CSE GROUP

http://www.csee.com.tw

Head office

TAIWAN

CSE. CHIANG SUNG ENTERPRISE CO., LTD.

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E-mail:csee@ms57.hinet.net

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Factory:
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Petchaburi, Thailand 76140
Tel:+66-327-96234, +66-327-96225~6 Fax:+66-327-96247

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E-mail: sales@csetechnologies.co.th

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FUJIAN CHIANG SHIN HARDWARE MACHINERY CO.,LTD.
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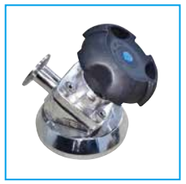
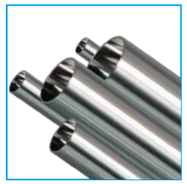
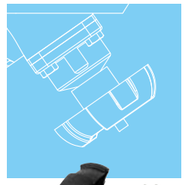
Worldwide service:

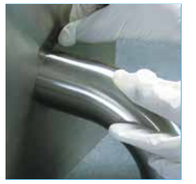
New York | India | Thailand | China | Xiamen | Guangzhou

CSE®









CSE BPE

Pharmaceutical / Biotechnology
Control Equipment

BPE

QA:0410091424

1142

CSE's of consistent management, rigorous quality guarantee, and intact responsibility

The American Society of Mechanical Engineers

ASME

BPE

CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope shown below in accordance with the applicable rules of the ASME BPE Standard on Bioprocessing Equipment. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any component certified under this authorization shall have been produced, assembled, and tested in accordance with the provisions of the aforementioned ASME standard.

COMPANY:

CSE. Chiang Sung Enterprise Co., Ltd.
CSE Technologies Co., Ltd.
39, 39/1 MOO 7 NONGCHUMPON KHAOYOY
PETCHABURI 76140
Thailand

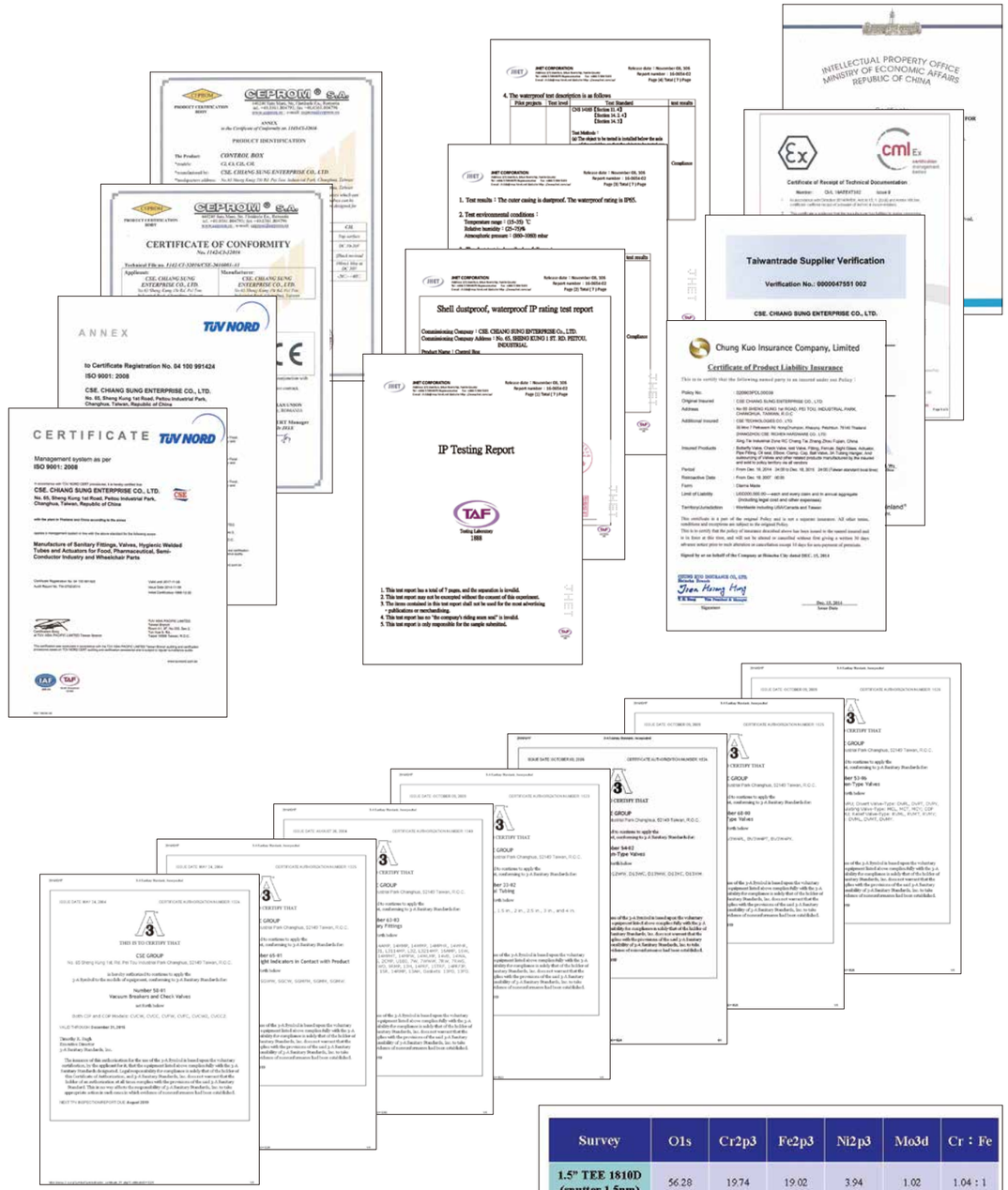
SCOPE:

Manufacture of ferrous tubing (excluding circumferential welds) and fittings, with electropolishing at the above location only.

