

**BPE**

**TUBES & FITTINGS**  
**VALVES & PUMPS**  
**TANKS**



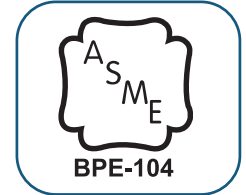
**BioClean**<sup>®</sup>

# BioClean<sup>®</sup> Hygienic Material Products

Health, safety is the eternal and a focused topic in nowadays' society, in order to protect the pharmaceuticals users, food and beverage consumers or cosmetics users and personal care interests, profound professional knowledge and close attention to cleanliness and details are highly required. With decades of experience in manufacturing and marketing hygienic products, Kinglai Group has created and introduced ultra-sanitary product line - BioClean. Optimized and improved fluid processing and easy CIP system during the food, medicine manufacturing to ensure the product safety.

BioClean products are certified by ASME BPE (certification number BPE-104) even better than been required. Imported standard austenitic stainless steel ASTM316L as raw materials, corrosion resistance stronger which in line with BSEN ISO9001: 2000. Sealing materials used in Europe famous brand Original EPDM, PTFE and TFM and other polymer materials respectively, to obtain FDA and USP class VI. Exclusive innovation in MP and EP surface treatment technology, BioClean outstanding performance: the inner surface can be achieved  $Ra \leq 0.375\mu m$  (15 $\mu$ inch) even meet customer-specific requirements.

BioClean has various kinds of pipes and fittings, with DIN, ISO, BS and ASME BPE and many other irregular standards. BioClean can provide customers with all sizes of sanitary diaphragm valves, sampling valve, C series centrifugal pumps, S Series high efficiency centrifugal pumps, LR series self-priming pump of high-standard solutions.



**ASME BPE  
FIRST IN ASIA**

Certified tubing and fitting manufacturer by ASME BPE Org.

# There is no end of starting

## **2016 KL Group GNB, KL Group Ireland JV.**

Acquisition KL Group GNB Establish, Setup KL Group Ireland JV.

## **2014 EHEDG Certified**

## **2013 ASME BPE Certified**

Certified tubing and fitting manufacturer by ASME BPE Org.

## **2012/2013 KingLai Group**

Joint Venture with abc on pressure vessel  
Investment on ITO equipment production

## **2011 Listed Stock (SZSE 300260)**

Certified by GB, ASME (pressure vessel)  
Certified by 3A (diaphragm valve, Filter, Changeover valve, tube)  
Expansion the 3rd phase (Hefeng factory)

## **2009 Polaris Factory**

3A Certified  
ISO9001-2008, PED Certified

## **2008 Certified of pressure piping**

Certified by ISO, BSI

## **2007 Established Polaris Stainless Steel Technology Co., Ltd.**

## **2006 Expansion the 3rd phase (KingLai factory)**

Certified by 3A (C pumps, Ball valve, Check valve)

## **2004 Certified by ISO 9001-2000**

## **2000 Built the domestic factory (KingLai factory)**

## **1991 Founded in Taiwan**

## **2022 Expanding new facilities in Huai'an, Jiangsu Province, China and Taichung city of TW**

## **2021 Expanded two more facilities in HQ**

## **2020 Participated in Covid-19 vaccine project**

## **2019 Expansion new plant**

## **2018 BIHAI filling machines fabricate company**

Acquisition BIHAI filling machines  
Fabricate company

## **2017 Lion Hygienic Materials Co., Ltd**

Setup Lion Hygienic material Co Ltd process for gasline to integrate vacuum industries.



# BioClean® Hygienic Tubes And Fittings

The manufacture of Bioclean's sanitary tubes and fittings follows a rigorous quality control method. All cold forming tubes keep a consistent wall thickness thanks to the use of precast tube. To guarantee that the tube dimensions comply with ASME BPE Table DT 3-1 after cold forming, adjustments are being made.

Mechanical vertical cutting technology is used to provide the appropriate surface treatment, in order to ensure accurate and consistent rail welding. All joints passed the visual examination. The allowance of ellipticity and verticality are checked by calibration equipment. The average roughness of surface treatment is checked by the profilometer.

## Product Traceability

In addition to raw materials from best factory, the strict flow and the inspection are also used to guarantee uniformity and traceability of product. The KingLai brand mark, raw material, the furnace number, the surface roughness and the caliber standard are signed in the production to show that it has passed the safeguard procedure. The brand mark "Bioclean" are signed in the surface of all hygienic products. Bar code and the date of production are signed on the package of pipe fittings which ensure highly effective distribution and traceability. All the products will arrive in the destination perfectly by packing in the solid packages with KingLai brand symbol.



# BioClean<sup>®</sup> Product material and surface finishing

## High purity raw materials

The product made of imported stainless steel with high purity ASTM 316L, BS EN ISO 9001:2000.

## Chemical composition ( % )

C	Si	Mn	P	S	Cr	Ni	Mo
≤0.030	≤1.00	≤2.00	≤0.035	0.005-0.017	16.0-18.0	10.0-14.0	2.0-3.0

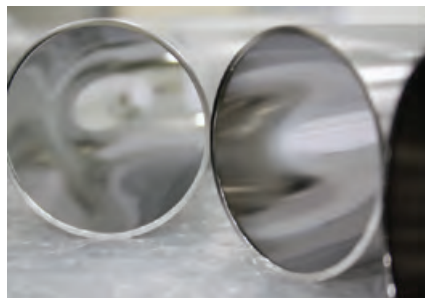
## Product standard

UNS	Seamless pipe and Welding pipe	Forging
S31603	ASTM A270 ASTM A270M	ASTM A743 EN 1.4409

## Surface finishing

The original MP and EP surface finishing, ID Ra 0.5-0.375μm , OD Ra 0.8μm. The surface roughness of electrolytic polishing can be Ra 0.12.

Polishing code	The inner surface ( ID )			The outer surface ( OD )			ASME BPE Surface processing code
	The maximum surface cleanliness Ra		Polishing method	The maximum surface cleanliness Ra		Polishing method	
	μ-in	μ-m		μ-in	μ-m		
HG	20	0.5	Mechanically Polished-MP	32	0.8	Mechanically Polished-MP	SF1
4G	15	0.375	Mechanically Polished-MP & Electro-polished-EP	32	0.8	Mechanically Polished-MP	SF4

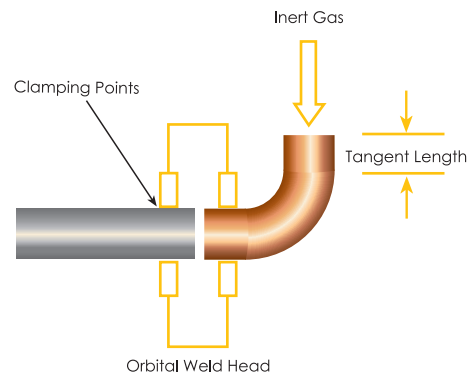
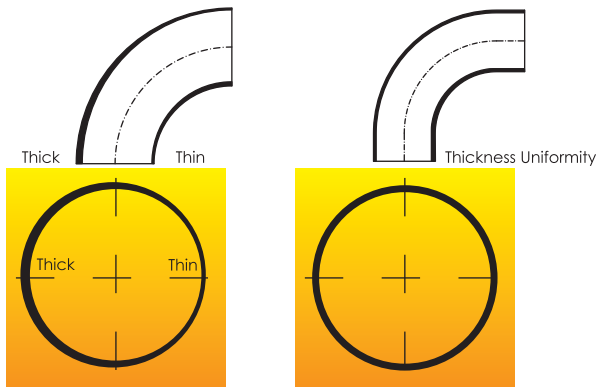
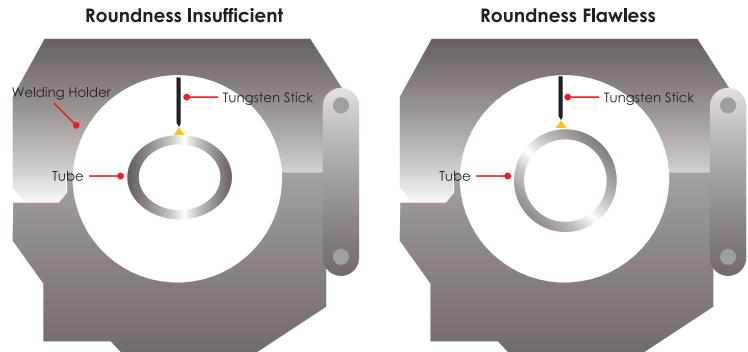


# AUTOMATIC WELDING

KL raw material applies to ASTM 304 and 316L with good corrosion resistance and good performance in welding. KL is now using automatic welding, like Orbital welding, TIG welding, MIG welding, to replace hand welding, which can improve working environment & efficiency, meanwhile low down labor cost.

KL tubing automatic welding procedure

1. Long tangent, easy for fixture
2. Fitting roundness, ASME BPE DT-3-1
3. Fitting wall thickness, ASME BPE ODT-3-1



## TIG & Orbital

1. Because iron condenses quickly and high temperatures only persist a brief time, pulse heating is effective for welding heat-sensitive materials.
2. It works well for welding thin coils since it only significantly affects a limited amount of space and heat input.
3. Because the amount of the heat input and the welding pool can be regulated, it is useful for welding on one side of a shape from both sides.
4. High frequency arc shock to refine grain, eliminate porosity, improve joint performance.
5. It's suitable for high-speed welding, and can obtain better work efficiency.

## Weakness of hand welding

1. Crack
2. Non-fusion
3. Lack of penetration
4. Bubble
5. Undercut
6. Crater
7. Slag inclusion
8. Burn through
9. Overlap
10. Forming uneven
11. Weld repair

# POLISHING PROCESS

KL hygienic tubing using 2B cold rolling coil, special welding procedure guarantee full penetration, and good welding performance complies with sanitary requirements for tubing.

## Bright Annealing-BA

Tubing temperature need to be cool down below 100°C with hydrogen protection, after reaching 1050°C. It removes inner stress, and on the other hand, generates a passivation layer to increase the corrosion resistance.



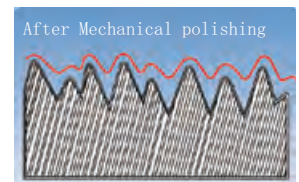
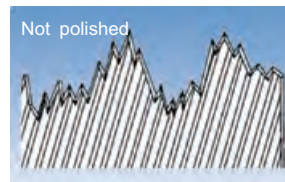
## Asid Cleaning & Passivated-AP

Pickle or passivation process can remove contaminations on surface, and generates a protection layer to increase corrosion resistance.

KL MP & EP process can guarantee surface roughness requirement of ASME BPE (0.8-0.375), and 0.12 is doable upon request.

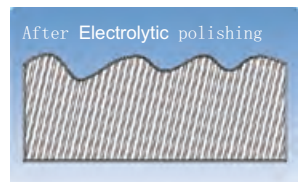
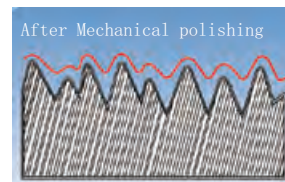
## Mechanically Polished-MP

Metal polishing wheel remove metallic contamination, make surface smooth as satin.



## Electro-polished-EP

Electro polish process removes spine and sunken, forming a protection layer to increase corrosion resistance. KL process MP before EP, which can guarantee a smooth surface and zero dead room.



### Buffing polishing (BP)

It is commonly used to improve the surface brightness of decorative stainless steel industry, despite the Ra value may be better, but many corner crack was observed under the electron microscope, the surface with many impurities and abrasive particles.

# BioClean<sup>®</sup> series products

## All series includes

Hygienic tubes and fittings comply with DIN11866, 11865, ISO2037 and ASME BPE A270 S2 and pass through 6 process steps in the sterile room. Bioclean Diaphragm Valves, Sampling Valves, Pumps, Tank and Cleaning Equipment comply with many standards such as ASME BPE, DIN and ISO. Our products conform to “the GMP standard” and Our products conform to “the GMP standard” and meet the strictest standard and support a hassle-free qualification and validation process.





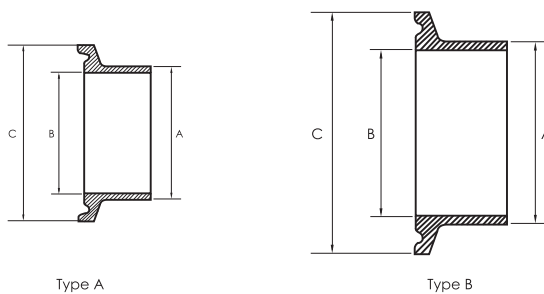
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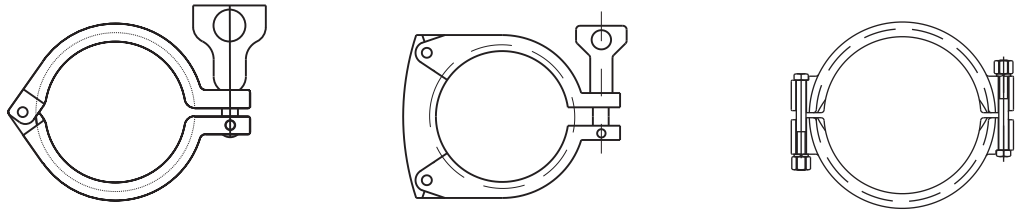
**Standard size DT-3-2(ASME BPE)**

Nominal Size, in.	Tube O.D		Tube Wall Thickness		Centerline Radius (CLR), R	
	in.	mm	in.	mm	in.	mm
1/4"	0.250	63.5	0.035	0.89	0.563	14.30
3/8"	0.375	9.53	0.035	0.89	1.125	28.58
1/2"	0.500	12.70	0.065	1.65	1.125	28.58
3/4"	0.750	19.05	0.065	1.65	1.125	28.58
1.0"	1.000	25.40	0.065	1.65	1.500	38.10
1.5"	1.500	38.10	0.065	1.65	2.250	57.15
2.0"	2.000	50.80	0.065	1.65	3.000	76.20
2.5"	2.500	63.50	0.065	1.65	3.750	92.25
3.0"	3.000	76.20	0.065	1.65	4.500	114.30
4.0"	4.000	101.60	0.083	2.11	6.000	152.40
6.0"	6.000	152.40	0.109	2.77	9.000	228.60



**Standard size and tolerance of DT-7-1 (ASME BPE)**

Size, in.	A		B		C		
	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Tolerance
Type A 1/4"	0.250	± 0.005	0.180	± 0.005	0.984	+ 0.005	- 0.005
3/8"	0.375	± 0.005	0.305	± 0.005	0.984	+ 0.005	- 0.005
1/2"	0.500	± 0.005	0.370	± 0.005	0.984	+ 0.005	- 0.005
3/4"	0.750	± 0.005	0.620	± 0.005	0.984	+ 0.005	- 0.005
Type B 1.0"	1.000	± 0.005	0.870	± 0.005	1.984	+ 0.008	- 0.005
1.5"	1.500	± 0.008	1.370	± 0.005	1.984	+ 0.008	- 0.005
2.0"	2.000	± 0.008	1.870	± 0.005	2.516	+ 0.008	- 0.008
2.5"	2.500	± 0.010	2.370	± 0.005	3.047	+ 0.008	- 0.008
3.0"	3.000	± 0.010	2.870	± 0.005	3.579	+ 0.010	- 0.010
4.0"	4.000	± 0.015	3.834	± 0.005	4.682	+ 0.015	- 0.015
6.0"	6.000	± 0.030	7.782	± 0.005	6.570	+ 0.030	- 0.030

**Hygienic Clamp: Rated Internal Working Pressure**


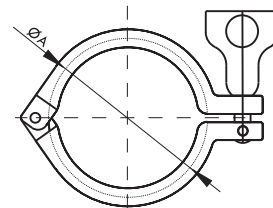
Nom. Size	13MHH Clamp				13MHH3 Clamp				13MHP Clamp			
	70°F/21°C		250°F/121°C		70°F/21°C		250°F/121°C		70°F/21°C		250°F/121°C	
	PSI	bar	PSI	bar	PSI	bar	PSI	bar	PSI	bar	PSI	bar
1/2" & 3/4"	1500	103	1200	83					1500	103	1200	83
1.0" & 1 1/2"	500	34	250	17	600	41	300	21	1500	103	1200	83
2.0"	450	31	250	17	550	38	275	19	1000	69	800	55
2 1/2"	400	28	200	14	450	31	225	16	1000	69	800	55
3.0"	350	24	150	10	350	24	160	11	1000	69	800	55
4.0"	200	14	125	9	250	17	150	10	1000	69	800	55
5.0"	175	12	100	7								
6.0"	150	10	75	5								
8.0"	100	7	50	3								
10.0"	40	3	30	2								

**Material features of the union ring seal**

FEATURE	EPDM	NBR	Viton	Silicone	TEFLON
Temperature Range	-48~135°C -55~275°F	-40~120°C -40~248°F	-29~204°C -20~400°F	-62~232°C -80~450°F	-40~232°C -40~450°F
Acid Resistance	Good-Excellent	Good	Good	Good	Good-Excellent
Alkali Resistance	Good-Excellent	Good	Poor-Good	Poor-Fair	Good-Excellent
Gasoline Resistance	Poor-Fair	Good-Excellent	Good-Excellent	Good	Good-Excellent
Diesel Resistance	Good	Good	Good-Excellent	Good	Good-Excellent
Abrasion Resistance	Good-Excellent	Good	Good	Good-Excellent	Good-Excellent
Compression Set	Fair	Good	Good-Excellent	Good-Excellent	Fair

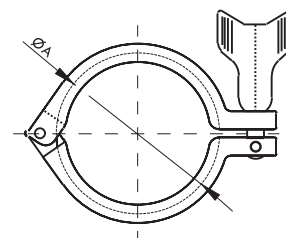
**13MHH Clamp**

No.	Nom.Size	A
1513016-000025	1/2"	28.6
1513016-000025	3/4"	28.6
1513016-000051	1.0"	53.9
1513016-000051	1.5"	53.9
1513016-000064	2.0"	67.4
1513016-000078	2.5"	80.9
1513016-000091	3.0"	94.4
1513016-000119	4.0"	122.4
1513016-000167	6.0"	170.4
1513016-000218	8.0"	221.2
1513016-000268	10.0"	272.0



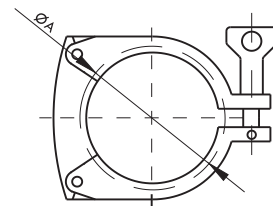
**13MHH Clamp**

No.	Nom.Size	A
1513001-000025	1/2"	28.6
1513001-000025	3/4"	28.6
1513001-000051	1.0"	53.9
1513001-000051	1.5"	53.9
1513001-000064	2.0"	67.4
1513001-000078	2.5"	80.9
1513001-000091	3.0"	94.4
1513001-000119	4.0"	122.4
1513001-000167	6.0"	170.4
1513001-000218	8.0"	221.2
1513001-000268	10.0"	272.0



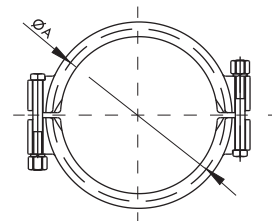
**13MHH3 Clamp**

No.	Nom.Size	A
1513003-000051	1.0"	53.9
1513003-000051	1.5"	53.9
1513003-000064	2.0"	67.4
1513003-000078	2.5"	80.9
1513003-000091	3.0"	94.4
1513003-000119	4.0"	122.4



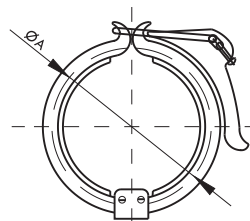
**13MHP Clamp**

No.	Nom.Size	A
1513002-000025	1/2"	28.6
1513002-000025	3/4"	28.6
1513002-000051	1.0"	52.0
1513002-000051	1.5"	52.0
1513002-000064	2.0"	65.5
1513002-000078	2.5"	79.0
1513002-000091	3.0"	92.5
1513002-000119	4.0"	158.8
1513002-000167	6.0"	170.4

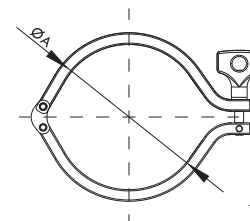

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**13MHL Clamp**

No.	Nom.Size	A
1513004-000051	1.0"	53.9
1513004-000051	1.5"	53.9
1513004-000064	2.0"	67.4
1513004-000078	2.5"	80.9
1513004-000091	3.0"	94.4
1513004-000119	4.0"	122.4

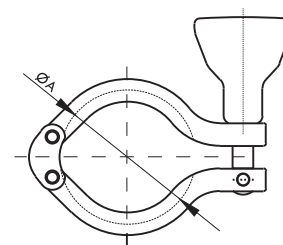

**TC Clamp**

No.	Nom.Size	A
1513017-000051	1.0"	53.4
1513017-000051	1.5"	53.4
1513017-000064	2.0"	66.0
1513017-000078	2.5"	81.3
1513017-000091	3.0"	94.0
1513017-000119	4.0"	122.0
1513017-000167	6.0"	171.2
1513017-000218	8.0"	222.0
1513017-000268	10.0"	274.0



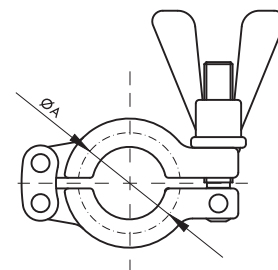
**TC Clamp**

No.	Nom.Size	A
1213007-000100	1.0"	53.9
1213007-000150	1.5"	53.9
1213007-000200	2.0"	67.4
1213007-000250	2.5"	80.9
1213007-000300	3.0"	94.4
1213007-000400	4.0"	122.4



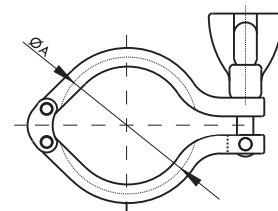
**TC Clamp**

No.	Nom.Size	A
1513028-000025	1/2"	28.0
1513028-000025	3/4"	28.0
1513028-000051	1.0"	53.9
1513028-000051	1.5"	53.9
1513028-000064	2.0"	67.4
1513028-000078	2.5"	80.9
1513028-000091	3.0"	94.4
1513028-000119	4.0"	122.0



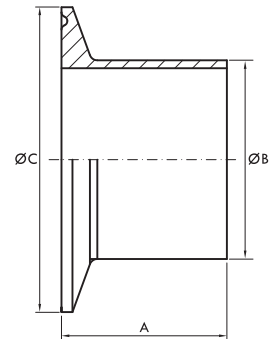
**TC Clamp**

No.	Nom.Size	A
1213001-000100	1.0"	53.9
1213001-000150	1.5"	53.9
1213001-000200	2.0"	67.4
1213001-000250	2.5"	80.9
1213001-000300	3.0"	94.4
1213001-000400	4.0"	122.4



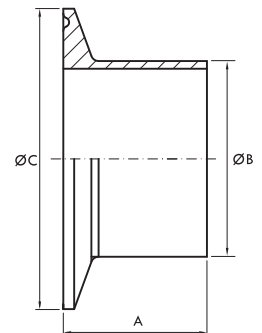
**DT-4.1.4-1 Clamp Ferrule**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)
5514004-000025	1/4"	1.750 (44.5)	0.250 (6.35)	0.984 (25.0)
5514004-000038	3/8"	1.750 (44.5)	0.375 (9.53)	0.984 (25.0)
5514004-000050	1/2"	1.750 (44.5)	0.500 (12.7)	0.984 (25.0)
5514004-000075	3/4"	1.750 (44.5)	0.750 (19.1)	0.984 (25.0)
5514004-000100	1.0"	1.750 (44.5)	1.000 (25.4)	1.984 (50.4)
5514004-000150	1.5"	1.750 (44.5)	1.500 (38.1)	1.984 (50.4)
5514004-000200	2.0"	2.250 (57.2)	2.000 (50.8)	2.516 (63.9)
5514004-000250	2.5"	2.250 (57.2)	2.500 (63.5)	3.047 (77.5)
5514004-000300	3.0"	2.250 (57.2)	3.000 (76.2)	3.579 (90.9)
5514004-000400	4.0"	2.250 (57.2)	4.000 (101.6)	4.682 (119.0)
5514004-000600	6.0"	3.000 (76.2)	6.000 (152.4)	6.570 (166.9)

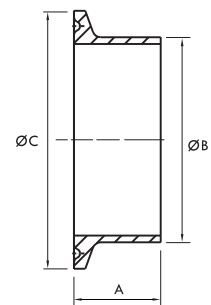

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**DT-4.1.4-1 Clamp Ferrule**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)
5514003-000025	1/4"	1.130 (28.7)	0.250 (6.35)	0.984 (25.0)
5514003-000038	3/8"	1.130 (28.7)	0.375 (9.53)	0.984 (25.0)
5514003-000050	1/2"	1.130 (28.7)	0.500 (12.7)	0.984 (25.0)
5514003-000075	3/4"	1.130 (28.7)	0.750 (19.1)	0.984 (25.0)
5514003-000100	1.0"	1.130 (28.7)	1.000 (25.4)	1.984 (50.4)
5514003-000150	1.5"	1.130 (28.7)	1.500 (38.1)	1.984 (50.4)
5514003-000200	2.0"	1.130 (28.7)	2.000 (50.8)	2.516 (63.9)
5514003-000250	2.5"	1.130 (28.7)	2.500 (63.5)	3.047 (77.5)
5514003-000300	3.0"	1.130 (28.7)	3.000 (76.2)	3.579 (90.9)
5514003-000400	4.0"	1.130 (28.7)	4.000 (101.6)	4.682 (119.0)
5514003-000600	6.0"	1.500 (38.1)	6.000 (152.4)	6.570 (166.9)


**DT-4.1.4-1 Clamp Ferrule**

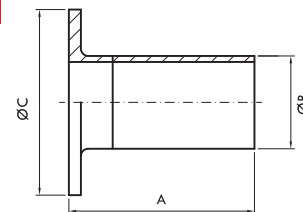
No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)
5514101-000050	1/2"	0.500 (12.7)	0.500 (12.7)	0.984 (25.0)
5514101-000075	3/4"	0.500 (12.7)	0.750 (19.1)	0.984 (25.0)
5514101-000100	1.0"	0.500 (12.7)	1.000 (25.4)	1.984 (50.4)
5514101-000150	1.5"	0.500 (12.7)	1.500 (38.1)	1.984 (50.4)
5514101-000200	2.0"	0.500 (12.7)	2.000 (50.8)	2.516 (63.9)
5514101-000250	2.5"	0.500 (12.7)	2.500 (63.5)	3.047 (77.5)
5514101-000300	3.0"	0.500 (12.7)	3.000 (76.2)	3.579 (90.9)
5514101-000400	4.0"	0.625 (15.9)	4.000 (101.6)	4.682 (119.0)





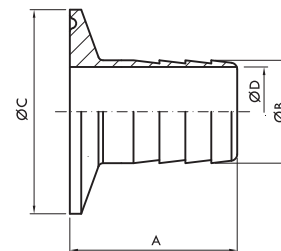
### 14W-AWF Stub End

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)
5514065-000050	1/2"	2.000 (50.8)	0.500 (12.7)	1.693 (43.0)
5514065-000075	3/4"	2.000 (50.8)	0.750 (19.1)	1.689 (42.9)
5514065-000100	1.0"	2.000 (50.8)	1.000 (25.4)	2.000 (50.8)
5514065-000150	1.5"	2.000 (50.8)	1.500 (38.1)	2.874 (73.0)
5514065-000200	2.0"	2.500 (63.5)	2.000 (50.8)	3.626 (92.1)
5514065-000250	2.5"	2.500 (63.5)	2.500 (63.5)	4.126 (104.8)
5514065-000300	3.0"	2.500 (63.5)	3.000 (76.2)	5.000 (127.0)
5514065-000400	4.0"	2.500 (63.5)	4.000 (101.6)	6.189 (157.2)
5514065-000600	6.0"	3.000 (76.2)	6.000 (152.4)	8.500 (215.9)



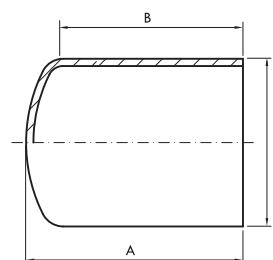
### 14MPHR Rubber Hose

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)
5514044-000050	1/2"	1.500 (38.1)	0.530 (13.5)	0.984 (25.0)	0.984 (25.0)
5514044-000075	3/4"	1.500 (38.1)	0.780 (19.8)	0.984 (25.0)	0.984 (25.0)
5514044-000100	1.0"	1.689 (42.9)	1.000 (25.4)	1.984 (50.4)	1.984 (50.4)
5514044-000150	1.5"	1.689 (42.9)	1.500 (38.1)	1.984 (50.4)	1.984 (50.4)
5514044-000200	2.0"	2.310 (58.7)	2.000 (50.4)	2.516 (63.9)	2.516 (63.9)
5514044-000250	2.5"	2.342 (59.5)	2.500 (63.5)	3.047 (77.5)	3.047 (77.5)
5514044-000300	3.0"	3.095 (78.6)	3.000 (76.2)	3.578 (90.9)	3.578 (90.9)
5514044-000400	4.0"	3.405 (86.5)	4.000 (101.6)	4.682 (119.0)	4.682 (119.0)



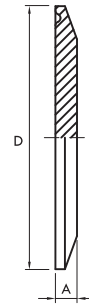
### DT-4.1.5-1 Blank End Caps

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	D in. (mm)
5516007-000050	1/2"	1.750 (44.5)	1.500 (38.1)	0.500 (12.7)
5516007-000075	3/4"	1.810 (46.0)	1.500 (38.1)	0.750 (19.1)
5516007-000100	1.0"	1.875 (47.6)	1.500 (38.1)	1.000 (25.4)
5516007-000150	1.5"	2.062 (52.4)	1.500 (38.1)	1.500 (38.1)
5516007-000200	2.0"	2.500 (63.5)	1.500 (38.1)	2.000 (50.8)
5516007-000250	2.5"	2.810 (71.4)	1.500 (38.1)	2.500 (63.5)
5516007-000300	3.0"	2.875 (73.0)	1.750 (44.5)	3.000 (76.2)
5516007-000400	4.0"	3.250 (82.6)	2.000 (50.8)	4.000 (101.6)
5516007-000600	6.0"	4.725 (120.7)	2.500 (63.5)	6.000 (152.4)



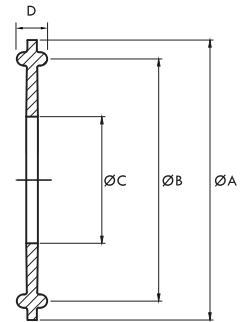
**DT-4.1.5-2 Blank**

No.	Nominal Size, in.	A in. (mm)	D in. (mm)
5516001-000050	1/2"	0.187 (4.7)	0.984 (25.0)
5516001-000075	3/4"	0.187 (4.7)	0.984 (25.0)
5516001-000100	1.0"	0.250 (6.4)	1.984 (50.4)
5516001-000150	1.5"	0.250 (6.4)	1.984 (50.4)
5516001-000200	2.0"	0.250 (6.4)	2.516 (63.9)
5516001-000250	2.5"	0.250 (6.4)	3.047 (77.5)
5516001-000300	3.0"	0.250 (6.4)	3.579 (76.2)
5516001-000400	4.0"	0.312 (7.9)	4.682 (101.6)
5516001-000600	6.0"	0.437 (11.1)	6.570 (166.9)

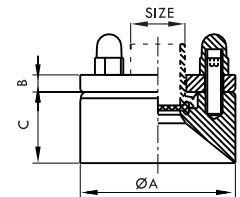

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**DT-7-1 Sealing Ring**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)
5515001-000100	1.0"	1.984 (50.4)	1.718 (43.6)	0.870 (22.1)	0.216 (5.5)
5515001-000150	1.5"	1.984 (50.4)	1.718 (43.6)	1.370 (34.8)	0.216 (5.5)
5515001-000200	2.0"	2.516 (63.9)	2.218 (56.3)	1.870 (47.5)	0.216 (5.5)
5515001-000250	2.5"	3.047 (77.4)	2.781 (70.6)	2.370 (60.2)	0.216 (5.5)
5515001-000300	3.0"	3.579 (90.9)	3.281 (83.3)	2.870 (72.9)	0.216 (5.5)
5515001-000400	4.0"	4.682 (118.9)	4.344 (110.3)	3.834 (97.4)	0.216 (5.5)

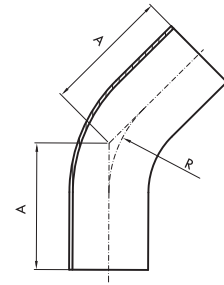

**Flange**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	D in. (mm)
5501K01-007500	3/4"	2.145 (54.5)	0.236 (6.0)	0.984 (25.0)
5501K01-010000	1.0"	3.326 (84.5)	0.236 (6.0)	0.984 (25.0)
5501K01-015000	1.5"	3.326 (84.5)	0.236 (6.0)	0.984 (25.0)
5501K01-020000	2.0"	3.917 (99.5)	0.236 (6.0)	0.984 (25.0)
5501K01-025000	2.5"	4.409 (112.0)	0.394 (10.0)	1.496 (38.0)
5501K01-030000	3.0"	5.157 (131.0)	0.94 (10.0)	1.496 (38.0)



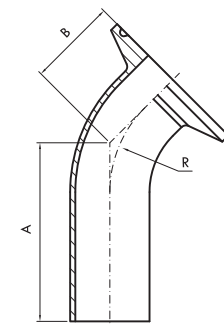
**DT-4.1.1-4 Automatic Tube Weld:45°Elbow**

No.	Nominal Size,in.	A in.(mm)	R in.(mm)
5506103-000050	1/2"	2.250 (57.2)	1.125 (28.6)
5506103-000075	3/4"	2.250 (57.2)	1.125 (28.6)
5506103-000100	1.0"	2.250 (57.2)	1.500 (38.1)
5506103-000150	1.5"	2.500 (63.5)	2.250 (57.2)
5506103-000200	2.0"	3.000 (76.2)	3.000 (76.2)
5506103-000250	2.5"	3.375 (85.7)	3.750 (95.3)
5506103-000300	3.0"	3.625 (92.1)	4.500 (114.3)
5506103-000400	4.0"	4.500 (114.3)	6.000 (152.4)
5506103-000600	6.0"	6.250 (158.8)	9.000 (228.6)



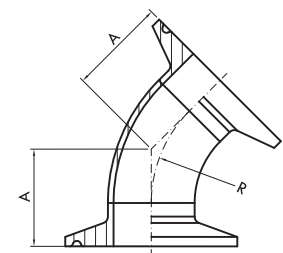
**DT-4.1.1-5 Automatic Tube Weld: Clamp Joint, 45°Elbow**

No.	Nominal Size,in.	A in.(mm)	B in.(mm)	R in.(mm)
5506303-000050	1/2"	2.250 (57.2)	1.000 (25.4)	1.125 (28.6)
5506303-000075	3/4"	2.250 (57.2)	1.000 (25.4)	1.125 (28.6)
5506303-000100	1.0"	2.250 (57.2)	1.125 (28.6)	1.500 (38.1)
5506303-000150	1.5"	2.500 (63.5)	1.438 (36.5)	2.250 (57.2)
5506303-000200	2.0"	3.000 (76.2)	1.750 (44.5)	3.000 (76.2)
5506303-000250	2.5 "	3.375 (85.7)	2.063 (52.4)	3.750 (95.3)
5506303-000300	3.0"	3.625 (92.1)	2.375 (60.3)	4.500 (114.3)
5506303-000400	4.0"	4.500 (114.3)	3.125 (79.4)	6.000 (152.4)
5506303-000600	6.0"	6.250 (158.8)	5.250 (133.4)	9.000 (228.6)



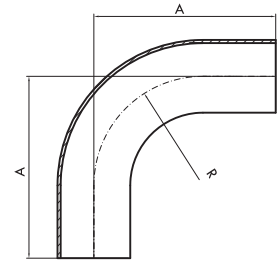
**DT-4.1.1-6 Clamp Joint: 45°Clamp Elbow**

No.	Nominal Size,in.	A in.(mm)	R in.(mm)
5506201-000050	1/2"	1.000 (25.4)	1.125 (28.6)
5506201-000075	3/4"	1.000 (25.4)	1.125 (28.6)
5506201-000100	1.0"	1.125 (28.6)	1.500 (38.1)
5506201-000150	1.5"	1.438 (36.5)	2.250 (57.2)
5506201-000200	2.0"	1.750 (44.5)	3.000 (76.2)
5506201-000250	2.5 "	2.063 (52.4)	3.750 (95.3)
5506201-000300	3.0"	2.375 (60.3)	4.500 (114.3)
5506201-000400	4.0"	3.125 (79.4)	6.000 (152.4)
5506201-000600	6.0"	5.250 (133.4)	9.000 (228.6)

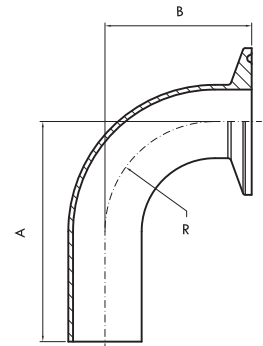


**DT-4.1.1-1 Automatic Tube Weld: 90° Elbow**

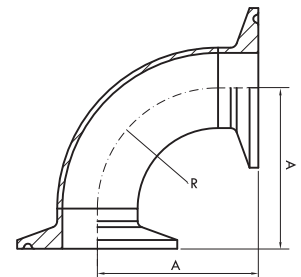
No.	Nominal Size, in.	A in. (mm)	R in. (mm)
5506102-000038	3/8"	2.625 (66.7)	1.125 (28.6)
5506102-000050	1/2"	3.000 (76.2)	1.125 (28.6)
5506102-000075	3/4"	3.000 (76.2)	1.125 (28.6)
5506102-000100	1.0"	3.000 (76.2)	1.500 (38.1)
5506102-000150	1.5"	3.750 (95.3)	2.250 (57.2)
5506102-000200	2.0"	4.750 (120.7)	3.000 (76.2)
5506102-000250	2.5"	5.500 (139.7)	3.750 (95.3)
5506102-000300	3.0"	6.250 (158.8)	4.500 (114.3)
5506102-000400	4.0"	203.2 (203.2)	6.000 (152.4)
5506102-000600	6.0"	11.500 (292.1)	9.000 (228.6)


**DT-4.1.1-2 Automatic Tube Weld: Clamp Joint, 90° Elbow**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	R in. (mm)
5506302-000038	3/8"	2.625 (66.7)	1.625 (41.3)	1.125 (28.6)
5506302-000050	1/2"	3.000 (76.2)	1.625 (41.3)	1.125 (28.6)
5506302-000075	3/4"	3.000 (76.2)	1.625 (41.3)	1.125 (28.6)
5506302-000100	1.0"	3.000 (76.2)	2.000 (50.8)	1.500 (38.1)
5506302-000150	1.5"	3.750 (95.3)	2.750 (69.9)	2.250 (57.2)
5506302-000200	2.0"	4.750 (120.7)	3.500 (88.9)	3.000 (76.2)
5506302-000250	2.5"	5.500 (139.7)	4.250 (108.0)	3.750 (95.3)
5506302-000300	3.0"	6.250 (158.8)	5.000 (127.0)	4.500 (114.3)
5506302-000400	4.0"	203.2 (203.2)	6.625 (168.3)	6.000 (152.4)
5506302-000600	6.0"	11.500 (292.1)	10.500 (266.7)	9.000 (228.6)

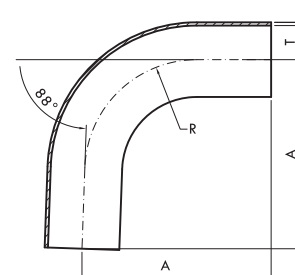

**DT-4.1.1-3 Clamp Joint: 90° Elbow**

No.	Nominal Size, in.	A in. (mm)	R in. (mm)
5506200-000050	1/2"	1.625 (41.3)	1.125 (28.6)
5506200-000075	3/4"	1.625 (41.3)	1.125 (28.6)
5506200-000100	1.0"	2.000 (50.8)	1.500 (38.1)
5506200-000150	1.5"	2.750 (69.9)	2.250 (57.2)
5506200-000200	2.0"	3.500 (88.9)	3.000 (76.2)
5506200-000250	2.5"	4.250 (108.0)	3.750 (95.3)
5506200-000300	3.0"	5.000 (127.0)	4.500 (114.3)
5506200-000400	4.0"	6.625 (168.3)	6.000 (152.4)
5506200-000600	6.0"	10.500 (266.7)	9.000 (228.6)



