m	Temporary immersion
				8		Protected against continuous submersion at a specified depth.	Continuous immersion

5. Type of Electrical Switches

TYPE	DESCRIPTION
 SPST (Single Pole, Single Throw)	Make or break one circuit.
 SPDT (Single Pole, Double Throw)	Make one circuit and break one circuit with common terminal.
 DPDT (Double Pole, Double Throw)	Make two circuits and break two circuit with two common terminals.
 SPDB (Single Pole, Double Break)	Make one circuit and break one circuit with no common terminals.

6. Dimension of Socket Welding (JIS)

90° Elbow, 45° Elbow, Tee - SCH40, SCH 80, SCH160



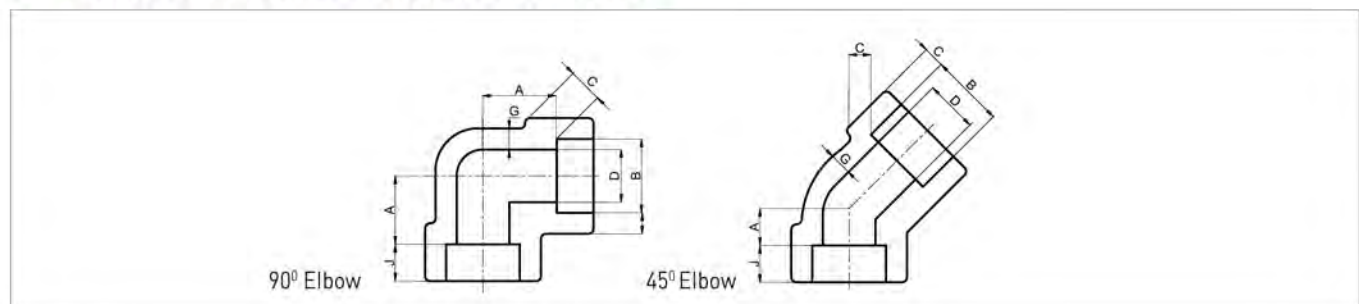
JIS B2316

TOL : Tolerances [UNIT : mm]

Nom Pipe Size		Socket Bore Dia		Bore Diameter of Fitting D				Socket Wall Thickness Min-T		Depth of Socket
A	B	S	TOL	SCH40	SCH80	SCH160	TOL	SCH40,80	SCH160	Min-C
6	1/8	11.0	+0.3 -0	7.1	5.7	4.0	±0.4	3.2	3.5	9.6
8	1/4	14.3		9.4	7.8	6.5		3.3	4.0	9.6
10	3/8	17.8		12.7	10.9	9.0		3.5	4.4	9.6
15	1/2	22.2		16.1	14.3	12.3		4.1	5.2	9.6
20	3/4	27.7		21.4	19.4	16.2		4.3	6.1	12.7
25	1	34.5		27.2	25.0	21.2		5.0	7.0	12.7
32	1-1/4	43.2	+0.4 -0	35.5	32.9	29.9	±0.8	5.4	7.0	12.7
40	1-1/2	49.1		41.2	38.4	34.4		5.6	7.8	12.7
50	2	61.1		52.7	49.5	43.1		6.1	9.6	15.9
65	2-1/2	77.1		65.9	62.3	57.3		7.7	10.4	15.9
80	3	90.0		78.1	73.9	66.9		8.4	12.3	15.9
100	4	115.5		102.3	97.1	87.3		9.4	18.0	19.0

7. Dimension of Socket Welding (ANSI)

90° Elbow, 45° Elbow, Tee- 3000#, 6000#, 9000#



ANSI B16.11

[UNIT : mm]