AUTHORIZED: **August 20, 2018**
EXPIRES: **August 20, 2023**
CERTIFICATE NUMBER: **BPE-122**

Vice President, Conformity Assessment

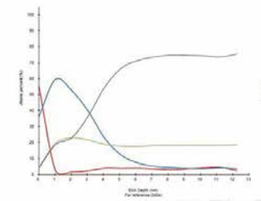
Managing Director, Conformity Assessment



C.S.E. is certified by 3A and TÜV ISO 9001 with EN10204 3.1 material cert. will be your assurance of outstanding quality & service.

Survey	O1s	Cr2p3	Fe2p3	Ni2p3	Mo3d	Cr : Fe
1.5" TEE 1810D (sputter 1.5nm)	56.28	19.74	19.02	3.94	1.02	1.04 : 1

1.5" TEE 1810D Depth profile



Note: " - " is shown the value under detection limit of XPS analysis.

BPE QA:0410091424 1142

Maximum Purity With Guaranteed Ra

Where cleanability of fittings is the issue, every step in the production process must be carefully controlled. Our production methods insure that no mechanical damage or flaws occur during manufacturing.
The cleaning procedures incorporate multi-process degreasing and washing steps provided to eliminate any residues of hydrocarbons and stains, using pure deionized water.
Our procedures and process capabilities result in the formation of a stabilized passive layer and increased corrosion resistance.

Our products proudly offer:

Maximum Cleanability

CSE fittings are cleaned using a multiple step process to assure clean surface, areas inside and out with repeatability every time.
Every fitting is passivated according to ASME BPE and ASTM A967 standards.

Full Traceability

We provide full traceability for each of our products by supplying all necessary production process data. Starting from certifications and incoming inspection of raw materials, through in-process quality control, final inspection, marking and packaging. The process is also completely documented with a unique job number for each BPE process component.

Every Fitting is Quality Inspected

All around quality and meticulous inspection insures that every fitting will be of the highest quality and in total compliance with all ASME-BPE standards.
CSE fittings are 100% visual inspected.

CSE Group

CSE own the international advanced production line and testing equipment, we focus on the quality control and devoted our professional engineers, skilled workforce into the each requirement from customers. CSE always put the demand of customer in our first consideration and keep on pursuing the promotion and innovation of the products. Therefore we enjoy in growing up with our customer to create the win-win situation.

Index

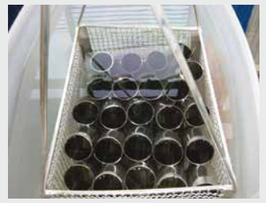
BPE Specialized Technology

What is EP ?

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

The different of EP & MP

1 Semi-finished Goods



2 Products Processed

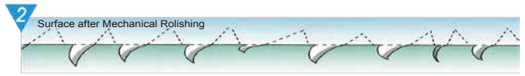
3 Cleaing The Finished

4 Inspect

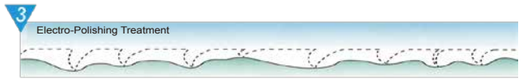
5 Finised Products

Mechanical Polishing (MP) & Electro-Polishing (EP)

Smeared Metal Surface



Although mechanical polishing (MP) is able to reduce the roughness from smeared stiainless surface rapidly, there are still some defects:
1. Surface roughness (Ra) is only approx. 0.3-0.5μm that still has great possibility of adhering particles.
2. The passivation layer must be destroyed after MP and caused rust easily.
3. During MP, the particle adhering problem on the interior surface is too tough to meet perfect purity even if after high purity cleaning procedure.



The performance of Electro-Polishing is albe to smooth away all the defects of MP.
The features of EP are as following:
1. The stainless surface is dissolved by EP liguid to remove all the particles and reduce roughness (Ra) to 0.05μm.
2. During EP process, Fe ion separates out first of all and let a passivation layer (Cr2O3) be created on the stainless surface for higher resistance of corrosion.

Perfect mirror finished surface without any impurities.

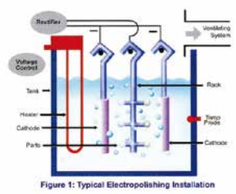


Figure 1: Typical Electropolishing Installation

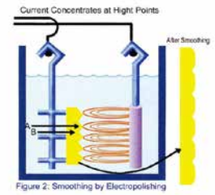


Figure 2: Smoothing by Electropolishing

Advantage of EP

1. Superior performance in polishing :
   it can dramatically improve the surface roughness On metal to ra0.05Um.
2. High purity :
   ep can remove particle, metal fatigue and oxidized metal from work piece, As well make surface smoothly, on which bacteria can not survived. Smooth surface will Help to solve the problem of particle adherent.
3. High resistance of corrosion :
   passivation layer is a very important product, Which is created On the surface of stainless steel during ep process, Stainless steel work piece processed With ep can obtain around 10 times corrosion resistance superior than no-ep one.

Fittings Specifications

Product:

Stainless Steel fittings comply with ASME BPE standards.
Gaskets are made from compounds which are FDA approved and USP 87, 88 Pharmaceutical Class VI certified.

Sizes:

Stainless Steel fittings are available in sizes 1/4" - 6" O.D. tube size.

Material:

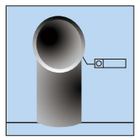
Fittings are fabricated in AISI 316L Stainless Steel with sulfur content of 0.005-0.017% achieving superior repeatability for automatic orbital welding process.