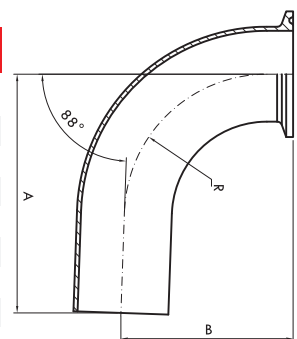
**Automatic Tube Weld: 88° Elbow**

No.	Nominal Size, in.	A in. (mm)	R in. (mm)
5506A01-000050	1/2"	3.078 (78.2)	1.125 (28.6)
5506A01-000075	3/4"	3.059 (77.7)	1.125 (28.6)
5506A01-000100	1.0"	3.047 (77.4)	1.125 (38.1)
5506A01-000150	1.5"	3.799 (96.5)	2.250 (57.2)
5506A01-000200	2.0"	4.803 (122.0)	3.000 (76.2)
5506A01-000250	2.5"	5.551 (141.0)	3.750 (95.3)
5506A01-000300	3.0"	6.260 (160.0)	4.500 (114.3)
5506A01-000400	4.0"	8.070 (205.0)	6.000 (152.4)



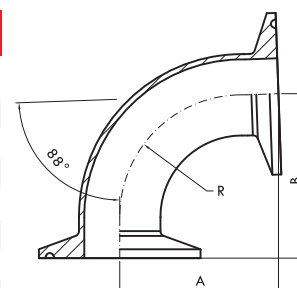
**Automatic Tube Weld: Clamp Joint, 88° Elbow**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	R in. (mm)
5506A21-000050	1/2"	3.031 (77.0)	1.598 (40.6)	1.125 (28.6)
5506A21-000075	3/4"	3.019 (76.7)	1.598 (40.6)	1.125 (28.6)
5506A21-000100	1.0"	3.019 (76.7)	1.949 (49.5)	1.500 (38.1)
5506A21-000150	1.5"	3.771 (95.8)	2.720 (69.1)	2.250 (57.2)
5506A21-000200	2.0"	4.803 (122.0)	3.630 (92.2)	3.000 (76.2)
5506A21-000250	2.5"	5.551 (140.0)	4.212 (107.0)	3.750 (95.3)
5506A21-000300	3.0"	6.260 (159.0)	4.960 (126.0)	4.500 (114.3)
5506A21-000400	4.0"	8.031 (204.0)	6.811 (173.0)	6.000 (152.4)



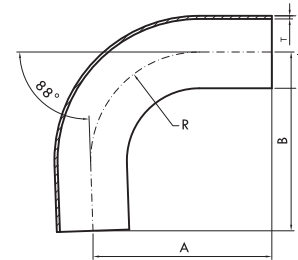
**Clamp Joint: 88° Elbow**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	R in. (mm)
5506A30-000050	1/2"	1.598 (40.6)	1.661 (42.2)	1.125 (28.6)
5506A30-000075	3/4"	1.578 (40.1)	1.641 (41.7)	1.125 (28.6)
5506A30-000100	1.0"	1.948 (49.5)	2.019 (51.3)	1.500 (38.1)
5506A30-000150	1.5"	2.696 (68.6)	2.791 (70.9)	2.250 (57.2)
5506A30-000200	2.0"	3.429 (87.1)	3.551 (90.2)	3.000 (76.2)
5506A30-000250	2.5"	4.173 (106.0)	4.291 (109.0)	3.750 (95.3)
5506A30-000300	3.0"	4.881 (124.0)	5.078 (129.0)	4.500 (114.3)
5506A30-000400	4.0"	4.496 (165.0)	6.732 (171.0)	6.000 (152.4)

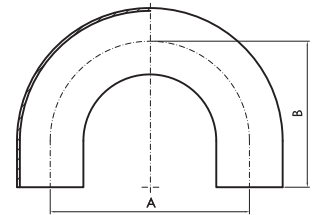


**Automatic Tube Weld: 92° Elbow**

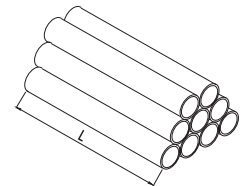
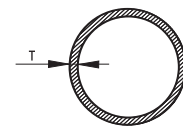
No.	Nominal Size, in.	A in. (mm)	R in. (mm)
5506B01-000050	1/2"	2.921 (74.2)	1.125 (28.6)
5506B01-000075	3/4"	3.044 (74.4)	1.125 (28.6)
5506B01-000100	1.0"	2.949 (74.9)	1.125 (38.1)
5506B01-000150	1.5"	3.700 (94.0)	2.250 (57.2)
5506B01-000200	2.0"	4.685 (119.0)	3.000 (76.2)
5506B01-000250	2.5"	5.433 (138.0)	3.750 (95.3)
5506B01-000300	3.0"	6.181 (157.0)	4.500 (114.3)
5506B01-000400	4.0"	7.913 (201.0)	6.000 (152.4)


**Automatic Tube Weld: Clamp Joint, 180° Elbow**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)
5506107-000050	1/2"	4.500 (114.3)	3.000 (76.2)
5506107-000075	3/4"	4.500 (114.3)	3.000 (76.2)
5506107-000100	1.0"	3.000 (76.2)	3.000 (76.2)
5506107-000150	1.5"	4.500 (114.3)	4.500 (114.3)
5506107-000200	2.0"	6.000 (152.4)	5.000 (127.0)
5506107-000250	2.5"	7.500 (190.5)	5.750 (146.1)
5506107-000300	3.0"	9.000 (228.6)	6.500 (165.1)
5506107-000400	4.0"	12.000 (304.8)	8.500 (215.9)
5506107-000600	6.0"	18.000 (457.2)	11.500 (292.1)

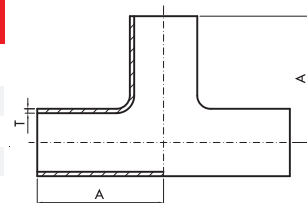

**Hygienic Tubes**

Nominal Size, in.	L mm	T in.	T mm
1/4"	6100.0	0.035	0.89
3/8"	6100.0	0.035	0.89
1/2"	6100.0	0.065	1.65
3/4"	6100.0	0.065	1.65
1.0"	6100.0	0.065	1.65
1.5"	6100.0	0.065	1.65
2.0"	6100.0	0.065	1.65
2.5"	6100.0	0.065	1.65
3.0"	6100.0	0.065	1.65
4.0"	6100.0	0.083	2.11
6.0"	6100.0	0.109	2.77



**DT-4.1.2-1 Automatic Tube Weld: Straight Tee**

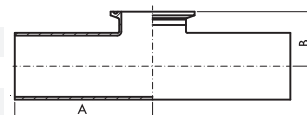
No.	Nominal Size, in.	A in. (mm)
5503102-000025	1/4"	1.750 (44.5)
5503102-000035	3/8"	1.750 (44.5)
5503102-000050	1/2"	1.875 (47.6)
5503102-000075	3/4"	2.000 (50.8)
5503102-000100	1.0"	2.125 (54.0)
5503102-000150	1.5"	2.375 (60.3)
5503102-000200	2.0"	2.875 (73.0)
5503102-000250	2.5"	3.125 (79.4)
5503102-000300	3.0"	3.375 (85.7)
5503102-000400	4.0"	4.125 (104.8)
5503102-000600	6.0"	5.625 (142.9)



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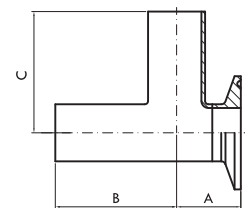
**DT-4.1.2-2 Automatic Tube Weld: Clamp Joint, Straight Tee**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)
5503201-000050	1/2"	1.875 (47.6)	1.000 (25.4)
5503201-000075	3/4"	2.000 (50.8)	1.125 (28.6)
5503201-000100	1.0"	2.125 (54.0)	1.125 (28.6)
5503201-000150	1.5"	2.375 (60.3)	1.375 (34.9)
5503201-000200	2.0"	2.875 (73.0)	1.625 (41.3)
5503201-000250	2.5"	3.125 (79.4)	1.875 (47.6)
5503201-000300	3.0"	3.375 (85.7)	2.125 (54.0)
5503201-000400	4.0"	4.125 (104.8)	2.750 (69.9)
5503201-000600	6.0"	5.625 (142.9)	4.625 (117.5)



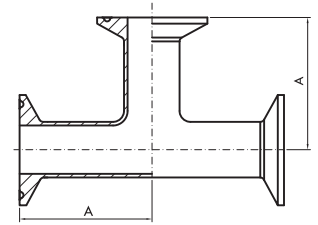
**DT-4.1.2-3 Mechanical Joint: Short Outlet Run Tee**

No.	Nominal Size, in.	A in. (mm)	B in. (mm)	R in. (mm)
5503202-000025	1/4"	0.875 (22.2)	1.750 (44.5)	1.750 (44.5)
5503202-000038	3/8"	0.875 (22.2)	1.750 (44.5)	1.750 (44.5)
5503202-000050	1/2"	0.875 (22.2)	1.875 (47.6)	1.875 (47.6)
5503202-000075	3/4"	1.000 (25.4)	2.000 (50.8)	2.000 (50.8)
5503202-000100	1.0"	1.125 (28.6)	2.125 (54.0)	2.125 (54.0)
5503202-000150	1.5"	1.375 (34.9)	2.375 (60.3)	2.375 (60.3)
5503202-000200	2.0"	1.625 (41.3)	2.875 (73.0)	2.875 (73.0)
5503202-000250	2.5"	1.875 (47.6)	3.125 (79.4)	3.125 (79.4)
5503202-000300	3.0"	2.125 (54.0)	3.375 (85.7)	3.375 (85.7)
5503202-000400	4.0"	2.750 (69.9)	4.125 (104.8)	4.125 (104.8)
5503202-000600	6.0"	4.625 (117.5)	5.625 (142.9)	5.625 (142.9)



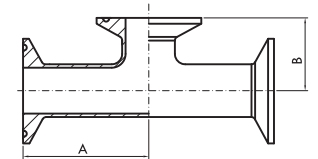
**DT-4.1.2-4 Clamp Joint: Straight Tee**

No.	Nominal Size, in.	A in. (mm)
5503302-000050	1/2"	2.250 (57.2)
5503302-000075	3/4"	2.375 (60.3)
5503302-000100	1.0"	2.625 (66.7)
5503302-000150	1.5"	2.875 (73.0)
5503302-000200	2.0"	3.375 (85.7)
5503302-000250	2.5"	3.625 (92.1)
5503302-000300	3.0"	3.875 (98.4)
5503302-000400	4.0"	4.750 (120.7)
5503302-000600	6.0"	7.125 (181.0)


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**DT-4.1.2-5 Clamp Joint: Short Outlet Tee**

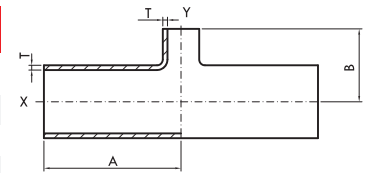
No.	Nominal Size, in.	A in. (mm)	B in. (mm)
5503200-000050	1/2"	2.250 (57.2)	1.000 (25.4)
5503200-000075	3/4"	2.375 (60.3)	1.125 (28.6)
5503200-000100	1.0"	2.625 (66.7)	1.125 (28.6)
5503200-000150	1.5"	2.875 (73.0)	1.375 (34.9)
5503200-000200	2.0"	3.375 (85.7)	1.625 (41.3)
5503200-000250	2.5"	3.625 (92.1)	1.875 (47.6)
5503200-000300	3.0"	3.875 (98.4)	2.125 (54.0)
5503200-000400	4.0"	4.750 (120.7)	2.750 (69.9)
5503200-000600	6.0"	7.125 (181.0)	4.625 (117.5)





**DT-4.1.2-6 Automatic Tube Weld: Reducing Tee**

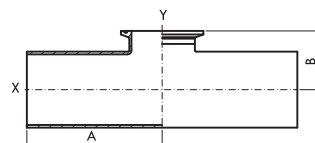
No.	Nominal Size, in.		A		B	
	X	Y	in. (mm)		in. (mm)	
5503102-050038	1/2"	3/8"	1.857	(47.6)	1.857	(47.6)
5503102-075025	3/4"	1/4"	2.000	(50.8)	2.000	(50.8)
5503102-075038	3/4"	3/8"	2.000	(50.8)	2.000	(50.8)
5503102-075050	3/4"	1/2"	2.000	(50.8)	2.000	(50.8)
5503102-100025	1.0"	1/4"	2.125	(54.0)	2.125	(54.0)
5503102-100038	1.0"	3/8"	2.125	(54.0)	2.125	(54.0)
5503102-100050	1.0"	1/2"	2.125	(54.0)	2.125	(54.0)
5503102-100075	1.0"	3/4"	2.125	(54.0)	2.125	(54.0)
5503102-150025	1.5"	1/4"	2.375	(60.3)	2.375	(60.3)
5503102-150050	1.5"	1/2"	2.375	(60.3)	2.375	(60.3)
5503102-150075	1.5"	3/4"	2.375	(60.3)	2.375	(60.3)
5503102-150100	1.5"	1.0"	2.375	(60.3)	2.375	(60.3)
5503102-200025	2.0"	1/4"	2.875	(73.0)	2.625	(66.7)
5503102-200038	2.0"	3/8"	2.875	(73.0)	2.625	(66.7)
5503102-200050	2.0"	1/2"	2.875	(73.0)	2.625	(66.7)
5503102-200075	2.0"	3/4"	2.875	(73.0)	2.625	(66.7)
5503102-200100	2.0"	1.0"	2.875	(73.0)	2.625	(66.7)
5503102-200150	2.0"	1.5"	2.875	(73.0)	2.625	(66.7)
5503102-250038	2.5"	3/8"	3.125	(79.4)	2.875	(73.0)
5503102-250050	2.5"	1/2"	3.125	(79.4)	2.875	(73.0)
5503102-250075	2.5"	3/4"	3.125	(79.4)	2.875	(73.0)
5503102-250100	2.5"	1.0"	3.125	(79.4)	2.875	(73.0)
5503102-250150	2.5"	1.5"	3.125	(79.4)	2.875	(73.0)
5503102-250200	2.5"	2.0"	3.125	(79.4)	2.875	(73.0)
5503102-300050	3.0"	1/2"	3.375	(85.7)	3.125	(79.4)
5503102-300075	3.0"	3/4"	3.375	(85.7)	3.125	(79.4)
5503102-300100	3.0"	1.0"	3.375	(85.7)	3.125	(79.4)
5503102-300150	3.0"	1.5"	3.375	(85.7)	3.125	(79.4)
5503102-300200	3.0"	2.0"	3.375	(85.7)	3.125	(79.4)
5503102-300250	3.0"	2.5"	3.375	(85.7)	3.125	(79.4)
5503102-400050	4.0"	1/2"	4.125	(104.8)	3.625	(92.1)
5503102-400075	4.0"	3/4"	4.125	(104.8)	3.625	(92.1)
5503102-400100	4.0"	1.0"	4.125	(104.8)	3.625	(92.1)
5503102-400150	4.0"	1.5"	4.125	(104.8)	3.625	(92.1)
5503102-400200	4.0"	2.0"	4.125	(104.8)	3.875	(98.4)
5503102-400250	4.0"	2.5"	4.125	(104.8)	3.875	(98.4)
5503102-400300	4.0"	3.0"	4.125	(104.8)	3.875	(98.4)
5503102-600075	6.0"	3/4"	5.625	(142.9)	4.875	(123.8)
5503102-600100	6.0"	1.0"	5.625	(142.9)	4.875	(123.8)
5503102-600150	6.0"	1.5"	5.625	(142.9)	4.875	(123.8)
5503102-600200	6.0"	2.0"	5.625	(142.9)	4.875	(123.8)
5503102-600250	6.0"	2.5"	5.625	(142.9)	4.875	(123.8)
5503102-600300	6.0"	3.0"	5.625	(142.9)	4.875	(123.8)
5503102-600400	6.0"	4.0"	5.625	(142.9)	5.125	(130.2)



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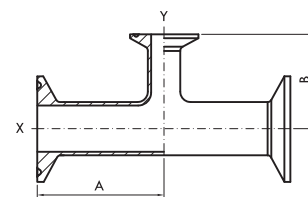
**DT-4.1.2-7 Automatic Tube Weld: Shrot Outlet Clamp,Joint, Reducing Tee**

No.	Nominal Size,in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5503201-075050	3/4"	1/2"	2.000	(50.8)	1.000	(25.4)
5503201-100050	1.0"	1/2"	2.125	(54.0)	1.125	(28.6)
5503201-100075	1.0"	3/4"	2.125	(54.0)	1.125	(28.6)
5503201-150050	1.5"	1/2"	2.375	(60.3)	1.375	(34.9)
5503201-150075	1.5"	3/4"	2.375	(60.3)	1.375	(34.9)
5503201-150100	1.5"	1.0"	2.375	(60.3)	1.375	(34.9)
5503201-200050	2.0"	1/2"	2.875	(73.0)	1.625	(41.3)
5503201-200075	2.0"	3/4"	2.875	(73.0)	1.625	(41.3)
5503201-200100	2.0"	1.0"	2.875	(73.0)	1.625	(41.3)
5503201-200150	2.0"	1.5"	2.875	(73.0)	1.625	(41.3)
5503201-250050	2.5"	1/2"	3.125	(79.4)	1.875	(47.6)
5503201-250075	2.5"	3/4"	3.125	(79.4)	1.875	(47.6)
5503201-250100	2.5"	1.0"	3.125	(79.4)	1.875	(47.6)
5503201-250150	2.5"	1.5"	3.125	(79.4)	1.875	(47.6)
5503201-250200	2.5"	2.0"	3.125	(79.4)	1.875	(47.6)
5503201-300050	3.0"	1/2"	3.375	(85.7)	2.125	(54.0)
5503201-300075	3.0"	3/4"	3.375	(85.7)	2.125	(54.0)
5503201-300100	3.0"	1.0"	3.375	(85.7)	2.125	(54.0)
5503201-300150	3.0"	1.5"	3.375	(85.7)	2.125	(54.0)
5503201-300200	3.0"	2.0"	3.375	(85.7)	2.125	(54.0)
5503201-300250	3.0"	2.5"	3.375	(85.7)	2.125	(54.0)
5503201-400050	4.0"	1/2"	4.125	(104.8)	2.625	(66.7)
5503201-400075	4.0"	3/4"	4.125	(104.8)	2.625	(66.7)
5503201-400100	4.0"	1.0"	4.125	(104.8)	2.625	(66.7)
5503201-400150	4.0"	1.5"	4.125	(104.8)	2.625	(66.7)
5503201-400200	4.0"	2.0"	4.125	(104.8)	2.625	(66.7)
5503201-400250	4.0"	2.5"	4.125	(104.8)	2.625	(66.7)
5503201-400300	4.0"	3.0"	4.125	(104.8)	2.625	(66.7)
5503201-600050	6.0"	1/2"	5.625	(142.9)	3.625	(92.1)
5503201-600075	6.0"	3/4"	5.625	(142.9)	3.625	(92.1)
5503201-600100	6.0"	1.0"	5.625	(142.9)	3.625	(92.1)
5503201-600150	6.0"	1.5"	5.625	(142.9)	3.625	(92.1)
5503201-600200	6.0"	2.0"	5.625	(142.9)	3.625	(92.1)
5503201-600250	6.0"	2.5"	5.625	(142.9)	3.625	(92.1)
5503201-600300	6.0"	3.0"	5.625	(142.9)	3.625	(92.1)
5503201-600400	6.0"	4.0"	5.625	(142.9)	3.750	(95.3)



**DT-4.1.2-8 Clamp Joint: Reducing Tee**

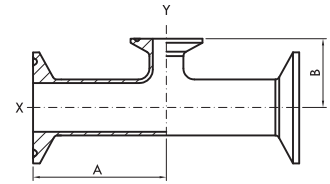
No.	Nominal Size, in.		A		B	
	X	Y	in. (mm)		in. (mm)	
5503302-050038	1/2"	3/8"	2.375	(60.3)	2.375	(60.3)
5503302-075050	3/4"	1/2"	2.500	(63.5)	2.500	(63.5)
5503302-100025	1.0"	1/4"	2.625	(66.7)	2.625	(66.7)
5503302-100050	1.0"	1/2"	2.625	(66.7)	2.625	(66.7)
5503302-100075	1.0"	3/4"	2.625	(66.7)	2.625	(66.7)
5503302-150050	1.5"	1/2"	2.875	(73.0)	2.875	(73.0)
5503302-150075	1.5"	3/4"	2.875	(73.0)	2.875	(73.0)
5503302-150100	1.5"	1.0"	2.875	(73.0)	2.875	(73.0)
5503302-200050	2.0"	1/2"	3.375	(85.7)	3.125	(79.4)
5503302-200075	2.0"	3/4"	3.375	(85.7)	3.125	(79.4)
5503302-200100	2.0"	1.0"	3.375	(85.7)	3.125	(79.4)
5503302-200150	2.0"	1.5"	3.375	(85.7)	3.125	(79.4)
5503302-250050	2.5"	1/2"	3.625	(92.1)	3.375	(85.7)
5503302-250075	2.5"	3/4"	3.625	(92.1)	3.375	(85.7)
5503302-250100	2.5"	1.0"	3.625	(92.1)	3.375	(85.7)
5503302-250150	2.5"	1.5"	3.625	(92.1)	3.375	(85.7)
5503302-250200	2.5"	2.0"	3.625	(92.1)	3.375	(85.7)
5503302-300050	3.0"	1/2"	3.875	(98.4)	3.625	(92.1)
5503302-300075	3.0"	3/4"	3.875	(98.4)	3.625	(92.1)
5503302-300100	3.0"	1.0"	3.875	(98.4)	3.625	(92.1)
5503302-300150	3.0"	1.5"	3.875	(98.4)	3.625	(92.1)
5503302-300200	3.0"	2.0"	3.875	(98.4)	3.625	(92.1)
5503302-300250	3.0"	2.5"	3.875	(98.4)	3.625	(92.1)
5503302-400050	4.0"	1/2"	4.750	(120.7)	4.125	(104.8)
5503302-400075	4.0"	3/4"	4.750	(120.7)	4.125	(104.8)
5503302-400100	4.0"	1.0"	4.750	(120.7)	4.125	(104.8)
5503302-400150	4.0"	1.5"	4.750	(120.7)	4.125	(104.8)
5503302-400200	4.0"	2.0"	4.750	(120.7)	4.375	(111.1)
5503302-400250	4.0"	2.5"	4.750	(120.7)	4.375	(111.1)
5503302-400300	4.0"	3.0"	4.750	(120.7)	4.375	(111.1)
5503302-600300	6.0"	3.0"	7.125	(181.0)	5.375	(136.5)
5503302-600400	6.0"	4.0"	7.125	(181.0)	5.750	(146.1)



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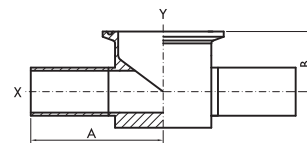
**DT-4.1.2-9 Clamp Joint: Short Outlet Reducing Tee**

No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5503200-075050	3/4"	1/2"	2.500	(63.5)	1.000	(25.4)
5503200-100050	1.0"	1/2"	2.625	(66.7)	1.125	(28.6)
5503200-100075	1.0"	3/4"	2.625	(66.7)	1.125	(28.6)
5503200-150050	1.5"	1/2"	2.875	(73.0)	1.375	(34.9)
5503200-150075	1.5"	3/4"	2.875	(73.0)	1.375	(34.9)
5503200-150100	1.5"	1.0"	2.875	(73.0)	1.375	(34.9)
5503200-200050	2.0"	1/2"	3.375	(85.7)	1.625	(41.3)
5503200-200075	2.0"	3/4"	3.375	(85.7)	1.625	(41.3)
5503200-200100	2.0"	1.0"	3.375	(85.7)	1.625	(41.3)
5503200-200150	2.0"	1.5"	3.375	(85.7)	1.625	(41.3)
5503200-250050	2.5"	1/2"	3.625	(92.1)	1.875	(47.6)
5503200-250075	2.5"	3/4"	3.625	(92.1)	1.875	(47.6)
5503200-250100	2.5"	1.0"	3.625	(92.1)	1.875	(47.6)
5503200-250150	2.5"	1.5"	3.625	(92.1)	1.875	(47.6)
5503200-250200	2.5"	2.0"	3.625	(92.1)	1.875	(47.6)
5503200-300050	3.0"	1/2"	3.875	(98.4)	2.125	(54.0)
5503200-300075	3.0"	3/4"	3.875	(98.4)	2.125	(54.0)
5503200-300100	3.0"	1.0"	3.875	(98.4)	2.125	(54.0)
5503200-300150	3.0"	1.5"	3.875	(98.4)	2.125	(54.0)
5503200-300200	3.0"	2.0"	3.875	(98.4)	2.125	(54.0)
5503200-300250	3.0"	2.5"	3.875	(98.4)	2.125	(54.0)
5503200-400050	4.0"	1/2"	4.750	(120.7)	2.625	(66.7)
5503200-400075	4.0"	3/4"	4.750	(120.7)	2.625	(66.7)
5503200-400100	4.0"	1.0"	4.750	(120.7)	2.625	(66.7)
5503200-400150	4.0"	1.5"	4.750	(120.7)	2.625	(66.7)
5503200-400200	4.0"	2.0"	4.750	(120.7)	2.625	(66.7)
5503200-400250	4.0"	2.5"	4.750	(120.7)	2.625	(66.7)
5503200-400300	4.0"	3.0"	4.750	(120.7)	2.625	(66.7)
5503200-600050	6.0"	1/2"	7.125	(181.0)	3.625	(92.1)
5503200-600075	6.0"	3/4"	7.125	(181.0)	3.625	(92.1)
5503200-600100	6.0"	1.0"	7.125	(181.0)	3.625	(92.1)
5503200-600150	6.0"	1.5"	7.125	(181.0)	3.625	(92.1)
5503200-600200	6.0"	2.0"	7.125	(181.0)	3.625	(92.1)
5503200-600250	6.0"	2.5"	7.125	(181.0)	3.625	(92.1)
5503200-600300	6.0"	3.0"	7.125	(181.0)	3.625	(92.1)
5503200-600400	6.0"	4.0"	7.125	(181.0)	3.375	(95.3)



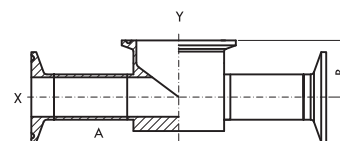
**DT-4.1.2-10 Automatic Tube Weld: Instrument Tee**

No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5503203-050150	1/2"	1.5"	2.500	(63.5)	0.875	(22.2)
5503203-075150	3/4"	1.5"	2.500	(63.5)	1.000	(25.4)
5503203-100150	1.0"	1.5"	2.750	(63.5)	1.125	(28.6)
5503203-050200	1/2"	2.0"	2.750	(69.9)	1.000	(25.4)
5503203-075200	3/4"	2.0"	2.750	(69.9)	1.125	(28.6)
5503203-100200	1.0"	2.0"	2.750	(69.9)	1.250	(31.8)
5503203-150200	1.5"	2.0"	2.750	(69.9)	1.500	(38.1)



**DT-4.1.2-11 Clamp Joint: Instrument Tee**

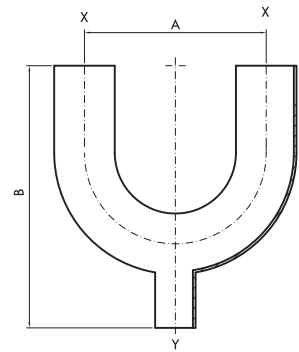
No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5503303-050150	1/2"	1.5"	3.000	(76.2)	0.875	(22.2)
5503303-075150	3/4"	1.5"	3.000	(76.2)	1.000	(25.4)
5503303-100150	1.0"	1.5"	3.000	(76.2)	1.125	(28.6)
5503303-050200	1/2"	2.0"	3.250	(82.6)	1.000	(25.4)
5503303-075200	3/4"	2.0"	3.250	(82.6)	1.125	(28.6)
5503303-100200	1.0"	2.0"	3.250	(82.6)	1.250	(31.8)
5503303-150200	1.5"	2.0"	3.250	(82.6)	1.500	(38.1)



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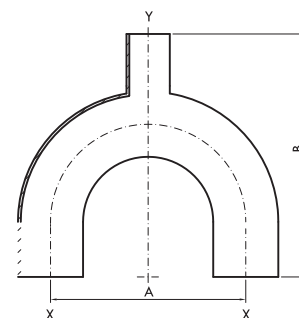
**Automatic Tube Weld: 180° Reducing Tee**

No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5506113-075050	3/4"	1/2"	4.500	(114.3)	4.992	(126.8)
5506113-100050	1.0"	1/2"	3.000	(76.2)	5.125	(130.2)
5506113-100075	1.0"	3/4"	3.000	(76.2)	5.125	(130.2)
5506113-000100	1.0"	1.0"	3.000	(76.2)	5.125	(130.2)
5506113-150050	1.5"	1/2"	4.500	(114.3)	6.874	(174.6)
5506113-150075	1.5"	3/4"	4.500	(114.3)	6.874	(174.6)
5506113-150100	1.5"	1.0"	4.500	(114.3)	6.874	(174.6)
5506113-000150	1.5"	1.5"	4.500	(114.3)	6.874	(174.6)
5506113-200050	2.0"	1/2"	6.000	(152.4)	7.622	(193.6)
5506113-200075	2.0"	3/4"	6.000	(152.4)	7.622	(193.6)
5506113-200100	2.0"	1.0"	6.000	(152.4)	7.622	(193.6)
5506113-200150	2.0"	1.5"	6.000	(152.4)	7.622	(193.6)
5506113-000200	2.0"	2.0"	6.000	(152.4)	7.622	(193.6)
5506113-250050	2.5"	1/2"	7.500	(190.5)	8.625	(219.1)
5506113-250075	2.5"	3/4"	7.500	(190.5)	8.625	(219.1)
5506113-250100	2.5"	1.0"	7.500	(190.5)	8.625	(219.1)
5506113-250150	2.5"	1.5"	7.500	(190.5)	8.625	(219.1)
5506113-250200	2.5"	2.0"	7.500	(190.5)	8.625	(219.1)
5506113-000250	2.5"	2.5"	7.500	(190.5)	8.625	(219.1)
5506113-300050	3.0"	1/2"	9.000	(228.6)	9.625	(244.5)
5506113-300075	3.0"	3/4"	9.000	(228.6)	9.625	(244.5)
5506113-300100	3.0"	1.0"	9.000	(228.6)	9.625	(244.5)
5506113-300150	3.0"	1.5"	9.000	(228.6)	9.625	(244.5)
5506113-300200	3.0"	2.0"	9.000	(228.6)	9.625	(244.5)
5506113-300250	3.0"	2.5"	12.000	(304.8)	9.625	(244.5)
5506113-000300	3.0"	3.0"	12.000	(304.8)	9.625	(244.5)
5506113-400050	4.0"	1/2"	12.000	(304.8)	12.125	(308.0)
5506113-400075	4.0"	3/4"	12.000	(304.8)	12.125	(308.0)
5506113-400100	4.0"	1.0"	12.000	(304.8)	12.125	(308.0)
5506113-400150	4.0"	1.5"	12.000	(304.8)	12.381	(314.5)
5506113-400200	4.0"	2.0"	12.000	(304.8)	12.381	(314.5)
5506113-400250	4.0"	2.5"	12.000	(304.8)	12.381	(314.5)
5506113-400300	4.0"	3.0"	12.000	(304.8)	12.381	(314.5)


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**Automatic Tube Weld: 180° Reducing Tee**

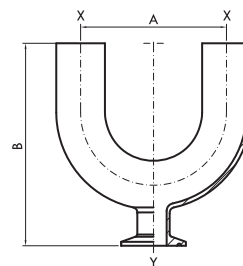
No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5506109-100050	1.0"	1/2"	3.000	(76.2)	4.271	(108.5)
5506109-100075	1.0"	3/4"	3.000	(76.2)	4.271	(108.5)
5506109-000100	1.0"	1.0"	3.000	(76.2)	4.271	(108.5)
5506109-150050	1.5"	1/2"	4.500	(114.3)	6.838	(173.7)
5506109-150075	1.5"	3/4"	4.500	(114.3)	6.838	(173.7)
5506109-150100	1.5"	1.0"	4.500	(114.3)	6.854	(174.1)
5506109-000150	1.5"	1.5"	4.500	(114.3)	6.854	(174.1)
5506109-200050	2.0"	1/2"	6.000	(152.4)	8.059	(204.7)
5506109-200075	2.0"	3/4"	6.000	(152.4)	8.059	(204.7)
5506109-200100	2.0"	1.0"	6.000	(152.4)	8.130	(206.5)
5506109-200150	2.0"	1.5"	6.000	(152.4)	8.130	(206.5)
5506109-000200	2.0"	2.0"	6.000	(152.4)	8.130	(206.5)
5506109-250050	2.5"	1/2"	7.500	(190.5)	9.066	(230.3)
5506109-250075	2.5"	3/4"	7.500	(190.5)	9.066	(230.3)
5506109-250100	2.5"	1.0"	7.500	(190.5)	9.066	(232.2)
5506109-250150	2.5"	1.5"	7.500	(190.5)	9.066	(232.2)
5506109-250200	2.5"	2.0"	7.500	(190.5)	9.066	(232.2)
5506109-000250	2.5"	2.5"	7.500	(190.5)	9.066	(232.2)
5506109-300050	3.0"	1/2"	9.000	(228.6)	10.059	(255.5)
5506109-300075	3.0"	3/4"	9.000	(228.6)	10.059	(255.5)
5506109-300100	3.0"	1.0"	9.000	(228.6)	10.133	(257.4)
5506109-300150	3.0"	1.5"	9.000	(228.6)	10.133	(257.4)
5506109-300200	3.0"	2.0"	9.000	(228.6)	10.133	(257.4)
5506109-300250	3.0"	2.5"	9.000	(228.6)	10.133	(257.4)
5506109-000300	3.0"	3.0"	9.000	(228.6)	10.133	(257.4)
5506109-400050	4.0"	1/2"	12.000	(304.8)	13.059	(331.7)
5506109-400075	4.0"	3/4"	12.000	(304.8)	13.059	(331.7)
5506109-400100	4.0"	1.0"	12.000	(304.8)	13.133	(333.6)
5506109-400150	4.0"	1.5"	12.000	(304.8)	13.133	(333.6)
5506109-400200	4.0"	2.0"	12.000	(304.8)	13.133	(333.6)
5506109-400250	4.0"	2.5"	12.000	(304.8)	13.133	(333.6)
5506109-400300	4.0"	3.0"	12.000	(304.8)	13.133	(333.6)
5506109-000400	4.0"	4.0"	12.000	(304.8)	13.133	(333.6)



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**Automatic Tube Weld: Shrot Outlet Clamp,Joint, 180°Reducing Tee**

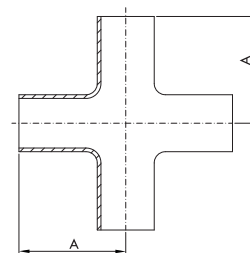
No.	Nominal Size,in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5506309-000075	3/4"	3/4"	4.500	(114.3)	3.897	(99.0)
5506309-100050	1.0"	1/2"	3.000	(76.2)	4.019	(102.1)
5506309-100075	1.0"	3/4"	3.000	(76.2)	4.019	(102.1)
5506309-000100	1.0"	1.0"	3.000	(76.2)	4.019	(102.1)
5506309-150050	1.5"	1/2"	4.500	(114.3)	5.838	(148.3)
5506309-150075	1.5"	3/4"	4.500	(114.3)	5.838	(148.3)
5506309-150100	1.5"	1.0"	4.500	(114.3)	5.838	(148.5)
5506309-000150	1.5"	1.5"	4.500	(114.3)	5.838	(148.5)
5506309-200050	2.0"	1/2"	6.000	(152.4)	6.559	(166.6)
5506309-200075	2.0"	3/4"	6.000	(152.4)	6.559	(166.6)
5506309-200100	2.0"	1.0"	6.000	(152.4)	6.629	(168.4)
5506309-200150	2.0"	1.5"	6.000	(152.4)	6.629	(168.4)
5506309-000200	2.0"	2.0"	6.000	(152.4)	6.629	(168.4)
5506309-250050	2.5"	1/2"	7.500	(190.5)	7.562	(192.1)
5506309-250075	2.5"	3/4"	7.500	(190.5)	7.562	(192.1)
5506309-250100	2.5"	1.0"	7.500	(190.5)	7.637	(194.0)
5506309-250150	2.5"	1.5"	7.500	(190.5)	7.637	(194.0)
5506309-250200	2.5"	2.0"	7.500	(190.5)	7.637	(194.0)
5506309-000250	2.5"	2.5"	7.500	(190.5)	7.637	(194.0)
5506309-300050	3.0"	1/2"	9.000	(228.6)	8.559	(217.4)
5506309-300075	3.0"	3/4"	9.000	(228.6)	8.559	(217.4)
5506309-300100	3.0"	1.0"	9.000	(228.6)	8.633	(219.3)
5506309-300150	3.0"	1.5"	9.000	(228.6)	8.633	(219.3)
5506309-300200	3.0"	2.0"	9.000	(228.6)	8.633	(219.3)
5506309-300250	3.5"	2.5"	9.000	(228.6)	8.633	(219.3)
5506309-000300	3.0"	3.0"	9.000	(228.6)	8.633	(219.3)
5506309-400050	4.0"	1/2"	12.000	(304.8)	11.059	(280.9)
5506309-400075	4.0"	3/4"	12.000	(304.8)	11.059	(280.9)
5506309-400100	4.0"	1.0"	12.000	(304.8)	11.133	(282.8)
5506309-400150	4.0"	1.5"	12.000	(304.8)	11.133	(282.8)
5506309-400200	4.0"	2.0"	12.000	(304.8)	11.133	(282.8)
5506309-400250	4.0"	2.5"	12.000	(304.8)	11.133	(282.8)
5506309-400300	4.0"	3.0"	12.000	(304.8)	11.133	(282.8)
5506309-400400	4.0"	4.0"	12.000	(304.8)	11.255	(285.9)





**DT-4.1.2-1 Automatic Tube Weld: Straight Cross**

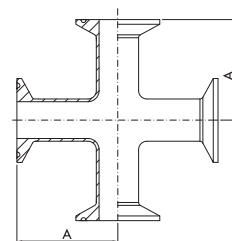
No.	Nominal Size,in.	A in.(mm)
5504102-000050	1/2"	1.875 (47.6)
5504102-000075	3/4"	2.000 (50.8)
5504102-000100	1.0"	2.125 (54.0)
5504102-000150	1.5"	2.375 (60.3)
5504102-000200	2.0"	2.875 (73.0)
5504102-000250	2.5"	3.125 (79.4)
5504102-000300	3.0"	3.375 (85.7)
5504102-000400	4.0"	4.125 (104.8)
5504102-000600	6.0"	5.625 (142.9)



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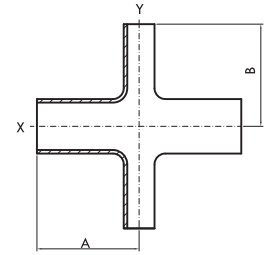
**DT-4.1.2-4 Clamp Joint: Straight Cross**