Nom Pipe Size	Socket Bore Dia	Bore Diameter of Fitting D			Socket Wall Thickness Min-C			Depth of Socket Min-J
		3000	6000	9000	3000	6000	9000	
1/8	10.65-10.90	6.1-7.6	3.2-4.8	-	3.20	3.45	-	10
1/4	14.10-14.35	8.5-10.0	5.6-7.1	-	3.30	4.00	-	10
3/8	17.55-17.80	11.8-13.3	8.4-9.9	-	3.50	4.35	-	10
1/2	21.70-21.95	15.0-16.6	11.0-12.5	5.6-7.2	4.10	5.20	8.20	10
3/4	27.05-27.30	20.2-21.7	14.8-16.3	10.3-11.8	4.25	6.05	8.55	13
1	33.80-34.05	25.9-27.4	19.9-21.5	14.5-16.0	5.00	6.95	9.95	13
1-1/4	42.55-42.80	34.3-35.8	28.7-30.2	22.0-23.5	5.30	6.95	10.60	13
1-1/2	48.65-48.90	40.1-41.7	33.2-34.7	27.2-28.7	5.55	7.80	11.15	13
2	61.10-61.35	51.7-53.5	42.1-43.6	37.4-38.9	6.05	9.50	12.15	16
2-1/2	73.80-74.20	61.2-64.2	-	-	7.65	-	-	16
3	89.80-90.15	76.4-79.5	-	-	8.30	-	-	16
4	115.45-115.80	100.7-103.8	-	-	9.35	-	-	19

8. Material Comparisons Table

GENERAL	JIS Symbol		ASTM Symbol		DIN	
CLASSIFICATION	Casting	Forging	Casting	Forging	Casting	Forging
CAST IRON	G5501-FC200	-	A126 CLASS B	-	GG-20	-
	G5501-FC250	-	A126 CLASS C	-	GG-30	-
CAST BRONZE	BC6	-	B62 C83600	-	-	-
DUCTILE IRON	G5502-FCD450	-	A395	A439-D2C	GGG-40	-
	G5502-FCD550	-	A536	-	GGG-50	-
CARBON STEEL	G5151-SCPH2	G3201-SF50	A216-WCB	A105	GS-C25N	1.0402
	G5151-SCPH21	-	A217-WC6	A182-F11	GS-22	1.7733
STAINLESS STEEL	G5121-SCS13	G3214-SUS F304	A351-CF8	A182-F304	1.4308	1.4301
	G5121-SCS14	G3214-SUS F316	A351-CF8M	A182-F316	1.4408	1.4401
	G5121-SCS16	G3214-SUS F316L	A351-CF3M	A182-F316L	1.4409	1.4404
	G5121-SCS19	G3214-SUS F304L	A351-CF3	A182-F304L	-	1.4306
TITANIUM	-	-	B367	B381	-	-
ALUMINIUM	ADC-12	-	B26	B247	3.3591	-
ALUMINIUM-BRONZE	AIBC2	-	B148-C95500	-	-	-
ALLOY 400(MONEL)	-	-	A494-M35	B564N04400	-	-
HASTELLOY C	-	-	A494-CW-12M	-	-	-
BOLTS	G4107-SNB7	-	-	A193-B7	-	1.7225
NUTS	G4303-SUS304	-	-	A194-8	-	1.4301
STAINLESS STEEL ROUND BAR	-	G4303-SUS304	-	A276-304	-	1.4301
	-	G4303-SUS316	-	A276-316	-	1.4401
	-	G4303-SUS316L	-	A276-316L	-	1.4404
	-	G4303-SUS304L	-	A276-304L	-	1.4306

9. Chemical & Physical Properties

(1) Casting Materials

Chemical Properties(화학적 특성)

Description	SS 304	SS 316	SS 304L	SS 316L	Cast Iron	Ductile Iron	Carbon Steel	High Temp	Hastelloy-C	Monel
Symbol	A351	A351	A351	A351	A126	A536	A216	A217	A494	A494
Grade	CF8	CF8M	CF3	CF3M	Class B	65-45-12	WCB	WC6	CW-12M-1	M-35
C% Max.	0.08	0.08	0.03	0.03	-	-	0.30	0.20	0.12	0.35
Mn %	1.50	1.50	1.50	1.50	-	-	1.00 Max.	0.5-0.8	1.00	1.5
P% Max.	0.04	0.04	0.04	0.04	0.75	-	0.040	0.040	0.04	0.03
S% Max.	0.04	0.04	0.04	0.04	0.15	-	0.045	0.045	0.03	0.03
Ni%	8.0-11.0	9.0-12.0	8.0-12.0	9.0-13.0	-	-	0.5 Max.	-	Balance	Balance
Cr%	18.0-21.0	18.0-21.0	17.0-21.0	17.0-21.0	-	-	0.5 Max.	1.0-1.5	15.7-17.5	-
Mo%	-	2.0-3.0	-	2.0-3.0	-	-	0.2 Max.	0.45-0.65	16.0-18.0	-
Cu	-	-	-	-	-	-	0.3 Max.	-	-	26.0-33.0
Si	2.00	1.50	2.00	1.50	-	-	0.6 Max.	0.60	1.00	1.25
Fe	-	-	-	-	-	-	-	-	-	3.5
V	-	-	-	-	-	-	-	-	0.2-0.4	-