Dimensions & Tolerances:

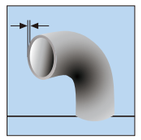
Dimensions as specified in ASME BPE Part DT-3-1

Nominal Size	O.D.		Wall Thickness Mechanical Polish (MP)		Wall Thickness Electropolish (EP)		Squareness Face to Tangent, B		Off Angle, 0		Equivalent Angle (for O)	Off Plane, P		Centerline Radius (CLR), R	
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	deg	in.	mm	in.	mm
1/4	± 0.005	± 0.13	+0.003/-0.004	+0.08/-0.10	+0.003/-0.006	+0.08/-0.15	0.005	0.13	0.009	0.23	2.1	0.030	0.76	0.563	14.30
3/8	± 0.005	± 0.13	+0.003/-0.004	+0.08/-0.10	+0.003/-0.006	+0.08/-0.15	0.005	0.13	0.012	0.3	1.8	0.030	0.76	1.125	28.58
1/2	± 0.005	± 0.13	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.005	0.13	0.014	0.36	1.6	0.030	0.76	1.125	28.58
3/4	± 0.005	± 0.13	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.005	0.13	0.018	0.46	1.4	0.030	0.76	1.125	28.58
1	± 0.005	± 0.13	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.025	0.64	1.4	0.030	0.76	1.500	38.10
1 1/2	± 0.008	± 0.20	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.034	0.86	1.3	0.050	1.27	2.250	57.15
2	± 0.008	± 0.20	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.043	1.09	1.2	0.050	1.27	3.000	76.20
2 1/2	± 0.010	± 0.25	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.010	0.25	0.054	1.37	1.2	0.050	1.27	3.750	95.25
3	± 0.010	± 0.25	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.016	0.41	0.068	1.73	1.3	0.050	1.27	4.500	114.30
4	± 0.015	± 0.38	+0.008/-0.010	+0.20/-0.25	+0.008/-0.012	+0.20/-0.30	0.016	0.41	0.086	2.18	1.2	0.060	1.52	6.000	152.40
6	± 0.030	± 0.76	+0.015/-0.015	+0.38/-0.38	+0.015/-0.017	+0.38/-0.43	0.030	0.76	0.135	3.43	1.3	0.060	1.52	9.000	228.60

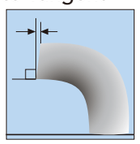
Roundness



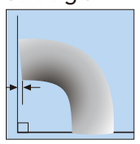
Wall Thickness



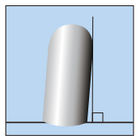
Squareness Face to Tangent



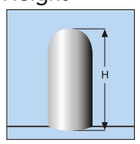
Off Angle

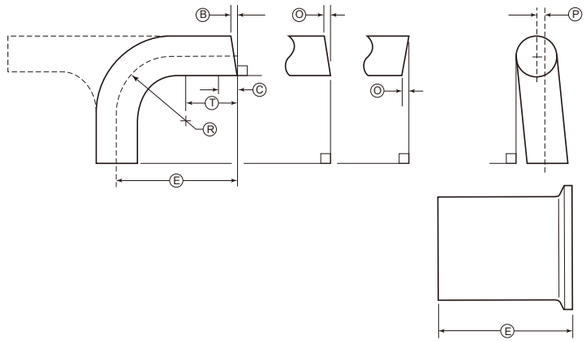


Off Plane



Height





General Notes:

a. Tolerance on (E) end-to-end and center-to-end: 0.050 in. (1.27 mm)
b. Tolerance for centerline radius (CLR) is ±10% of the nominal dimension

Fittings Specifications

Surface Finish:

Reference: ASME BPE-2014, Part SF, Table SF-2.4-1.

Surface Finish Code	BPE Surface Designation	Inside Surface			Outside Surface
		Ra Maximum		Surface Condition	Surface Condition
		µ-in.	µm		
PX	SF0			No finish requirement	No finish requirement
PC	SF1	20	0.51	Mechanically Polished [1]	Light Polish
PL	SF1	20	0.51	Mechanically Polished [1]	Mechanically polished to 32 Ra µ-in.
PD	SF4	15	0.38	Mechanically Polished [1] & Electropolished	Light Polish
PM	SF4	15	0.38	Mechanically Polished [1] & Electropolished	Mechanically polished to 32 Ra µ-in.
PR	-	10	0.25	Mechanically Polished [1] & Electropolished	Mechanically polished to 32 Ra µ-in.

[1] Or any other finishing method that meets the Ra max.

- MaxPure fittings guarantee the Ra in all internal surfaces, including bent areas where it is difficult to polish and difficult to measure.
- All Ra readings are taken across the lay, wherever possible.
- No single Ra reading shall exceed the Ra max. value in this table.
- Other Ra readings are available if agreed upon between owner/user and supplier, not to exceed values in this table.

Cleaning:

A multi step cleaning cycle is conducted to ensure that fittings are cleaned with a perfect passivation layer. The cleaning process involves degreasing, pickling, electro polishing (as required) and passivation. During the final stage, the fittings are double-rinsed using D.I. water.

Inspection Procedures:

All fittings produced by EGMO production are 100% visually inspected for any surface finish imperfections, as mentioned in Table SF-2.2-1, SF-2.2-2, SF-2.4-1 and SF 2.6-1 in the ASME BPE 2014 specification. All dimensional characteristics are inspected for tolerances listed in parts DT-3-1 to DT-9.3-1 in the ASME BPE 2014 specification.