No.	Nominal Size,in.	A in.(mm)
5504302-000050	1/2"	2.250 (57.2)
5504302-000075	3/4"	2.375 (60.3)
5504302-000100	1.0"	2.625 (66.7)
5504302-000150	1.5"	2.875 (73.0)
5504302-000200	2.0"	3.375 (85.7)
5504302-000250	2.5"	3.625 (92.1)
5504302-000300	3.0"	3.875 (98.4)
5504302-000400	4.0"	4.750 (120.7)
5504302-000600	6.0"	7.125 (181.0)



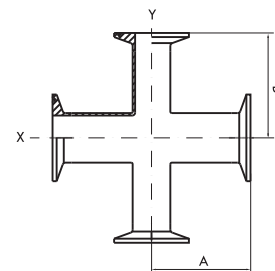
**Automatic Tube Weld: Reducing Cross**

No.	Nominal Size, in.		A		B	
	X	Y	in. (mm)		in. (mm)	
5504102-075050	3/4"	1/2"	2.000	(50.8)	2.000	(50.8)
5504102-100050	1.0"	1/2"	2.125	(54.0)	2.125	(54.0)
5504102-100075	1.0"	3/4"	2.125	(54.0)	2.125	(54.0)
5504102-150050	1.5"	1/2"	2.375	(60.3)	2.375	(60.3)
5504102-150075	1.5"	3/4"	2.375	(60.3)	2.375	(60.3)
5504102-150100	1.5"	1.0"	2.375	(60.3)	2.375	(60.3)
5504102-200050	2.0"	1/2"	2.875	(73.0)	2.625	(66.7)
5504102-200075	2.0"	3/4"	2.875	(73.0)	2.625	(66.7)
5504102-200100	2.0"	1.0"	2.875	(73.0)	2.625	(66.7)
5504102-200150	2.0"	1.5"	2.875	(73.0)	2.625	(66.7)
5504102-250050	2.5"	1/2"	3.125	(79.4)	2.875	(73.0)
5504102-250075	2.5"	3/4"	3.125	(79.4)	2.875	(73.0)
5504102-250100	2.5"	1.0"	3.125	(79.4)	2.875	(73.0)
5504102-250150	2.5"	1.5"	3.125	(79.4)	2.875	(73.0)
5504102-250200	2.5"	2.0"	3.125	(79.4)	2.875	(73.0)
5504102-300050	3.0"	1/2"	3.375	(85.7)	3.125	(79.4)
5504102-300075	3.0"	3/4"	3.375	(85.7)	3.125	(79.4)
5504102-300100	3.0"	1.0"	3.375	(85.7)	3.125	(79.4)
5504102-300150	3.0"	1.5"	3.375	(85.7)	3.125	(79.4)
5504102-300200	3.0"	2.0"	3.375	(85.7)	3.125	(79.4)
5504102-300250	3.0"	2.5"	3.375	(85.7)	3.125	(79.4)
5504102-400050	4.0"	1/2"	4.125	(104.8)	3.625	(92.1)
5504102-400075	4.0"	3/4"	4.125	(104.8)	3.625	(92.1)
5504102-400100	4.0"	1.0"	4.125	(104.8)	3.625	(92.1)
5504102-400150	4.0"	1.5"	4.125	(104.8)	3.625	(92.1)
5504102-400200	4.0"	2.0"	4.125	(104.8)	3.875	(98.4)
5504102-400250	4.0"	2.5"	4.125	(104.8)	3.875	(98.4)
5504102-400300	4.0"	3.0"	4.125	(104.8)	3.875	(98.4)
5504102-600300	6.0"	3.0"	5.625	(142.9)	5.125	(130.2)
5504102-600400	6.0"	4.0"	5.625	(142.9)	5.125	(130.2)



**Clamp Joint: Straight Cross**

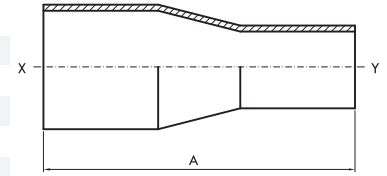
No.	Nominal Size, in.		A		B	
	X	Y	in.(mm)		in.(mm)	
5504302-07550	3/4"	1/2"	2.500	(63.5)	2.500	(63.5)
5504302-01050	1.0"	1/2"	2.625	(66.7)	2.625	(66.7)
5504302-01075	1.0"	3/4"	2.625	(66.7)	2.625	(66.7)
5504302-01550	1.5"	1/2"	2.875	(73.0)	2.875	(73.0)
5504302-01575	1.5"	3/4"	2.875	(73.0)	2.875	(73.0)
5504302-01510	1.5"	1.0"	2.875	(73.0)	2.875	(73.0)
5504302-02050	2.0"	1/2"	3.375	(85.7)	3.125	(79.4)
5504302-02075	2.0"	3/4"	3.375	(85.7)	3.125	(79.4)
5504302-02010	2.0"	1.0"	3.375	(85.7)	3.125	(79.4)
5504302-02015	2.0"	1.5"	3.375	(85.7)	3.125	(79.4)
5504302-02510	2.5"	1.0"	3.625	(92.1)	3.375	(85.7)
5504302-02515	2.5"	1.5"	3.625	(92.1)	3.375	(85.7)
5504302-02520	2.5"	2.0"	3.625	(92.1)	3.375	(85.7)
5504302-03010	3.0"	1.0"	3.875	(98.4)	3.625	(92.1)
5504302-03015	3.0"	1.5"	3.875	(98.4)	3.625	(92.1)
5504302-03020	3.0"	2.0"	3.875	(98.4)	3.875	(98.4)
5504302-03025	3.0"	2.5"	3.875	(98.4)	3.875	(98.4)
5504302-04010	4.0"	1.0"	4.750	(120.7)	4.125	(104.8)
5504302-04015	4.0"	1.5"	4.750	(120.7)	4.125	(104.8)
5504302-04020	4.0"	2.0"	4.750	(120.7)	4.375	(111.1)
5504302-04025	4.0"	2.5"	4.750	(120.7)	4.375	(111.1)
5504302-04030	4.0"	3.0"	4.750	(120.7)	4.375	(111.1)
5504302-06030	6.0"	3.0"	7.125	(181.0)	5.375	(136.5)
5504302-06040	6.0"	4.0"	7.125	(181.0)	5.750	(146.1)



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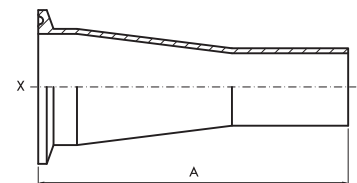
**DT-4.1.3-1(a) Automatic Tube Weld: Concentric**

No.	Nominal Size, in.		A	
	X	Y	in. (mm)	
5505004-050025	1/2"	1/4"	3.250	(82.6)
5505004-005038	1/2"	3/8"	3.250	(82.6)
5505004-075038	3/4"	3/8"	3.250	(82.6)
5505004-075050	3/4"	1/2"	4.000	(101.6)
5505004-100038	1.0"	3/8"	4.500	(114.3)
5505004-100050	1.0"	1/2"	4.500	(114.3)
5505004-100075	1.0"	3/4"	4.000	(101.6)
5505004-150038	1.5"	3/8"	6.000	(152.4)
5505004-150050	1.5"	1/2"	5.550	(139.7)
5505004-150075	1.5"	3/4"	5.000	(127.0)
5505004-150100	1.5"	1.0"	5.000	(127.0)
5505004-200050	2.0"	1/2"	7.750	(196.9)
5505004-200075	2.0"	3/4"	7.250	(184.2)
5505004-200100	2.0"	1.0"	7.250	(184.2)
5505004-200150	2.0"	1.5"	5.250	(133.4)
5505004-250050	2.5"	1/2"	9.750	(247.7)
5505004-250075	2.5"	3/4"	9.250	(235.0)
5505004-050025	2.5"	1.0"	9.250	(235.0)
5505004-250150	2.5"	1.5"	7.250	(184.2)
5505004-250200	2.5"	2.0"	5.550	(139.7)
5505004-300050	3.0"	1/2"	13.250	(336.6)
5505004-300075	3.0"	3/4"	12.250	(311.2)
5505004-300100	3.0"	1.0"	11.250	(285.8)
5505004-300150	3.0"	1.5"	9.250	(235.0)
5505004-300200	3.0"	2.0"	7.500	(190.5)
5505004-300250	3.0"	2.5"	5.550	(139.7)
5505004-400050	4.0"	1/2"	17.500	(444.5)
5505004-400075	4.0"	3/4"	16.500	(419.1)
5505004-400100	4.0"	1.0"	15.500	(393.7)
5505004-400150	4.0"	1.5"	13.500	(342.9)
5505004-400200	4.0"	2.0"	11.750	(298.5)
5505004-400250	4.0"	2.5"	9.750	(247.7)
5505004-400300	4.0"	3.0"	7.750	(196.9)
5505004-600300	6.0"	3.0"	10.000	(254.0)
5505004-600400	6.0"	4.0"	10.000	(254.0)



**DT-4.1.3-2(a) Clamp Joint: Tube Weld Concentric**

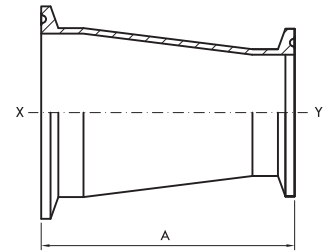
No.	Nominal Size, in.		A in.(mm)
	X	Y	
5505201-075050	3/4"	1/2"	3.000 (76.2)
5505201-100050	1.0"	1/2"	3.500 (88.9)
5505201-100075	1.0"	3/4"	3.000 (76.2)
5505201-150050	1.5"	1/2"	4.500 (114.3)
5505201-150075	1.5"	3/4"	4.000 (101.6)
5505201-150100	1.5"	1.0"	4.000 (101.6)
5505201-200050	2.0"	1/2"	6.500 (165.1)
5505201-200075	2.0"	3/4"	6.000 (152.4)
5505201-200100	2.0"	1.0"	6.000 (152.4)
5505201-200150	2.0"	1.5"	4.000 (101.6)
5505201-250100	2.5"	1.0"	8.000 (203.2)
5505201-250150	2.5"	1.5"	6.000 (152.4)
5505201-250200	2.5"	2.0"	4.248 (107.9)
5505201-300100	3.0"	1.0"	10.000 (254.0)
5505201-300150	3.0"	1.5"	8.000 (203.2)
5505201-300200	3.0"	2.0"	6.250 (158.8)
5505201-300250	3.0"	2.5"	4.250 (108.0)
5505201-400100	4.0"	1.0"	14.125 (358.8)
5505201-400150	4.0"	1.5"	12.125 (308.0)
5505201-400200	4.0"	2.0"	10.375 (263.5)
5505201-400250	4.0"	2.5"	8.375 (212.7)
5505201-400300	4.0"	3.0"	6.375 (161.9)
5505201-600300	6.0"	3.0"	9.000 (228.6)
5505201-600400	6.0"	4.0"	9.000 (228.6)



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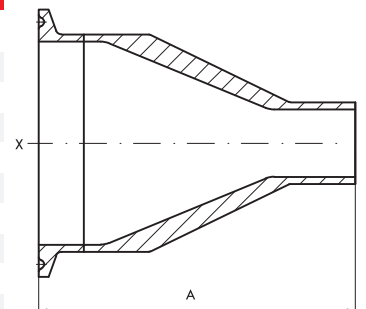
**DT-4.1.3-3(a) Clamp Joint: Concentric**

No.	Nominal Size, in.		A in. (mm)
	X	Y	
5505200-075050	3/4"	1/2"	2.000 (50.8)
5505200-100050	1.0"	1/2"	2.500 (63.5)
5505200-100075	1.0"	3/4"	2.000 (50.8)
5505200-150050	1.5"	1/2"	3.500 (88.9)
5505200-150075	1.5"	3/4"	3.000 (76.2)
5505200-150100	1.5"	1.0"	3.000 (76.2)
5505200-200050	2.0"	1/2"	5.500 (139.7)
5505200-200075	2.0"	3/4"	5.000 (127.0)
5505200-200100	2.0"	1.0"	5.000 (127.0)
5505200-200150	2.0"	1.5"	3.000 (76.2)
5505200-250050	2.5"	1/2"	7.500 (190.5)
5505200-250075	2.5"	3/4"	7.000 (177.8)
5505200-250100	2.5"	1.0"	7.000 (177.8)
5505200-250150	2.5"	1.5"	5.000 (127.0)
5505200-250200	2.5"	2.0"	3.000 (76.2)
5505200-300100	3.0"	1.0"	9.000 (228.6)
5505200-300150	3.0"	1.5"	7.000 (177.8)
5505200-300200	3.0"	2.0"	5.000 (127.0)
5505200-300250	3.0"	2.5"	3.000 (76.2)
5505200-400100	4.0"	1.0"	13.125 (333.4)
5505200-400150	4.0"	1.5"	11.125 (282.6)
5505200-400200	4.0"	2.0"	9.125 (231.8)
5505200-400250	4.0"	2.5"	7.125 (181.0)
5505200-400300	4.0"	3.0"	5.125 (130.2)
5505200-600300	6.0"	3.0"	7.500 (190.5)
5505200-600400	6.0"	4.0"	7.625 (193.7)



**DT-4.1.3-2(b) Clamp Joint: Tube Weld Concentric**

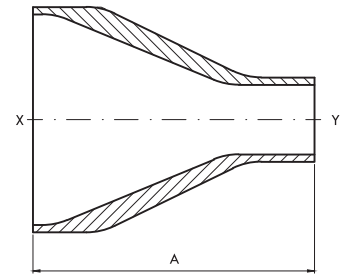
No.	Nominal Size, in.		A in. (mm)
	X	Y	
5505202-038025	3/8"	1/4"	2.125 (54.0)
5505202-050025	1/2"	1/4"	2.375 (60.3)
5505202-050038	1/2"	3/8"	2.375 (60.3)
5505202-075038	3/4"	3/8"	2.500 (63.5)
5505202-075050	3/4"	1/2"	2.625 (66.7)
5505202-100038	1.0"	3/8"	2.750 (69.9)
5505202-100050	1.0"	1/2"	3.000 (76.2)
5505202-100075	1.0"	3/4"	2.625 (66.7)
5505202-150038	1.5"	3/8"	3.500 (88.9)
5505202-150050	1.5"	1/2"	3.250 (82.6)
5505202-150075	1.5"	3/4"	3.500 (88.9)
5505202-150100	1.5"	1.0"	3.000 (76.2)
5505202-200050	2.0"	1/2"	4.105 (104.3)
5505202-200075	2.0"	3/4"	3.875 (98.4)
5505202-200100	2.0"	1.0"	3.875 (98.4)
5505202-200150	2.0"	1.5"	3.000 (76.2)
5505202-250050	2.5"	1/2"	5.378 (136.6)
5505202-250075	2.5"	3/4"	5.125 (130.2)
5505202-250100	2.5"	1.0"	5.125 (130.2)
5505202-250150	2.5"	1.5"	3.875 (98.4)
5505202-250200	2.5"	2.0"	3.000 (76.2)
5505202-300050	3.0"	1/2"	7.125 (181.0)
5505202-300075	3.0"	3/4"	6.625 (168.3)
5505202-300100	3.0"	1.0"	6.125 (155.6)
5505202-300150	3.0"	1.5"	4.750 (120.7)
5505202-300200	3.0"	2.0"	3.875 (98.4)
5505202-300250	3.0"	2.5"	3.125 (79.4)
5505202-400050	4.0"	1/2"	8.995 (228.5)
5505202-400075	4.0"	3/4"	8.750 (222.2)
5505202-400100	4.0"	1.0"	7.995 (203.1)
5505202-400150	4.0"	1.5"	6.995 (177.7)
5505202-400200	4.0"	2.0"	5.750 (146.1)
5505202-400250	4.0"	2.5"	4.875 (123.8)
5505202-400300	4.0"	3.0"	4.500 (114.3)
5505202-600300	6.0"	3.0"	8.000 (203.2)
5505202-600400	6.0"	4.0"	6.375 (161.9)



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**DT-4.1.3-1(b) Automatic Tube Weld: Concentric**

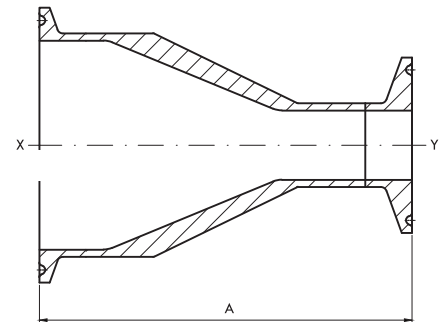
No.	Nominal Size, in.		A in.(mm)
	X	Y	
5505005-038025	3/8"	1/4"	1.625 (41.3)
5505005-050025	1/2"	1/4"	1.875 (47.6)
5505005-050038	1/2"	3/8"	1.875 (47.6)
5505005-075038	3/4"	3/8"	2.000 (50.8)
5505005-075050	3/4"	1/2"	2.125 (54.0)
5505005-100038	1.0"	3/8"	2.250 (57.2)
5505005-100050	1.0"	1/2"	2.500 (63.5)
5505005-100075	1.0"	3/4"	2.125 (54.0)
5505005-100038	1.5"	3/8"	3.000 (76.2)
5505005-150050	1.5"	1/2"	2.750 (69.9)
5505005-150075	1.5"	3/4"	3.000 (76.2)
5505005-150100	1.5"	1.0"	2.500 (63.5)
5505005-200050	2.0"	1/2"	3.606 (91.6)
5505005-200075	2.0"	3/4"	3.375 (85.7)
5505005-200100	2.0"	1.0"	3.375 (85.7)
5505005-200150	2.0"	1.5"	2.500 (63.5)
5505005-250050	2.5"	1/2"	4.878 (123.9)
5505005-250075	2.5"	3/4"	4.625 (117.5)
5505005-250100	2.5"	1.0"	4.625 (117.5)
5505005-250150	2.5"	1.5"	3.375 (85.7)
5505005-250200	2.5"	2.0"	2.500 (63.5)
5505005-300050	3.0"	1/2"	6.625 (168.3)
5505005-300075	3.0"	3/4"	6.125 (155.6)
5505005-300100	3.0"	1.0"	5.625 (142.9)
5505005-300150	3.0"	1.5"	4.255 (108.0)
5505005-300200	3.0"	2.0"	3.375 (85.7)
5505005-300250	3.0"	2.5"	2.625 (66.7)
5505005-400050	4.0"	1/2"	8.375 (212.7)
5505005-400075	4.0"	3/4"	8.125 (206.4)
5505005-400100	4.0"	1.0"	7.375 (187.3)
5505005-400150	4.0"	1.5"	6.375 (161.9)
5505005-400200	4.0"	2.0"	5.125 (130.2)
5505005-400250	4.0"	2.5"	4.250 (108.0)
5505005-400300	4.0"	3.0"	3.875 (98.4)
5505005-600300	6.0"	3.0"	7.250 (184.2)
5505005-600400	6.0"	4.0"	5.625 (142.9)





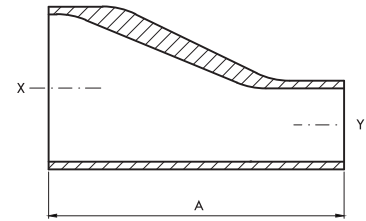
**DT-4.1.3-3(b) Clamp Joint: Concentric**

No.	Nominal Size, in.		A	
	X	Y	in. (mm)	
5505203-038025	3/8"	1/4"	2.625	(66.7)
5505203-050025	1/2"	1/4"	2.875	(73.0)
5505203-050038	1/2"	3/8"	2.875	(73.0)
5505203-075038	3/4"	3/8"	3.000	(76.2)
5505203-075050	3/4"	1/2"	3.125	(79.4)
5505203-100038	1.0"	3/8"	3.252	(82.6)
5505203-100050	1.0"	1/2"	3.500	(88.9)
5505203-100075	1.0"	3/4"	3.125	(79.4)
5505203-150038	1.5"	3/8"	4.000	(101.6)
5505203-150050	1.5"	1/2"	3.752	(95.3)
5505203-150075	1.5"	3/4"	4.000	(101.6)
5505203-150100	1.5"	1.0"	3.500	(88.9)
5505203-200050	2.0"	1/2"	4.606	(117.0)
5505203-200075	2.0"	3/4"	4.375	(111.1)
5505203-200100	2.0"	1.0"	4.375	(111.1)
5505203-200150	2.0"	1.5"	3.500	(88.9)
5505203-250050	2.5"	1/2"	5.878	(149.3)
5505203-250075	2.5"	3/4"	5.626	(142.9)
5505203-250100	2.5"	1.0"	5.626	(142.9)
5505203-250150	2.5"	1.5"	4.375	(111.1)
5505203-250200	2.5"	2.0"	3.500	(88.9)
5505203-300050	3.0"	1/2"	7.626	(193.7)
5505203-300075	3.0"	3/4"	7.126	(181.0)
5505203-300100	3.0"	1.0"	6.626	(168.3)
5505203-300150	3.0"	1.5"	5.250	(133.4)
5505203-300200	3.0"	2.0"	4.375	(111.1)
5505203-300250	3.0"	2.5"	3.626	(92.1)
5505203-400050	4.0"	1/2"	9.496	(241.2)
5505203-400075	4.0"	3/4"	9.248	(234.9)
5505203-400100	4.0"	1.0"	8.500	(215.8)
5505203-400150	4.0"	1.5"	7.496	(190.4)
5505203-400200	4.0"	2.0"	6.250	(158.8)
5505203-400250	4.0"	2.5"	5.375	(136.5)
5505203-400300	4.0"	3.0"	5.000	(127.0)
5505203-600300	6.0"	3.0"	8.500	(215.9)
5505203-600400	6.0"	4.0"	7.000	(177.8)



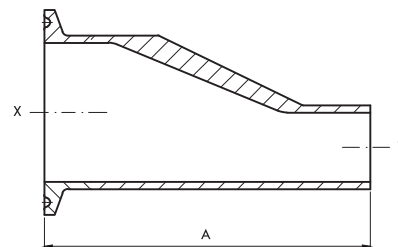
**DT-4.1.3-1(b) Automatic Tube Weld: Eccentric Reducer**

No.	Nominal Size, in.		A	
	X	Y	in. (mm)	
5505105-038025	3/8"	1/4"	1.625	(41.3)
5505105-050025	1/2"	1/4"	1.875	(47.6)
5505105-050038	1/2"	3/8"	1.875	(47.6)
5505105-075038	3/4"	3/8"	2.000	(50.8)
5505105-075050	3/4"	1/2"	2.125	(54.0)
5505105-100038	1.0"	3/8"	2.250	(57.2)
5505105-100050	1.0"	1/2"	2.500	(63.5)
5505105-100075	1.0"	3/4"	2.125	(54.0)
5505105-150038	1.5"	3/8"	3.000	(76.2)
5505105-150050	1.5"	1/2"	2.750	(69.9)
5505105-150075	1.5"	3/4"	3.000	(76.2)
5505105-150100	1.5"	1.0"	2.500	(63.5)
5505105-200050	2.0"	1/2"	3.606	(91.6)
5505105-200075	2.0"	3/4"	3.375	(85.7)
5505105-200100	2.0"	1.0"	3.375	(85.7)
5505105-200150	2.0"	1.5"	2.500	(63.5)
5505105-250050	2.5"	1/2"	4.878	(123.9)
5505105-250075	2.5"	3/4"	4.625	(117.5)
5505105-250100	2.5"	1.0"	4.625	(117.5)
5505105-250150	2.5"	1.5"	3.375	(85.7)
5505105-250200	2.5"	2.0"	2.500	(63.5)
5505105-300050	3.0"	1/2"	6.625	(168.3)
5505105-300075	3.0"	3/4"	6.125	(155.6)
5505105-300100	3.0"	1.0"	5.625	(142.9)
5505105-300150	3.0"	1.5"	4.255	(108.0)
5505105-300200	3.0"	2.0"	3.375	(85.7)
5505105-300250	3.0"	2.5"	2.625	(66.7)
5505105-400050	4.0"	1/2"	8.375	(212.7)
5505105-400075	4.0"	3/4"	8.125	(206.4)
5505105-400100	4.0"	1.0"	7.375	(187.3)
5505105-400150	4.0"	1.5"	6.375	(161.9)
5505105-400200	4.0"	2.0"	5.125	(130.2)
5505105-400250	4.0"	2.5"	4.250	(108.0)
5505105-400300	4.0"	3.0"	3.875	(98.4)
5505105-600300	6.0"	3.0"	7.250	(184.2)
5505105-600400	6.0"	4.0"	5.625	(142.9)



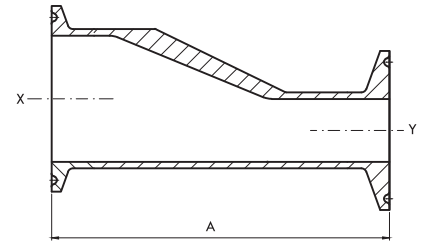
**DT-4.1.3-2(b) Clamp Joint: Tube Weld Eccentric Reducer**

No.	Nominal Size, in.		A in. (mm)
	X	Y	
5505302-038025	3/8"	1/4"	2.125 (54.0)
5505302-050025	1/2"	1/4"	2.375 (60.3)
5505302-050038	1/2"	3/8"	2.375 (60.3)
5505302-075038	3/4"	3/8"	2.500 (63.5)
5505302-075050	3/4"	1/2"	2.625 (66.7)
5505302-100038	1.0"	3/8"	2.750 (69.9)
5505302-100050	1.0"	1/2"	3.000 (76.2)
5505302-100075	1.0"	3/4"	2.625 (66.7)
5505302-150038	1.5"	3/8"	3.500 (88.9)
5505302-150050	1.5"	1/2"	3.250 (82.6)
5505302-150075	1.5"	3/4"	3.500 (88.9)
5505302-150100	1.5"	1.0"	3.000 (76.2)
5505302-200050	2.0"	1/2"	4.105 (104.3)
5505302-200075	2.0"	3/4"	3.875 (98.4)
5505302-200100	2.0"	1.0"	3.875 (98.4)
5505302-200150	2.0"	1.5"	3.000 (76.2)
5505302-250050	2.5"	1/2"	5.378 (136.6)
5505302-250075	2.5"	3/4"	5.125 (130.2)
5505302-250100	2.5"	1.0"	5.125 (130.2)
5505302-250150	2.5"	1.5"	3.875 (98.4)
5505302-250200	2.5"	2.0"	3.000 (76.2)
5505302-300050	3.0"	1/2"	7.125 (181.0)
5505302-300075	3.0"	3/4"	6.625 (168.3)
5505302-300100	3.0"	1.0"	6.125 (155.6)
5505302-300150	3.0"	1.5"	4.750 (120.7)
5505302-300200	3.0"	2.0"	3.875 (98.4)
5505302-300250	3.0"	2.5"	3.125 (79.4)
5505302-400050	4.0"	1/2"	8.995 (228.5)
5505302-400075	4.0"	3/4"	8.750 (222.2)
5505302-400100	4.0"	1.0"	7.995 (203.1)
5505302-400150	4.0"	1.5"	6.995 (177.7)
5505302-400200	4.0"	2.0"	5.750 (146.1)
5505302-400250	4.0"	2.5"	4.875 (123.8)
5505302-400300	4.0"	3.0"	4.500 (114.3)
5505302-600300	6.0"	3.0"	8.000 (203.2)
5505302-600400	6.0"	4.0"	6.375 (161.9)



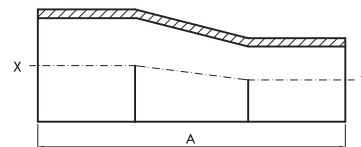
**DT-4.1.3-3(b) Clamp Joint: Eccentric Reducer**

No.	Nominal Size, in.		A	
	X	Y	in. (mm)	
5505303-038025	3/8"	1/4"	1.625	(66.7)
5505303-050025	1/2"	1/4"	1.875	(73.0)
5505303-050038	1/2"	3/8"	1.875	(73.0)
5505303-075038	3/4"	3/8"	2.000	(76.2)
5505303-075050	3/4"	1/2"	2.125	(79.4)
5505303-100038	1.0"	3/8"	2.250	(82.6)
5505303-100050	1.0"	1/2"	2.500	(88.9)
5505303-100075	1.0"	3/4"	2.125	(79.4)
5505303-150038	1.5"	3/8"	3.000	(101.6)
5505303-150050	1.5"	1/2"	2.750	(95.3)
5505303-150075	1.5"	3/4"	3.000	(101.6)
5505303-150100	1.5"	1.0"	2.500	(88.9)
5505303-200050	2.0"	1/2"	3.606	(117.0)
5505303-200075	2.0"	3/4"	3.375	(111.1)
5505303-200100	2.0"	1.0"	3.375	(111.1)
5505303-200150	2.0"	1.5"	2.500	(88.9)
5505303-250050	2.5"	1/2"	4.878	(149.3)
5505303-250075	2.5"	3/4"	4.625	(142.9)
5505303-250100	2.5"	1.0"	4.625	(142.9)
5505303-250150	2.5"	1.5"	3.375	(111.1)
5505303-250200	2.5"	2.0"	2.500	(88.9)
5505303-300050	3.0"	1/2"	6.625	(193.7)
5505303-300075	3.0"	3/4"	6.125	(181.0)
5505303-300100	3.0"	1.0"	5.625	(168.3)
5505303-300150	3.0"	1.5"	4.255	(133.4)
5505303-300200	3.0"	2.0"	3.375	(111.1)
5505303-300250	3.0"	2.5"	2.625	(92.1)
5505303-400050	4.0"	1/2"	8.375	(241.2)
5505303-400075	4.0"	3/4"	8.125	(234.9)
5505303-400100	4.0"	1.0"	7.375	(215.8)
5505303-400150	4.0"	1.5"	6.375	(190.4)
5505303-400200	4.0"	2.0"	5.125	(158.8)
5505303-400250	4.0"	2.5"	4.250	(136.5)
5505303-400300	4.0"	3.0"	3.875	(127.0)
5505303-600300	6.0"	3.0"	7.250	(215.9)
5505303-600400	6.0"	4.0"	5.625	(177.8)



**DT-4.1.3-1(a) Automatic Tube Weld: Eccentric Reducer**

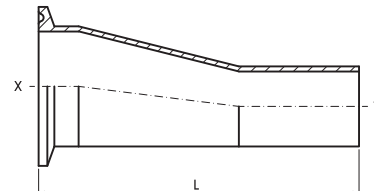
No.	Nominal Size, in.		A in.(mm)
	X	Y	
5505104-005038	1/2"	3/8"	3.250 (82.6)
5505104-075038	3/4"	3/8"	3.250 (82.6)
5505104-075050	3/4"	1/2"	4.000 (101.6)
5505104-100038	1.0"	3/8"	4.500 (114.3)
5505104-100050	1.0"	1/2"	4.500 (114.3)
5505104-100075	1.0"	3/4"	4.000 (101.6)
5505104-150038	1.5"	3/8"	6.000 (152.4)
5505104-150050	1.5"	1/2"	5.550 (139.7)
5505104-150075	1.5"	3/4"	5.000 (127.0)
5505104-150100	1.5"	1.0"	5.000 (127.0)
5505104-200050	2.0"	1/2"	7.750 (196.9)
5505104-200075	2.0"	3/4"	7.250 (184.2)
5505104-200100	2.0"	1.0"	7.250 (184.2)
5505104-200150	2.0"	1.5"	5.250 (133.4)
5505104-250050	2.5"	1/2"	9.750 (247.7)
5505104-250075	2.5"	3/4"	9.250 (235.0)
5505104-050025	2.5"	1.0"	9.250 (235.0)
5505104-250150	2.5"	1.5"	7.250 (184.2)
5505104-250200	2.5"	2.0"	5.550 (139.7)
5505104-300050	3.0"	1/2"	13.250 (336.6)
5505104-300075	3.0"	3/4"	12.250 (311.2)
5505104-300100	3.0"	1.0"	11.250 (285.8)
5505104-300150	3.0"	1.5"	9.250 (235.0)
5505104-300200	3.0"	2.0"	7.500 (190.5)
5505104-300250	3.0"	2.5"	5.550 (139.7)
5505104-400050	4.0"	1/2"	17.500 (444.5)
5505104-400075	4.0"	3/4"	16.500 (419.1)
5505104-400100	4.0"	1.0"	15.500 (393.7)
5505104-400150	4.0"	1.5"	13.500 (342.9)
5505104-400200	4.0"	2.0"	11.750 (298.5)
5505104-400250	4.0"	2.5"	9.750 (247.7)
5505104-400300	4.0"	3.0"	7.750 (196.9)
5505104-600300	6.0"	3.0"	10.000 (254.0)
5505104-600400	6.0"	4.0"	10.000 (254.0)



1  
1.1

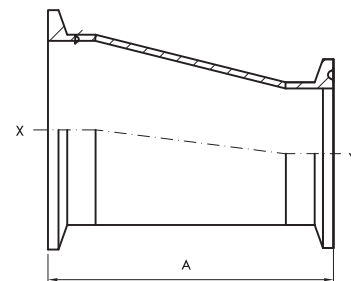
**DT-4.1.3-1(a) Clamp Joint: Tube Weld Eccentric Reducer**

No.	Nominal Size, in.		A	
	X	Y	in. (mm)	
5505301-075050	3/4"	1/2"	3.000	(76.2)
5505301-100050	1.0"	1/2"	3.500	(88.9)
5505301-100075	1.0"	3/4"	3.000	(76.2)
5505301-150050	1.5"	1/2"	4.500	(114.3)
5505301-150075	1.5"	3/4"	4.000	(101.6)
5505301-150100	1.5"	1.0"	4.000	(101.6)
5505301-200050	2.0"	1/2"	6.500	(165.1)
5505301-200075	2.0"	3/4"	6.000	(152.4)
5505301-200100	2.0"	1.0"	6.000	(152.4)
5505301-200150	2.0"	1.5"	4.000	(101.6)
5505301-250075	2.5"	3/4"	8.000	(203.2)
5505301-250100	2.5"	1.0"	8.000	(203.2)
5505301-250150	2.5"	1.5"	6.000	(152.4)
5505301-250200	2.5"	2.0"	4.250	(108.0)
5505301-300100	3.0"	1.0"	10.000	(254.0)
5505301-300150	3.0"	1.5"	8.000	(203.2)
5505301-300200	3.0"	2.0"	6.250	(158.8)
5505301-300250	3.0"	2.5"	4.250	(108.0)
5505301-400100	4.0"	1.0"	14.125	(358.8)
5505301-400150	4.0"	1.5"	12.125	(308.0)
5505301-400200	4.0"	2.0"	10.375	(263.5)
5505301-400250	4.0"	2.5"	8.375	(212.7)
5505301-400300	4.0"	3.0"	6.375	(161.9)
5505301-600300	6.0"	3.0"	8.750	(222.3)
5505301-600400	6.0"	4.0"	9.000	(228.6)



**DT-4.1.3-3(a) Clamp Joint: Eccentric Reducer**

No.	Nominal Size, in.		A in. (mm)
	X	Y	
5505300-075050	3/4"	1/2"	2.000 (50.8)
5505300-100050	1.0"	1/2"	2.500 (63.5)
5505300-100075	1.0"	3/4"	2.000 (50.8)
5505300-150050	1.5"	1/2"	3.500 (88.9)
5505300-150075	1.5"	3/4"	3.000 (76.2)
5505300-150100	1.5"	1.0"	3.000 (76.2)
5505300-200050	2.0"	1/2"	5.500 (139.7)
5505300-200075	2.0"	3/4"	5.000 (127.0)
5505300-200100	2.0"	1.0"	5.000 (127.0)
5505300-200150	2.0"	1.5"	3.000 (76.2)
5505300-250100	2.5"	1.0"	7.000 (177.8)
5505300-250150	2.5"	1.5"	5.000 (127.0)
5505300-250200	2.5"	2.0"	3.000 (76.2)
5505300-300100	3.0"	1.0"	9.000 (228.6)
5505300-300150	3.0"	1.5"	7.000 (177.8)
5505300-300200	3.0"	2.0"	5.000 (127.0)
5505300-300250	3.0"	2.5"	3.000 (76.2)
5505300-400100	4.0"	1.0"	13.125 (333.4)
5505300-400150	4.0"	1.5"	11.125 (282.6)
5505300-400200	4.0"	2.0"	9.125 (231.8)
5505300-400250	4.0"	2.5"	7.125 (181.0)
5505300-400300	4.0"	3.0"	5.125 (130.2)
5505300-600300	6.0"	3.0"	7.625 (193.7)
5505300-600400	6.0"	4.0"	7.625 (193.7)



1  
1.1

2  
2.1





## Global leader of hygienic materials and equipment

As a leading manufacturer of Sanitary pipes, fittings, valves, pumps, pressure vessels, and other types of equipment, KINGLAI Group is committed to R&D and production of safer, reliable, and Sanitary applied materials and products. Our 30 years of accumulation and experiences enable all-around services for customers, which are well acknowledged in the market.

BioClean is a whole new sub-brand of KINGLAI Group in sterile diaphragm valves and sanitary pumps. The products are widely applied in biopharmacy, water for injection (WFI), personal care, and microelectronic semiconductors. Dedicated itself into more reliable products, Bioclean will promote the progress in environment, science, and health.

## Second-generation sterile diaphragm valve

Flexible use of valves is made possible by the hand wheel position limit device. Meanwhile, a clear indication of the valves' closing state can prevent diaphragms' short service lives from being caused by over tightening.

With abundant and flexible options in accessories and automation components, Bioclean sterile diaphragm valves are an ideal control product. In addition to standard parts, we also provide diversified customized solutions, such as bottom tank valves, multi-path valves, and SAP/GMP valves.



## General Introduction

As one of the most common valves used in pharmaceutical engineering, sterile diaphragm valves are ideal for applications that require zero bacteria breeding as well as high cleaning and sterilization performance. Compared with valve products such as ball valves and butterfly valves, diaphragm valves with static seals use sealing elements free of wearing and a structure without dead angles, thus being more sanitary and durable.

As an ideal choice in bio-pharmaceuticals and other applications with demanding sanitary conditions, Kinglai's BioClean series sterile diaphragm valves comply with ASME BPE Design Standards and CGMP (Current Good Manufacturing Practice), and also have passed 3A Sanitary Standards Certification.



Our sterile diaphragm valves feature completely transparent production process, which is fully traceable from stainless steel base metal to valve diaphragm and gasket. Each valve has passed strict performance tests before delivery to ensure excellent product performance and complete verification from beginning to end.

Kinglai sterile diaphragm valves cover KDV series straight-through diaphragm valves, KDV-T type diaphragm valves, KDV-TU water diaphragm valves, KDV-MU U-type diaphragm valves, KDMP multi-way diaphragm valves, KGMP SAP\GMP diaphragm valves and KTBV bottom diaphragm valves.



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### Product Features:



#### Advantages of Sealing Technology

With over 30 years of service, Kinglai has developed trustworthy technical resources and significant application expertise, enabling us to make more logical recommendations for the selection of elastic seals to satisfy the application needs of varied working situations.

Our diaphragm valves' diaphragms offer superior thermal stability, ductility, chemical stability, and fatigue resistance thanks to ongoing and close collaboration with international manufacturers, making them more dependable and long-lasting.



#### High Compatibility

Kinglai valves can be configured with a variety of connections, including welded type and ferrule type quick disconnect couplings, and are suitable for pipes of all sizes that meet ASME BPE, 3A, ISO, DIN, BS, JIS and other standards, thus ensuring high quality and reliable use anywhere in the pipeline system.



#### Strict Sanitary Standards

While complying with ASME BPE Sterile Diaphragm Valve Design Standards, Kinglai's sterile diaphragm valves are manufactured by electrolytic polishing.

They satisfy EN 10204 3.1/MTR Traceability Standards, Declaration of Conformity with FDA, USP Class VI Certification and 3A Sanitary Standards Certification, all of which ensure product contamination control.



#### Advantages of Valve Body

Kinglai is determined that a reliable and robust manufacturing capability is the foundation for high-quality goods. Service life is ensured by rigorous inspection and testing. Years of advancements in production techniques allow Kinglai to guarantee that the surface finish of the valves may reach up to 0.375 MM (BPE SF4) without any wave. The most effective barrier against bacterial contamination for the valves is a finely polished surface.