Physical Properties

Tensile Strength	70	70	70	70	21	64	70-95	70-95	70	6
Min. Kis MPa	>= 485	485	485	485	145	450	488-655	485-655	485	450
Yield Point	30	30	30	30	-	41	36	40	30	25
Min. Kis MPa	>= 205	205	205	205	-	311	250	275	205	170
Elongation in 2 inch % Min.	35	>= 30	35	30	-	18	22	20	35	25
Reduction of Area % Min.	-	-	-	-	-	-	35	35	-	-

(2) Wrought Materials

Chemical Properties (물리적 성질)

Description	SS 304	SS 316	SS 304L	SS 316L	SS 321	Ductile	Carbon Steel	Hard Facing	Bolts	Nuts
Symbol	A182	A182	A182	A182	A182	A439	ASTM	KLS	A193	A194
Grade	F304	F316	F304L	F316L	F321	D2C	A105	HF-6R	B7	2H
C% Max.	0.08	0.08	0.03	0.03	0.08	0.29	0.35 Max.	1.05	0.37-0.49	0.40
Si% Max.	1.00	1.00	1.00	1.00	1.00	1.0-3.0	0.35	1.11	0.15-0.35	-
Mn %	2.00	2.00	2.00	2.00	2.00	1.8-2.4	0.6-1.05	-	0.75-1.20	-
P% Max.	0.04	0.04	0.04	0.04	0.04	0.08	0.04	-	0.035	0.04
S% Max.	0.03	0.03	0.03	0.03	0.03	-	0.05	-	0.04	0.05
Ni%	8.0-11.0	10.0-14.0	8.0-13.0	10.0-15.0	9.0-12.0	21.0-24.0	-	-	-	-
Cr%	18.0-20.0	16.0-18.0	18.0-20.0	16.0-18.0	17.0 Min.	0.5	-	28.3	0.75-1.20	-
Mo%	-	2.0-3.0	-	2.0-3.0	-	-	-	-	0.15-0.25	-
Ti%	-	-	-	-	C% $\times$ 5-0.7	-	-	-	-	-
Fe%	-	-	-	-	-	-	-	0.3	Balance	Balance
W%	-	-	-	-	-	-	-	4.2	-	-
Co%	-	-	-	-	-	-	-	Balance	-	-

Physical Properties

Tensile Strength	75	75	70	70	75	58	70	-	125	175
Min. Kis MPa	517	517	483	483	517	400	483	-	862	-
Yield Point	30	30	25	25	30	28	36	-	105	-
Min. Kis MPa	207	207	172	172	207	193	248	-	724	-
Elongation in 2 inch % Min.	30	30	30	30	30	20	22	-	16	-
Reduction of Area % Min.	50	50	50	50	50	-	30	-	50	-

10. Elastomer General Chart

The following chart should be used as a general guide.

Application suggested derive from recommendation given by elastomer manufacturer.

The resistance can be affected by type of fluid, concentration, temperature, pressure, flow rate or evaporation of the medium.

The final choice us to be taken by the customer based on characteristics and specific application.