Fitting Marking Information:

Each fitting and process component is permanently laser Marked to show the following:
a. Heat number/code traceable to material test report for each product
contact surface component
b. Material type
c. Manufacturer's name, logo, & trademark
d. Product contact surface designation for the appropriate BPE specification
e. ASME BPE mark

Packaging & Labeling:

Each fitting is capped, bagged and labeled in full compliance with the ASME BPE standard.
Every label includes a QR Code which directs to the fitting's Material Test Report (Please refer to page 46).

Documentation:

Full Material Test Reports are supplied with the finished products and are available On-Line at www.MaxPure.net

Professional technical equipment and production

Spectrum Analysis Machine

Orbital Welding

Roughness Check

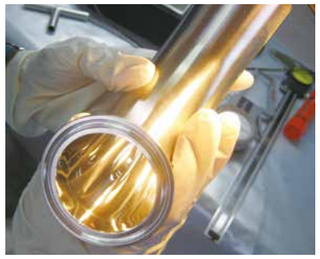
2.5D for surface Check

Vernier Caliper

Precision and strict quality control process

Tube Line

BPE EP Inspect



Bright Annealing Process After Form

Welded License

BPE EP Processing

BPE QA:0410091424 1142

BPE Auto / Manual Control Valves

For many years, CSE Group always base on the highest principle of "To Attain The Minimum Residual" &"Zero Blind Spot" for the Diaphragm Valve designed. Now, we are the first assigns the brand for The cGMP & The National Health Research (NHRI)…and the other famous Pharmaceutical Factories. In addition, the designed also conform to BPE Standard.

＋Description

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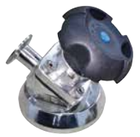

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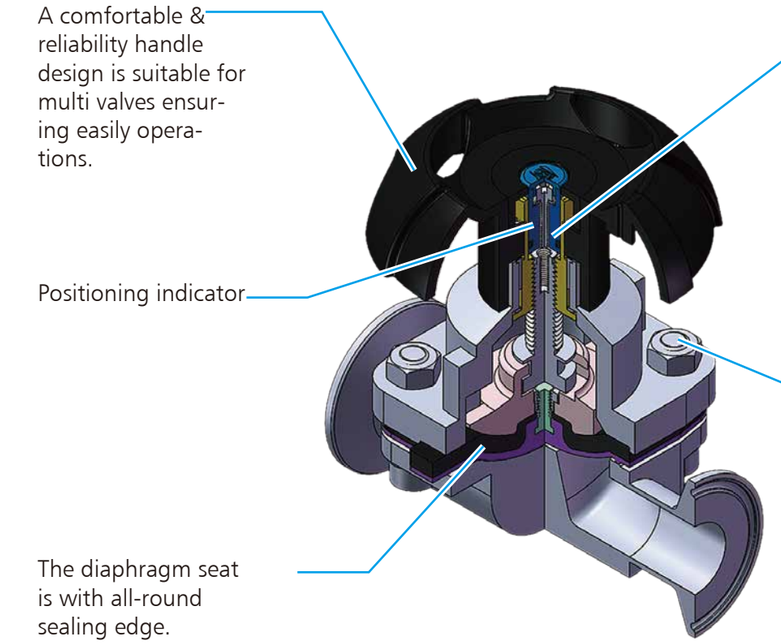
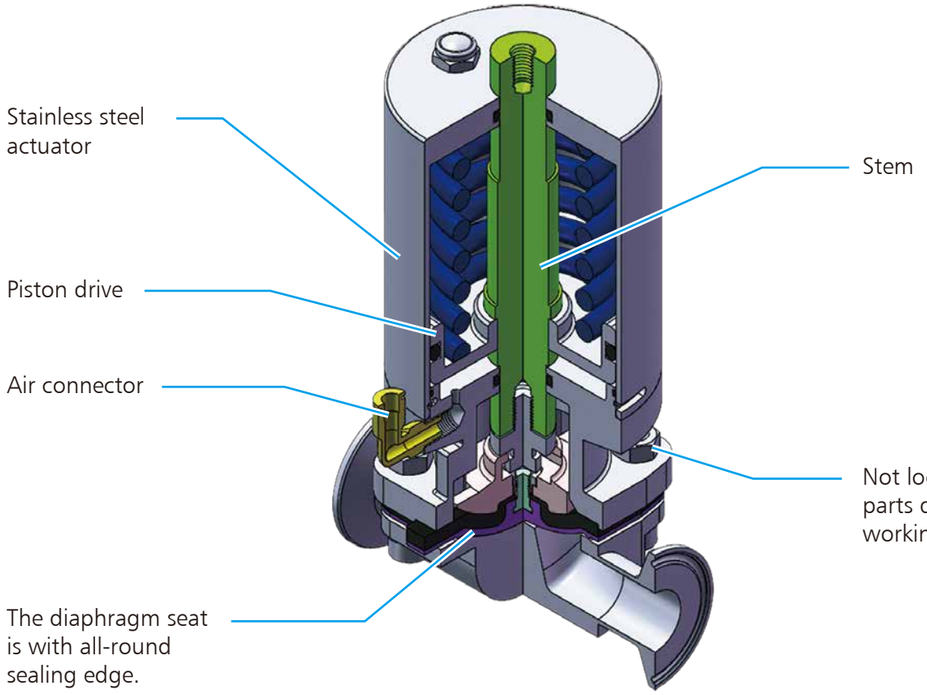




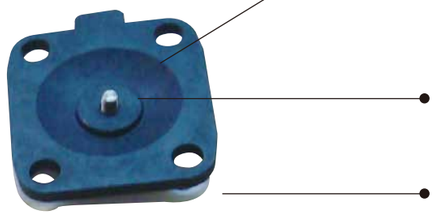
Body

All the materials of the body is 316L & Forged. The surface can be divided into two kinds- Sand Blasted & Electrolytic Polished (EP).
With the external body Electrolytic Polished. It improves the corrosion resistance and makes the external appearance more bright and beautiful as well. The Body ends connection sizes are processed by high precision CNC. Then, the body's inside is polished by professional polishing technology. CSE Group also can design more bodies according to the clients' requires.