# KDV sterile diaphragm valve

## Design and Structure

### Modular Design

With modular structure design, the BioClean series sterile diaphragm valves can meet various demands.

The valves are composed of the following components:

- Controller
- Actuator
- Diaphragm
- Valve body

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Controller	 Feedback device	 Positioner	 Manual positioner		
Actuator	 Stainless steel	 Composite material	 Aluminum alloy	 Stainless steel	 Composite material
Diaphragm	 EPDM		 EPDM+PTFE		
Valve body	 Straight-through type	 T-type	 Multi-way	 SAP / GMP	 Bottom valve

## Optional Configurations



Generally, the BioClean series pneumatic sterile diaphragm valves can be used in conjunction with the feedback device or valve positioner.

As for the BioClean series pneumatic sterile diaphragm valve equipped with valve positioner, the real-time feedback of valve opening can be achieved. Meanwhile, the valve's opening position (travel percentage) can be adjusted via remote PLC control or direct adjustment on the automatic regulator, thus realizing precise control over the valve.

The BioClean series multi-way sterile diaphragm valves allow customized design and processing of valve bodies on request. These valve bodies are made by forging and fine machining. Multi-way diaphragm valves can effectively reduce the overall space of the pipeline system, and are easier to clean and discharge.



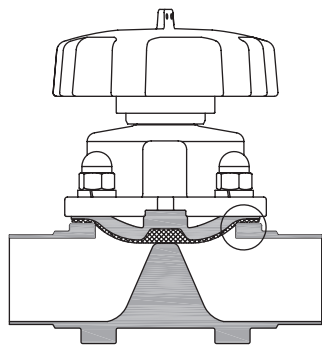
Option			
Standards for connections	DIN, ISO, 3A, BPE	Material of valve body	316L
Mode of connections	Welded type, ferrule type or welded and ferrule type	Process of valve body	Casting or forging
Size	1/4" - 3"	Material of seal	EPDM, EPDM+PTFE
Form of valve body	Straight-through type, T-type, multi-way type, SAP/GMP or bottom valve	Polishing	Electrolytic polishing
Driver	Manual, pneumatic NC (default) or double acting	Controller	Solenoid valve, travel switch or valve positioner

1. Please contact us for purchase of SAP/GMP diaphragm valves and multi-way diaphragm valves.
2. If the valves with feedback device are to be used in risky areas, please specify the explosive-proof grade.

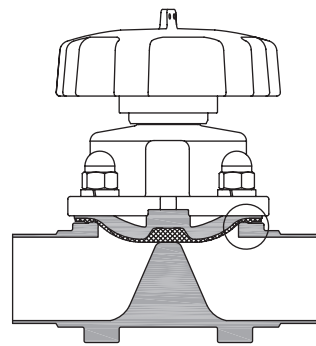
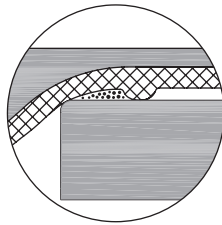
## KDV sterile diaphragm valve

### Diaphragm

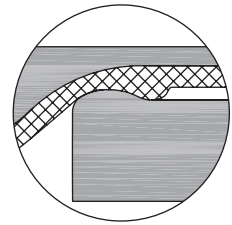
#### Design of Diaphragm



Conventional diaphragm valves  
Prone to residues



BioClean diaphragm valves  
Prevent residues



Unlike that of conventional diaphragm valves, the bodies of BioClean series sterile diaphragm valves have a tight seal on the inside diameter that reduces the ring clearance between the diaphragm and the valve body. This feature makes the BioClean series diaphragm valves particularly suitable for aseptic process.

#### Material of Diaphragm

Two options are provided for the material of diaphragms: EPDM soft artificial rubber and PTFE rigid artificial rubber. Single or double diaphragm designs are available.

The double diaphragm design allows two diaphragms to work independently, thus reducing the tension caused by different thermal properties. As each application has different working conditions, different requirements are put forward for the diaphragms. In order to select the most suitable diaphragms, the following factors need to be considered: working pressure, application temperature and process fluid. EPDM is suitable for most application conditions, but some high temperature conditions require diaphragms made of PTFE materials.



#### Certificate of Material

Declaration of Conformity with FDA (CFR 21:177.2600 or 177.1550)

USP Class VI Certification

### Selection of actuators



Engineering plastic actuator



Stainless steel actuator

The BioClean series sterile diaphragm valves are available with hand wheels or air cylinders made from various materials.

Drive hand wheels or pneumatic actuators made from composite engineering plastics can meet your demands in most general working conditions, while stainless steel actuators are a good choice in case of small installation space, compact valve structure or high cleaning requirements for the outer parts of the valve.

PP, PC, stainless steels and aluminum alloy materials are optional.



Material	PP	PC	Stainless steel		Aluminum alloy
Size	Driver	Hand wheel	Hand wheel	Driver	Driver
¼"		●		●	
⅜"		●		●	
½"		●		●	
¾"			●	●	
1.0"	●	●		●	
1½"	●	●		●	
2.0"	●	●		●	
2½"			●		●
3.0"			●		●

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## KDV sterile diaphragm valve

### Valve Body



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Kinglai provides all kinds of high quality valve bodies that are widely accepted. Two manufacturing methods are optional, i.e. casting and forging, with strict control of ferrite content and sulfur content.

The diaphragm valve bodies made by casting and forming are very cost-effective, and the superior materials used in accordance with American Standards enable greater versatility.

The forging-formed and precision-matched valve bodies have an incredibly compact construction and excellent chemical stability. Forged bodies provide considerable benefits in terms of surface oxidation resistance and long-term anti-corrosion performance to ensure the good quality of the products throughout prolonged use.

Form of valve body	Cast type	Forged type	Forged block
Two-way valve	●	●	
T-type valve	●	●	●
Tandem valve	●	●	●
Multi-way valve			●

Type	Cast type	Forged type / Forged block
Material	CF3M (316L)	1.4435 (316L)
Ferrite content	< 15%	< 0.5%
Sulfur content	< 0.04%	0.005-0.017%

EN 10204 3.1/ MTR Traceability Certificate

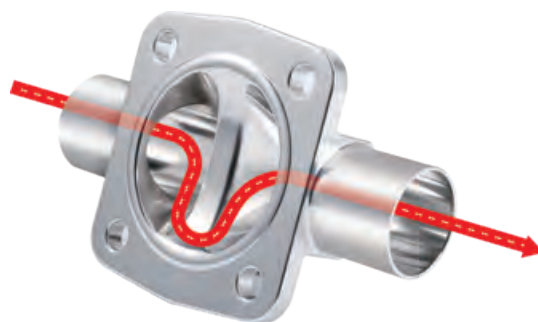


## Self-discharge of Valves

The BioClean series sterile diaphragm valves have excellent self-discharge performance and are capable of maintaining excellent self-discharge capability in both horizontal and vertical mountings. It is necessary for the pipeline designers and users to cooperate to make use of the self-discharge characteristics.

The factors that influence self-discharge:

- Valve dimension and pipeline specification
- Surface finish and treatment method (Ra)
- Discharge direction
- Surface tension and viscosity of medium
- Design inclination angle of pipeline - recommended angle 2~3°



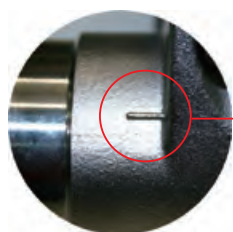
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### Self-discharge Mounting



Self-discharge angle  $\alpha$

During mounting, the marks at both ends of the valve body shall be set with correct angle to optimize self-discharge performance.



During mounting, this mark shall be horizontal and facing upward.

### Table of self-discharge angles

Size	1/4"	3/8"	1/2"	3/4"	1.0"	1 1/2"	2.0"	2 1/2"	3.0"
$\alpha$	32.5°	23.5°	21°	20°	29.2°	25°	18.2°	27°	19°

## KDV Sterile diaphragm valve



### Application

KDV Sterile diaphragm valves produced by King Lai can meet the production process with cleanness and sterilization requirements. The product is widely applied in medicine, food and bio-pharmacy, as well as sectors of semiconductors, microelectronics, personal care, water for injection, and other industries.

### Features

- The valves bodies are available in casting and forging, and can meet demands of different customers.
- The specifications are complete, available from DN4 ~ DN80.
- The diaphragm is made of materials with corrosion resistance and in line with the certification of FDA and USP24 class 6.
- The protrusions around the valves body and the prominent part of the diaphragm are closely matched with each other to ensure that the diaphragm can be tightly sealed with the valve body in the open or closed state. Such structure, in line with EHEDG design standards, can achieve zero residual and is easy to clean.
- The normally-closed structure of diaphragm ensures easier manual switching.
- By using the adjustable limit nut to prevent excessive closing, the rotary handwheel may maximise sealing safety and increase the lifespan of the diaphragm by ensuring that the diaphragm has a pre-set closing pressure.
- The condition of the valves, including their degree of openness or closure, can be determined by the red switching indicator between the hand wheel and the lid.
- The solenoid valves, position feedback or position regulator can be installed on the pneumatic valves at consumer's request to realize automatic control or flow control of the valves.

**Technical Data**

Items	Details
Actuator	Manual Pneumatic normally closed (NC) / Double acting (DA)
Control	Feedback device/ adjustment positioner/ cylindrical position sensor
Body material	CF3M (316L), 1.4435 (316L)
Diaphragm material	EPDM, EPDM+PTFE
Size	DN4 – DN80
Connections	Butt-weld, Clamp, Weld/clamp ASME BPE, 3A, ISO, DIN
Surface finish	Outer surface sand blasted Inner surface Ra≤0.5µm(SF1), Ra≤0.375µm(SF4)
Certifications	3A, CE

Size		DN4~DN50	DN65/DN80
Working temperature	EPDM	Max. pressure	10bar      8bar
		Max. temperature	-10°C~130°C, 14~212°F
		SIP	150°C, 302°F max.60min
	EPDM+PTFE	Max. pressure	6bar, 87psi      5bar, 72psi
		Max. temperature	-10°C~150°C, 14~212°F
		SIP	150°C, 302°F no.limit
Pneumatic pressure	Normally close (NC)	5-6bar, 72-87psi      5-7bar, 72-101psi	
	Normally open (NO)	5.5bar, 79psi	
	Double action (DA)	5.5bar, 79psi	
Pneumatic connection		G1/8"	G1/4"

If the sterilisation temperatures listed above are applied to the EPDM or PTFE diaphragms for longer periods of time, the service life of the diaphragms will be reduced. In these cases, maintenance cycles must be adapted accordingly.

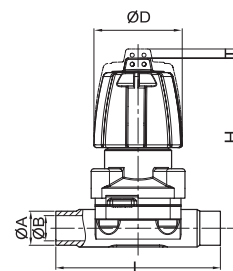
PTFE diaphragms can also be used as steam barriers; however, this will reduce their service life. The maintenance cycles must be adapted accordingly.

Types	Casting	Forging, Forged block
Material	CF3M (316L)	1.4435 (316L)
Ferrite	< 15%	< 0.5%
Sulfur contents	< 0.04%	0.005-0.017%

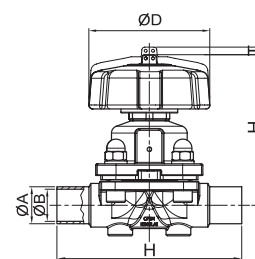
Compliance with EN 10204 3.1/MTR traceability certificate  
 FDA-FDA Declaration of Conformity (CFR 21:177.2600 or 177.1550)  
 Compliance Certificate for USP-USP VI Category

**KDV-M100-1**
**Manual diaphragm valves with welding ends**

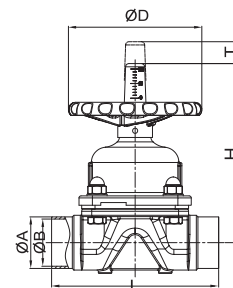
Code	Size	A	B	D	T	H	L
1558100-000025	¼"	6.35	4.57	33	4.5	58	61
1558100-000038	⅜"	9.53	7.75	33	4.5	58	61
1558100-000050	½"	12.7	9.4	33	4.5	63.5	61


**KDV-M100-2**
**Manual diaphragm valves with welding ends**

Code	Size	A	B	D	T	H	L
1558100-000075	¾"	19.1	15.8	60	6	79.5	113
1558100-000100	1.0"	25.4	22.1	90	11	103.5	127
1558100-000150	1½"	38.1	34.8	110	15.5	129.8	159
1558100-000200	2.0"	50.8	47.5	128	20.5	153	190


**KDV-M100-3**
**Manual diaphragm valves with welding ends**

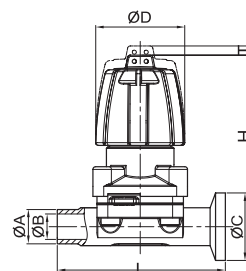
Code	Size	A	B	D	T	H	L
1558100-000250	2½"	63.5	60.2	200	44	264	250
1558100-000300	3"	76.2	72.9	200	44	269	250



**KDV-M200-1**

**Manual diaphragm valves with weld/clamp ends**

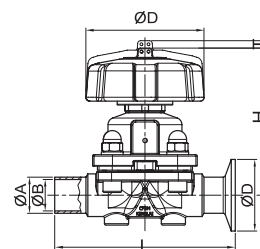
Code	Size	A	B	C	D	T	H	L
1558200-000025	¼"	6.35	4.57	25	33	4.5	58	62
1558200-000038	⅜"	9.53	7.75	25	33	4.5	58	62
1558200-000050	½"	12.7	9.4	25.0	33	4.5	63.5	62



**KDV-M200-2**

**Manual diaphragm valves with welding /clamp ends**

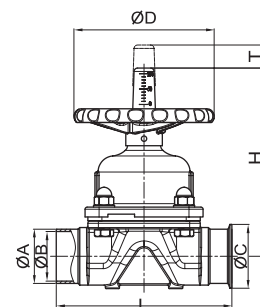
Code	Size	A	B	C	D	T	H	L
1558100-000075	¾"	19.1	15.8	25.0	60	6	79.5	115
1558200-000075	1.0"	25.4	22.1	50.4	90	11	103.5	127
1558120-000075	1½"	38.1	34.8	50.4	110	15.5	129.8	159
1558220-000075	2.0"	50.8	47.5	63.9	128	20.5	153	190



**KDV-M200-3**

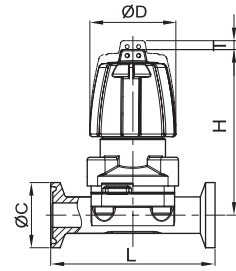
**Manual diaphragm valves with welding /clamp ends**

Code	Size	A	B	C	D	T	H	L
1558200-000250	2½"	63.5	60.2	77.5	200	44	264	250
1558200-000300	3.0"	76.2	72.9	90.9	200	44	269	250

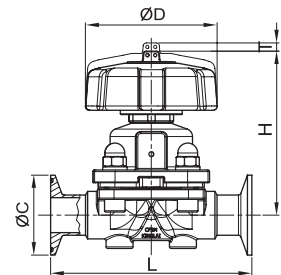


**KDV-M300-1**
**Manual diaphragm valves with clamp ends**

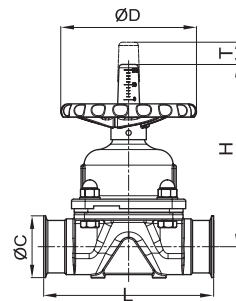
Code	Size	C	D	T	H	L
1558300-000025	¼"	25	33	4.5	58	63
1558300-000038	⅜"	25	33	4.5	58	63
1558300-000050	½"	25	33	4.5	63.5	63


**KDV-M300-2**
**Manual diaphragm valves with clamp ends**

Code	Size	C	D	T	H	L
1558300-000075	¾"	25	60	6	79.5	117
1558300-000100	1.0"	50.4	90	11	103.5	127
1558300-000150	1½"	50.4	110	15.5	129.8	159
000200	2.0"	63.9	128	20.5	153	190


**KDV-M300-3**
**Manual diaphragm valves with clamp ends**

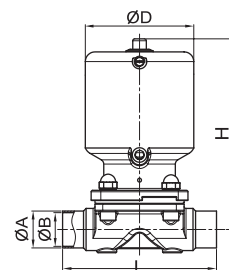
Code	Size	C	D	T	H	L
1558300-000250	2½"	77.5	200	44	264	250
1558300-000300	3.0"	90.9	200	44	269	250



### KDV-P120

#### Pneumatic diaphragm valves with clamp ends

Code	Size	A	B	D	H	L
1558120-000025	¼"	6.35	4.57	45	101	61
1558120-000038	⅜"	9.53	7.75	45	101	61
1558120-000050	½"	12.7	9.4	45	101	61
1558120-000075	¾"	19.1	15.8	60	127	113
1558120-000100	1.0"	25.4	22.1	89	162	127
1558120-000150	1½"	38.1	34.8	112	193	159
1558120-000200	2.0"	50.8	47.5	142	227	190

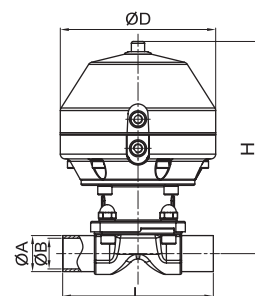


Stainless steel actuator has a smaller diameter and easier to install.

### KDV-P160-1

#### Pneumatic diaphragm valves with welding ends (plastic actuator)

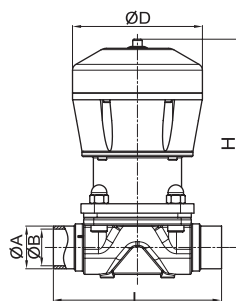
Code	Size	A	B	D	H	L
1558160-000100	1.0"	25.4	22.1	128	188	127
1558160-000150	1½"	38.1	34.8	164	227	159
1558160-000200	2.0"	50.8	47.5	164	227	190



### KDV-P160-2

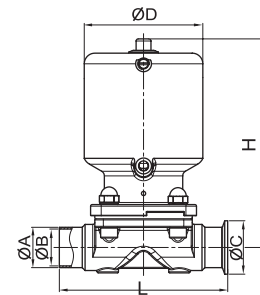
#### Pneumatic diaphragm valves with welding ends (aluminum actuator)

Code	Size	A	B	D	H	L
1558160-000250	2½"	63.5	60.2	193	311.6	250
1558160-000300	3"	76.2	72.9	193	311.6	250



**KDV-P220**
**Pneumatic diaphragm valves with welding/clamp ends (Stainless steel actuator)**

Code	Size	A	B	C	D	H	L
1558220-000025	¼"	6.35	4.57	25.0	45	101	62
1558220-000038	⅜"	9.53	7.75	25.0	45	101	62
1558220-000050	½"	12.7	9.4	25.0	45	101	62
1558220-000075	¾"	19.1	15.8	25.0	60	127	115
1558220-000100	1.0"	25.4	22.1	50.4	89	162	127
1558220-000150	1½"	38.1	34.8	50.4	112	193	159
1558220-000200	2.0"	50.8	47.5	63.9	142	227	190

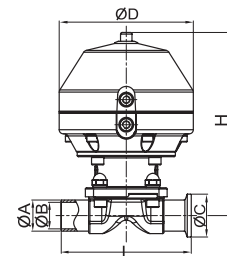


Stainless steel actuator has a smaller diameter and easier to install.

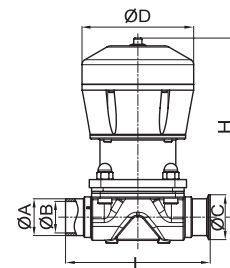
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**KDV-P260-1**
**Pneumatic diaphragm valves with welding/clamp ends (plastic actuator)**

Code	Size	A	B	C	D	H	L
1558260-000100	1.0"	25.4	22.1	50.4	89	188	127
1558260-000150	1½"	38.1	34.8	50.4	112	227	159
1558260-000200	2.0"	50.8	47.5	63.9	142	227	190


**KDV-P260-2**
**Pneumatic diaphragm valves with welding/clamp ends (Aluminum alloy actuator)**

Code	Size	A	B	C	D	H	L
1558260-000250	2½"	63.5	60.2	77.5	193	311.6	250
1558260-000300	3"	76.2	72.9	90.9	193	311.6	250

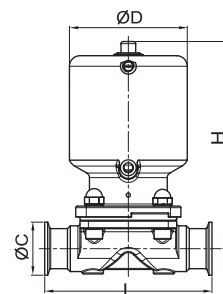




**KDV-P320**

Pneumatic diaphragm valves with welding/clamp ends (Stainless steel actuator)

Code	Size	C	D	H	L
1558320-000025	¼"	25	45	101	63
1558320-000038	⅜"	25	45	101	63
1558320-000050	½"	25	45	101	63
1558320-000075	¾"	25	60	127	117
1558320-000100	1.0"	50.4	89	162	127
1558320-000150	1½"	50.4	112	193	159
1558320-000200	2.0"	63.9	142	227	190

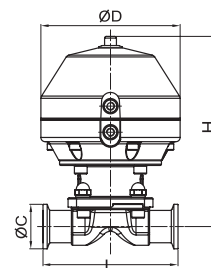


Stainless steel actuator has a smaller diameter and easier to install.

**KDV-P360-1**

Pneumatic diaphragm valves with clamp ends (plastic actuator)

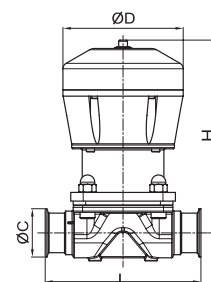
Code	Size	C	D	H	L
1558360-000100	1.0"	50.4	89	188	127
1558360-000150	1½"	50.4	112	227	159
1558360-000200	2.0"	63.9	142	227	190



**KDV-P360-2**

Pneumatic diaphragm valves with clamp ends (Aluminum alloy actuator)

Code	Size	C	D	H	L
1558360-000250	2½"	77.5	193	311.6	250
1558360-000300	3.0"	90.9	193	311.6	250



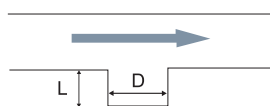
## KDV-T Sterile forging diaphragm valve



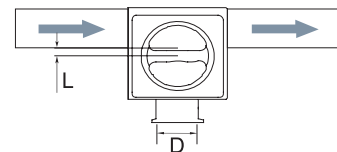
Design of valves body:  
Precisely forged blocks

### Features

- Compact structure, fully self-drained, and without dead corners.
- Forged valves body with dense inter-granular structure, quick sterilization and easy verification.
- Integrated and cutting-edge processing to guarantee a safe and reliable installation.
- For the purpose of ensuring the circulation of the main pipeline, the main pipe is larger than the branches.
- Applicable to high-purity water system, drainages and taps.



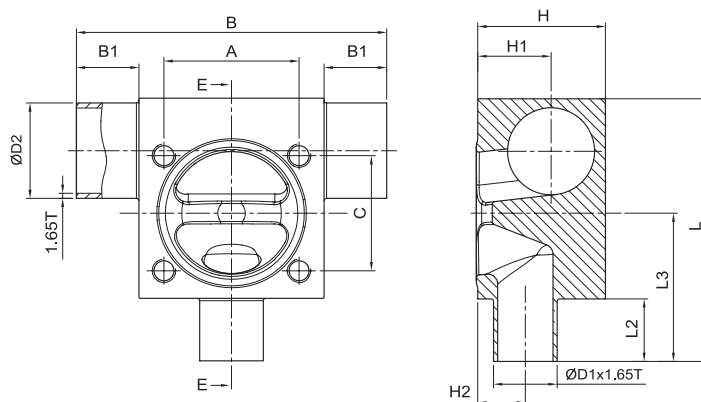
BPE:SD-3.11.1



BioClean Sterile diaphragm  
valve  $L/D \leq 2:1$

### Technical Data

Items	Details
Working pressure	0-10bar, 145psi (EPDM) 0-7bar, 101psi (PTFE)
Working temperature	-40~130°C , -40~266 °F (EPDM) -40~150°C , -40~302 °F (EPDM+PTFE)
Driving structure	Manual / pneumatic control
Body design	OEM/ODM
Body material	1.4435 (316L), forging block
Surface finish	External sand blasting Internal surface $Ra \leq 0.5\mu\text{m}$ (SF1), $Ra \leq 0.375\mu\text{m}$ (SF4)
Connections	Butt-Weld, Clamp ISO, DIN, ASME BPE, 3A



**KDV-T5**

NO.	D1	D2
1558500-10005002	12.7	25.4
1558500-10007502	19.1	25.4
1558500-10010002	25.4	25.4
1558500-15007502	19.1	38.1
1558500-15010002	25.4	38.1
1558500-20010002	25.4	50.8
1558500-20015002	38.1	50.8

A	B	B1	C	D	H	H1	H2	L	L1	L2	L3	M
22.0	82.0	25.0	22.0	6.0	35.0	20.0	8.5	66.0	15.3	20.0	36.0	M4
44.5	114.5	25.0	39.7	10.0	38.0	23.5	19.0	93.0	17.9	25.0	55.0	M6
54.0	124.0	25.0	46.0	10.0	38.0	23.5	19.0	93.0	17.9	25.0	59.0	M8
39.7	100.0	25.0	44.5	8.0	48.0	27.7	12.5	97.0	23.5	25.0	53.0	M6
54.0	124.0	25.0	46.0	10.0	51.0	29.9	19.0	105.0	25.0	25.0	59.0	M8
54.0	134.0	30.0	46.0	10.0	64.0	36.2	19.0	118.0	32.0	25.0	59.0	M8
70.0	162.0	30.0	65.0	10.0	66.0	39.1	26.0	133.0	34.1	25.0	71.0	M10

## KDV-T Sterile casting diaphragm valve



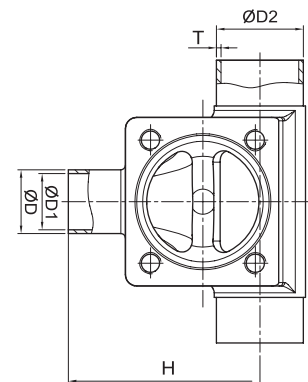
### Features

- Compact structure, fully self-drained, and without dead corners.
- Forged valves body with dense inter-granular structure, quick sterilization and easy verification.
- Integrated and art-of-the-state processing to ensure safe and reliable installation.
- The size of the main pipe is larger than that of the branches to ensure the circulation of the main pipeline.
- Applicable to high-purity water system, drainages and taps.

2  
2.3

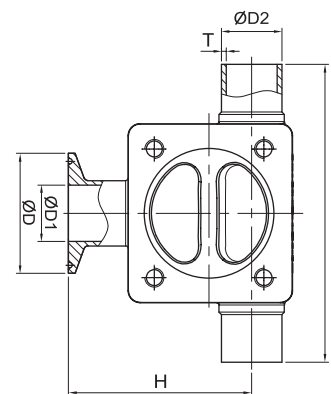
### KDV-T500 (welding & welding ends)

NO.	D	D1	D2	T	H	L
1558500-050050	12.7	9.4	12.7	1.65	42.5	72
1558500-075075	19.1	15.8	19.1	1.65	62.8	101
1558500-100050	12.7	9.4	25.4	1.65	49.3	82
1558500-100075	19.1	15.8	25.4	1.65	66.5	101
1558500-100100	25.4	22.1	25.4	1.65	76.9	125
1558500-150050	12.7	9.4	38.1	1.65	57.5	82
1558500-150075	19.1	15.8	38.1	1.65	73.5	101
1558500-150100	25.4	22.1	38.1	1.65	84	124
1558500-150150	38.1	34.8	38.1	1.65	98.1	150
1558500-200050	12.7	9.4	50.8	1.65	64.6	92
1558500-200175	19.1	15.8	50.8	1.65	80.6	111
1558500-200100	25.4	22.1	50.8	1.65	92	134
1558500-200150	38.1	34.8	50.8	1.65	105.1	160
1558500-200200	50.8	47.5	50.8	1.65	120.3	176
1558500-250050	12.7	9.4	63.5	1.65	71.6	92
1558500-250075	19.1	15.8	63.5	1.65	87.6	111
1558500-250100	25.4	22.1	63.5	1.65	98.1	135
1558500-250150	38.1	34.8	63.5	1.65	112.2	160



**KDV-T600 (welding & clamp ends)**

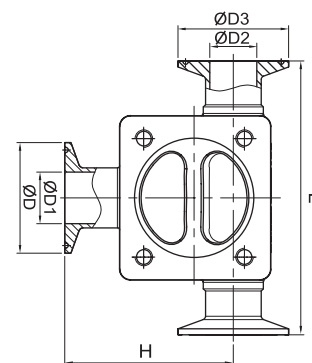
NO.	D	D1	D2	T	H	L
1558600-050050	25	9.4	12.7	1.65	44.5	72
1558600-075075	25	15.8	19.1	1.65	64.8	101
1558600-100050	25	9.4	25.4	1.65	51.3	82
1558600-100075	25	15.8	25.4	1.65	68.5	101
1558600-100100	50.4	22.1	25.4	1.65	76.9	125
1558600-150050	25	9.4	38.1	1.65	59.5	82
1558600-150075	25	15.8	38.1	1.65	75.5	101
1558600-150100	50.4	22.1	38.1	1.65	84	124
1558600-150150	50.4	34.8	38.1	1.65	98.1	150
1558600-200050	25	9.4	50.8	1.65	66.6	92
1558600-200175	25	15.8	50.8	1.65	82.6	111
1558600-200100	50.4	22.1	50.8	1.65	92	134
1558600-200150	50.4	34.8	50.8	1.65	105.1	160
1558600-200200	63.9	47.5	50.8	1.65	120.3	176
1558600-250050	25	9.4	63.5	1.65	73.6	92
1558600-250075	25	15.8	63.5	1.65	89.6	111
1558600-250100	50.4	22.1	63.5	1.65	98.1	135
1558600-250150	50.4	34.8	63.5	1.65	112.2	160



2  
2.3

**KDV-T400 (clamp ends)**

NO.	D	D1	D2	D3	H	L
1558400-050050	25	9.4	9.4	25	44.5	97.4
1558400-075075	25	15.8	15.8	25	64.8	126.4
1558400-100050	25	9.4	22.1	50.4	51.3	107.4
1558400-100075	25	15.8	22.1	50.4	68.5	126.4
1558400-100100	50.4	22.1	22.1	50.4	76.9	150.4
1558400-150050	25	9.4	34.8	50.4	59.5	107.4
1558400-150075	25	15.8	34.8	50.4	75.5	126.4
1558400-150100	50.4	22.1	34.8	50.4	84	149.4
1558400-150150	50.4	34.8	34.8	50.4	98.1	175.4
1558400-200050	25	9.4	47.5	63.9	66.6	117.4
1558400-200175	25	15.8	47.5	63.9	82.6	136.4
1558400-200100	50.4	22.1	47.5	63.9	92	159.4
1558400-200150	50.4	34.8	47.5	63.9	105.1	185.4
1558400-200200	64	47.5	47.5	63.9	120.3	201.4
1558400-250050	25	9.4	60.2	77.5	73.6	117.4
1558400-250075	25	15.8	60.2	77.5	89.6	136.4
1558400-250100	50.4	22.1	60.2	77.5	98.1	160.4
1558400-250150	50.4	34.8	60.2	77.5	112.2	185.4



## KDV-TU Water point diaphragm valve

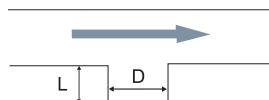


### Application

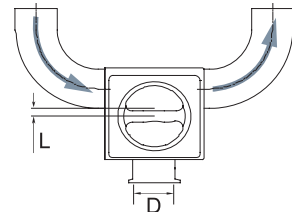
To avoid the retention of the bacterial at the barrier of U-shaped tee through diaphragm valves, reduce the number of welds and improve the smoothness of the contact surface (MOC) with a minimum length of the horizontal pipe. BPE 2012: SD-3.1.2.2, to eliminate the risk of breeding of bacterial at retention area of fluid at discharge port area and ensure that the loop is absolutely safe.

### Features

- In the loop for production of purified water (PW) and injection water (WFI), one of the applications is on the tap valves.
- The valve must ensure an absolute safe loop and prevent environmental damage, which will also be worn as a junction point. Therefore this valve must have highest level of security and cleanliness



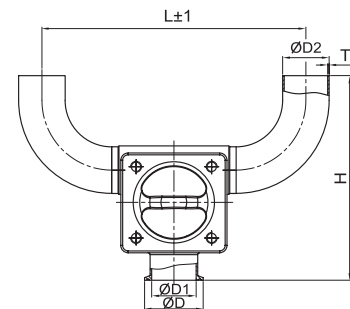
BPE:SD-3.11.1



KDV-T609 L/D ≤ 2:1

### KDV-TU6

NO.	D	D1	D2	T	C	H
1559100-050050	25.0	9.4	12.7	1.65	109.2	120.7
1559100-075075	25.0	15.8	19.1	1.65	128.2	131.7
1559100-100050	25.0	9.4	25.4	1.65	128.2	127.5
1559100-100075	25.0	15.8	25.4	1.65	147.2	150.7
1559100-100100	50.4	22.1	25.4	1.65	171.2	153.1
1559100-150050	25.0	9.4	38.1	1.65	166.4	154.8
1559100-150075	25.0	15.8	38.1	1.65	185.4	188.9
1559100-150100	50.4	22.1	38.1	1.65	208.4	179.3
1559100-150150	50.4	34.8	38.1	1.65	234.4	193.4
1559100-200050	25.0	9.4	50.8	1.65	204.4	187.2
1559100-200075	25.0	15.8	50.8	1.65	234.4	226.9
1559100-200100	50.4	22.1	50.8	1.65	246.4	211.7
1559100-200150	50.4	34.8	50.8	1.65	272.4	225.8
1559100-200200	64.0	47.5	50.8	1.65	288.4	241.0
1559100-250050	25.0	9.4	63.5	1.65	242.6	213.3
1559100-250075	25.0	15.8	63.5	1.65	261.6	265.1
1559100-250100	50.4	22.1	63.5	1.65	285.6	237.8
1559100-250150	50.4	34.8	63.5	1.65	310.6	251.9

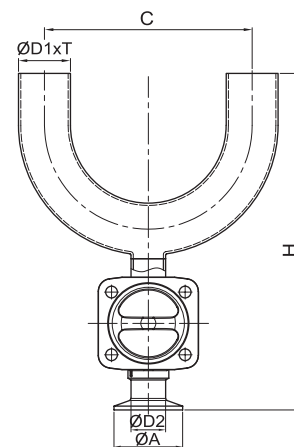


## KDV-MU U-type diaphragm valve

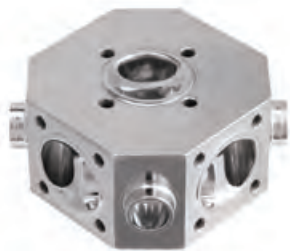


### KDV-MU400

NO.	D1	T	D2	A	C	H
1559400-075050	19.1	1.65	12.7	25	114.3	139.7
1559400-075075	19.1	1.65	19.1	25	114.3	179.7
1559400-100050	25.4	1.65	12.7	25	76.2	142.9
1559400-100075	25.4	1.65	19.1	25	76.2	182.9
1559400-100100	25.4	1.65	25.4	50.4	76.2	201.8
1559400-150050	38.1	1.65	12.7	25	114.3	189.1
1559400-150075	38.1	1.65	19.1	25	114.3	229.1
1559400-150100	38.1	1.65	25.4	50.4	114.3	248.4
1559400-150150	38.1	1.65	38.1	50.4	114.3	286.5
1559400-200050	50.8	1.65	12.7	25	152.4	208.9
1559400-200075	50.8	1.65	19.1	25	152.4	248.9
1559400-200100	50.8	1.65	25.4	50.4	152.4	267.8
1559400-200150	50.8	1.65	38.1	50.4	152.4	306.2
1559400-200200	50.8	1.65	50.8	64	152.4	330.2
1559400-250050	63.5	1.65	12.7	25	190.5	232.85
1559400-250075	63.5	1.65	19.1	25	190.5	272.85
1559400-250100	63.5	1.65	25.4	50.4	190.5	293.7
1559400-250150	63.5	1.65	38.1	50.4	190.5	331.8
1559400-250200	63.5	1.65	50.8	64	190.5	355.8
1559400-300050	76.3	1.65	12.7	25	228.6	258.2
1559400-300075	76.3	1.65	19.1	25	228.6	298.2
1559400-300100	76.3	1.65	25.4	50.4	228.6	319
1559400-300150	76.3	1.65	38.1	50.4	228.6	357.1
1559400-300200	76.3	1.65	50.8	64	228.6	381.1



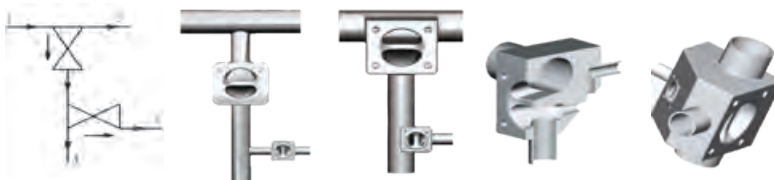
## KDMP Multi-port diaphragm valves



Multi-channel diaphragm valves can save installation space and time, reduce cost, and can be used as a substitute in the valves

### Evolution of multi-channel valves

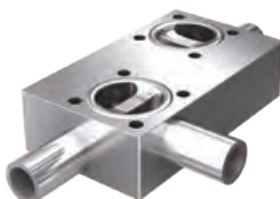
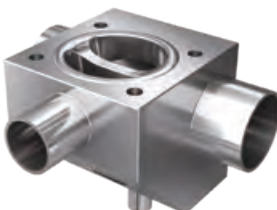
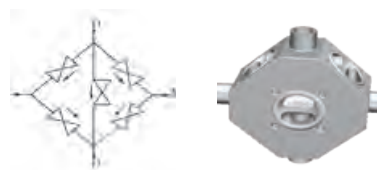
T-valve with sterilizing port



Integrated GMP valve



Chromatography valve



### Technical Data

Items	Details
Working pressure	0-10bar, 145psi (EPDM) 0-7bar, 101psi (PTFE)
Working temperature	-40~130°C , -40~266 °F (EPDM) -40~150°C , -40~302 °F (EPDM+PTFE)
Operation	Manual / pneumatic
Body design	OEM/ODM
Body material	1.4435 (316L), forging block
Surface finish	External sand blasting Internal surface Ra≤0.5μm(SF1), Ra≤0.375μm(SF4)
Connections	Butt-Weld, Clamp ISO, DIN, ASME BPE, 3A



## KGMP SAP/GMP diaphragm valves



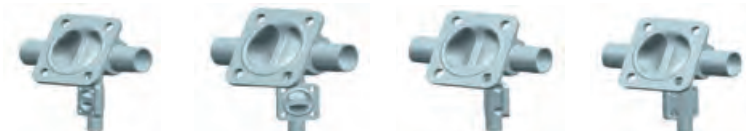
The KGMP / SAP diaphragm valves are available in a variety of angles and positions with forging or casting materials (as shown in the drawing).

Horizontal installation of the main valve with automatic drainage and vertical installation of the branch valve at the left side.



HVL-01      HVL-02      HVL-03      HVL-04

Horizontal installation of the main valve with automatic drainage and vertical installation of the branch valve at the right side.



HVR-01      HVR-02      HVR-03      HVR-04

Horizontal installation of the main valve (upwards) and vertical installation of the branch valve at the right (left) side.



HVR-05      HVR-06      HVR-07      HVR-08

Horizontal installation of the main valve with automatic drainage and automatic drainage for the branch vertically installed at the left side.