Material	General Application	Service Temperature	Not Recommended For
EPDM	Water, Steam Sea Water Brine Ester Alkali Ozone Alcohol Brake Fluid Treated Water With Caustic Soda	-20°C to +120°C (Allowable temperature in continuous use 0°C ~ 100°C)	Hydrocarbon Oils Fats Grease
NBR	Hydrocarbon Natural Gas Oil and Fat Air Gasoline	-10°C to +80°C (Allowable temperature in continuous use 0°C ~ 70°C) (L- NBR -50°C to 70°C)	Solvent Benzene Xylene
SBR	Acids and Alkalis	-20°C to +80°C	
VITON	Acid, Oils Hydrocarbon	-10°C to + 220°C	Steam, Ester Freon22, Alkalis Solvent, Ketone
SILICONE	Food Beverage	-20°C to +140°C	Steam Solvent Hydrocarbon
TEFLON	Solvent Corrosive Products Ketone	-50°C to +200°C (PTFE -196°C to + 220°C)	Fluid Containing Powers Alkaline Gaseous Fluorine
NEOPRENE	Acid, Ozone, Oils Fats Grease Solvent	-18°C to + 90°C	Ketone, Thinner Concentrated Acids

11. Rubber Seat Materials

Features of Rubber

The following is general informations and special application shall be referred to the manufacturer's representatives.

Commom Name	ASTM Code	Max. Tempe- rature	Abrasion	Aging	Sun Light Resist- ance	Water Resist- ance	Oil Resist- ance	Solvent	Strong Acid	Weak Acid	Strong Alkali	Weak Alkali
Buna-N	NBR	130°C	◎	◎	○	◎	◎	△	X	○	○	◎
Neoprene	CR	120°C	◎	◎	◎	◎	○	X	X	○	○	◎
Natural Rubber	NR	100°C	◎	○	○	◎	X	X	X	○	○	◎
EPDM	EPT	150°C	○	◎	◎	◎	X	X	○	◎	◎	◎
Silicone	Si	230°C	○	◎	◎	○	X-○	△	X	○	○	◎
Viton	FPM	260°C	○	◎	◎	◎	◎	○	◎	◎	◎	◎

Note : ◎ excellent, ○ good, △ fair, X poor

12. Valve Leakage Rates

Leakage Class ISA RP39.6	Allowable Leakage Rate Air or Water	Valve Types	Remarks
Class I	Category II, III or, IV but no test required by agreement between user and supplier	Valve Types Listed in Category II, III & V	Quality of mfg. implies that these valves do not exceed leakage classes II, III & IV, but on guarantee is stipulated.
Class II	0.5% Rated valve capacity, (maximum Cv)	Globe double seated. Globe single seated, balanced with stepped metal piston seat. Butterfly, metal lined.	
Class III	0.1% of rated valve capacity	High quality globe double seated. Globe single seated, balanced with continuous metal piston seals.	
Class IV	0.01% of rated valve capacity	Globe double seated. Globe single seated, balanced with elastomer piston seals. Rotary eccentric cam type. Ball valves with metal seat.	
Class V	5×10^{-4} cc/min. of water per inch of orifice diameter per psi differential pressure	Globe valves in Class with heavy duty actuator to increase seating force.	Few valves continue to remain this tight in service unless the seat plastically deforms to maintain contact with the plug.
Class VI	Maximum permissible leakage associated with resilient seating valves. Expressed as bubbles per min. as per RP39.6*	Globe with resilient seat. Butterfly, elastomer lined. Rotary eccentric cam with elastomer seat. Ball with resilient seat, solid ball type. Diaphragm, Weir type. Plug valves, elastomer seated or sealant injection sealing system.	Elastomer sealed valves remain this tight for many thousands of cycles until the seal is worn or cut.

※ Example - 0.45cc/min for a 2-inch port orifice diameter in globe, butterfly or ball valve with 50 psi differential pressure air. Equivalent to 3 bubbles per minute from a 1/4- inch O.D. .032- Inch wall tube, 1/4- inch under water surface.

NOTE : The terms bubble tight and drop tight are meaningless unless some leakage rate is specified.
Lack of visible air bubbles using soap solution indicates leakage of less than 1×10^{-3} to 1×10^{-4} cc/sec.