Diaphragm

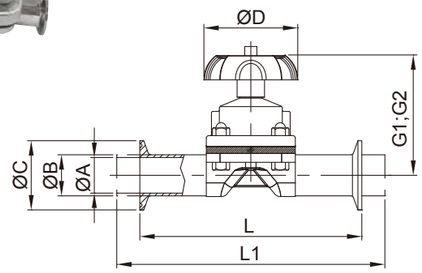
All the diaphragms in CSE Group meet sanitary and Pharmaceutical Standards and they have gained Certificate of FDA. The Diaphragms are high temperature resistant and strong corrosion resistance; they are of long service life and are widely used.

Internal Structure of the Diaphragm



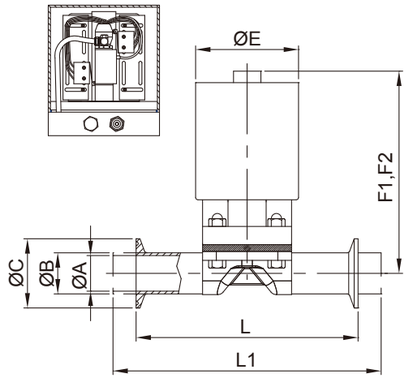
- EPDM SEAL
  Work Temp.: -40°C ~110°C
- Stainless steel screw°C
- PTFE SEAL
  Work Temp.: -10°C ~150°C

Pneumatic/Manual Diaphragm Valve
2WAY



3A/BPE

SIZE	1/2"	3/4"	1"	1.5"	2"
ØA	9.4	15.75	22.1	34.8	47.5
ØB	12.7	19.05	25.4	38.1	50.8
ØC-3A	25	25	50.5	50.5	64
ØC-BPE	25	25	25/50.39	50.39	63.91
ØD	60	60	95	95	118
ØE	60	60	85	85	133
F1	122	122	212	217	315
F2	131	131	225	232	333
G1	74	74	100	119	135
G2	83	83	113	134	153
L	88.9	101.6	114.3	139.7	158.8
L1	124	135	141.2	168.4	190.5



DIN

DIN	DN10	DN20	DN25	DN32	DN40	DN50
ØA	10	20	26	32	38	50
ØB	13	23	29	35	41	53
ØC	34	34	50.5	50.5	50.5	64
ØD	—	60	60	95	95	118
ØE	60	85	85	85	85	133
F1	122	212	212	217	217	315
F2	131	225	225	232	232	333
G1	74	100	100	119	119	135
G2	83	113	113	134	134	153
L	88.9	101.6	114.3	139.7	139.7	158.8
L1	124	135	141.2	168.4	168.4	190.5

Tank Bottom Valve

Material:
- Body: Forged/316L
  Diaphragm: EPDM+PTFE/NC or NO

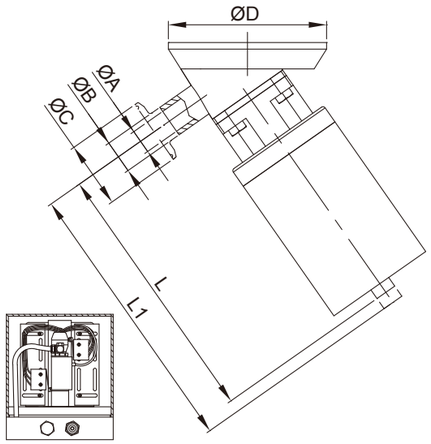
Connection:
- Clamp End/Weld End…

Operation:
- Normal Open / Normal Close

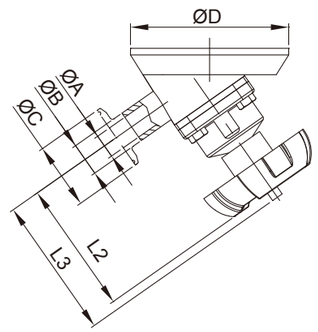
Work Temp.:
- Diaphragm: EPDM+PTFE (-10°C~150°C)

Work Pressure:
- Max: 10 Bar

Surface:
- SF1: ID Polished to Ra≤0.5μm /
  SF4: EP Finished to Ra≤0.38μm
  ID/OD Mirror Polished & ID Ra≤0.5μm /
  OD Sand Blasted…



SIZE	1/2"	3/4"	1"	1.5"	2"
ØA	9.4	15.75	22.1	34.8	47.5
ØB	12.7	19.05	25.4	38.1	50.8
ØC	25	25	50.5	50.5	64
ØD	100	100	120	160	160
L	122	122	212	217	315
L1	131	131	225	232	333
L2	74	74	100	119	135
L3	83	83	113	134	153



Tank Bottom Valve (Pneumatic/Manual)

“No Residual” & “Zero Blind Spot.” Design
- The material will throw-up with 45 degree to make the body will not residual and it will use CIP System or Ultra-Hight Temperate (UHT) Cleaning design. The design is conform to BPE Standard.

The Actuator can be to “Take off and Replace quickly.”

The Actuator can be set in Control Box.