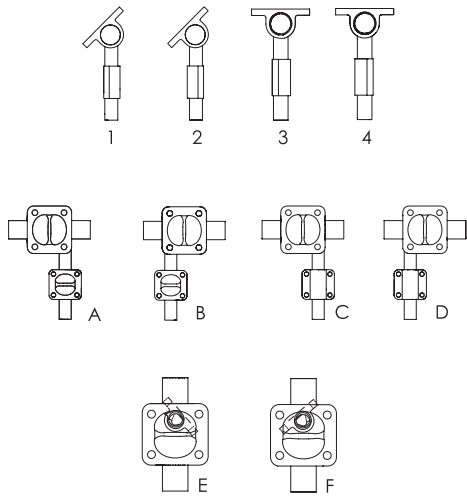


HHL-01      HHL-02      HHR-01      HHR-02

Vertical installation of the main valve and automatic drainage for the branch horizontally installed



VHU-01      VHU-02      VHD-01      VHD-02



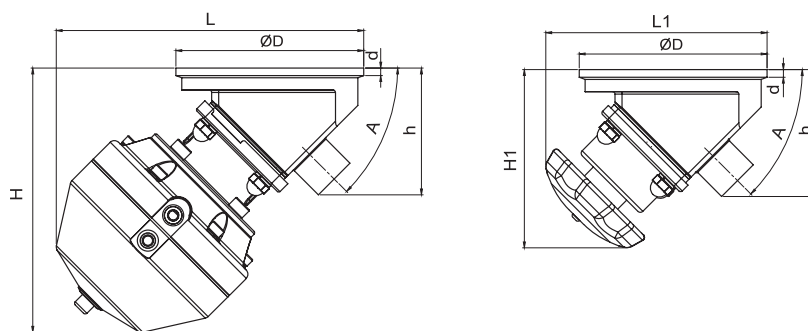
## KTBV Tank outlet valve



KL Group Tank Bottom valve is applied in pharmaceutical, food and beverage industrial, normally install at the bottom of tank, sampling and draining function, can composite SIP/CIP: KL Tank bottom valve is develop from diaphragm valve , The sealing weir is close to the tank wall as far as possible, avoid dead area.

### Technical Data

Items	Details
Working pressure	0-10bar, 145psi (EPDM) 0-7bar, 101psi (EPDM+PTFE)
Working temperature	-40~130°C , (EPDM) -40~150°C , (EPDM+PTFE)
Actuator	Manually operated , Pneumatically operated
Body design	Zero dead design
Body material	CF3M (316L), 1.4435 (316L) Forging blank
Surface Finish	Out Surface sanding, Internally Ra≤ 0.375μm(SF4)
Connection	weld-weld, clamp-clamp ISO, DIN, ASME BPE, 3A



No	Size	A	D	H	H1	L	L1	h	d	OD	T
1558700-000100	1.0"	45°	119	175.1	122.9	206.6	154.1	82.9	6.0	25.4	1.65
1558700-000150	1.5"	45°	160	225.1	151.6	262	207	108	6.5	38.1	1.65
1558700-000200	2.0"	45°	180	234.3	167	274	274	12.7	6.5	50.8	1.65
1558700-000300	3.0"	45°	250	344.7	270	402.4	326.1	173.5	8.5	76.2	1.65

## KSV Sampling Valve

- There are three series of KSV sampling, G series regular sampling valve, S series sterile sampling valve, and SS sterile series sampling valve.
- G series by rotating the hand wheel sampling valve is made of stainless steel, durable. Health type design, suitable for just sampling, don't need the sterilization conditions valve Connection with other parts have a clamp or welding type, sampling mouth is welding type or hose connection.
- S series and SS aseptic sampling valve adopts aseptic design, POM material rotate hand wheel, either Can guarantee the strength and the hot sweet design.
- S and SS two series of aseptic sampling valve is very suitable for food, pharmaceutical and other must be strictly controlled. The operation condition of the bacteria, because it conform to the requirements of the sanitary production at the same time. In production, sterile sampling valve can fully under the condition of not interrupt processing to ensure continuous random aseptic sampling.
- SS series can be performed steam sterilization before and after sampling, effectively prevent the possibility of contamination and the valve itself bacteria infection.
- KSV aseptic sampling valve body connection structure can design based on the assembling surface, junction surface, welding or clamp type is optional. (can be based on customer demand welding on the tanks, welding on the pipe or use another chuck connection joints. S and SS series KSV aseptic sampling valve outlet pipe connection has a cassette, pagoda, hose type, etc.)



**KSV - G series sampling valve / KSV - S aseptic sampling valve  
KSV - SS sterile sampling valve can be sterilized**

### KSV-G series viscosity :Application to regular water sampling

#### KSV-S series

- Low viscosity: 0-8000CP, particle diameter < 8mm.
- Application: brew, dairy, pharmaceutical, and biochemical industry.

#### KSV-SS series Aseptic sampling valve with sterilization

- High viscosity: 0-2000 cp, grain diameter < 8mm.
- Applications: brew, dairy, pharmaceutical and biotechnology industries.

### Technical parameters

- Flow components material: 316L SS
- Other steel: 304L SS
- Seal Material: PTFE/EPDM
- Handle material: POM/SS
- Surface finish: inner surface EP Ra≤0.5μm
- Outside surface MP: Ra≤0.8μm
- maxi medium pressure: 0.6 Mpa
- min allowed pressure: 0.04 Mpa
- Working Temp: - 20°C ~ 120°C
- Sterilization temperature: ≤ 121°C Max 20min



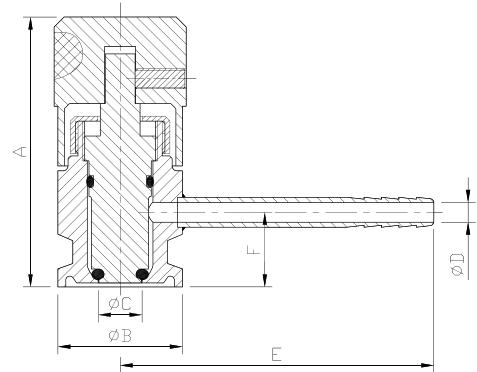
## KSV Regular sampling valve

KSV Regular sampling valve has the characteristics of simple structure, convenient operation, and suitable for just sampling without sterilization conditions.

KSV Basic sampling valve including KSV- G4 and KSV –G6 two types of structure.

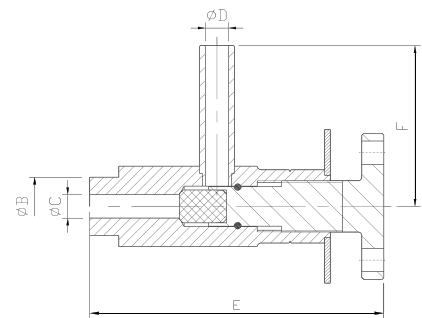
### KSV-G4 Regular Sampling valve A1531103ZZ0002504K

TYPE	A	B	C	D	E	F
Hose Connection	54.2	20.0	8.8	4.0	62.8	15.0



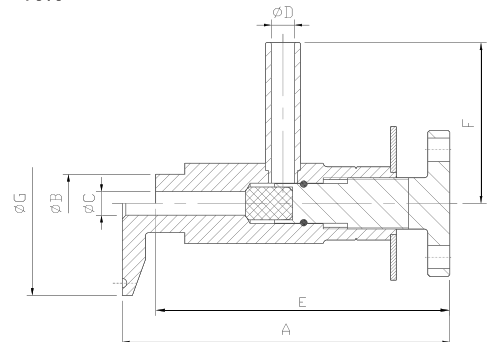
### KSV-G6 Welding end Basic Sampling valve A1531000ZZ0000504K

TYPE	A	B	C	D	E	F	G
Weld	/	19.0	6.4	6.4	57.0	46.0	/



### KSV-G6 Clamp end Basic Sampling valve A1531001ZZ0000504K

TYPE	A	B	C	D	E	F	G
Clamp	92.0	19.0	6.4	7.72	/	46.0	50.4

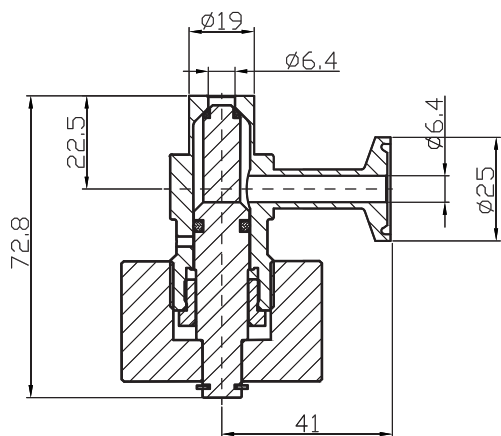


### KSV-S Aseptic sampling valve selection criteria

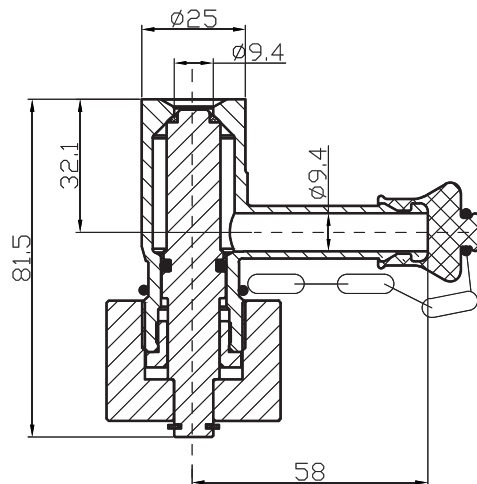
Aseptic sampling valve	Diameter and connection method		Sampling and connection method		Sample viscosity	Sampling particles diameter
S6	DN20	Weld/Clamp	DN6	Weld/Clamp/Pagoda	0~200cp	< 2mm
S9	DN25	Weld/Clamp	DN15	Weld/Clamp/Pagoda	0~2000cp	< 4mm
S12	DN40	Weld/Clamp	DN15	Weld/Clamp/Pagoda	0~5000cp	< 6mm
S15	DN50	Weld/Clamp	DN20	Weld/Clamp/Pagoda	0~8000cp	< 8mm

### KSV-S6 Series

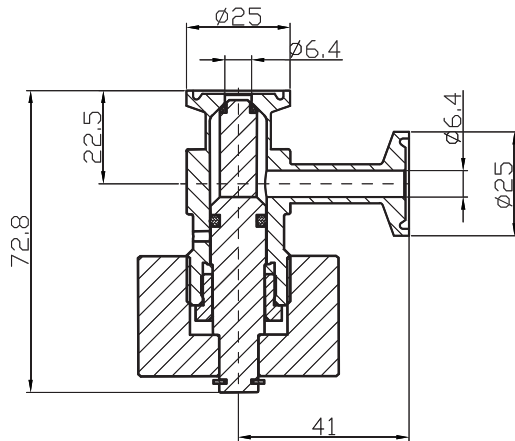
KSV-S6 Sampling Valve



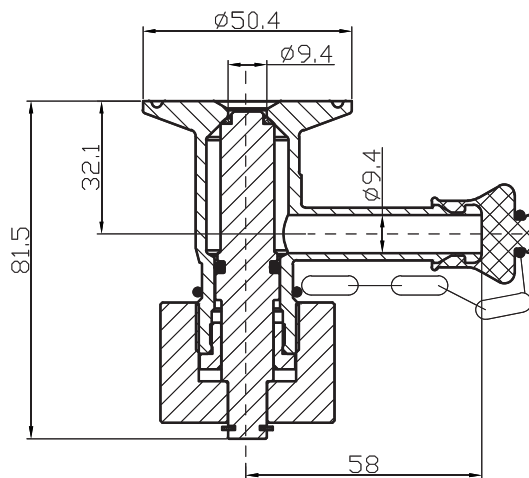
S6 Weld (S6-W-C)



S9 Weld (S9-W-B)



S6 Clamp (S6-C-C)



S9 Clamp (S9-C-B)

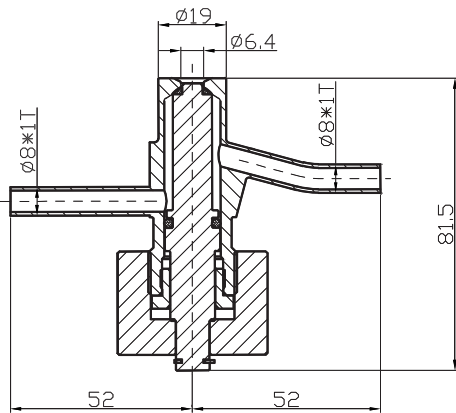
**KSV-SS Sterile sampling valve (sterilization) type selection criteria**

Aseptic sampling valve	Diameter and connection method		Sampling and connection method		Sterilization connection		Sample viscosity	Sampling particles diameter
	DN	Method	DN	Method	DN	Method		
SS6	DN20	Weld/Clamp	DN6	Weld/Clamp/Pagoda	DN6	Weld/Clamp/Pagoda	0~200cp	< 2mm
SS9	DN25	Weld/Clamp	DN15	Weld/Clamp/Pagoda	DN15	Weld/Clamp/Pagoda	0~2000cp	< 4mm
SS12	DN40	Weld/Clamp	DN15	Weld/Clamp/Pagoda	DN15	Weld/Clamp/Pagoda	0~5000CP	< 6mm
SS15	DN50	Weld/Clamp	DN20	Weld/Clamp/Pagoda	DN20	Weld/Clamp/Pagoda	0~8000CP	< 8mm

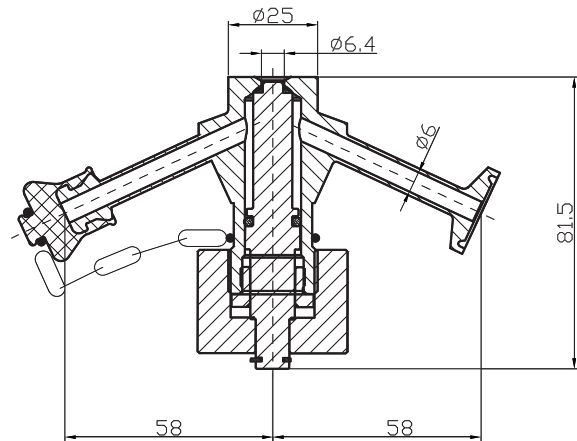
 2  
2.9

**KSV-SS Series**

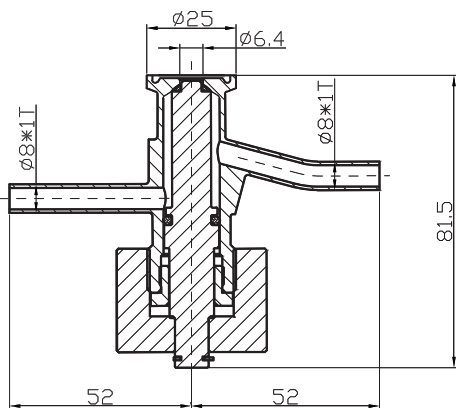
KSV-SS6 Can be sterilized aseptic sampling valve



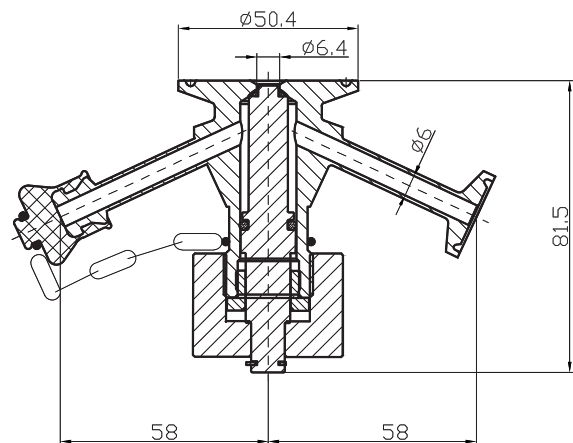
SS6 Weld (SS6-W-WW)



SS6 Weld (SS6-W-BC)

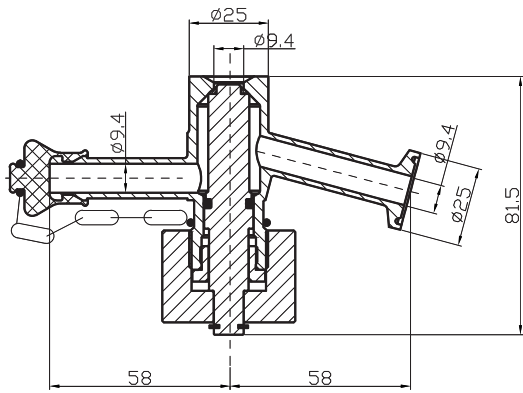


SS6 Clamp (SS6-C-WW)

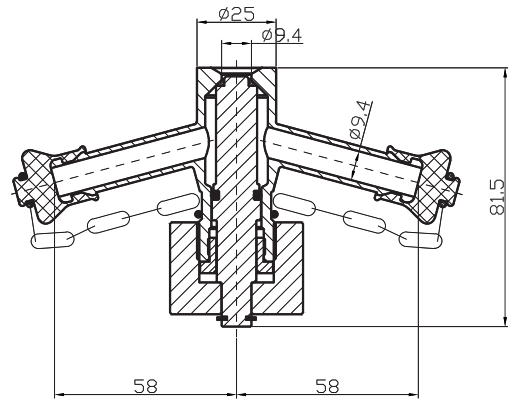


SS6 Clamp (SS6-C-BC)

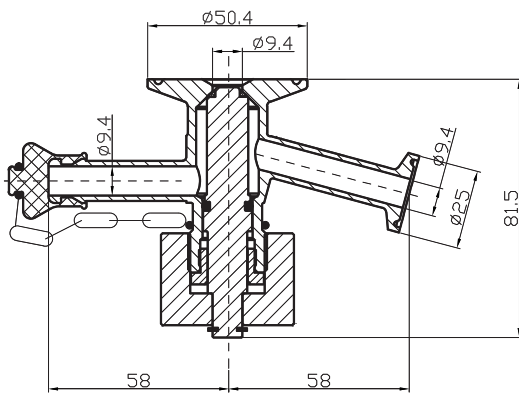
KSV-SS9 Can be sterilized aseptic sampling valve



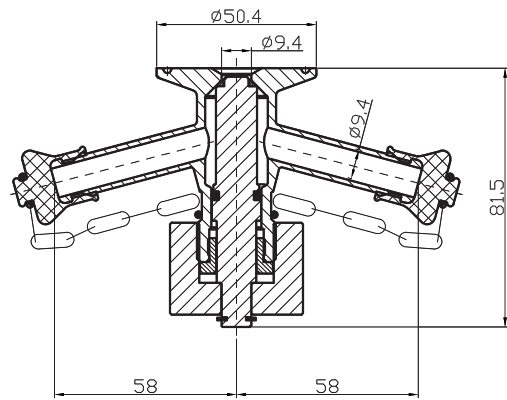
SS9 Weld (SS9-W-BC)



SS9 Weld (SS9-W-BB)



SS9 Clamp (SS9-C-BC)



SS9 Clamp (SS9-C-BB)

## KBV Sanitary ball valves

### Application

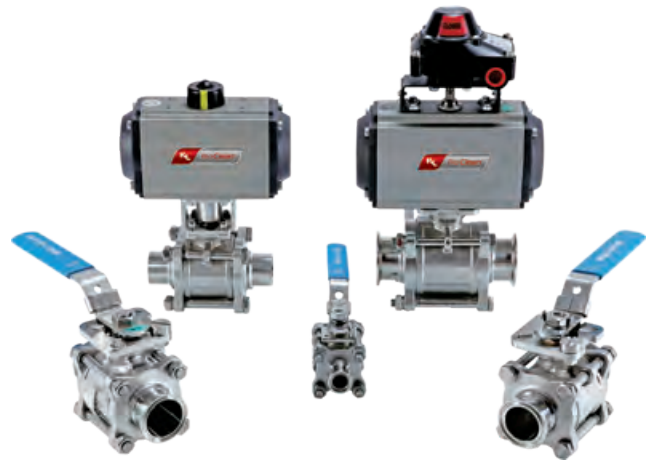
KBV is a new type hygienic ball valve developed by King Lai and is designed for use as a product valve for the food, beverage, pharmaceutical and chemical industries. With full diameter design, without any fluid barrier, KBV becomes the best choice for viscous fluid or liquids with particle.

### Working Principle

KBV ball valve consists of a ball with a circular channel as an opening and closing part. It is open when the ball's hole is in line with the flow and closed when it is pivoted 90-degrees. It is applicable to fully linear design of the valve to reduce the turbulence and pressure drop of the pipeline. An encapsulated seat option is available for critical process applications requiring maximum reduction of potential for product entrapment.

### Standard design

The O-ring design and disc spring at mandrel are for better seal and easy operation. High platform design without stent and connecting shaft can save the installation time and cost of pneumatic actuator. The valve body is made of ASTM 316L stainless steel, valve seat is made of PTFE material, in line with USP6 and FDA certification. The seat is divided into standard and encapsulated type. The valve can be operated by a stainless steel handle or an pneumatic actuator and both of them can be equipped feedback elements. Pneumatic ball valve is divided into three types: normally closed (NC), normally open (NO), double action (DA).



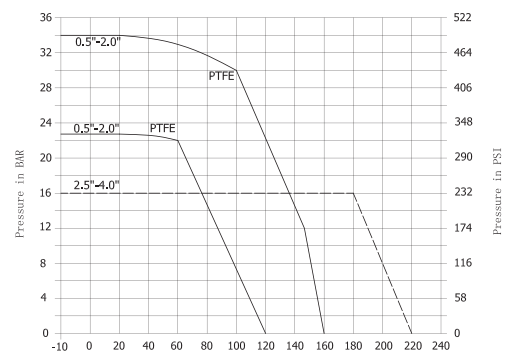
3  
3.1

### Technical Data

Items	Details
Operating temperature	PTFE(TFM): -40~150°C
Ambient temperature	-20~80° C, -4~176° F
Working pressure	Refer to Pressure vs. Temperature diagram
Automatic control unit	Feedback device, locator, cylindrical position sensor
Seat material	PTFE, PTFE(TFM)
Seat form	Standard, Encapsulated (TFM/PEEK is standard only)
Material	1.4404, 1.4409 (CF3M, 316L) EN10088
Connections	Butt-Weld, Clamp 3A, DIN, ISO, GB
Size	DN15~DN100
Surface treatment	Outer surface electro-brightening Inner surface Ra ≤ 0.8μm(SF1), Ra ≤ 0.5μm(SF4)
Certifications	3A, CE

### Pressure vs. Temperature

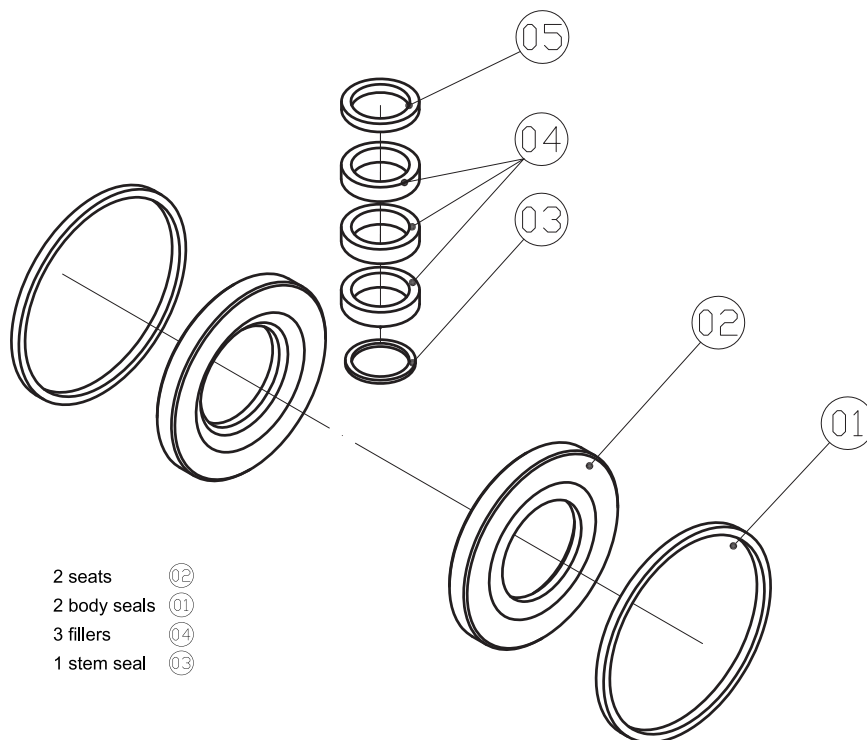
Pressure vs. Temperature



SIP (stem in place) up to 150°C is possible but only when using PTFE, and without operating it. Any seal material must be 95°C before operating. When welding both flanges, make sure they are axially movable 30-40mm (depending on the specifications) for valve maintenance (see instructions).







- 2 seats ②
- 2 body seals ①
- 3 fillers ④
- 1 stem seal ③

Valve Type	01	02	03	04	05
PTFE(standard / encapsulated)	PTFE	PTFE	PTFE	PTFE	Graphite
PTFE(TFM)(Standard only)	PTFE	TFM	PTFE	PTFE	Graphite



Standard



Encapsulated



White means PTFE/PTFE(TFM)

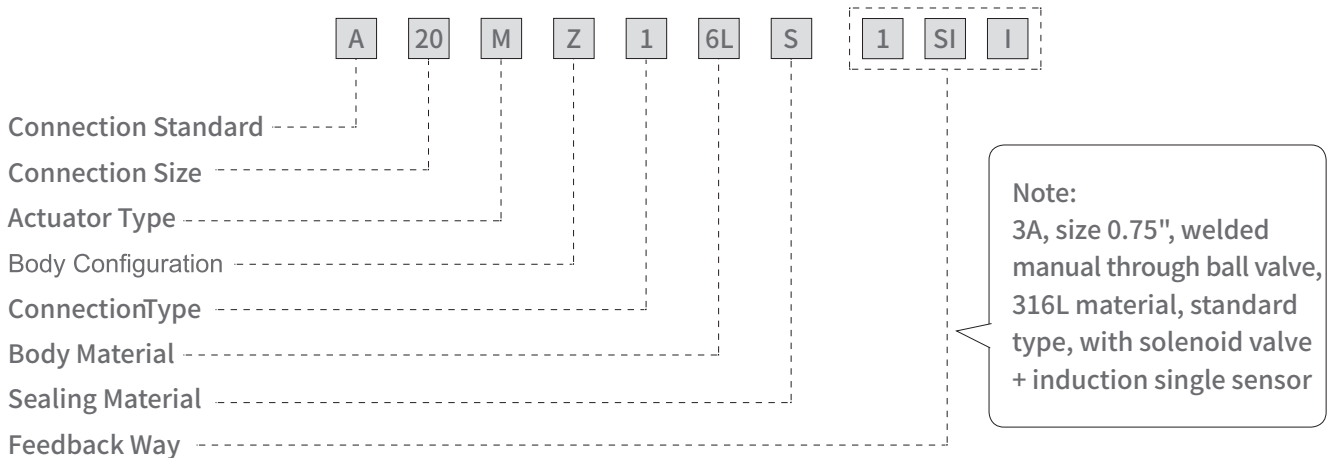
Minimum torque range of the actuator

Pipe	Torque(kgf.m)
15.0	0.9
20.0	1.1
25.0	1.4
38.0	2.7
51.0	3.1
63.5	5.0
76.1	7.3
101.6	10.7

### Optional Configurations

Connection standard	DIN	Connection ends	Welded	
	ISO		Clamp	
	3A		Welded / Clamp	
	GB			
Size of connector	0.5"	Material of valve body	316L	
	0.75"		304L	
	1.0"	valve	Encapsulated	
	1.5"		Standard type	
	2.0"		Feedback form (Only applies to pneumatic)	
	2.5"		Electromagnetic valve	Have
	3.0"			No
	4.0"		Sensor	No
	Single induction			
Actuator	Manual	Sensor form	Induction type	
	Pneumatic normally open		Machine type	
	Pneumatic normally closed			
	Double action			
Body form	straightway			
	T-Type			

### Selection code example

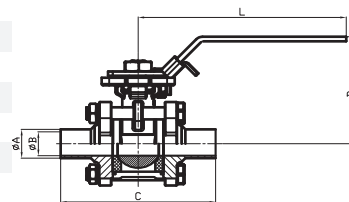


Note: If the valve with feedback signal is used at a hazardous area, please specify the explosion-proof grade of the electronic component when ordering!

### Manual ball valve (welded -end)

KBV-MW-S (single-action and double-action, optional); 1507021-XXXXXX (standard type)

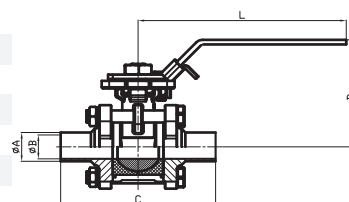
No.	SIZE	A	B	C	H	L
1507021-000050	1/2"	12.7	9.4	88.6	65.5	138.2
1507021-000075	3/4"	19.05	15.8	102.7	69.8	138.2
1507021-000100	1.0"	25.4	22.1	115.2	78.7	138.2
1507021-000150	1.5"	38.1	34.8	139.9	96.6	190.5
1507021-000200	2.0"	50.8	47.5	158.1	106.7	190.5
1507021-000250	2.5"	63.5	60.2	198.0	142	293.3
1507021-000300	3.0"	76.2	72.9	227.5	148.5	293.3
1507021-000400	4.0"	101.6	97.4	241.0	179.4	293.3



### Manual ball valve (welded -end)

KBV-MW-E (single-action and double-action, optional); 1507020-XXXXXX (Encapsulated)

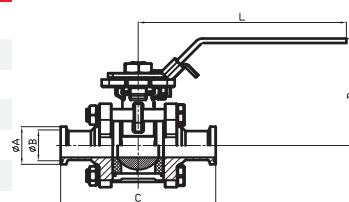
No.	SIZE	A	B	C	H	L
1507020-000050	1/2"	12.7	9.4	88.6	65.5	138.2
1507020-000075	3/4"	19.05	15.8	102.7	69.8	138.2
1507020-000100	1.0"	25.4	22.1	115.2	78.7	138.2
1507020-000150	1.5"	38.1	34.8	139.9	96.6	190.5
1507020-000200	2.0"	50.8	47.5	158.1	106.7	190.5
1507020-000250	2.5"	63.5	60.2	198.0	142	293.3
1507020-000300	3.0"	76.2	72.9	227.5	148.5	293.3
1507020-000400	4.0"	101.6	97.4	241.0	179.4	293.3



### Manual ball valve (Clamp-end)

KBV-MW-S (M dynamic and double action, optional); 1507121-XXXXXX (standard type)

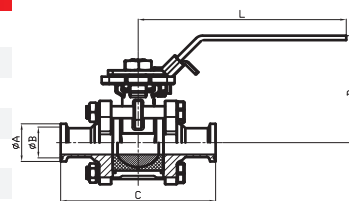
No.	SIZE	A	B	C	H	L
1507121-000050	1/2"	12.7	9.4	88.6	65.5	138.2
1507121-000075	3/4"	19.05	15.8	102.7	69.8	138.2
1507121-000100	1.0"	25.4	22.1	115.2	78.7	138.2
1507121-000150	1.5"	38.1	34.8	139.9	96.6	190.5
1507121-000200	2.0"	50.8	47.5	158.1	106.7	190.5
1507121-000250	2.5"	63.5	60.2	198.0	142	293.3
1507121-000300	3.0"	76.2	72.9	227.5	148.5	293.3
1507121-000400	4.0"	101.6	97.4	241.0	179.4	293.3



### Manual ball valve (Clamp-end)

KBV-MW-E (single-action and double-action, optional); 1507120-XXXXXX (Encapsulated)

No.	SIZE	A	B	C	H	L
1507120-000050	1/2"	12.7	9.4	88.6	65.5	138.2
1507120-000075	3/4"	19.05	15.8	102.7	69.8	138.2
1507120-000100	1.0"	25.4	22.1	115.2	78.7	138.2
1507120-000150	1.5"	38.1	34.8	139.9	96.6	190.5
1507120-000200	2.0"	50.8	47.5	158.1	106.7	190.5
1507120-000250	2.5"	63.5	60.2	198.0	142	293.3
1507120-000300	3.0"	76.2	72.9	227.5	148.5	293.3
1507120-000400	4.0"	101.6	97.4	241.0	179.4	293.3



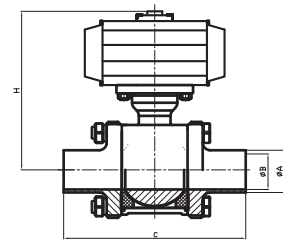
Note: Please replace XXXXXX with the combination code in the Code column and not change the first 6 digits in the order

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### Pneumatic ball valve (welded-end)

KBV-PW-S (M-action and double-action, optional); 1507321-XXXXXX (standard type)

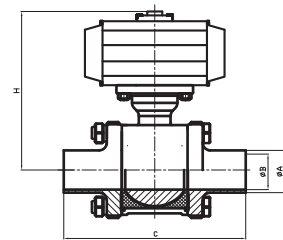
No.	SIZE	A	B	C	H
1507321-000050	1/2"	12.7	9.4	88.6	131.5
1507321-000075	3/4"	19.1	15.8	102.7	135.8
1507321-000100	1.0"	25.4	22.1	115.2	144.7
1507321-000150	1.5"	38.1	34.8	139.9	173
1507321-000200	2.0"	50.8	47.5	158.1	195.2
1507321-000250	2.5"	63.5	60.3	198.0	223.7
1507321-000300	3.0"	76.1	72.9	227.5	238
1507321-000400	4.0"	101.6	97.6	241.0	285.4



### Pneumatic ball valve (welded-end)

KBV-PW-E (single-action and double-action, optional); 1507320-XXXXXX (Encapsulated)

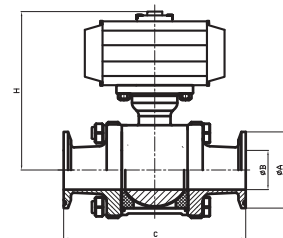
No.	SIZE	A	B	C	H
1507320-000050	1/2"	12.7	9.4	88.6	131.5
1507320-000075	3/4"	19.1	15.8	102.7	135.8
1507320-000100	1.0"	25.4	22.1	115.2	144.7
1507320-000150	1.5"	38.1	34.8	139.9	173
1507320-000200	2.0"	50.8	47.5	158.1	195.2
1507320-000250	2.5"	63.5	60.3	198.0	223.7
1507320-000300	3.0"	76.1	72.9	227.5	238
1507320-000400	4.0"	101.6	97.6	241.0	285.4



### Pneumatic ball valve (Clamp-end)

KBV-PW-S (single action and double action, optional); 1507321-XXXXXX (standard type)

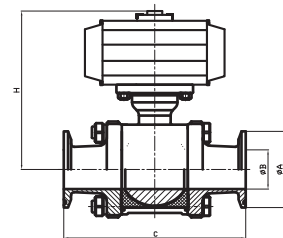
No.	SIZE	A	B	C	H
1507321-000050	1/2"	12.7	9.4	88.6	131.5
1507321-000075	3/4"	19.1	15.8	102.7	135.8
1507321-000100	1.0"	25.4	22.1	115.2	144.7
1507321-000150	1.5"	38.1	34.8	139.9	173
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1507321-000250	2.5"	63.5	60.3	198.0	223.7
1507321-000300	3.0"	76.1	72.9	227.5	238
1507321-000400	4.0"	101.6	97.6	241.0	285.4



### Pneumatic ball valve (Clamp-end)

KBV-PW-E (single-action and double-action, optional); 1507320-XXXXXX (Encapsulated)

No.	SIZE	A	B	C	H
1507320-000050	1/2"	12.7	9.4	88.6	131.5
1507320-000075	3/4"	19.1	15.8	102.7	135.8
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1507320-000200	2.0"	50.8	47.5	158.1	195.2
1507320-000250	2.5"	63.5	60.3	198.0	223.7
1507320-000300	3.0"	76.1	72.9	227.5	238
1507320-000400	4.0"	101.6	97.6	241.0	285.4



Note: Please replace XXXXXX with the combination code in the Code column and not change the first 6 digits in the order

# Sanitary pumps

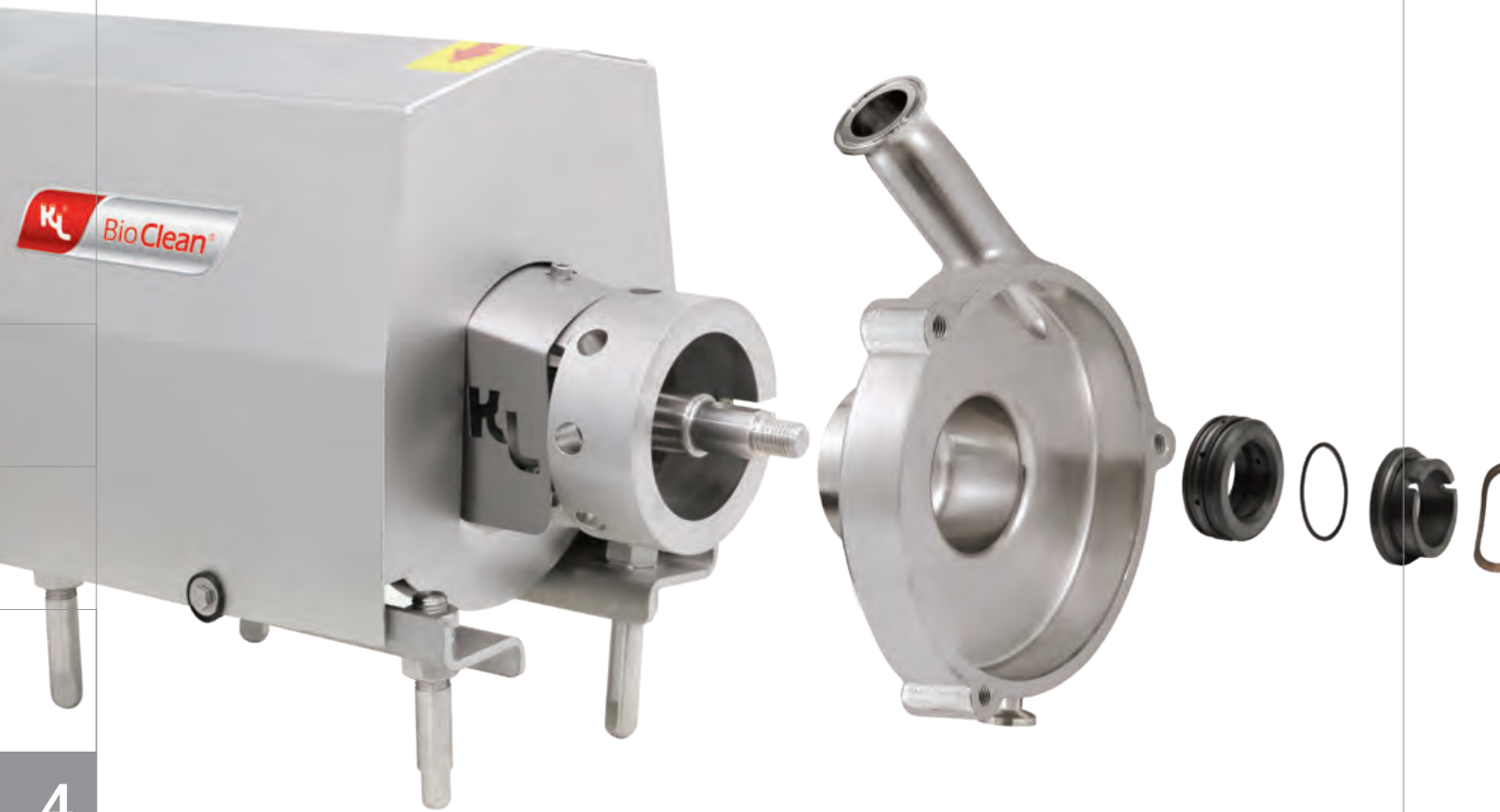
## Fully-upgraded Sanitary Pumps

In order to satisfy the application requirements of customers' complex working conditions, KingLai Group never stops its exploration in the development and application of sanitary pumps, experts with doctorates, has successfully developed all series of sanitary pumps based on the demands in the global market, including centrifugal pumps, self-priming pumps, shearing pumps, rotor pumps and high-efficiency mixing systems, etc.

## Entirely-new Structural Design and Technology

Every pump from KingLai is quality and reliable. With over 20 years' technical accumulations and industrial application experiences, our pumps can run with high efficiency and stability. As for the design of pumps' flow passages, details determine success or failure. Thanks to appropriate design of the clearance between pump cavity and the impeller structure, our products can run quietly and stably with less volume loss and lower NPSH. Processed through CNC five-axis machining center after precise casting, the impeller boasts outstanding precision.