13. Reference Standard & Specification

* ISO (International Organization for Standardization) : 국제표준화기구

- ISO 9001 : Quality system. Model of quality assurance in design, development, production, installation and servicing
- ISO 5208 : Industrial valves, pressure testing for valves
- ISO 5211 : Part turn valve actuator attachment
- ISO 7121 : Flanged steel ball valves
- ISO 10631 : Metallic butterfly valve for general purpose

* ANSI (American National Standards Institute) : 미국규격협회

- B1.1 : Unified screw threads
- B2.1 : Pipe threads(except dryseal)
- B16.5 : Steel pipe flanges and flange fittings
- B16.10 : Face-to-face and end-to-end dimension of ferrous valves
- B16.11 : Forged steel fittings, socket welding and threaded
- B16.20 : Ring joint gaskets and grooves for steel pipe flange
- B16.21 : Nonmetallic gaskets for pipe flanges
- B16.25 : Butt welding ends
- B16.34 : Steel valves flanged and butt welding end
- B18.2.1 : Square and hex bolts and screws
- B18.2.2 : Square and hex nuts
- B31.1 : Power piping
- B31.2 : Fuel gas piping
- B31.3 : Chemical plant and petroleum refining piping
- B31.4 : Liquid petroleum transportation piping systems
- B31.5 : Refrigeration piping systems
- B31.7 : Nuclear power piping
- B31.8 : Gas transmission and distribution piping systems
- B36.10 : Wrought steel and wrought iron pipe

* BS (British Standard) : 영국표준규격

- BS 1414 : Steel wedge gate valves(flange and butt welding ends)
- BS 1560 : Circular flange for pipe, flanges and fitting
- BS 1868 : Steel check valves(flange and butt welding ends)
- BS 1873 : Steel globe and globe stop and check valves(flange and butt welding ends)
- BS 2080 : Face-to-face, center-to-center, end-to-end and center-to-end dimension of valves
- BS 5146 : Inspection and test of valves
- BS 5351 : Steel ball valves for the petroleum, petrochemical and allied industries
- BS 5352 : Steel wedge gate, globe and check valves(50mm & smaller)
- BS 6364 : Valve for cryogenic service
- BS 6755 PART 2 : Specification for fire type testing requirements

* JIS (Japanese Industrial Standard) : 일본공업규격

- JIS B2003 : General rules for inspection of valves
- JIS B2032 : Wafer type rubber seated butterfly valves
- JIS B2064 : Butterfly valve for water works
- JIS B2071 : 10kgf/cm² cast steel flanged globe valves
- JIS B2073 : 10kgf/cm² cast steel flanged gate valves(outside screw type)
- JIS B2074 : 10kgf/cm² cast steel flanged swing check valves
- JIS B2081 : 20kgf/cm² cast steel flanged globe valves
- JIS B2083 : 20kgf/cm² cast steel flanged gate valves(outside screw type)
- JIS B2084 : 20kgf/cm² cast steel flanged swing check valves
- JIS B2201 : Pressure ratings for ferrous material pipe flanges

- JIS B2203 : Tolerances for pipe flanges
- JIS B2210 : Basic dimension of ferrous material pipe flanges
- JIS B2220 : Basic dimension of ferrous material pipe flanges
- JIS F2312 : Shipbuilding rubber seat butterfly valves
- JIS F2316 : Shipbuilding rubber seat butterfly valves

*** API (American Petroleum Institute) : 미국석유회**

- API 6A : Specification for wellhead equipment
- API 6D : Specification for pipeline valves(steel gate, plug, ball and check valve)
- API Standard 598 : Valve Inspection and test
- API Standard 600 : Steel gate valves, flanged and butt welding ends
- API Standard 603 : Class 150, cast corrosion resistant flanged and gate valves
- API Standard 605 : Large diameter carbon steel flanges
- API Standard 607 : Fire test for soft seated quarter turn valves
- API Standard 609 : Butterfly valve ; double flanged, lug & wafer type
- AP Spec. RP6F : Recommended practice for fire test for valves
- AP Spec. 6FA : Specification for fire test for valves
- AP Spec. Q1 : Specification for quality programs