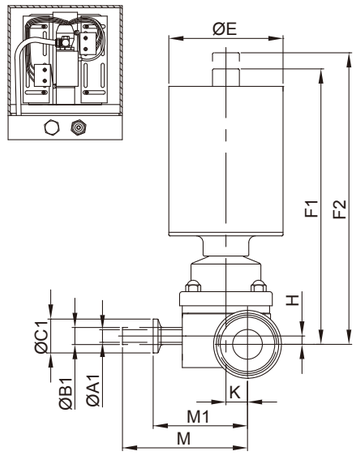
Construction Summarization

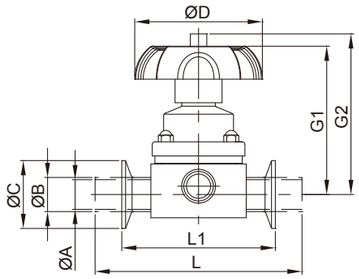
The Flange of Tank Bottom Valves can be welded directly to containers or tank.

The material will throw-up with 45 degree to make the body will not residual

The Body is Forged
The Material is 316L

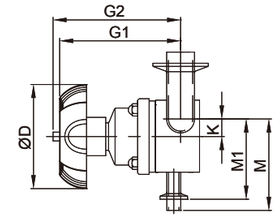
Pneumatic/Manual Diaphragm Valve T-TYPE3WAY

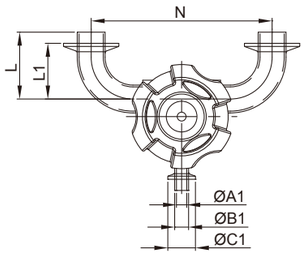


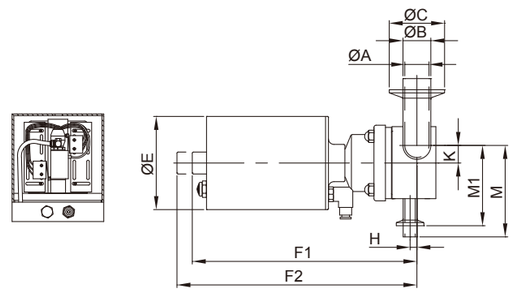


SIZE	1/2"x1/2"	1/2"x3/4"	1/2"x1"	1/2"x1.5"	1/2"x2"	3/4"x3/4"	3/4"x1"	3/4"x1.5"	3/4"x2"	1"x1"	1"x1.5"	1"x2"	1.5"x1.5"	1.5"x2"	2"x2"
ØA	9.4	15.75	22.1	34.8	47.5	15.75	22.1	34.8	47.5	22.1	34.8	47.5	34.8	47.5	47.5
ØB	12.7	19.05	25.4	38.1	50.8	19.05	25.4	38.1	50.8	25.4	38.1	50.8	38.1	50.8	50.8
ØC	25	25	50.5	50.5	64	25	50.5	50.5	64	50.5	50.5	64	50.5	64	64
ØA1	9.4	9.4	9.4	9.4	9.4	15.75	15.75	15.75	15.75	22.1	22.1	22.1	34.8	34.8	47.5
ØB1	12.7	12.7	12.7	12.7	12.7	19.05	19.05	19.05	19.05	25.4	25.4	25.4	38.1	38.1	50.8
ØC1	25	25	25	25	25	25	25	25	25	50.5	50.5	50.5	50.5	50.5	64
ØD	60	60	60	60	60	60	60	60	60	95	95	95	95	95	118
ØE	60	60	60	60	60	60	60	60	60	85	85	85	85	85	133
F1	122	122	122	122	122	122	122	122	122	212	212	212	217	217	315
F2	131	131	131	131	131	131	131	131	131	225	225	225	232	232	333
G1	74	74	74	74	74	74	74	74	74	100	100	100	119	119	135
G2	83	83	83	83	83	83	83	83	83	113	113	113	134	134	153
H	—	6.18	13.2	19.5	19.5	4.5	10.7	17.5	17.5	6.2	14.5	18.4	6.2	13.7	—
K	6.8	9.98	13.15	19.5	25.85	9.98	13.15	19.5	25.85	16.05	22.4	28.75	22.4	28.75	28.75
L	139.7	139.7	154	153.6	153.6	139.7	153.6	153.6	153.6	172.6	172.6	172.6	197.6	197.6	211.6
L1	88.9	88.9	114.3	114.3	114.3	88.9	114.3	114.3	114.3	114.3	114.3	114.3	139.7	139.7	158.8
M	69.4	72.58	75.75	82.1	88.45	72.58	75.75	82.1	88.45	86.65	93	99.35	105	111.35	123.75
M1	51	54.18	57.35	63.7	70.05	54.18	57.35	63.7	70.05	70.6	74.6	80.95	86.6	92.95	98.95