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4.1

## S Series Sanitary High-efficiency Centrifugal Pumps



Specially designed for professional fields with high-performance demands and high cleanliness requirements, King Lai KL-S Series Sanitary High-efficiency Centrifugal Pumps conform to the standards of water for injection (WFI) and are also suitable for other demanding application fields. This series of centrifugal pumps has higher energy efficiency ratio and thus can effectively reduce users' continuous input cost.



KL-S Series Sanitary High-efficiency Centrifugal Pumps use open-type cast impellers processed through CNC five-axis machining to ensure high strength and excellent processing accuracy. Moreover, the unique structure and optimized hydrodynamic design can ensure smooth and efficient running, longer comprehensive service life, and low noise.



### Heavy-duty structure

A minimal design wall thickness of 6mm is adopted by the S Series Sanitary Centrifugal Pumps to ensure their stable performance in pressure resistance, vibration and shock, thus providing the best guarantee for their efficient and trouble-free operations.

### Compact internal structure

Smaller and more appropriate structural clearance ensures efficient running. The clearance between the pump case and the impeller is 0.5mm, which can minimize the volume loss in the pump chamber. The ultra-low NPSH value ensures normal operation even in adverse suction conditions. Moreover, the conveyed materials can contain gas or solid granules in either homogeneous or heterogeneous state.

### Various types of mechanical seals available

Thanks to the design of front rotating ring load seal, the operator just needs to remove the pump cover and impeller, without dismantling the pump case, to complete easy maintenance of the single or double mechanical seal. Depending on different materials, temperatures and operating

conditions, a variety of sealing materials are available, which are completely applicable to CIP and SIP systems.

### Sterile and ultra-clean design

The degree of finish for surfaces of the pump chamber, impeller, gland, and other parts in contact with liquids is below Ra0.5 $\mu$ m. In principle, concave corner shall not be set inside the flow passage; if unavoidable, its radius shall be above 1.6mm, so as to ensure smooth flowing of the medium or cleaning fluid without holdup to prevent bacteria breeding and product cross-contamination.

### Minimization of secondary turbulence

The optimized design of pump pressure passage according to the fluid mechanics principle guarantees stable and smooth delivery of materials, minimizes secondary turbulence of materials in the pump head, and reduces temperature increase-thermal effect of materials, thus ensuring high efficiency of the pump.



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## C Series Sanitary Centrifugal Pumps



KingLai Group's centrifugal pumps include KL-C Series Sanitary Centrifugal Pumps and KL-S Series High-efficiency Centrifugal Pumps. Through targeted selection, the two types of centrifugal pumps can be applied in almost all the scenarios requiring sanitary conveying.

With cost being mainly considered, KL-C Series Centrifugal Pumps are highly economical and cost-effective with stable running and simple structure. Being suitable for applications that require soft material processing, the open-type impeller design can ensure the completeness of materials to the maximum extent. Various types of mechanical seals are available, which are made of FDA-certified materials that conform to 3A standard.







**F-type seal ring**

As an ideal choice when the temperature of fluid is higher than 100°C and the vacuum degree is about 355mmHg, the seal ring can be washed by water.

**Connection of pump spindle**

The reliable structural design can help reduce run-out of spindle vibration, and noise, thus extending the service life of the mechanical seal.

**Stable mechanical seal**

The seal can provide reliable and stable operation in longer service life, thus achieving less downtime. The high surface finish can help reduce the surface pressure of the sealing ring, thus reducing wear and improving efficiency.

**Open-type impeller design**

Suitable for conveying materials containing particles or relatively viscous materials, the special design of impeller and its internal structure can achieve stable and smooth conveying and maximally ensure material completeness.

**Pump case**

Made of high purity 316L stainless steel sheet through integrated cold extrusion forming and butt welding, the pump case features excellent strength, outstanding toughness and fine surface finish, which is more corrosion preventive and hygienic.



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## L Series Sanitary Self-priming Pumps

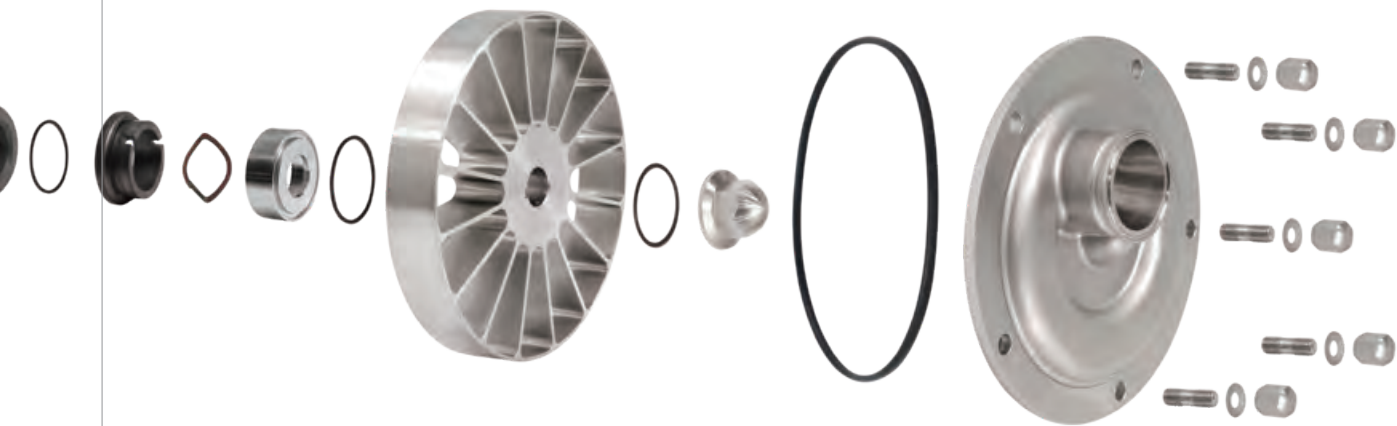


With excellent self-priming capacity and reliability, KingLai Group's KL-L Series Self-priming Pumps are suitable for industries like food and beverages, pharmaceutical engineering as well as fine chemical engineering.

With the radially-arranged unique ring-type impeller, KL-L Series boast optimized inner clearance of pump chamber to achieve its self-priming performance and high working efficiency, thus being widely recognized by customers.

Under conditions where the process medium contains gas, KL-L Series Self-priming Pumps are an ideal solution, which can convey products containing air or bubbles. Therefore, in addition to sucking materials, these self-priming pumps are widely used in CIP systems, as they are especially suitable to serve as the return pump for the CIP systems or to be used to exhaust the storage tanks.





### Optimized flow passage

As for the design of flow passages, details determine success or failure. With the optimized design of flow passage and more appropriate inner clearance of pump chamber, the L Series Self-priming Pumps can effectively reduce loss and achieve higher working efficiency. Furthermore, they can be used for pumping products with air or bubbles.

### Various types of mechanical seals available

This series can use the same type of mechanical seals as KL-S Series Sanitary High-efficiency Centrifugal Pumps, thus making it easier for inventory and maintenance.

Thanks to the design of front rotating ring load seal, the operator just needs to remove the pump cover and impeller, without dismantling the pump case, to complete easy maintenance of the single or double mechanical seal. Depending on different materials, temperatures and operating conditions, a variety of sealing materials are available, which are completely applicable to CIP and SIP systems.

### Impeller

Lateral pressure passage and radially-arranged unique impeller blade are designed to work together to achieve joint transmission of pressure energy.



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## J Series Sanitary Shearing Pump

KL-J Series Shearing Pumps are the best solutions for in-production homogenization and emulsification, which are widely used in the industries of foods, beverages and bio-pharmaceuticals, etc. They can effectively mix heterogeneous products and output stable emulsified liquids after shearing teeth's complete shearing and emulsification to prevent agglomeration and solidification. All KL-J Series Shearing Pumps are especially suitable for volume mixing production, and can be connected with SIP and CIP systems.

Compared with conventional in-tank mixing or in-furnace dissolution process, KL-J Series Shearing Pumps can substantially reduce the time required for homogenization and emulsification with approximately 10% raw materials saved, thus reducing your cost.

With the shearing teeth being precisely manufactured by CNC milling machine, KL-J Series Shearing Pumps boast a finish degree lower than 0.5 $\mu$ m for surfaces in contact with liquids, to avoid bacteria or hazardous substance contamination in tiny spaces.





### High-efficiency structure

The clearance between the rotor or stator and the pump case is always 0.5mm, and the shearing teeth are arranged reversely to the cutter point to produce gas explosion effect, which can realize further shearing and breaking of materials at the rear part of the shearing teeth, thus ensuring shearing effect and medium heterogeneity.

### Ultra clean and sterile design

The surface roughness of the pump chamber, rotor and stator, and other parts in contact with liquids is below Ra0.5 $\mu$ m, to avoid bacteria or hazardous substance contamination in tiny spaces.

### Heavy-duty structure

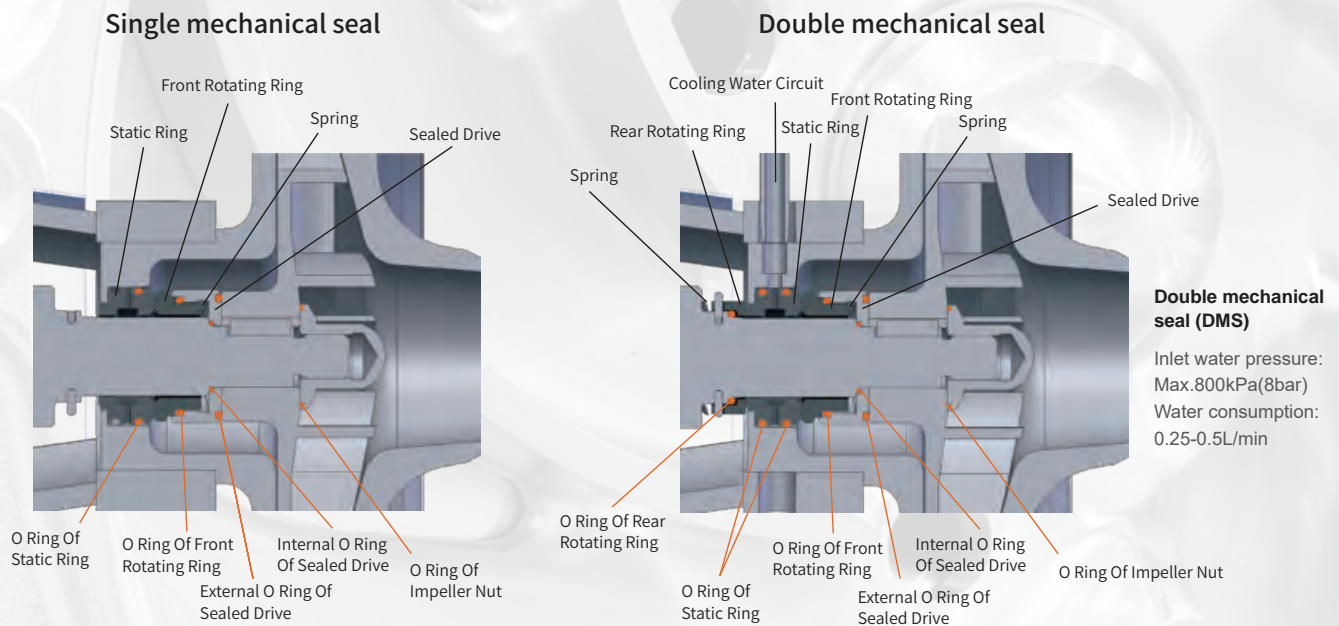
The wall thickness of the J Series Sanitary Shearing Pumps is at least 6mm, to ensure their stable performance

in pressure resistance, vibration and shock, etc., thus providing the best guarantee for their efficient and trouble-free operations.

### Various types of mechanical seals available

This series can use the same type of mechanical seals as KL-S Series Sanitary High-efficiency Centrifugal Pumps, thus making it easier for inventory and maintenance. Thanks to the design of front rotating ring load seal, the operator just needs to remove the pump cover and impeller, without dismantling the pump case, to complete easy maintenance of the single or double mechanical seal. Depending on different materials, temperatures and operating conditions, a variety of sealing materials are available, which are completely applicable to CIP and SIP systems.

## Various types of mechanical seals available



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4.1

### Working conditions of double mechanical seal:

- High-viscosity medium:** The floating of the rotating ring will be affected due to the high medium viscosity and the medium may leak with a single seal; furthermore, the high-viscosity fluid will feature slow backflow at the mechanical seal, resulting in poor cooling effect of the fluid on the mechanical seal. In view of this, double mechanical seals shall be used with external supply of cooling circulating water.
- High-temperature medium:** As high temperature will cause faster seal wearing, reduce material strength and speed up aging of sealing rings, double mechanical seal shall be used with external supply of cooling circulating water.
- Medium containing solid particles:** Solid particles will also affect the floating of the rotating ring and speed up seal wearing; in addition, the fluid with solid particles will feature slow backflow at the mechanical seal, resulting in poor cooling effect of the fluid on the mechanical seal. In view of this, double mechanical seal shall be used with external supply of cooling circulating water.
- High system pressure (above 4 Bar):** As the medium may leak with an externally-installed single mechanical seal, double mechanical seal can be resistant to pressure up to 6 Bar.
- In case of severe cavitation,** the distance of the impeller's axial motion will become larger and the seal wearing will be quickened, so double mechanical seal shall be used with external supply of cooling water.



#### D-type single mechanical seal

D-type externally balanced food sealing ring (sanitary)

Material of sealing ring: SS/C (rotating ring)

Working condition: Ordinary temperature pure water, etc.



#### DG-type single mechanical seal

DG-type externally balanced sealing ring with stationary ring (sanitary)

Material of sealing ring: SiC / C (rotating ring)

Working conditions: Ordinary temperature medium without viscosity or particles

Material of sealing ring: SiC/SiC (rotating ring)

Working conditions: 50°C - 90°C or viscous medium with particles



#### E-type mechanical seal

E-type flush-type double mechanical seal (sanitary)

Material of sealing ring: SS/SiC/CC (rotating ring)

Working condition: Above 90°C or viscous medium with particles



#### F-type single mechanical seal

Flush-type externally balanced sealing ring (sanitary)

Same structure with D-type, it also has flush function

Suitable for applications with special demands

## S Series Sanitary High-efficiency Centrifugal Pumps



### Application fields

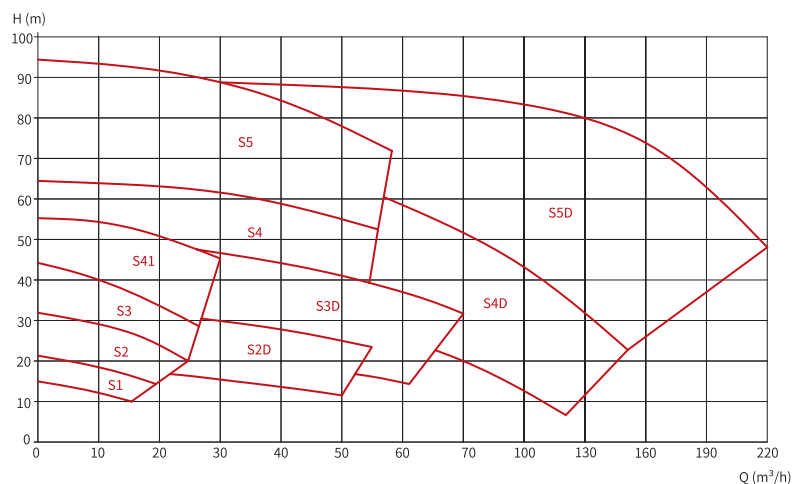
Specially designed for professional fields with high-performance demands and high cleanliness requirements, KingLai Group's KL-S Series Sanitary High-efficiency Centrifugal Pumps conform to the standards of water for injection (WFI) and are also suitable for other demanding application fields. While meeting the sanitary standards and the requirements on soft processing, this series of centrifugal pumps also boast chemical stability. In addition, they dazzle with higher energy efficiency ratio and thus can effectively reduce users' continuous unput cost.

There are altogether ten models of KL-S Series Sanitary High-efficiency Centrifugal Pumps, i.e. S1, S2, S3, S41, S4, S5, S2D, S3D, S4D and S5D.

### Structural design

- Processed through CNC five-axis machining, the open-type cast impeller boasts high strength, excellent processing accuracy and easy cleaning.
- The low NPSH value of S Series Sanitary Pumps ensures normal operation even in adverse suction conditions. Moreover, the conveyed materials can contain gas or solid granules.
- The degree of finish for surfaces of the pump chamber, impeller, gland, and other parts in contact with liquids is below Ra0.5 $\mu$ m. In principle, concave corner shall not be set inside the flow passage. If unavoidable, the radius of the concave corner shall be above 1.6mm, thus ensuring smooth flowing of the medium or cleaning fluid without holdup.

### Model spectrum



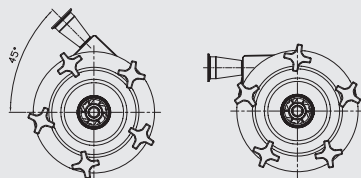


Technical parameters

Item	Parameter
Material	Steel parts of flow passage components: W. 1.4404(316L)
	Other steel parts: W. 1.4301(304)
	Surface treatment: Ra ≤ 0.5µm
	Sealing elements of flow passage components: VITON,EPDM,TEFLON
Joint for flush-type spindle seal	6mm tube/1/8" (G thread) external thread
Motor	ABB B35 series motor with base flange connection; conforming to IEC metric standards; 2 poles = 3000/3600rpm at 50/60Hz.
	Model: standard motor with fixed ball bearing mounted on the drive end
Operating data	Max. inlet pressure: 800kPa (8 bar)
	Temperature: -20°C ~ 180°C
	Water consumption: 0.25-0.5L/min (flush-type double-end mechanical seal)
	Noise: 60-80dB(A), at 1m
	Head: 0-94m
	Flow rate: 220T/h

Options

- A. Impeller with reduced diameter
- B. Motor applicable to other voltage or frequency
- C. Motor with higher safety/explosion-proof grade
- D. Double-end mechanical seal
- E. Discharge outlet: discharge from connector or discharge from diaphragm valve
- F. Outlet direction of pump, see the following drawing:



Order

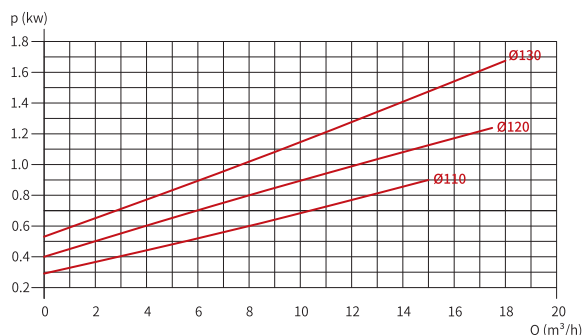
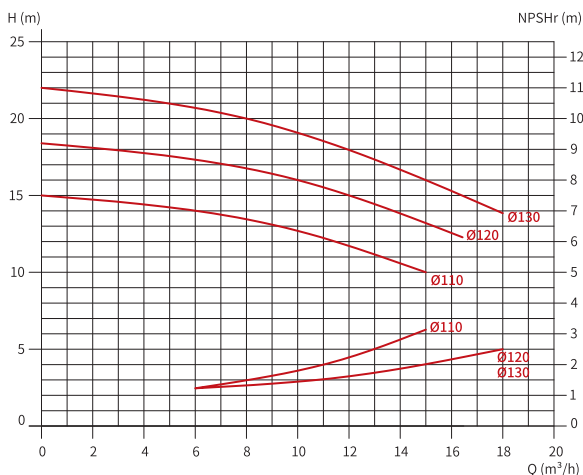
Please provide the following information in the order:

- Model of pump
- Connection: ferrule type, welded type, flanged type or threaded type
- Impeller diameter
- Rated power of motor
- Voltage and frequency
- Flow rate, pressure and temperature
- Density and viscosity of product
- Options

Performance Curve

S1

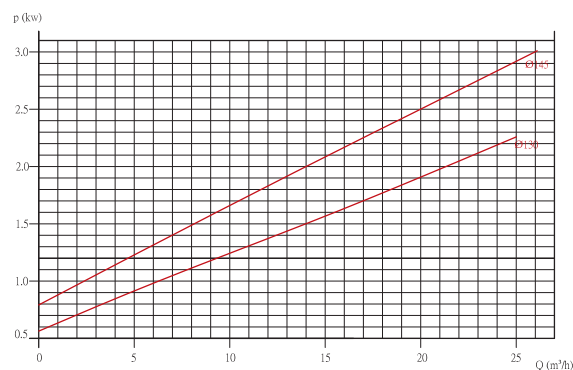
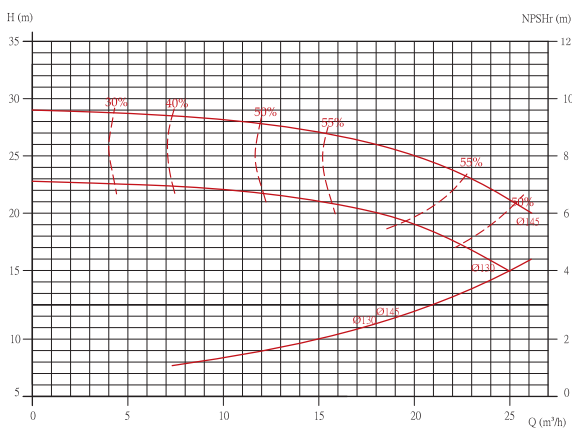
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø130	Ø110	DN50	DN40	316L/304



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4.2

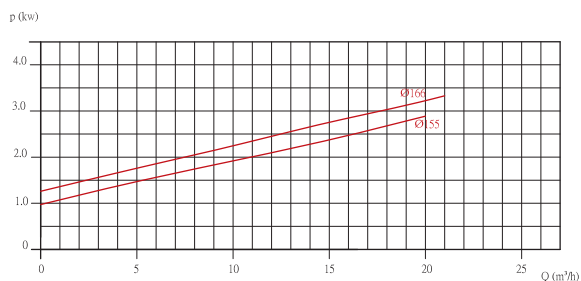
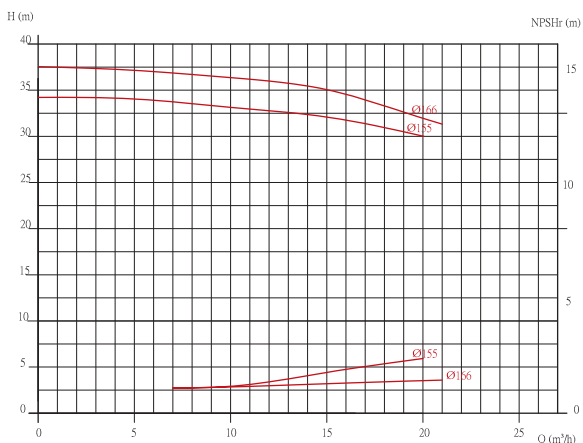
S2

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø140	Ø130	DN50	DN40	316L/304



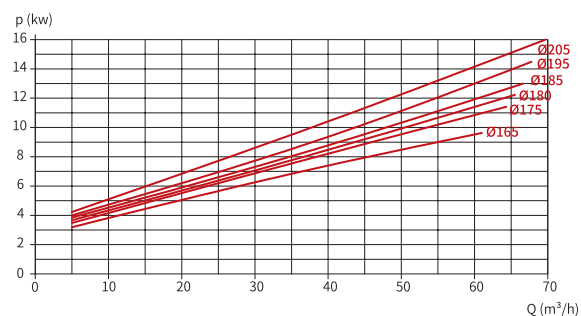
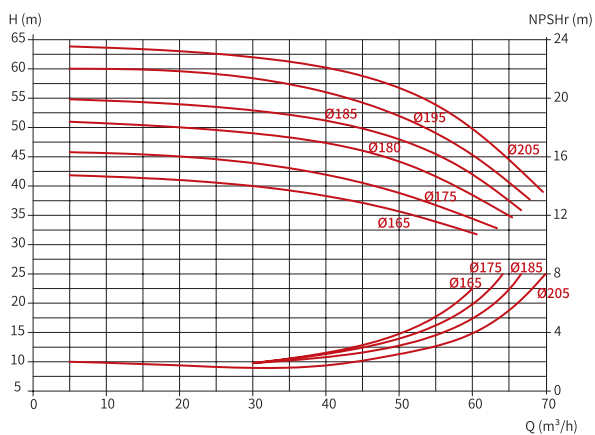
S3

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø205	Ø150	DN50	DN40	316L/304



S41

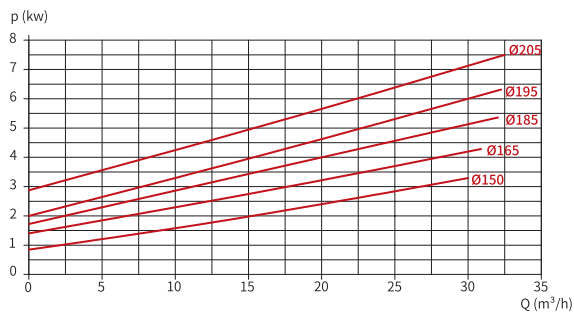
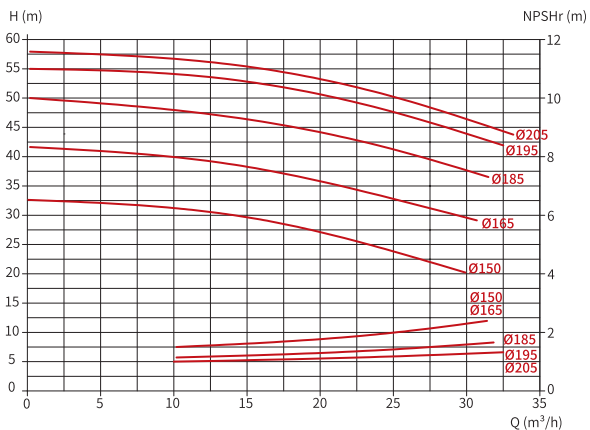
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø205	Ø155	DN65	DN50	316L/304



## Performance Curve

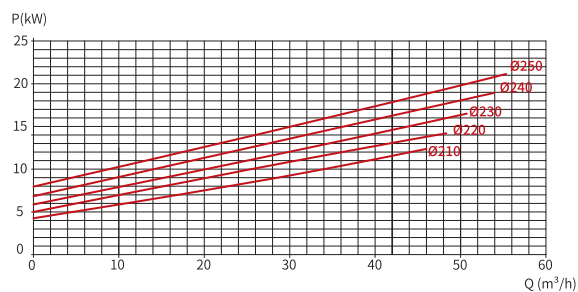
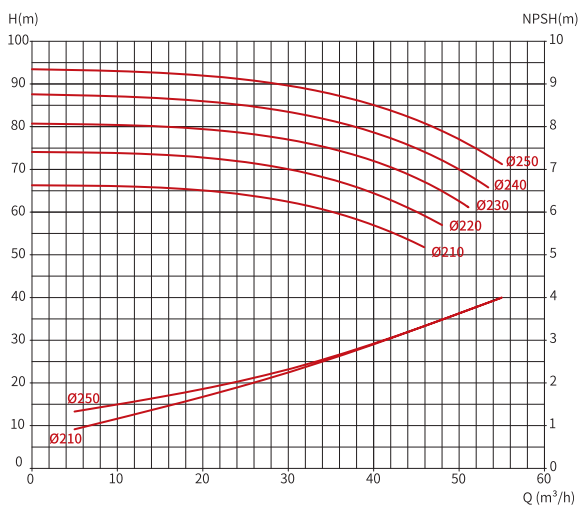
## S4

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø205	Ø165	DN65	DN50	316L/304


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4.2

## S5

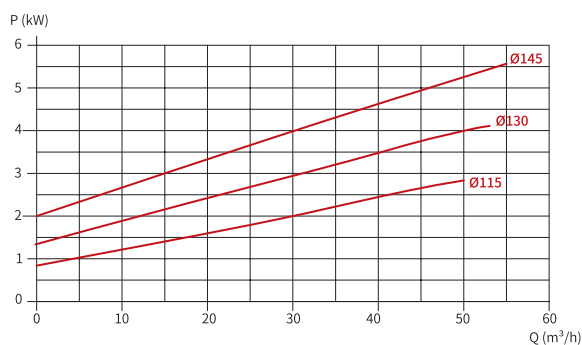
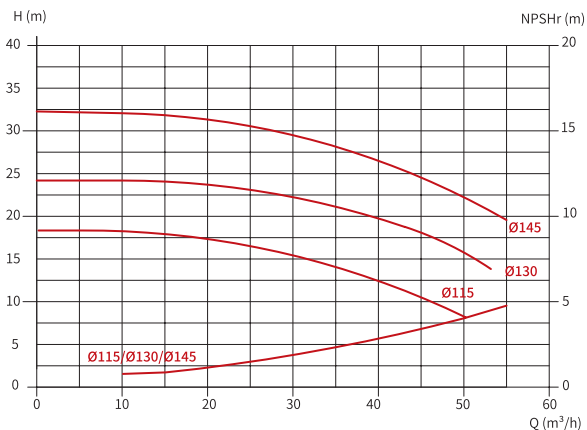
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø250	Ø210	DN80	DN50	316L/304



Performance Curve

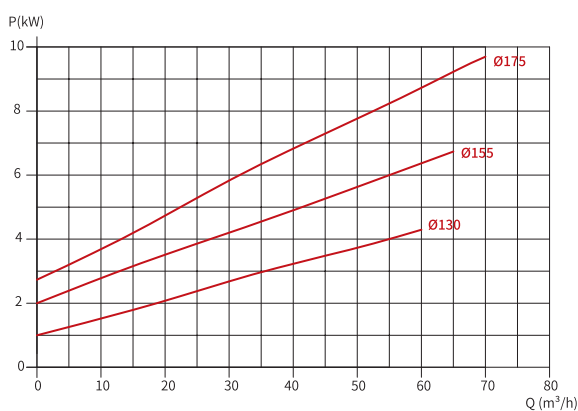
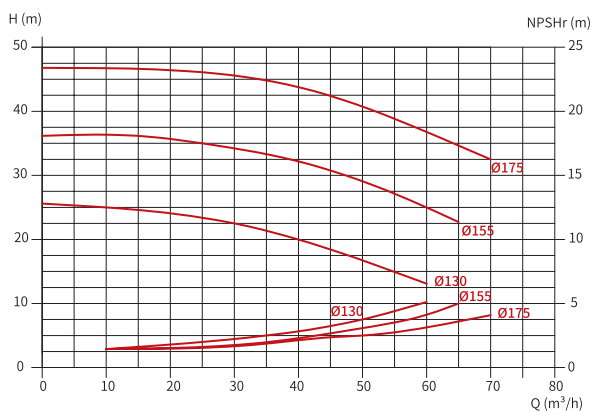
S2D

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø145	Ø115	DN65	DN50	316L/304



S3D

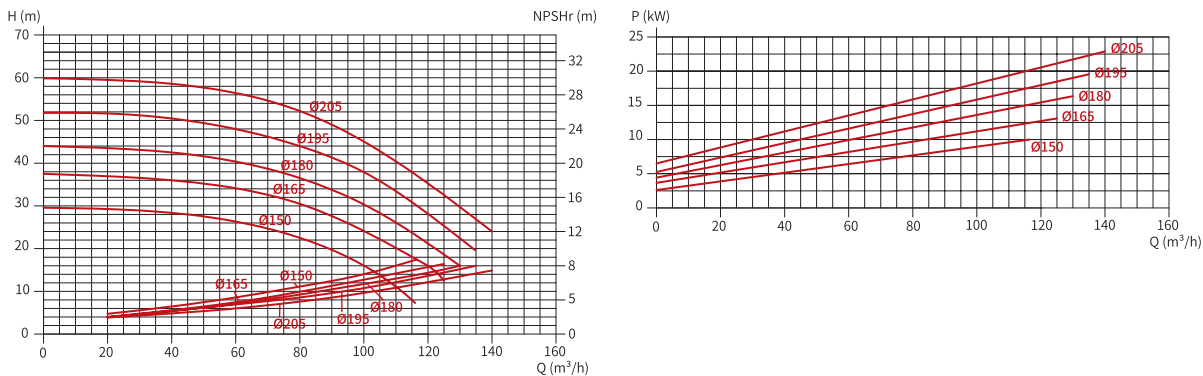
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø205	Ø155	DN65	DN50	316L/304



Performance Curve

S4D

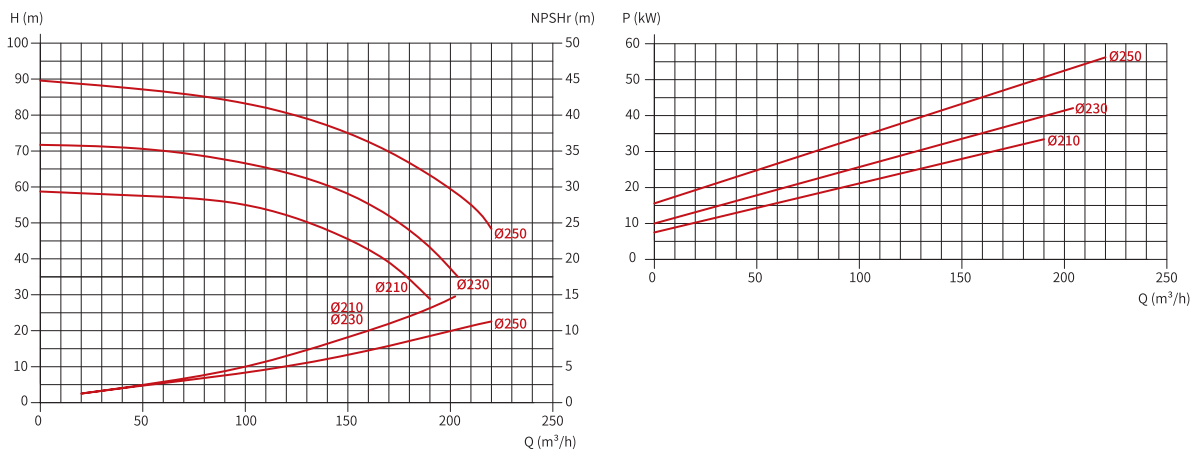
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø205	Ø150	DN80	DN65	316L/304



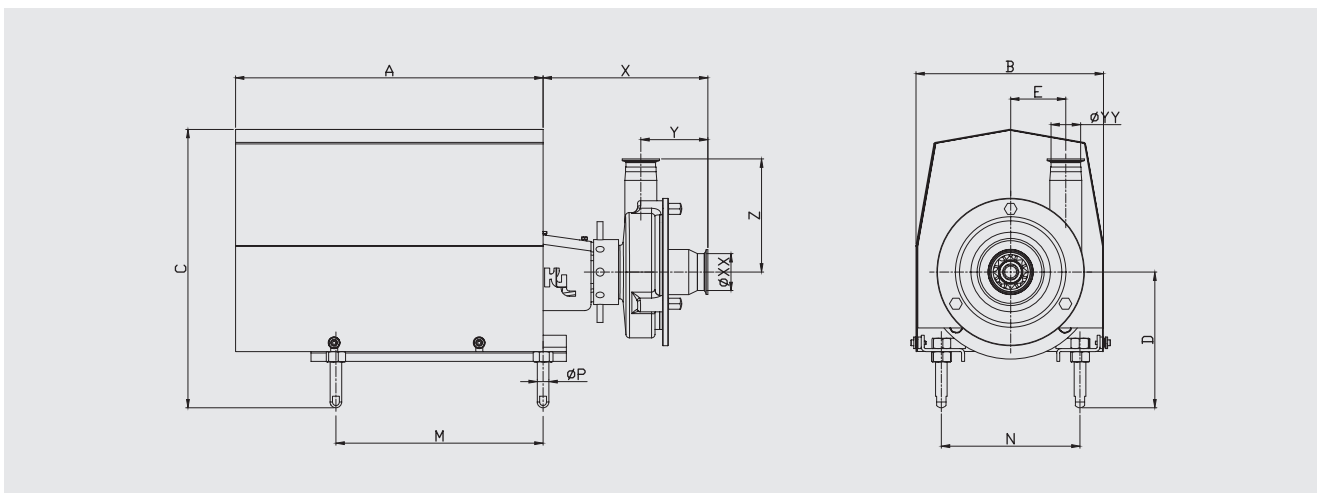
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S5D

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø250	Ø210	DN80	DN65	316L/304



Installation Dimensions



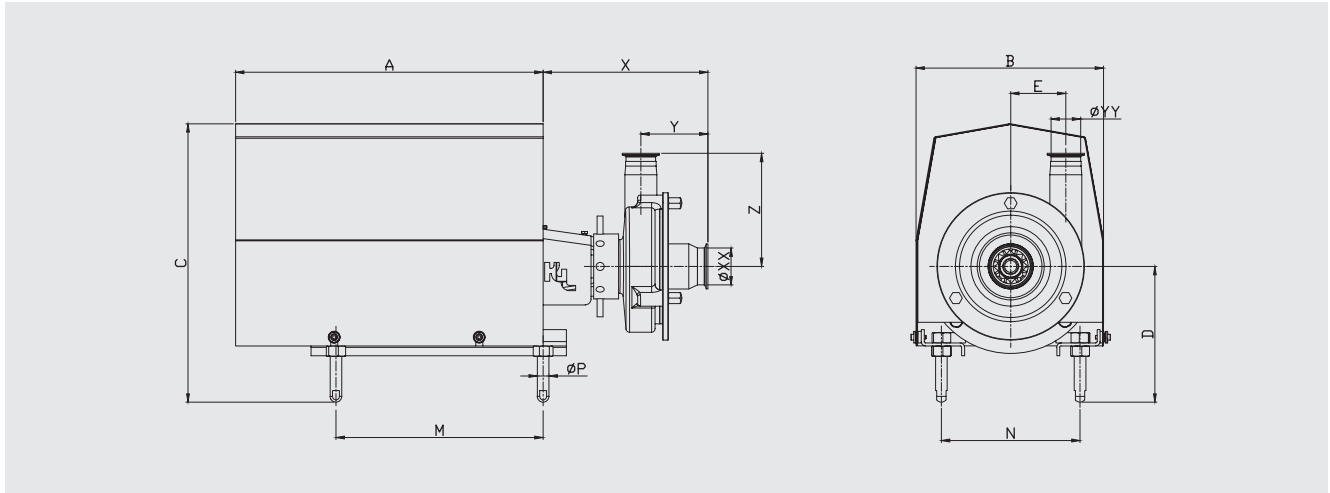
S1

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S1-80	225	95	142	58	38.1	25.4	360	230	338	358	177	197	230	154	Ø16
S1-90	225	95	142	80	50.8	38.1	360	230	335	355	170	190	255	158	Ø16
S1-100	245	95	142	58	38.1	25.4	450	273	427	447	219	239	280	190	Ø20
S1-112	245	95	142	80	50.8	38.1	450	273	427	447	219	239	282	204	Ø20

S2

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S2-80	210	91	173.5	80	50.8	38.1	360	230	338	358	177	197	230	154	Ø16
S2-90	212	91	173.5	80	50.8	38.1	360	230	335	355	170	190	255	158	Ø16
S2-100	241	91	173.5	80	50.8	38.1	450	273	427	447	219	239	280	190	Ø20
S2-112	241	91	173.5	80	50.8	38.1	450	273	427	447	219	239	280	190	Ø20
S2-132	250	91	173.5	80	50.8	38.1	530	323	483	503	237	257	357	239	Ø20

## Installation Dimensions



## S3

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S3-100	251	91.5	209	101	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S3-112	251	91.5	209	101	63.5	50.8	450	273	427	447	219	239	282	204	Ø20
S3-132	260	91.5	209	101	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
S3-160	289	91.5	209	101	63.5	50.8	550	373	564	584	262	282	440	266	Ø20