*** DIN (Deutsche Industrie Norm / German Industrial Standard) : 독일공업규격**

- DIN 1691 : Cast iron with lamellar graphite (grey cast iron)
- DIN 2500 : Flanges ; General information
- DIN 2531 ~ 35 : Cast iron flanges ; Norminal pressure 6 ~ 40
- DIN 2543 ~ 45 : Cast steel flanges ; Norminal pressure 16 ~ 40
- DIN 3202 T1 : Face-to-face dimension of flanged valves
- DIN 3202 T3 : Face-to-face dimension of weld end valves
- DIN 3210 : Coupling of electric actuators for valve
- DIN 3211 : Valves ; terminology
- DIN 3339 : Valves ; body materials
- DIN 3354 T1 : Butterfly valves ; general information
- DIN 3354 T2 : Flanged cast iron butterfly stop valves with resilient seat
- DIN 3356 T1 : Valves, general requirements
- DIN 3356 T5 : Stainless steel stop valves
- DIN 3358 : Attachment of linear thrust actuators ; mating dimension
- DIN 17440 : Stainless steels ; quality requirements
- DIN 50049 : Documents on material tests
- DIN EN 19 : Marking of general purpose industrial valves

*** NACE (National Association of Corrosion Engineers) : 미국부식엔지니어링협회**

- NACE materials are optional and must be specified on purchase orders.
- MR-01-75 : Sulfide stress cracking resistant metallic material for oil field equipment
- MT-01-77 : Laboratory corrosion testing of metals for the process industries

*** ASTM (American Society for Testing Materials) : 미국재료시험협회**

*** ASME (American Society of Mechanical Engineers) : 미국기계학회**

*** AWWA (American Water Works Association) : 미국수도협회**

*** IEC (International Electro Technical Committee) : 국제전기표준회의**

*** AISI (American Iron and Steel Institute) : 미국철강협회**

14. Comparative Pipe Dimension Table

JIS G 3447 (KSD 3585)			JIS G 3459★ (KSD 3576)			IDF			3A			ISO			DIN		
Nom. Size	O.D.	t	Nom. Size	O.D.	t	Nom. Size	O.D.	t	Nom. Size	O.D.	t	Nom. Size	O.D.	t	Nom. Size	O.D.	t
1/4"	6.35	1.0	8A	13.8	1.65								12.0	1.0			
3/8"	9.53	1.0	10A	17.3	1.65								17.2	1.0			
1/2"	12.7	1.0	15A	21.7	2.1								21.3	1.0			
3/4"	19.05	1.24															
1.0 ⁵	25.4	1.2	20A	27.2	2.1	1.0S	25.4	1.2		25.4	1.25		25.0	1.2	DN25	30.0	2.0
1.25 ⁵	31.8	1.2	25A	34.0	2.8	1.25S	31.8	1.2					33.7	1.2	32	36.0	2.0
1.5 ⁵	38.1	1.2	32A	42.7	2.8	1.5S	38.1	1.2		38.0	1.25		38.0	1.2			
													40.0	1.2	40	42.0	2.0
2.0 ⁵	50.8	1.5	40A	48.6	2.8	2.0S	50.8	1.5		50.8	1.65		51.0	1.2	50	54.0	2.0
2.5 ⁵	63.5	2.0	50A	60.5	2.8	2.5S	63.5	2.0		63.5	1.65		63.5	1.6			
													70.0	1.6	65	70.0	2.0
3.0 ⁵	76.3	2.0	65A	76.3	3.0	3.0S	76.3	2.0		76.2	1.65		76.1	1.6			
3.5 ⁵	89.1	2.0	80A	89.1	3.0	3.5S	89.1	2.0					88.9	2.0	80	85.0	2.0
4.0 ⁵	101.6	2.0	90A	101.6	3.0	4.0S	101.6	2.0		101.6	1.65		101.6	2.0	100	104.0	2.0
4.5 ⁵	114.3	3.0	100A	114.3	3.0								114.3	2.0	125	129.0	2.0
5.5 ⁵	139.8	3.0	125A	139.8	3.4								139.7	2.0			
6.5 ⁵	165.2	3.0	150A	165.2	3.4								168.3	2.6	150	156.0	2.0
			200A	216.3	4.0								219.1	2.6			
			250A	267.4	4.0								273.0	2.6			
			300A	318.5	4.5								323.9	2.6			
													355.6	2.6			
													406.4	3.2			