Pneumatic/Manual Diaphragm Valve 3WAY/U-Bend Valve







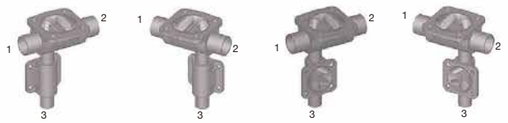
SIZE	1/2"x1/2"	3/4"x1/2"	1"x1/2"	1.5"x1/2"	2"x1/2"	3/4"x3/4"	1"x3/4"	1.5"x3/4"	2"x3/4"	1"x1"	1.5"x1"	2"x1"	1.5"x1.5"	2"x1.5"	2"x2"
ØA	9.4	15.75	22.1	34.8	47.5	15.75	22.1	34.8	47.5	22.1	34.8	47.5	34.8	47.5	47.5
ØB	12.7	19.05	25.4	38.1	50.8	19.05	25.4	38.1	50.8	25.4	38.1	50.8	38.1	50.8	50.8
ØC	25	25	50.5	50.5	64	25	50.5	50.5	64	50.5	50.5	64	50.5	64	64
ØA1	9.4	9.4	9.4	9.4	9.4	15.75	15.75	15.75	15.75	22.1	22.1	22.1	34.8	34.8	47.5
ØB1	12.7	12.7	12.7	12.7	12.7	19.05	19.05	19.05	19.05	25.4	25.4	25.4	38.1	38.1	50.8
ØC1	25	25	25	25	25	25	25	25	25	50.5	50.5	50.5	50.5	64	64
ØD	60	60	60	60	60	60	60	60	60	95	95	95	95	95	118
ØE	60	60	60	60	60	60	60	60	60	85	85	85	85	85	133
F1	122	122	122	122	122	122	122	122	122	212	212	212	217	217	315
F2	131	131	131	131	131	131	131	131	131	225	225	225	232	232	333
G1	74	74	74	74	74	74	74	74	74	100	100	100	119	119	135
G2	83	83	83	83	83	83	83	83	83	113	113	113	134	134	153
H	—	6.18	13.44	19.5	19.5	4.5	10.7	17.5	17.5	6.2	14.5	18.4	6.2	13.7	—
K	6.8	9.98	13.15	19.5	25.85	9.98	13.15	19.5	25.85	16.05	22.4	28.75	22.4	28.75	28.75
L	57.15	66.68	76.2	95.3	120.7	66.68	76.2	95.3	120.7	76.2	95.3	120.7	95.3	120.7	120.7
L1	31.75	41.25	50.8	69.9	88.9	41.28	50.8	69.9	88.9	50.8	69.9	88.9	69.9	88.9	88.9
M	69.4	72.85	75.75	82.1	88.45	72.58	72.75	82.1	88.45	70.6	93	99.35	105	111.35	123.75
M1	51	54.18	57.35	63.7	70.05	54.18	57.35	63.7	70.05	68.25	74.6	80.95	86.6	92.95	98.95
N	101.7	120.7	165.1	203.3	241.3	120.7	165.1	203.3	241.3	165.1	203.3	241.3	228.7	266.7	285.8

Multi-port Diaphragm Valve

TDV TYPE

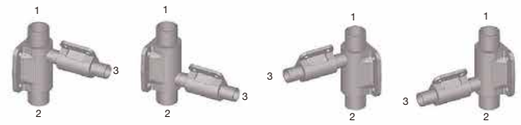
The multi-port body design is helping to streamline the fitting line and is taking the advantages of the combination of traditional valve position and assembly, and there are options of a variety of angles and positions in series to choose from for venting or steering, often using for sampling or steam.

Level main body at drain angle / vertical sub-body (LAV0 – type)



LAV0-1.2 LAV0-2.2 LAV0-1.1 LAV0-2.1

Vertical main body / horizontal sub-body at drain angle (V0HA – type)



V0HA-1.1 V0HA-2.1 V0HA-1.2 V0HA-2.2

Level main body at drain angle / vertical sub-body at drain angle (LAVA – type)

LAVA-1.2 LAVA -2.2 LAVA -1.1 LAVA -2.1

Level main body at drain angle / horizontal sub-body at drain angle (LAHA – type)

LAHA-1.1 LAHA -2.1 LAHA -1.2 LAHA -2.2

Block Diaphragm Valve

BDV TYPE

The block diaphragm valve body is designed to be no gap which can ensure completely drain and zero dead angle, and optimize the complex tubing-line system for safe fluid configuration, recommended for horizontal installation position.

LBI90 - type | **VBA45 - type** | **VOH90 - type** | **LBV90 - type** | **UBI90 – type** | **BOI90- type**

Eccentric bodies for sampling

A-type | **B-type** | **C-type** | **D-type**

Center bodies for sampling

A-type | **B-type** | **C-type** | **D-type**

Fully integrated type

Fully integrated type

Diaphragm valve with sub-body connecting and block type ones that composed of two or more valve bodies both are an innovative concept design combined with modern processing technology. The multi-port direction valve body is convenient to connect to different tubing-lines which can save installation time and space, it can also be designed according to customized requirements as multi-angle or installing location.
These types of valve bodies made of forged or cast materials are mostly used for sampling or steam applications. It can simplify the traditional valve combination configuration, and the design that can reduce the dead angle and ensure complete drainage to achieve the effect of sterilization.

Advantage

- Customized specific design.
- Compact design and smaller envelope dimension is achievable for the actuators.
- Combination of many different nominal diameters.
- Optimized drain ability and minimized dead leg.
- Reduction of using fittings, tubing and welding jobs in a system.
- All end connections and materials are available according to the customer's specification.