## S41

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S41-100	260	104	193	96	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S41-112	260	104	193	96	63.5	50.8	450	273	427	447	219	239	282	204	Ø20
S41-132	280	104	193	96	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
S41-160	290	104	193	96	63.5	50.8	550	373	564	584	262	282	440	266	Ø20
S41-180	310	104	193	96	63.5	50.8	650	373	564	584	262	282	440	266	Ø20



## Installation Dimensions

## S4

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S4-100	260	104	193	96	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S4-112	260	104	193	96	63.5	50.8	450	273	427	447	219	239	282	204	Ø20
S4-132	280	104	193	96	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
S4-160	290	104	193	96	63.5	50.8	550	373	564	584	262	282	440	266	Ø20
S4-180	310	104	193	96	63.5	50.8	650	373	564	584	262	282	440	266	Ø20

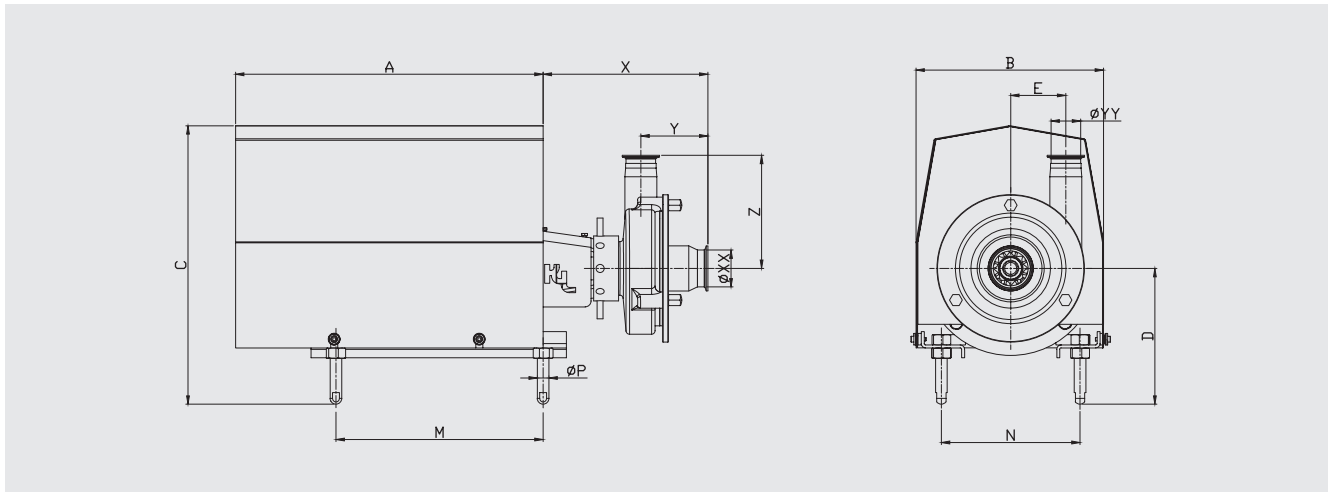
## S5

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S5-132	250	99	205	145	76.2	63.5	530	323	483	503	237	257	357	239	Ø20
S5-160	270	99	205	145	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
S5-180	270	99	205	145	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
S5-200	270	99	205	145	76.2	63.5	/	/	/	/	262	282	460	320	Ø25

## S2D

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S2D-80	285	118	195	79	63.5	50.8	360	230	338	358	177	197	230	154	Ø16
S2D-90	285	118	195	79	63.5	50.8	360	230	335	355	170	190	255	158	Ø16
S2D-100	285	118	195	79	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S2D-112	285	118	195	79	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S2D-132	305	118	195	79	63.5	50.8	530	323	483	503	237	257	357	239	Ø20

## Installation Dimensions



## S3D

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S3D-90	245	115.5	195	95	63.5	50.8	360	230	335	355	170	190	255	158	Ø16
S3D-100	266	115.5	195	95	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
S3D-112	266	115.5	195	95	63.5	50.8	450	273	427	447	219	239	282	204	Ø20
S3D-132	286	115.5	195	95	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
S3D-160	275	115.5	195	95	63.5	50.8	550	373	564	584	262	282	440	266	Ø20

## S4D

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S4D-100	280	118	193	115	76.2	63.5	450	273	427	447	219	239	280	190	Ø20
S4D-112	280	118	193	115	76.2	63.5	450	273	427	447	219	239	282	204	Ø20
S4D-132	300	118	193	115	76.2	63.5	530	323	483	503	237	257	357	239	Ø20
S4D-160	315	118	193	115	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
S4D-180	320	118	193	115	76.2	63.5	650	373	564	584	262	282	440	266	Ø20

## Installation Dimensions

## S5D

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
S5D-132	300	119	231	140	76.2	63.5	530	323	483	503	237	257	357	239	Ø20
S5D-160	320	119	231	140	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
S5D-180	320	119	231	140	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
S5D-200	320	119	231	140	76.2	63.5	/	/	/	/	262	282	460	320	Ø25
S5D-225	320	119	231	140	76.2	63.5	/	/	/	/	262	282	460	320	Ø25

## C Series Sanitary Centrifugal Pumps



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4.3

### Application fields

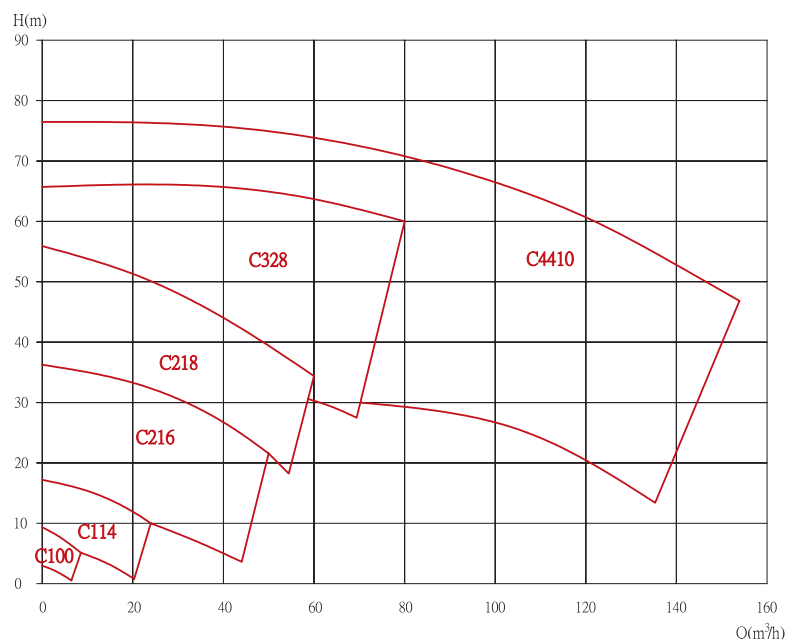
KL-C Series Sanitary Centrifugal Pumps are highly economical, cost-effective, and stable with a simple structure. Widely used in the industries of foods, beverages and dairy products, etc., the pumps are suitable for applications that require soft material processing and can ensure the completeness of materials to the maximum extent. As for C Series Sanitary Centrifugal Pumps, various types of mechanical seals are available, which are made of FDA-certified materials that conform to 3A sanitary standards.

There are altogether six models of KL-C Series Sanitary Centrifugal Pumps, i.e. C100, C114, C216, C218, C328 and C4410.

### Structural design

- Made of 316L stainless steel sheet through integrated cold extrusion forming and butt welding, the pump case of KL-C Series features excellent strength and toughness.
- While achieving the minimum NPSH and noise level, the appropriate clearance between the impeller and the pump case is made to be suitable for fluids as viscous as possible.
- The simple front-mounting design and optimized mechanical seals can ensure failure-free operations for a longer time.
- Processed through CNC five-axis machining, the open-type cast impeller boasts high strength and processing accuracy.
- The groove design of the rolling spindle can effectively avoid "stagnant water", which is applicable to CIP system.

### Model spectrum

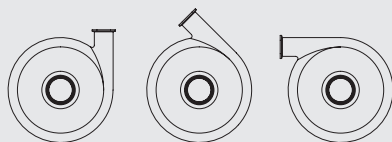


Technical Parameter

Item	Parameter
Material	Steel parts of flow passage components: W. 1.4404(316L)
	Other steel parts: W. 1.4301(304)
	Surface treatment: Ra ≤ 0.5µm
	Sealing elements of flow passage components: VITON,EPDM
Joint for flush-type spindle seal	6mm tube/1/8" (G thread) external thread
Motor	Motor with base flange; conforming to IEC metric standards; 2950RPM/380V/50Hz; protection grade: IP55; Temperature rise grade: F/B; Cooling mode: IC411; Working mode: S1; Energy efficiency rate: IE2
	Model: Standard motor with fixed ball bearing mounted on the drive end
Operating data	Max. inlet pressure: 1,000kPa (10 bar)
	Temperature: -10°C ~ 140°C (EPDM)
	Water consumption: 0.25-0.5L/min (flush-type double-end mechanical seal)
	Noise: 60-80dB(A), at 1m
	Head: 0-90m
	Flow rate: 180T/h

Options

- A. Impeller with reduced diameter
- B. Motor applicable to other voltage or frequency
- C. Motor with higher safety/explosion-proof grade
- D. Double-end mechanical seal
- E. Discharge outlet: discharge from connector or discharge from diaphragm valve
- F. Outlet direction of pump, see the following drawing:



Order

Please provide the following information in the order:

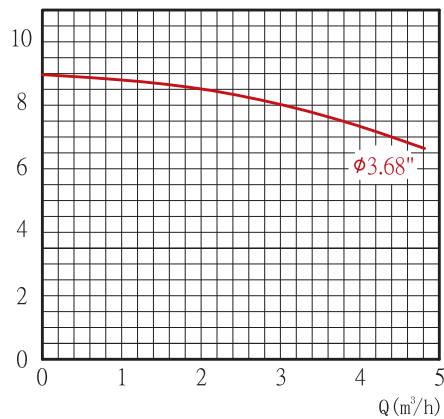
- Model of pump
- Connection: ferrule type, welded type, flanged type or threaded type
- Impeller diameter
- Rated power of motor
- Voltage and frequency
- Flow rate, pressure and temperature
- Density and viscosity of product
- Options

## Performance Curve

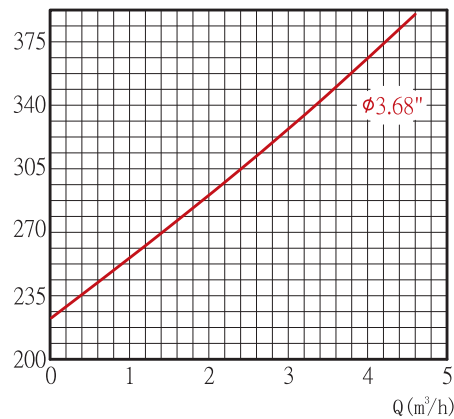
## KL-C100

Medium	RPM	Frequency	Impeller diameter	Inlet dimension	Outlet dimension	Material
20±5°C clean water	2950RPM	50HZ	∅ 3.68"	∅ 1.5"	∅ 1.0"	316L/304

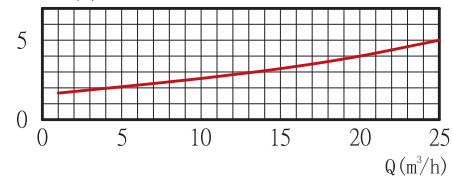
H(m)



P(w)



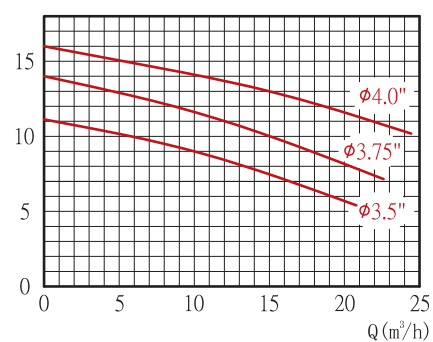
NPSHr (m)


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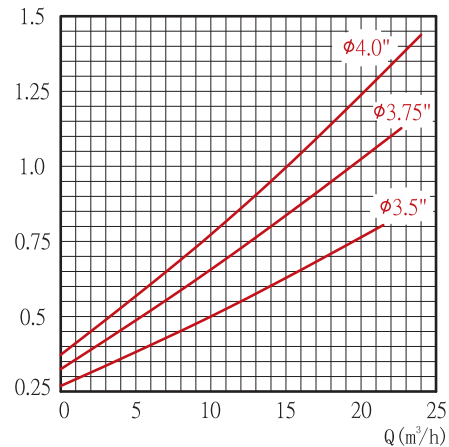
## KL-C114

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	∅ 4"	∅ 3.5"	∅ 1.5"	∅ 1.5"	316L/304

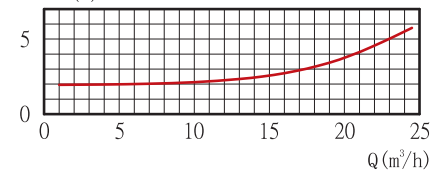
H(m)



P(kw)



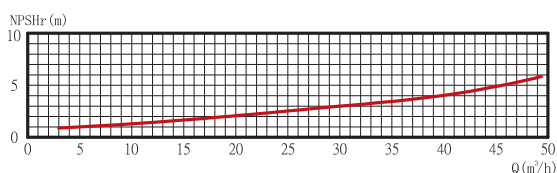
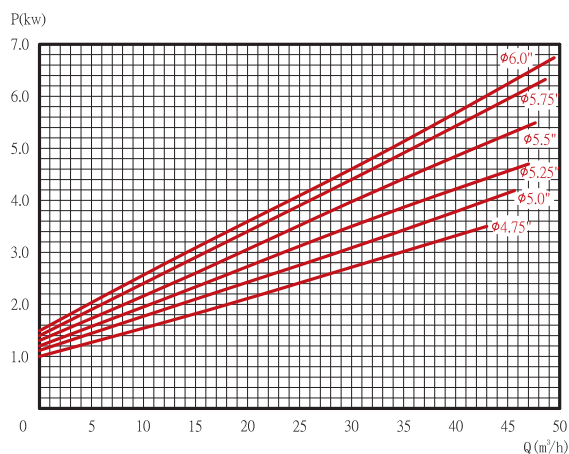
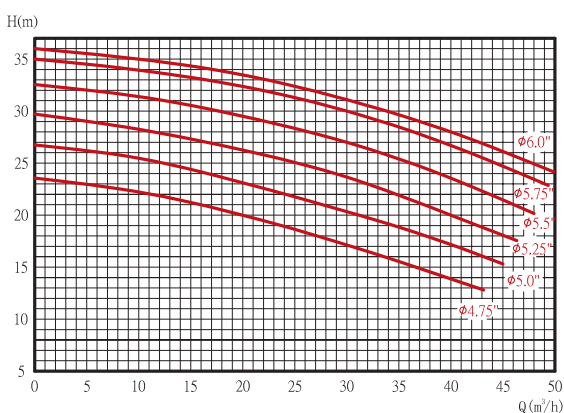
NPSHr (m)



Performance Curve

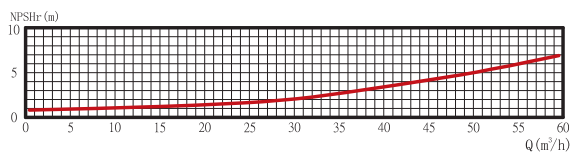
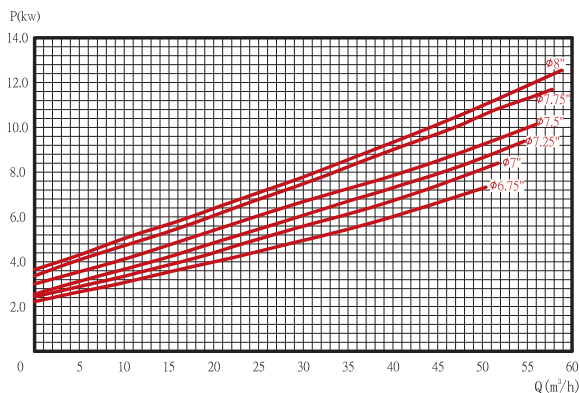
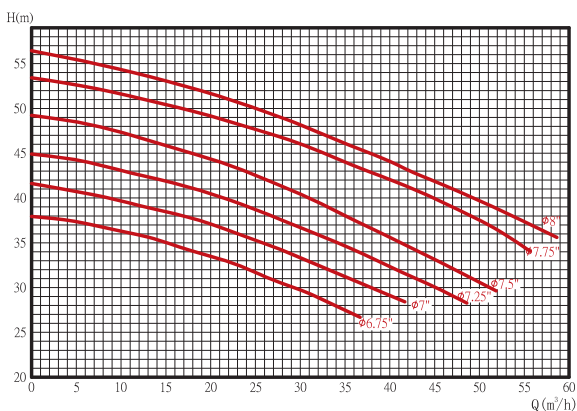
KL-C216

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø 6"	Ø 4.75"	Ø 2.0"	Ø 1.5"	316L/304



KL-C218

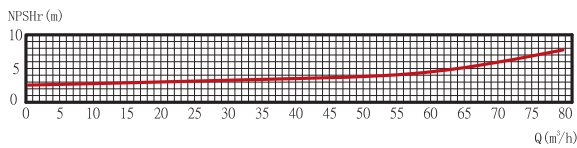
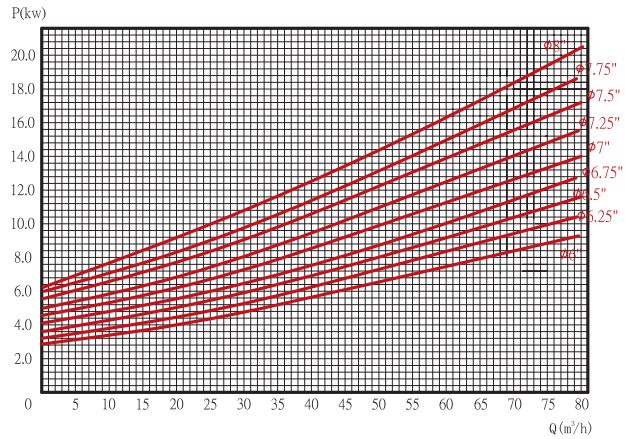
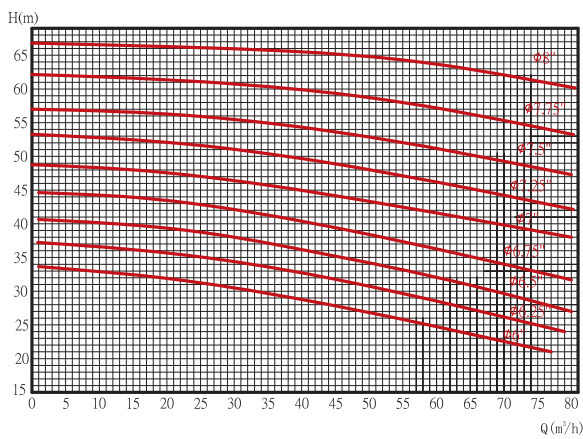
Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø 8"	Ø 6.75"	Ø 2.0"	Ø 1.5"	316L/304



## Performance Curve

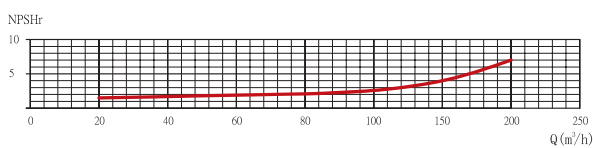
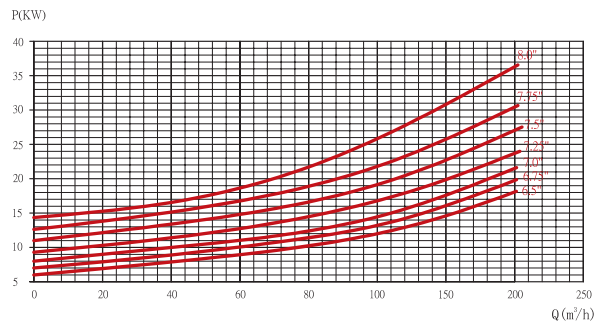
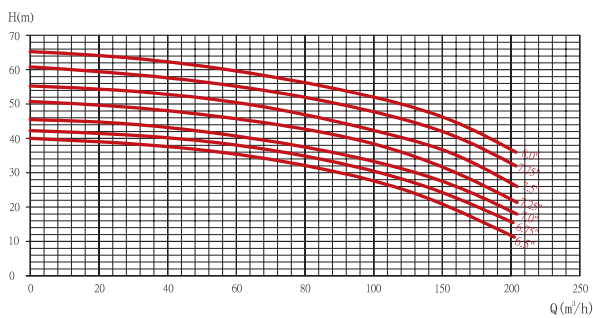
## KL-C328

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø 8"	Ø 6"	Ø 3.0"	Ø 2.0"	316L/304


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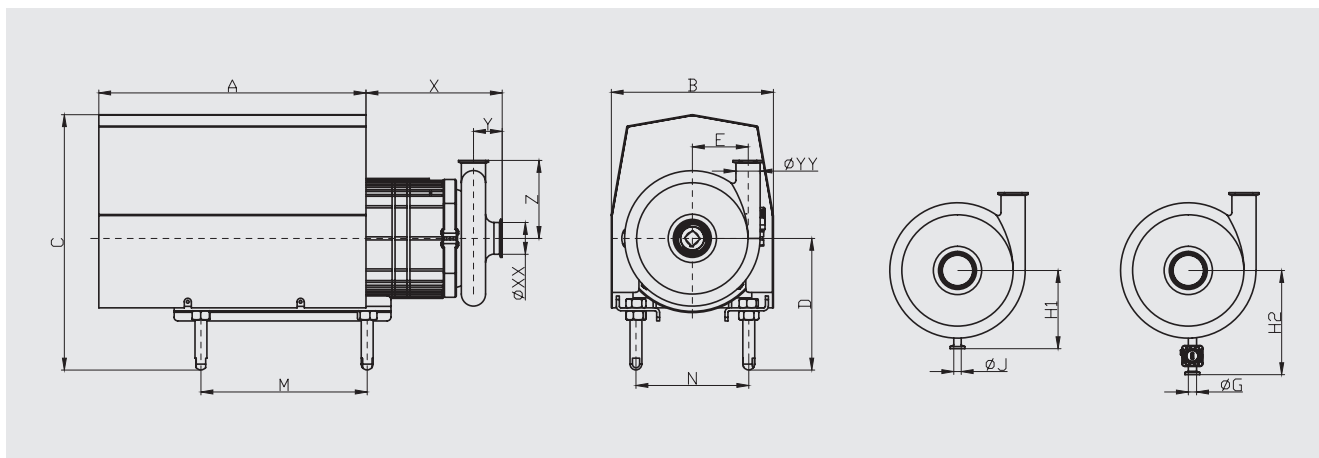
## KL-C4410

Medium	RPM	Frequency	Impeller diameter		Inlet dimension	Outlet dimension	Material
			Max.	Min.			
20±5°C clean water	2950RPM	50HZ	Ø 8"	Ø 6.5"	Ø 4"	Ø 4"	316L/304





Installation Dimensions



C100

Dimension	Motor	
	0.37/0.55KW	0.75/1.1KW
X	85	77
Y	40	40
Z	89	89
E	35	35
XX	38	38
YY	25	25
A	300	360
B	210	223
C min	304	340
C max	319	355
D min	141	160
D max	156	175
M	180	230
N	144	154
J	12.7	12.7
G	19.1	19.1
H1	70	70
H2	137	137

C114

Dimension	Motor			
	0.75/1.1KW	1.5/2.2KW	3KW	4KW
X	180	182	180	179
Y	40	40	40	40
Z	92	92	92	92
E	67	67	67	67
XX	38	38	38	38
YY	38	38	38	38
A	360	360	450	450
B	223	223	273	273
C min	335	335	430	430
C max	355	355	450	450
D min	175	175	222	234
D max	195	195	242	254
M	230	255	280	282
N	154	158	190	204
J	12.7	12.7	12.7	12.7
G	19.1	19.1	19.1	19.1
H1	103	103	103	103
H2	170	170	170	170

## Installation Dimensions

## C216

Dimension	Motor			
	1.5/2.2KW	3KW	4KW	5.5/7.5KW
X	184	229	228	228
Y	48	48	48	48
Z	114	114	114	114
E	94	94	94	94
XX	51	51	51	51
YY	38	38	38	38
A	360	450	450	530
B	223	273	273	323
C min	335	430	430	480
C max	355	450	450	500
D min	175	222	234	234
D max	195	242	254	254
M	255	280	282	357
N	158	190	204	239
J	12.7	12.7	12.7	12.7
G	19.1	19.1	19.1	19.1
H1	148	148	148	148
H2	215	215	215	215

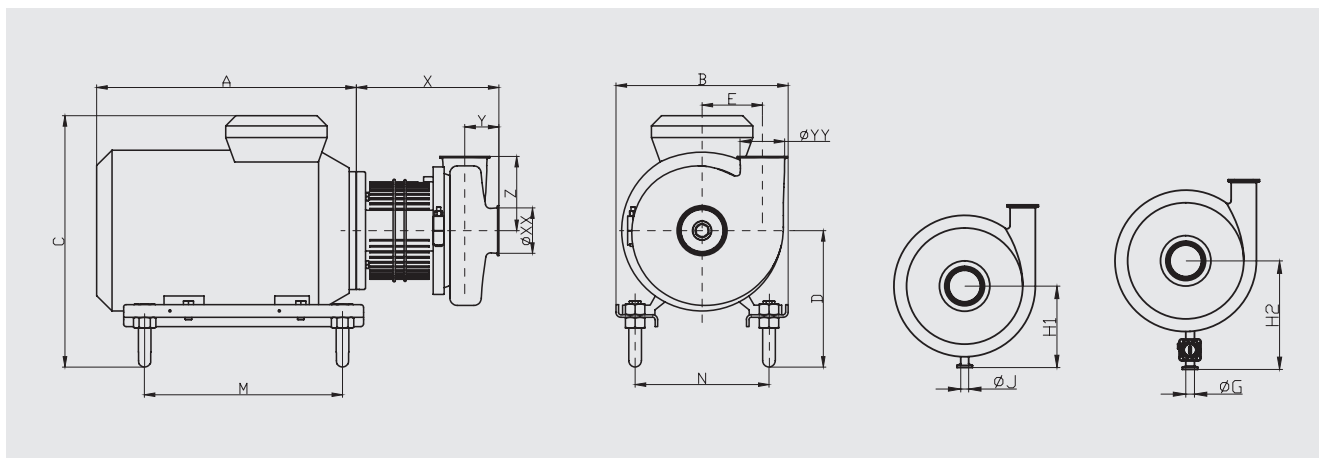
## C218

Dimension	Motor		
	4KW	5.5/7.5KW	11/15KW
X	191	227	260
Y	52	52	52
Z	140	140	140
E	119	119	119
XX	51	51	51
YY	38	38	38
A	450	530	550
B	273	323	373
C min	427	480	564
C max	447	500	584
D min	214	234	262
D max	234	254	282
M	282	357	440
N	204	239	266
J	12.7	12.7	12.7
G	19.1	19.1	19.1
H1	155	155	155
H2	222	222	222

## C328

Dimension	Motor		
	5.5/7.5KW	11/15KW	18.5/22KW
X	233	265	254
Y	56	56	56
Z	140	140	140
E	120	120	120
XX	76	76	76
YY	51	51	51
A	530	550	700
B	323	373	388
C min	480	564	585
C max	500	584	605
D min	234	262	304
D max	254	282	324
M	357	440	439
N	239	266	279
J	12.7	12.7	12.7
G	19.1	19.1	19.1
H1	155	155	155
H2	222	222	222

Installation Dimensions



C4410

Dimension	Motor				
	11/15/18.5KW	22KW	30/37KW	45KW	55KW
X	335	339	339	339	258
Y	81	81	81	81	81
Z	176	176	176	176	176
E	143	143	143	143	143
XX	101	101	101	101	101
YY	101	101	101	101	101
A	515	573	617	714	742
B	344	371	409	462	534
C min	515	557	597	664	709
C max	535	577	617	684	729
D min	262	304	324	350	375
D max	282	324	344	370	395
M	440	430	470	500	570
N	254	279	318	356	406
J	12.7	12.7	12.7	12.7	12.7
G	19.1	19.1	19.1	19.1	19.1
H1	196	196	196	196	196
H2	263	263	263	263	263

## L Series Sanitary Self-priming Pumps



4

4.4

### Application fields

Under conditions where the process medium contains gas, KL-L Series Self-priming Pumps are an ideal solution, as they can convey products containing air or bubbles. Therefore, except for sucking materials, these self-priming pumps can serve as the return pump for CIP systems or be used to exhaust the storage tanks.

There are six models of KL-L series self-priming pumps: L1, L2, L3, L4, L5, L6.

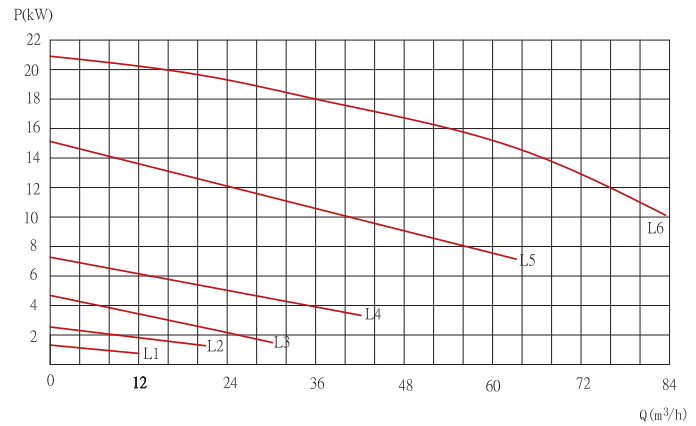
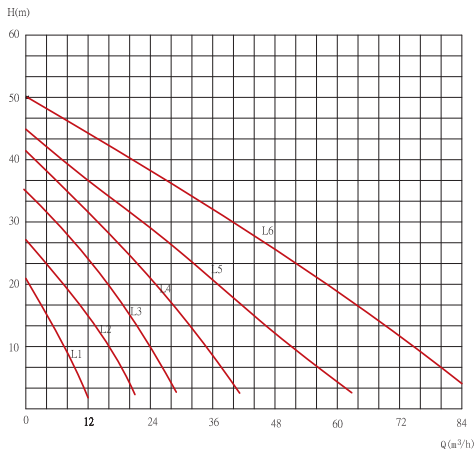
### Structural design

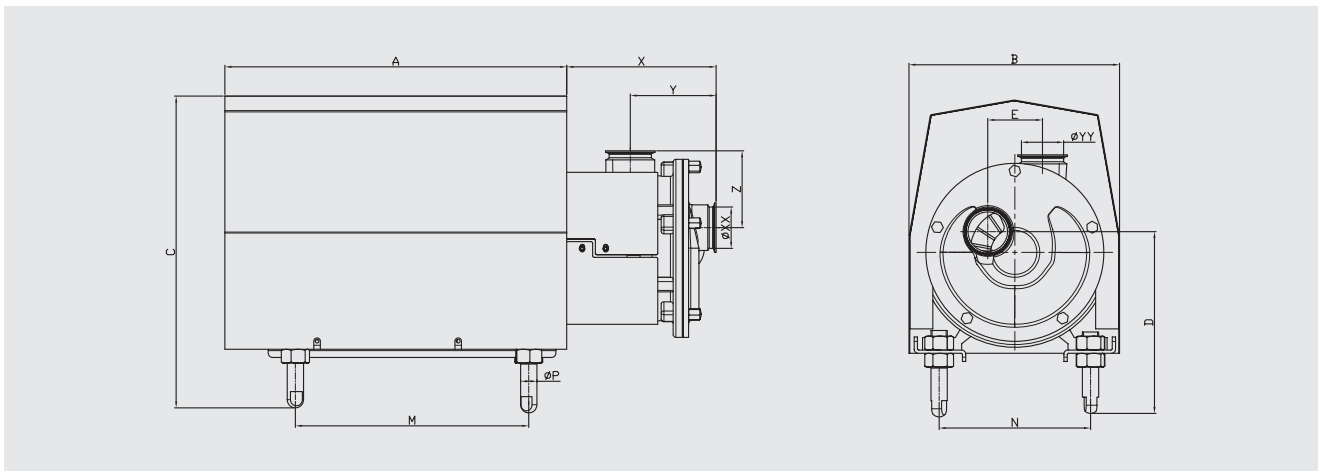
- L series self-priming pump with the advanced impeller design minimize recirculation and ensure the efficient transfer of energy.
- Minor gap between the pump casing and the impeller ensures high volume efficiency.
- It is shared with KL-S series sanitary high-efficiency centrifugal pump. It is designed with front moving ring load seal. Single and double mechanical seal maintenance requires simple disassembly of the pump cover and impeller without disassembling the pump casing.
- A variety of sealing materials and configurations can be chosen, adapt to different process and temperature, fully suitable for CIP, SIP systems.

Technical Parameter

Item	Parameter
Material	Steel parts of flow passage components: W. 1.4404(316L)
	Other steel parts: W. 1.4301(304)
	Surface treatment: Ra≤0.8μm
	Sealing elements of flow passage components:VITON,EPDM
Joint for flush-type spindle seal	66mm tube/1/8" (G thread) external thread
Motor	Motor with base flange connection; Conforming to IEC metric standards; 3P; Inverter: 50Hz; 380V 1450rpm; Protection grade: IP55; Temperature rise grade: F/B; Cooling mode: IC411; Working mode: S1; Energy efficiency rate: IE3
	Model: standard motor with fixed ball bearing mounted on the drive end
Operating data	Max. inlet pressure: 500kPa (5 bar)
	Temperature: -20°C ~180°C
	Water consumption: 0.25-0.5L/min (flush-type double-end mechanical seal)
	Noise: <85dB at 1m
	Suction head: 8m

Model	Medium	RPM	Frequency	Impeller diameter	Inlet dimension	Outlet dimension	Suction head	Material
L1	20±5°C clean water	1450RPM	50HZ	170mm	DN50	DN50	8M	316L/304
L2	20±5°C clean water	1450RPM	50HZ	170mm	DN50	DN50	8M	316L/304
L3	20±5°C clean water	1450RPM	50HZ	200mm	DN50	DN50	8M	316L/304
L4	20±5°C clean water	1450RPM	50HZ	200mm	DN50	DN65	8M	316L/304
L5	20±5°C clean water	1450RPM	50HZ	251mm	DN80	DN80	8M	316L/304
L6	20±5°C clean water	1450RPM	50HZ	265mm	DN80	DN80	8M	316L/304





Model	X	Y	Z	E	XX	YY	A	B	C	D	M	N	P
L1-80	211.7	136.8	109.7	62.5	50.8	50.8	350	223	337.2	198.4	255	158	16
L1-90	217.5	136.8	109.7	62.5	50.8	50.8	400	273	411	219	280	206	20
L2-100/112	217.5	136.8	109.7	62.5	50.8	50.8	400	273	411	219	282	204	20
L2-132	221.6	136.8	109.7	62.5	50.8	50.8	530	323.2	479.8	255	357	239	20
L3-132	233.3	132.2	119.7	78	50.8	50.8	530	323.2	479.8	285	357	239	20
L4-132	243.3	141	119.7	78	63.5	50.8	530	323.2	479.8	260.5	357	239	20
L4-160	266.6	141	119.7	78	63.5	50.8	550	373	564.2	285	440	266	20
L5-160	275.2	158.1	141.6	101	76.2	76.2	662	373	566.4	303.2	440	266	20
L6-160	268.2	159.2	150.7	100	76.2	76.2	662	373	566.4	293.8	440	266	20
L6-180	293.2	159.2	150.7	100	76.2	76.2	593	371	557.6	333.6	430	279	32
L6-200	293.2	159.2	150.7	100	76.2	76.2	638	409	598	354	470	318	32

## J Series Sanitary Shearing Pumps



### Application fields

KL-J Series Shearing Pumps are the best solutions for homogenization and emulsification, which are widely used in food and beverages like juice, jam, mashed potato, ice cream and CMC, etc. as well as the pharmaceutical engineering like tissue homogenization, injection and various ointments, etc. They can effectively mix heterogeneous products and output stable emulsified liquids after shearing teeth's complete shearing and emulsification to prevent agglomeration and solidification.

There are altogether five models of KL-J Series Sanitary Shear Pumps, i.e. J1, J2, J3, J4 and J5.

### Structural design

- A minimal design wall thickness of 6mm is adopted by the J Series Sanitary Shearing Pumps to ensure their stable performance in pressure resistance, vibration and shock, etc., thus providing the best guarantee for their efficient and trouble-free operations.
- The clearance between the rotor or stator and the pump case is always 0.5mm, and the shearing teeth are arranged reversely to the cutter point to produce gas explosion effect, which can realize further shearing and breaking of materials at the rear part of the shearing teeth, thus ensuring shearing effect and medium heterogeneity.
- The surface roughness of the pump chamber, rotor, stator and other parts in contact with liquids is below Ra0.5μm, to avoid bacteria or hazardous substance contamination in tiny spaces.