JIS G3447 : ←1→ (KSD 3585) Stainless Steel Sanitary Tubing(새너터리관)

★ Sch 10S

JIS G3459 : ←2→ (KSD 3576) Stainless Steel Pipes(배관용 강관)

IDF : International Dairy Federation (국제낙농연합회)

3A : American Sanitary Standards(미국낙농 및 식품가공기기인증)

ISO : International Organization for Standardization (국제표준화기구)

DIN : Deutsche Industrie Norm(German Industrial Standard) (독일공업규격)

15. Surface Roughness (Intensity of Illumination): 표준거칠기(조도)

GRADE	AP(Anneal Picked)	BA(Bright Annealed)	EP(Electro Polished)
Inner Surface Roughness	Ry ≤ 25μm Cut Off Legth : 2.5mm Messuring Legth : 12.5mm	Ry ≤ 3.0μm 10μ Inch Ra(Avg.) Cut Off Legth : 0.8mm Messuring Legth : 4mm	Ry ≤ 0.7μm 5μ Inch Ra(Avg.) Cut Off Legth : 0.25mm Messuring Legth : 1.25mm

*EP Grade : Optional for user's demand, SCS16 only

16. Properties of Saturated Steam

Gauge Pressure, psi	Absolute Pressure, psi	Temperature		Total Heat Above 32°F		Latent Heat L=H-h Heat units	Volume, Cu Ft in 1 Lb of Steam	Weight of 1 Cu Ft steam, Lb	Entropy of the water	Entropy of Evapo-ration
		Celsius °C	Fahrenheit °F	In the Water Heat units	In the Steam H Heat units					
0.0	14.7	100.0	212.0	180.0	1150.4	970.4	26.79	0.03732	0.3118	1.4447
5.3	20	108.9	228.0	196.1	1156.2	960.0	20.08	0.04980	0.3355	1.3965
10.3	25	115.6	240.1	208.4	1160.4	952.0	16.30	0.6140	0.3532	1.3604
15.3	30	121.3	250.3	218.4	1163.9	945.1	13.74	0.0728	0.3680	1.3311
20.3	35	126.3	259.3	227.9	1166.8	938.9	11.89	0.0841	0.3808	1.3060
25.3	40	130.7	267.3	236.1	1169.4	933.3	10.49	0.0953	0.3920	1.2841
30.3	45	134.7	274.5	243.4	1171.6	928.2	9.39	0.1065	0.4021	1.2644
35.3	50	138.3	281.0	250.1	1173.6	923.5	8.51	0.1175	0.4113	1.2468
40.3	55	141.7	287.1	256.3	1175.4	919.0	7.78	0.1285	0.4196	1.2309
45.3	60	144.8	292.7	262.1	1177.0	914.0	7.17	0.1394	0.4272	1.2160
50.3	65	147.8	298.0	267.5	1178.5	911.0	6.65	0.1503	0.4344	1.2024
55.3	70	150.5	302.9	272.6	1179.8	907.2	6.20	0.1612	0.4411	1.1896
60.3	75	153.1	307.6	277.4	1181.1	903.7	5.81	0.1721	0.4474	1.1778
65.3	80	155.6	321.0	282.0	1182.3	900.3	5.47	0.1829	0.4535	1.1665
70.3	85	157.9	316.3	286.3	1183.4	897.1	5.16	0.1937	0.4590	1.1561
75.3	90	160.2	320.3	290.5	1184.4	893.9	4.89	0.2044	0.4644	1.1461
80.3	95	162.3	324.1	294.5	1185.4	890.9	4.65	0.2151	0.4694	1.1367
85.3	100	164.3	327.8	298.3	1186.3	888.0	4.429	0.2258	0.4743	1.1277
91.3	106	166.7	332.0	302.7	1187.4	884.7	4.192	0.2390	0.4798	1.1174
95.3	110	168.2	334.8	305.5	1188.0	882.5	4.047	0.2472	0.4834	1.1108
101.3	116	170.4	338.7	309.6	1189.0	879.3	3.848	0.2599	0.4886	1.1014
105.3	120	171.8	341.3	312.3	1189.6	877.2	3.726	0.2683	0.4919	1.0954
111.3	126	173.9	345.0	316.2	1190.4	874.2	3.556	0.2812	0.4967	1.0865
115.3	130	175.2	347.4	318.6	1191.0	872.3	3.452	0.2897	0.4998	1.0809
121.3	136	177.1	350.8	322.3	1191.7	869.4	3.308	0.3023	0.5043	1.0728
125.3	140	178.4	353.1	324.6	1192.2	867.6	3.219	0.3107	0.5072	1.0675
131.3	146	180.2	356.3	328.0	1192.9	864.9	3.092	0.3234	0.5114	1.0599
135.3	150	181.4	358.5	330.2	1193.4	863.2	3.012	0.3320	0.5142	1.0550
141.3	156	183.1	361.6	333.5	1194.1	860.6	2.902	0.3446	0.5182	1.0477
145.3	160	184.2	363.6	335.6	1194.5	858.8	2.384	0.3529	0.5208	1.0431
151.3	166	185.8	366.5	338.7	1195.1	856.4	2.737	0.3654	0.5245	1.0365
155.3	170	186.9	368.5	340.7	1195.4	854.7	2.675	0.3738	0.5269	1.0321
161.3	176	188.5	371.3	343.7	1196.0	852.3	2.588	0.3864	0.5305	1.0257
165.3	180	189.5	373.1	345.6	1196.4	850.8	2.533	0.3948	0.5328	1.0215
171.3	186	191.0	375.8	348.5	1196.9	848.4	2.455	0.4073	0.5362	1.0154
175.3	190	192.0	377.6	350.4	1197.3	846.9	2.406	0.4157	0.5384	1.0114
181.3	196	193.4	380.2	353.1	1197.8	844.7	2.335	0.4283	0.5416	1.0056
185.3	200	194.4	381.9	354.9	1198.1	843.2	2.290	0.4370	0.5437	1.0019

Latent Heat of steam = 970 Btu/Lb

Vacuum Inches of mercury	Absolute Pressure, psi	Temperature		Total Heat Above 32°F		Latent Heat L=H-h Heat units	Volume, Cu Ft in 1 Lb of Steam	Weight of 1 Cu Ft steam, Lb	Entropy of the water	Entropy of Evapo-ration
		Celsius °C	Fahrenheit °F	In the Water Heat units	In the Steam H Heat units					
29.74	0.0886	0	32	0.00	1073.4	1073.4	3294.0	0.000304	0.0000	2.1832
29.56	0.1780	10	50	18.08	1081.4	1063.3	1702.0	0.000587	0.0361	2.0865
29.18	0.3626	21.1	70	38.06	1090.3	1052.3	871.0	0.001148	0.0745	1.9868
28.50	0.696	32.2	90	58.00	1099.2	1041.2	469.3	0.002131	0.1114	1.8944
27.88	1	38.79	101.83	69.8	1104.4	1034.6	333.0	0.00300	0.1327	1.8427
23.81	3	60.84	141.52	109.4	1121.6	1012.3	118.5	0.00845	0.2008	1.6840
19.74	5	72.38	162.28	130.1	1130.5	1000.3	73.33	0.01364	0.2348	1.6084
15.67	7	80.47	176.85	144.7	1136.5	991.8	53.56	0.01867	0.2579	1.5582
11.60	9	86.82	188.27	156.2	1141.1	985.0	42.36	0.02361	0.2756	1.5202
7.52	11	92.08	197.75	165.7	1144.9	979.2	35.10	0.02849	0.2902	1.4895
3.45	13	96.59	205.87	173.8	1148.0	974.2	30.03	0.03330	0.3025	1.4639
1.42	14	98.64	209.55	177.5	1149.4	971.9	28.02	0.03569	0.3018	1.4523

Latent Heat of steam = 970 Btu/Lb

Certificate





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