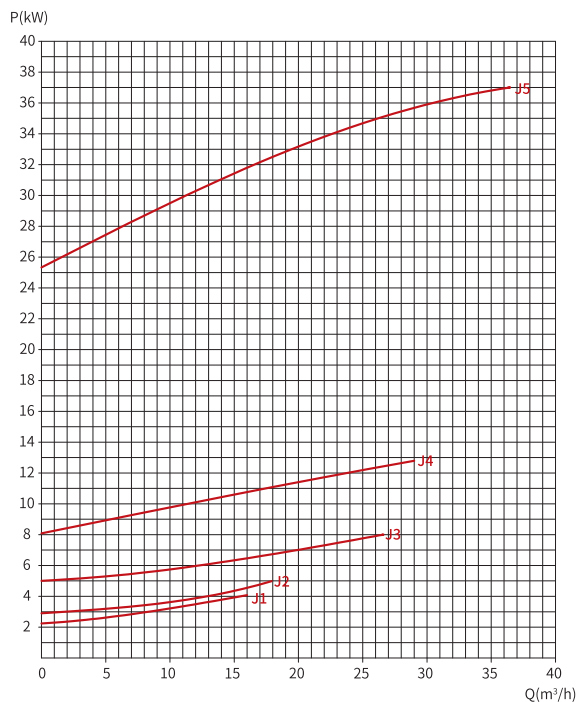
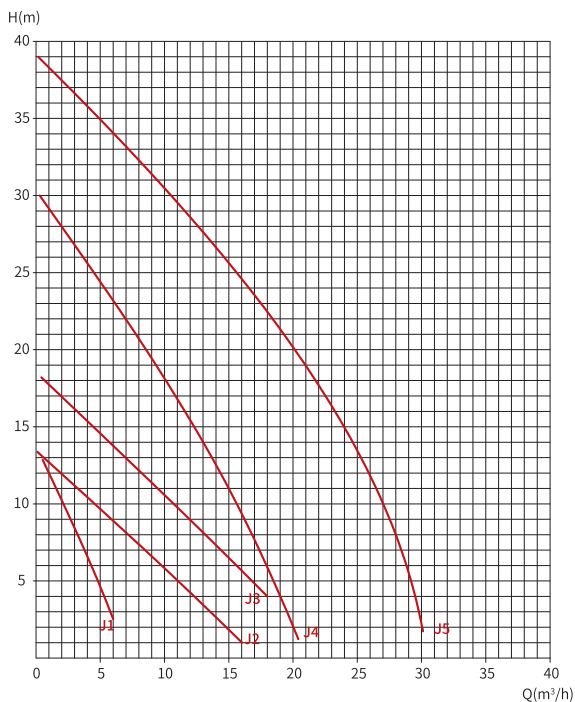
### Technical Parameter

Item	Parameter
Material	Steel parts of flow passage components: W. 1.4404(316L)
	Other steel parts: W. 1.4301(304)
	Surface treatment: Ra≤0.5μm
	Sealing elements of flow passage components: VITON,EPDM
Joint for flush-type spindle seal	6mm tube/1/8" (G thread) external thread
Motor	ABB B35 series motor with base flange connection; conforming to IEC metric standards; 3P; 50Hz; Protection grade: IP55
	Model: standard motor with fixed ball bearing mounted on the drive end
Operating data	Max. inlet pressure: 800kPa (8bar)
	Temperature: -20°C ~180°C
	Water consumption: 0.25~0.5L/min (flush-type double-end mechanical seal)
	Noise: 60-80dB(A), at 1m
	Head: 0-39m
	Flow rate: 0-30T/h

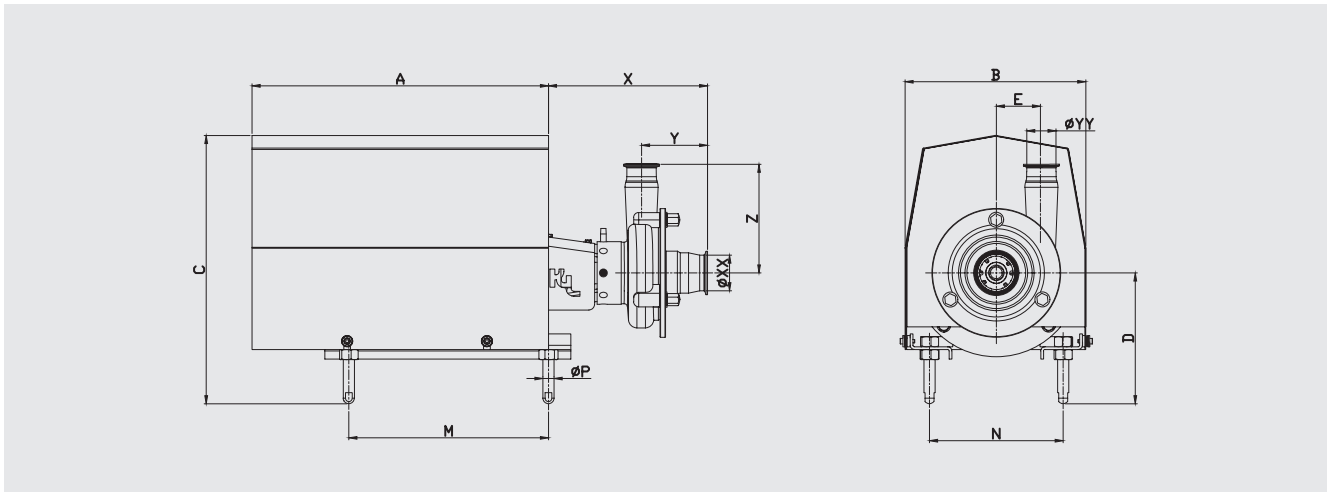


Performance Curve

Model	Medium	RPM	Frequency	Rotor diameter	Inlet	Outlet	Material
J1	20±5°C clean water	2900r/min	50Hz	Ø117	DN40	DN25	316L/304
J2	20±5°C clean water	2900r/min	50Hz	Ø145	DN65	DN50	316L/304
J3	20±5°C clean water	2900r/min	50Hz	Ø175	DN65	DN50	316L/304
J4	20±5°C clean water	2900r/min	50Hz	Ø200	DN80	DN65	316L/304
J5	20±5°C clean water	2900r/min	50Hz	Ø250	DN80	DN65	316L/304



## Installation Dimensions


**J1 ABB M2BAX 90°**

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
J1-100	245	95	142	58	38.1	25.4	450	273	427	447	219	239	280	190	Ø20
J1-112	245	95	142	80	50.8	38.1	450	273	427	447	219	239	282	204	Ø20
J1-132	250	95	142	80	50.8	38.1	530	323	483	503	237	257	357	239	Ø20

**J2 ABB M2BAX 90°**

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
J2-100	285	118	195	79	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
J2-112	285	118	195	79	63.5	50.8	450	273	427	447	219	239	280	190	Ø20
J2-132	305	118	195	79	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
J2-160	335	118	195	79	63.5	50.8	550	373	564	584	262	282	440	266	Ø20

**J3 ABB M2BAX 90°**

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
J3-132	246	78	195	95	63.5	50.8	530	323	483	503	237	257	357	239	Ø20
J3-160	275	78	195	95	63.5	50.8	550	373	564	584	262	282	440	266	Ø20

## Installation Dimensions

### J4 ABB M2BAX 90°

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
J4-132	300	118	193	115	76.2	63.5	530	323	483	503	237	257	357	239	Ø20
J4-160	315	118	193	115	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
J4-180	320	118	193	115	76.2	63.5	650	373	564	584	262	282	440	266	Ø20

### J5 ABB M2BAX 90°

Model	X	Y	Z	E	XX	YY	A	B	C min	C max	D min	D max	M	N	P
J5-160	320	119	231	140	76.2	63.5	530	323	483	503	237	257	357	239	Ø20
J5-180	320	119	231	140	76.2	63.5	550	373	564	584	262	282	440	266	Ø20
J5-200	320	119	231	140	76.2	63.5	/	/	/	/	262	282	460	320	Ø25
J5-225	320	119	231	140	76.2	63.5	/	/	/	/	262	282	460	320	Ø25



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4.6

## R Series Rotor Pumps

### The Design

- The R-Series Rotor Pumps feature an innovative, non-contact, counter-reversing cam rotor design with a face seal between the rotor, pump housing and pump cover.
- The line seal between the rotors, through high-precision machining, forms a perfect seal area while at low viscosity and high temperatures
- The symmetrical design of the rotor makes the direction of rotation of the pump reversible. The design of the rotor also takes full account of the protection product.
- It also enables efficient operation. It will not be over-squeezed.

### The Features

- Traffic: 0-77m<sup>3</sup>/h
- The maximum outlet pressure: 12bar
- The highest delivery viscosity: 100,000mPas
- Applicable to CIP/SIP
- Optional heating/cooling jacket
- Optional single seal, double seal, with flush seal.
- Easy to dismantle and easy to maintain.

### Specifications

R system	R1	R2	R2D	R3	R3D	R4	R4D	R5	R5D
L / Turn	0.02L	0.1L	0.15L	0.27L	0.37L	0.67L	1.04L	1.76L	2.4L
Maximum outlet pressure	9bar	9bar	8bar	12bar	8bar	12bar	8bar	12bar	8bar
Maximum flow	2.3m³/h	7m³/h	10m³/h	15m³/h	20m³/h	30m³/h	45m³/h	70m³/h	80m³/h
Maximum speed	900rpm	900rpm	900rpm	700rpm	700rpm	600rpm	600rpm	400rpm	400rpm
Inlet/outlet size	DN20	DN25	DN40	DN40	DN50	DN50	DN80	DN80	DN100
Highest delivery viscosity	100000mPas								

### Industrial application

- **Food Industry:** Tomato Concentrate, Fruit Juice, Fat, Jam, Mashed Potato, Mustard Paste, Ice Cream, Chocolate Milk, etc.
- **Dairy industry:** Dairy products, yogurt, butter, creamer, soft cheese, butter, etc.
- **Pharmaceutical industry:** pill paste, syrup, soft ointment, antibiotics, etc.
- **Daily chemical industry:** Lipsticks, creams and lotions, face creams, toothpastes, skin care products, etc.
- **Chemical industry:** resin, resin emulsification, polymers, various emulsions, emulsions, auxiliaries, etc.

The pressure vessel business of KINGLAI was founded in 2010. The company has been focusing on the development, design, manufacture, sales and service of pressure vessels in the field of clean and ultra clean areas. We boasts a complete quality system, advanced manufacturing equipment, experienced engineers, fullprocess technical documentation and other resources. Our goal is to provide customers with high quality products and services and keep exceeding customers' expectation in quality and value with our complete quality system and professional team. In a long period in the future, KINGLAI will become a highend clean pressure vessel product provider through timely communication and excellent organization.

**Customized containers**

KL will produce containers for food, beverage, pharmaceutical, chemical, and electronic applications as below:  
 Capacity of container:The largest diameter is 4.2 meters, the volume is 90 tons.  
 Pressure Level:The design and manufacture meet ASME & GB requirements and with ASME & .GB labels.  
 Corrosion resistance:The construction materials contain stainless steel and nickel-based alloys.  
 Quality: The best quality container in today' s market.

**Performance ensured by high technology and testing.**

First of all, the test starts from the inspection of raw materials and covers the entire production process. The rigorous testing and recording procedures ensure the compliance with the most stringent industry standards. Before shipment, record the results of your container testing, which may include dye penetration test, X-ray inspection, pressure test, surface roughness reading of surface treatment, salt and ferrite test and endoscopy check of optical fiber on the cut -off surface.

5  
5.1



To ensure the level of pressure vessel process, KINGLAI Group has built an independent modern pressure vessel manufacturing plant with a huge investment, whose plant area exceeding 10,000 m2 so as to meet the demands of different customers on the delivery and budget.



**Our new factory has everything you need.**

The crane 9 m long has capacity up to 20 tons.

The state-of-the-art tools in China, include: oil-free compressed air, reverse osmosis/deionized water, clean steam, nitrogen, helium and argon

Advanced equipment, including: Material handling equipment (20 -ton bridge crane), welding equipment (tungsten gas and natural gas metal, track, welding and polishing locator/mechanical arm, automatic sewing machine) automatic polishing equipment, positive raw material identification equipment, molding and cutting equipment (straight and round shear, 75 -ton press, hydraulic pipe press which molded interlocking which is able to curl 3/4" stainless steel plate), testing and inspection equipment (endoscope, portable ultrasonic flaw detector, iron salt detection, profile detection, liquid penetration testing equipment, portable CMM, linear measurement tools and measuring instruments and dedicated customization FAT detectors)

Dedicated FAT video conference room

A safe truck handling area

Functions of specification/authentication: CE/PED, ASME, TS, ASME U/S

Materials include: Stainless steel and nickel-based alloys

Providing various types of devices which include: CIP containers, dispensing tanks, large tanks, bioreactors and fermenting tank

Engineering, customized design and manufacturing

Professional project management and specific project teams

The workshops with a variety of facilities enable us to produce superior components and assemble modular systems for customers.

**We have a strong capability of customization**

KI' s customized cylindrical containers and pressure vessels are suitable for pharmaceutical, biotechnology, fine chemicals, cosmetics and other ultra-pure water manufacturing environment.

As a part of the integrated electric polishing process, your container has gone through strict pre-cleaning, final high -clean washing and electric polishing protection.

We provide this service in our own plant, so we have a competitive price and fast production speed to meet your needs for high quality products.



**Advantage of customization**

Because we developed each container separately and are aware that each working environment is unique, you will never need to change your production method to accommodate our goods. The specialised design can satisfy your exacting requirements and specifications.

- Capacity and pressure level
- Mechanical and electric polishing and roughness degree of surface ( $Ra \leq 0.4\mu m$ )
- Fixed or removable design
- Cone, sloping or concave bottom
- Fixed or moveable lid
- Type, size and location of port
- Honeycomb, traditional and semi-tube heated/cooled shells
- Stainless steel insulating jacket
- The accessories such as light sources, mirrors, manholes, sensors, pressure gauges, sampling valves and sprayers. The mixers are installed at both top and bottom.



**All KL' s provided customized containers**

- Materials include stainless steel and nickel-based alloys
- Registered labels meeting ASME specifications
- G/B150, TSGR0004-2009
- JB/T4730-2005 NB/T47015-2011
- Certified contour reading instrument and the roughness of electric polished surface
- Endoscopy





## KRSH Rotary Spray Head

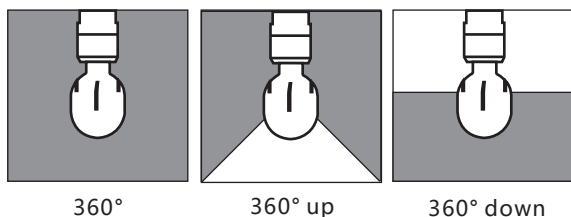
KRSH is a rotary spray head that uses cleaning media to provide coverage and impact. The device represents an effective alternative to traditional static spray balls because it uses low volumes of cleaning fluid at low pressure. The double ball bearing in the RSH's rotating head makes the device suitable for all industrial cleaning applications, including tanks, reactors, vessels and other containers ranging from 0.05 m<sup>3</sup> to 50 m<sup>3</sup>, depending on dimensions and cleaning task.

The flow of the cleaning media causes the head of the KRSH to rotate, and the fan-shaped jets lay out a swirling pattern throughout the tank or reactor. This generates the impact needed for the efficient removal of residual product; the cascading flow covers all internal surfaces of the vessel.



Technical Data
Raw material
AISI 316L (UNS S31603)
Min. tank opening
RSH-Ø25 25mm diameter(DN25)
RSH-Ø45 45mm diameter(DN45)
RSH-Ø65 65mm diameter(DN65)
Maximum operating temperature
95C (maximum ambient temperature is 140°C)
Cleaning radius
RSH-Ø25 max. r=0.6M
RSH-Ø45 max. r=1.4M
RSH-Ø65 max. r=2M
Operating pressure
1-3 bar
Spray form
360°, above 270°, below 180°
Interface form
Thread type, welded type, pin tpe type

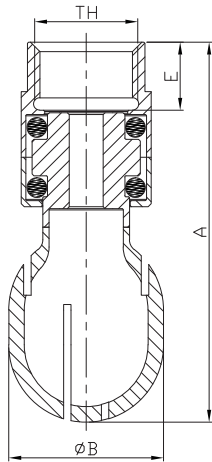
### Spray form



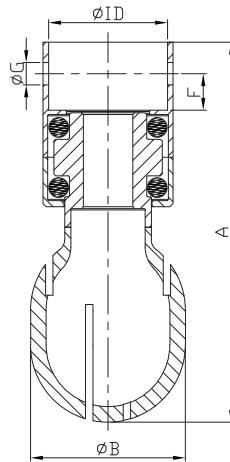
Working method	Size	Connection method:	Cleaning range	Ball diameter	2bar/flow	Cleaning range M	1bar/flow	Cleaning range M	Number of installed balls in a single tank	Material
Spiral type	3/4"	<input type="checkbox"/> 3/8" screw <input type="checkbox"/> pin type <input type="checkbox"/> welded type	360°UP 270°UP 180°Down	Ø25	3M <sup>3</sup> /H	MAX.R0.8M	1.1M <sup>3</sup> /H	MAX.R0.6M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
	1"	<input type="checkbox"/> 4/3" screw <input type="checkbox"/> pin type <input type="checkbox"/> welded type		Ø45	5.5M <sup>3</sup> /H	MAX.R1.4M	4M <sup>3</sup> /H	MAX.R1M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
	1.5"/2"	<input type="checkbox"/> pin type <input type="checkbox"/> welded type		Ø65	16M <sup>3</sup> /H	MAX.R2M	11M <sup>3</sup> /H	MAX.R1.5M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
Fixed	SMS25	<input type="checkbox"/> pin type <input type="checkbox"/> welded type	360°UP 180°UP 180°Down	Ø65	15M <sup>3</sup> /H	MAX.R2.7M	11M <sup>3</sup> /H	MAX.R2M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
	SMS38	<input type="checkbox"/> pin type <input type="checkbox"/> welded type		Ø65	17M <sup>3</sup> /H	MAX.R3M	11M <sup>3</sup> /H	MAX.R2.5M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
	SMS51	<input type="checkbox"/> pin type <input type="checkbox"/> welded type		Ø91	35M <sup>3</sup> /H	MAX.R4.5M	28M <sup>3</sup> /H	MAX.R4M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304
	SMS76	<input type="checkbox"/> pin type <input type="checkbox"/> welded type		Ø119	48M <sup>3</sup> /H	MAX.R4.5M	32M <sup>3</sup> /H	MAX.R3.5M	Please attach a simple picture	<input type="checkbox"/> 316L <input type="checkbox"/> 304

## Tank Cleaning Equipment

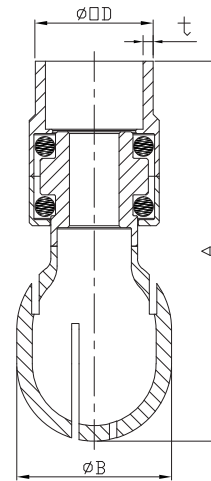
Lubricant	Self-lubricating through the cleaning solution
Material	AISI 316L (UNSS31603)
Size	Min.Φ25mm
Operating pressure	1 ~ 3bar
Recommended pressure	2bar
Operating temperature	95°C
Ambient temperature	140°C
Wetting radius	2.5m
Cleaning radius	Max.0.6m
Interface form Thread type	3/8"Rp (BSP)
Plug type	3/4"(BPE/3A)
Welded type	3/4"(BPE/3A)
Surface treatment	Inner surface Ra0.5μm, Outer surface Ra0.8μm



Thread type



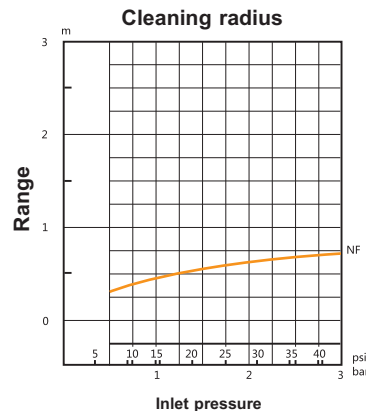
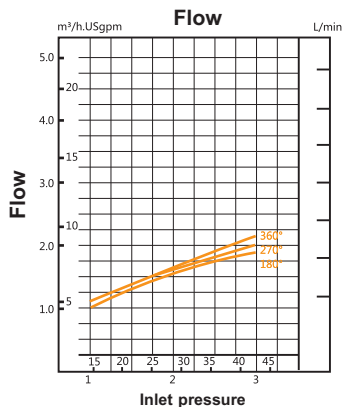
Plug type



Welded type

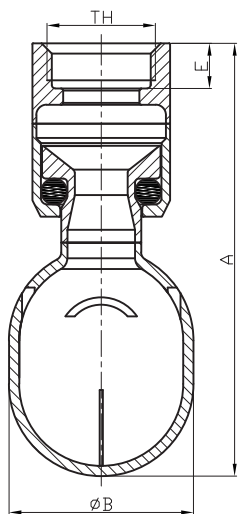
### KRS-25 Standard size

Types	A	B	E	F	G	Interface size
Thread type	61.4	25	11	/	/	3/8"Rp(BSP ) or 3/8"NPT
Plug type	61.4	25	11	5.9	3.6	ID:19.2
Welding type	61.4	25	/	/	/	ODxt : 19.1x1.65

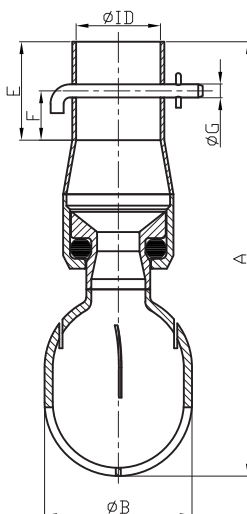


# Tank Cleaning Equipment

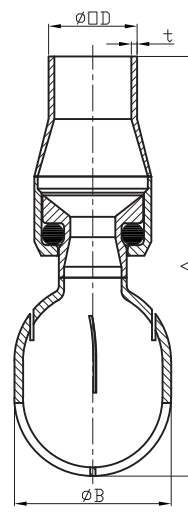
Lubricant	Self-lubricating through the cleaning solution
Material	AISI 316L (UNSS31603)
Size	Min.Φ25mm
Operating pressure	1 ~ 3bar
Recommended pressure	2bar
Operating temperature	95 °C
Ambient temperature	140°C
Wetting radius	2.5m
Cleaning radius	Max.0.6m
Interface form Thread type	Thread type: 3/4"Rp(BSP)
Plug type	1"(BPE/3A)
Welded type	1"(BPE/3A)
Surface treatment	Inner surface Ra0.5μm, Outer surface Ra0.8μm



Thread type



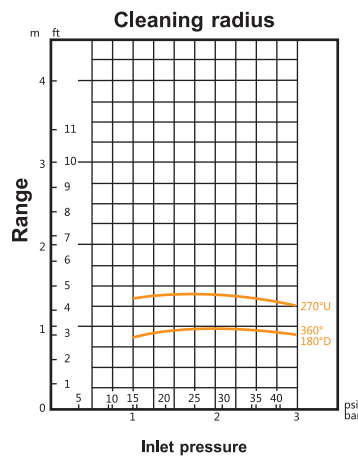
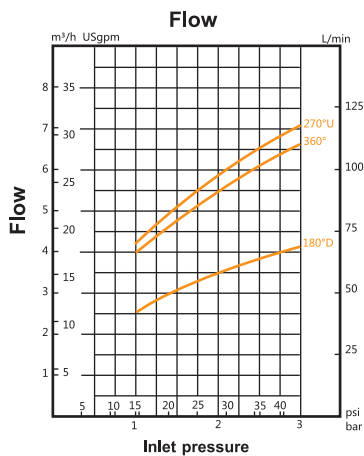
Plug type



Welded type

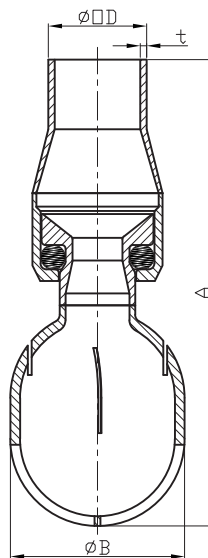
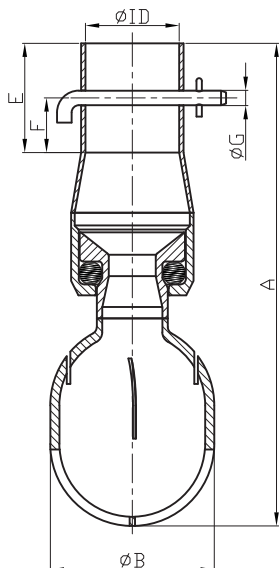
## KRSH-25 Standard size

Types	A	B	E	F	G	Interface size
Thread type	105.6	45	11	/	/	3/4"Rp(BSP ) or 3/4"NPT
Plug type	132.5	45	30	15	4.2	ID:25.7
Welding type	120.5,500	45	/	/	/	ODxt : 25.4x1.65



## Tank Cleaning Equipment

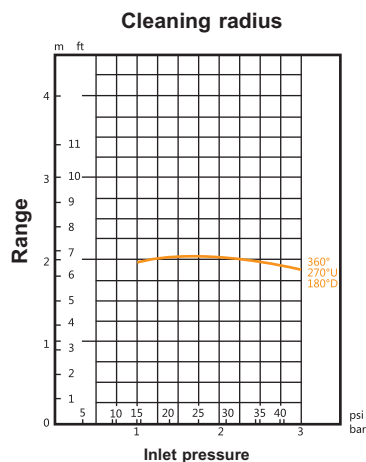
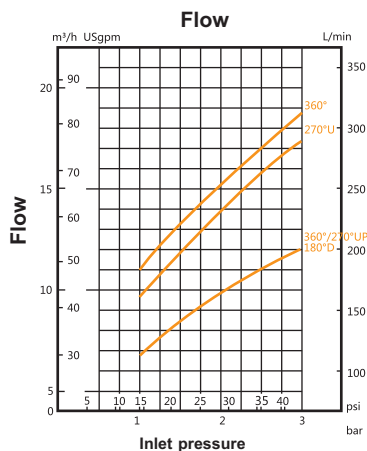
Lubricant	Self-lubricating through the cleaning solution
Material	AISI 316L (UNSS31603)
Size	Min. $\Phi 65\text{mm}$
Operating pressure	1 ~ 3bar
Recommended pressure	2bar
Operating temperature	95°C
Ambient temperature	140°C
Wetting radius	3m
Cleaning radius	Max.2m
Interface form Thread type	Plug type: 1.5"/2.0"(BPE/ISO)
Welded type	1.5"/2.0"(BPE/ISO )
Surface treatment	Outer surface Ra0.5 $\mu\text{m}$ , Inner surface Ra0.8 $\mu\text{m}$



5  
5.2

### KRSH-65 Standard size

Types	A	B	E	F	G	Interface size (1.5")	Interface size (2.0")
Plug type	154.8	65	30	15	4.2	ID:38.4	ID:51.1
Welding type	154.8	65	/	/	/	Od x t : 38.1x1.65	OD x t : 50.8x1.65



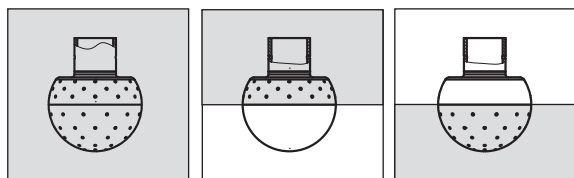
# Tank Cleaning Equipment

KSB is a fixed spray ball for cleaning the tank in the food and beverage industry

Fixed spray ball is used in cleaning task with lower requirement.



## Spray Pattern

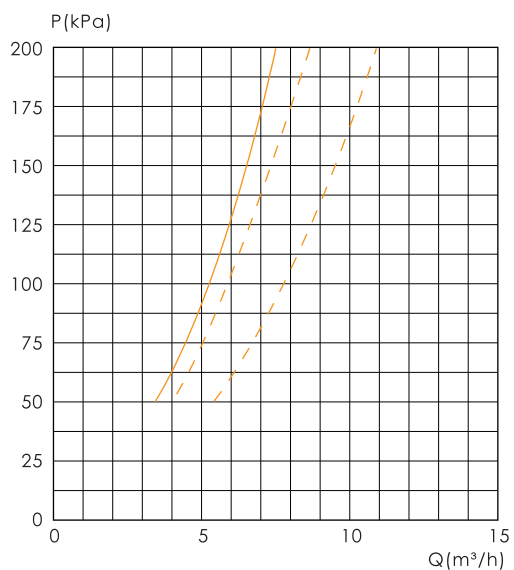


360°

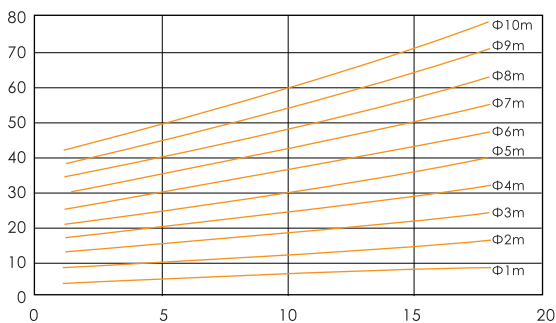
180° up

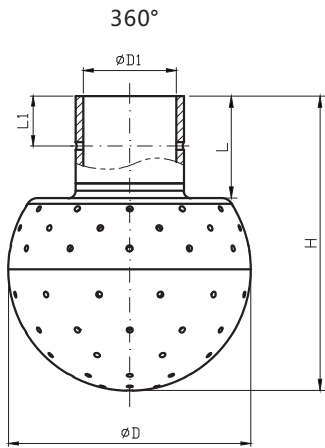
180° down

## Flow chart

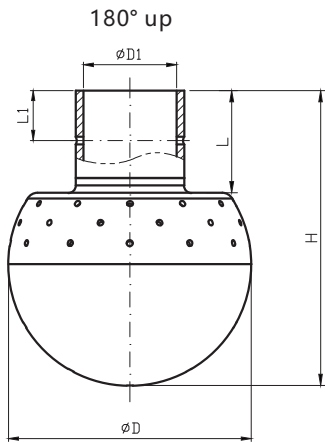


## Flow demand/vertical tank

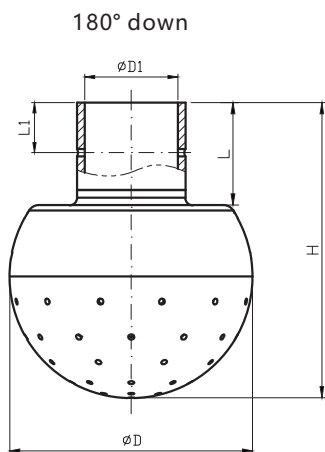



**360°**

SIZE	D	D1	H	L	L1	Q(m <sup>3</sup> /h) 1bar	Q(m <sup>3</sup> /h) 2.5bar	Overcurrent diameter(Øm)
3/4"	40	19.3	52.6	21.0	9.0	4.2		1.0-1.5
1.0"	65	25.3	79.0	27.4	13.4	11.0	17.3	2.5-3.0
1.5"	65	38.3	79.0	27.4	13.4	11.8	19.2	2.5-3.5
2.0"	91	51.3	114.0	38.5	17.25	28.6	41.7	4.0-5.0


**180° up**

SIZE	D	D1	H	L	L1	Q(m <sup>3</sup> /h) 1bar	Q(m <sup>3</sup> /h) 2.5bar	Overcurrent diameter(Øm)
3/4"	40	19.3	52.6	21.0	9.0	2.1		1.0-1.5
1.0"	65	25.3	79.0	27.4	13.4	8.7	12.8	2.5-3.0
1.5"	65	38.3	79.0	27.4	13.4	9.6	14.8	2.5-3.5
2.0"	91	51.3	114.0	38.5	17.25	19.5	30.6	4.0-5.0


**180° down**

SIZE	D	D1	H	L	L1	Q(m <sup>3</sup> /h) 1bar	Q(m <sup>3</sup> /h) 2.5bar	Overcurrent diameter(Øm)
3/4"	40	19.3	52.6	21.0	9.0	2.5		1.0-1.5
1.0"	65	25.3	79.0	27.4	13.4	7.0	10.9	2.5-3.0
1.5"	65	38.3	79.0	27.4	13.4	10.9	16.6	2.5-3.5
2.0"	91	51.3	114.0	38.5	17.25	17.0	28.0	4.0-5.0

## Kinglai Heat Exchangers

TEMA establishes the industry standard for heat exchangers. Our heat exchangers are constructed from the beginning with quality in mind. To create the most effective, economical heat exchanger for your thermal transfer needs, our technical specialists collaborate directly with you. Kinglai heat exchangers are created to provide superior performances and trouble-free operation, even in the most demanding ultra-pure processing environment. This is accomplished by documenting the raw materials in accordance with BPE codes, precision CNC milling of tub sheets and bonnets, final finishing, testing, and documentation. Kinglai custom designs every heat exchanger specifically to meet your exact application requirements. Specially designed computer software combines fluid dynamics, thermophysical properties, thermodynamics and actual empirical data to ensure your shell and tube heat exchanger design is perfect for your application.



### Our each HXR consists of the following making characteristics :

- Custom designed, state-of-the-art hydraulic tube expansion – eliminates spiral stress and work hardening and minimizes damage to the tube finish
- Custom designed, state-of-the-art orbital tube welders for tube-to-tubesheet seal welds
- Proprietary tube-bending apparatus for U-tube designs ensures product contact surface finish adherence in the U-bend area
- All heat exchangers with surface finishes of 0.6µm to 0.3µm include electronics-grade seamless tubing
- Sanitary welded tubing is available for surface finishes of greater than 0.75µm
- 100% BPE compliant
- Stringent QA/QC procedures
- The excellent document control department make all certification documents, More than 50 years, All HXRs 100% through the FDA certification

### Technical specifications

High-pressure hydraulic expansion is used in our cutting-edge fabrication method to seal the tube-to-tube sheet seams. This lessens the possibility of tubing over-thinning, work-hardening effects, and roller expansion damage. Additionally, the potential of cross contamination is almost eliminated by our unique integrated twin tube design. Consistent performance, less maintenance, and a prolonged equipment life are the outcomes. Each HXR should undergo thorough testing and programme file detection prior to shipment, including the following.

- Hydrostatic pressure testing
- Dye penetration examination
- Radiography
- Profilometer readings of surface finish to ensure surface finishes to less than 25 microinches Ra.
- Computer-verified performance
- The light and endoscopic examination

#### Code & Standards

- o TEMA
- o ASME BPE 2005
- o ASME UM, U, NBR & R
- o Canadian Registration (CRN)
- o CE/PED
- o TUV
- o Singapore Ministry of Manpower (MOM)





## Hygienic Double tube Sheet & Tube Heat Exchanger

### Application:

Hygienic Double tube Sheet & Tube Heat Exchanger are widely used in the pharmaceutical, biopharmaceutical, food, and other industries; they are mainly used for heating and cooling injection water, purified water, and products.

### Product Details:

- Product wetted material: Stainless steel 316L.
- Non-metallic materials: O-ring materials are available in EPDM, VITON, FDA 21CFR177 and USP Class VI.
- Design pressure: -1~10 Bar
- Design temperature: 150~200°C
- Heat exchanger types: Straight tube, U tube.
- Standards: GB, ASME VII, PED
- Surface finish: The tube pass can provide mechanical polishing Ra0.6um, Ra0.4um, electrolytic polishing Ra0.4um; the outer surface can be sandblasted or wire drawing.
- Insulation: The heat exchanger shell can provide rock wool or aluminosilicate insulation.

### Documentation:

The following completion documents provides with heat exchanger pipe.

- FDA certificate and USP Class VI certificate.
- Weld layout, weld record, welder list, and welder qualification certificate.
- The non-destructive test report, pressure test report, and penetration test report.
- QC and QA inspection report.
- Pickling passivation report, electrolytic polishing report, and roughness test report.
- ASME U stamp or PED certificate.
- Installation, operation and maintenance manual
- Spare parts list.

## Viscosity and specific gravity of various products

Product		Proportion	Viscosity
Acetic acid	5%	1.01	
	10%	1.01	31.7 SSU@15°C
	50%	1.06	33 SSU@15°C
	80%	1.08	35 SSU@15°C
Animal fat		0.9	130 SSU@46°C 50 SSU@93°C
Barbecue		1.05	11,555 SSU@4-24°C
Beer		1.02	32 SSU@20°C
Animal Blood		.93-.98	15,000 SSU@13°C
Butter		.93-.98	15,000 SSU@13°C 440 SSU@32°C 220 SSU@46°C
Coconut oil		0.92	125 SSU@41°C
Corn Oil		0.92	135 SSU@54°C 54 SSU@100°C
Corn starch solution	22 Baume	1.18	150 SSU@21°C 130 SSU@38°C
	24 Baume	1.2	600 SSU@21°C 440 SSU@38°C
	25 Baume	1.21	1400 SSU@21°C 800 SSU@38°C
Cottage cheese		1.02	4300 SSU
Dressing			
Cream Sweet		1	73 SSU
		.99	140 SSU
		.99	215 SSU
Egg yolk		1.12	21,500 SSU@1.7°C
Gelatin		1.01	1,380-2,580 SSU@71°C
Glucose		1.35-1.44	35M-100M SSU@38°C 4M-11M SSU@65.5°C
Honey		1.3	1250 1425 SSU@38°C
Ice Cream		1.15	1050 SSU@ °C
Lard		0.96	287 SSU@38°C
Linseed Oil		.92-.94	143 SSU@38°C 93 SSU@54.5°C
Malt Syrup		1.41	85,400 SSU@25°C
Maple Syrup		1.37	2,000 SSU@ °C
Margarine		0.93	13,900 SSU@29°C
Milk		1.02-1.05	31.5 SSU@20°C
Molasses	A. First	1.4-1.46	1300-23,500 SSU@38°C 700-8160 SSU@54°C
	B. Second	1.43-1.48	6535-61,180 SSU@38°C 3058-61,180 SSU@54°C
	C. Third	1.46-1.49	12,190-255M SSU@38°C
Mustard		1	17,000 SSU@29.4°C
Olive Oil		.91-.92	200 SSU@38°C
Peanut Butter		1.2	77,400 SSU@43-60°C
Sesame Seeds Oil		0.92	184 SSU@38°C 100 SSU@54°C
Soy Bean Oil		0.91	500 SSU@7°C
Tomato paste		1.14	60M-80M SSU 21M SSU@approx.
Water		1	31 SSU@20°C

## Friction loss chart

The following table shows the loss due to friction.

Loss of Each Pipe or Pipe Passing Through Stainless Steel Pipe Fittings and Stainless Steel Pipe

### Friction Table for Loss of Pipe Fittings and Fittings for Food outside Diameter

m <sup>3</sup> /hr. Capacity	Outer Diameter Pipe Size																	
	1" ID=0.870"			1-1/2" ID=1.370"			2" ID=1.870"			2-1/2" ID=2.370"			3" ID=2.870"			4" ID=3.834"		
	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee
0.5	0.01	0.003	0.030															
1.0	0.025	0.006	0.061															
1.1	0.035	0.008	0.076															
2.3	0.12	0.018	0.021	0.02	0.003	0.045	0.005	0.005	0.030									
3.4	0.25	0.030	0.242	0.04	0.006	0.076	0.013	0.006	0.045									
4.5	0.43	0.067	0.455	0.06	0.009	0.091	0.02	0.008	0.061	0.005	0.006	0.030	0.003	0.006	0.018			
5.7	0.66	0.021	0.697	0.08	0.012	0.121	0.025	0.009	0.076	0.006	0.009	0.045	0.004	0.009	0.024			
6.8	0.93	0.212	1.000	0.105	0.018	0.167	0.035	0.015	0.091	0.008	0.015	0.061	0.005	0.012	0.030			
8.0	1.22	0.379	1.576	0.135	0.027	0.242	0.04	0.018	0.121	0.011	0.018	0.076	0.006	0.015	0.039			
9.1				0.17	0.033	0.303	0.05	0.024	0.152	0.015	0.021	0.091	0.007	0.018	0.045			
10.2				0.21	0.048	0.394	0.063	0.030	0.182	0.02	0.027	0.106	0.008	0.020	0.055			
11.4				0.25	0.061	0.485	0.073	0.036	0.212	0.022	0.030	0.121	0.01	0.021	0.061			
13.6				0.34	0.106	0.667	0.1	0.055	0.273	0.03	0.036	0.136	0.015	0.024	0.076			
18.2				0.57	0.230	1.121	0.16	0.091	0.455	0.05	0.045	0.167	0.02	0.030	0.121			
22.7				0.85	0.409	1.758	0.23	0.133	0.697	0.075	0.055	0.182	0.03	0.033	0.152	0.008	0.012	0.030
27.3				1.18	0.621	2.758	0.32	0.194	1.000	0.105	0.064	0.303	0.04	0.039	0.182	0.01	0.015	0.045
31.8							0.42	0.258	1.364	0.14	0.070	0.379	0.05	0.048	0.242	0.013	0.018	0.061
36.4							0.54	0.342	1.758	0.17	0.085	0.485	0.07	0.061	0.333	0.015	0.021	0.076
40.9							0.67	0.439	2.242	0.205	0.094	0.606	0.08	0.064	0.394	0.02	0.024	0.091
45.5							0.81	0.552	2.727	0.245	0.106	0.758	0.1	0.079	0.485	0.025	0.027	0.121

### Friction Table for Loss of Pipe Fittings and Fittings for Food outside Diameter

m <sup>3</sup> /hr. Capacity	Outer Diameter Pipe Size																	
	1" ID=0.870"			1-1/2" ID=1.370"			2" ID=1.870"			2-1/2" ID=2.370"			3" ID=2.870"			4" ID=3.834"		
	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee	Tube	Elbow	Tee
50.5							0.95	0.673	3.333	0.29	0.124	0.909	0.12	0.091	0.576	0.028	0.030	0.152
54.5										0.39	0.161	1.364	0.165	0.118	0.758	0.04	0.035	0.182
63.6										0.45	0.185	1.606	0.19	0.127	0.848	0.045	0.036	0.197
68.2										0.515	0.212	1.879	0.22	0.152	0.939	0.05	0.039	0.212
79.5										0.68	0.318	2.576	0.28	0.203	1.242	0.07	0.045	0.273
90.9										0.86	0.470	3.333	0.36	0.267	1.576	0.85	0.055	0.364
102.3										1.05	0.682	4.091	0.44	0.333	2.000	0.105	0.061	0.455
113.6													0.54	0.424	2.424	0.13	0.070	0.530
125.0													0.64	0.515	2.879	0.15	0.082	0.636
136.4													0.75	0.621	3.091	0.175	0.091	0.758
147.7													0.87	0.730	3.939	0.2	0.103	0.848
159.1													1.0	0.848	4.545	0.23	0.121	1.030
170.5																0.26	0.130	1.152
181.8																0.3	0.152	1.333
193.2																0.33	0.170	1.515
204.5																0.37	0.188	1.727
215.9																0.41	0.212	1.909
227.3																0.45	0.242	2.121
250.0																0.53	0.321	2.606





**Note**

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