Code Description

Multi-port type Example：LAV0 - 1.1

L	A	V	0	–	1	1
Main body	Main body tilt angle	Sub-body	Sub-body Angle tilt angle		The location to connect sub-boy with main body	Sub-body direction
level = L vertical = V	With tilt angle = A Without tilt angle = 0	Horizontal = H vertical = V	With tilt angle = A Without tilt angle = 0		Left = 1 right = 2	1 = front 2 = behind

Block type Example：LBI90

L	B	I	90
Main run	Diaphragm + main run	Outlet port shape	Outlet port angle
level = L vertical = V U type = U Bending = B	back to back = B not level = O	tilt = A upright = I V type = V Bending = B Horizontal = H	45° = 45 90° = 90

Sample Valve for BPE

UHT Sterilizing & No Residual

Others OEM

說明

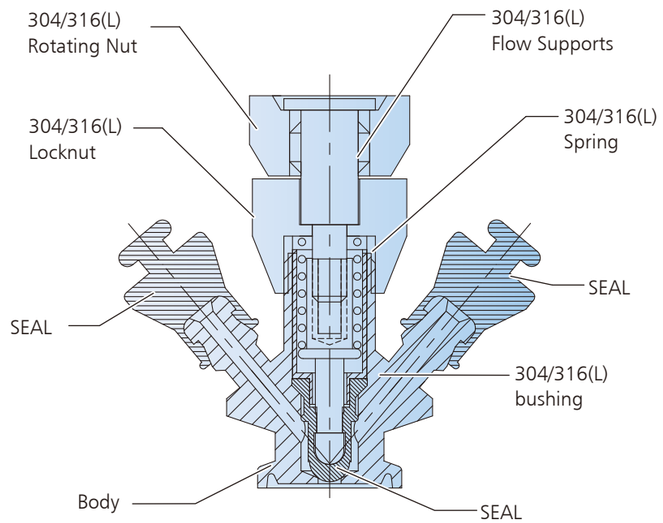
Hygienic Sample Valve for BPE

Materials:

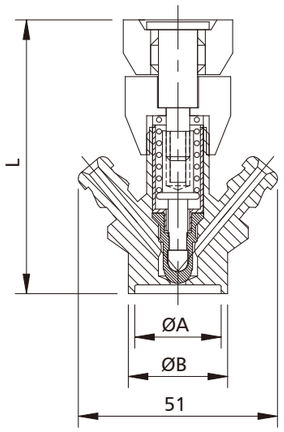
- Flow area: AISI 316L
- Other steel parts: AISI 316
- Plug stem: AISI 316L
- Gasket for flow area: EPDM/ Silicon/ FKM

Technical data:

- Temperature range: Full vacuum. -10°C to +140°C(EPDM).



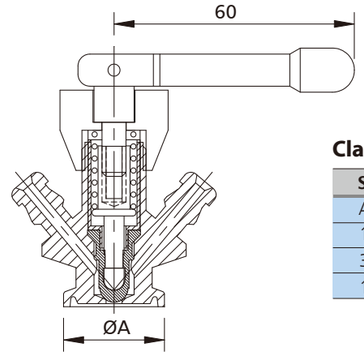
DA Type



Weld

SIZE	ØA	ØB	L
1/2"	9.4	12.7	71.5
3/4"	15.75	19.05	71.5
1.0"	22.1	25.4	71.5

DB Type

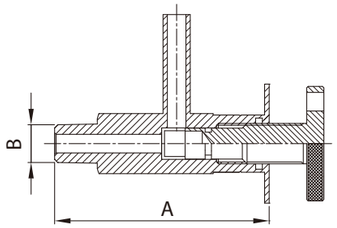


Clamp

SIZE	ØA	L
A37	34	70
1/2"	25.2	70
3/4"	25.2	70
1.0"	50.5	70

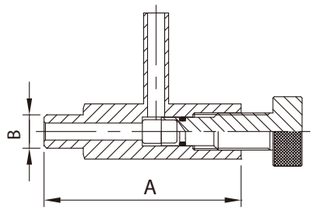
CSE Sample Cock Valve

A Type



Type	A	B
16AMP	66.4	ø50.5
Ferrule	79.9	ø50.5
Male	75	1/4 NPT 3/8 NPT 1/2 NPT
Flange	81.5	60x29

B Type

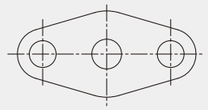


Type	A	B
16AMP	(82)	ø50.5/ø64
Ferrule	(90.6)	ø25
Male	(91.9)	1/4 NPT 3/8 NPT 1/2 NPT

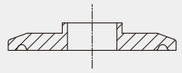
Connecting End

(1) PF Thread End

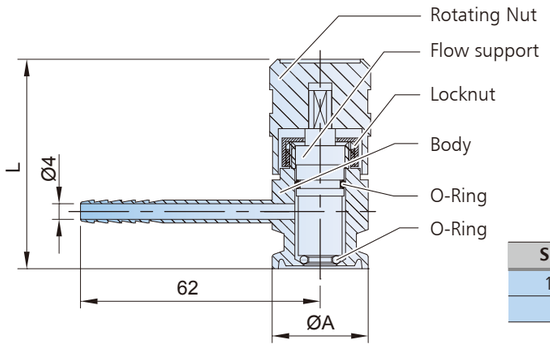
(2) Welding Flange End



(2) Welding Ferrule End

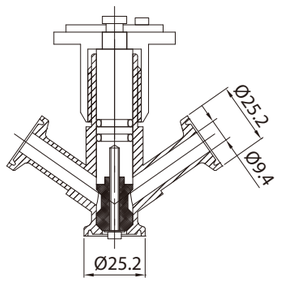


C Type

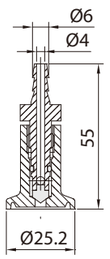


SIZE	ØA	L
1/2"	25.2	70
1"	50.5	70

D Type

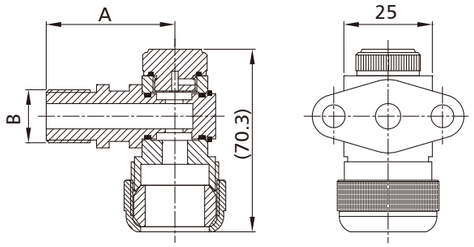


F Type



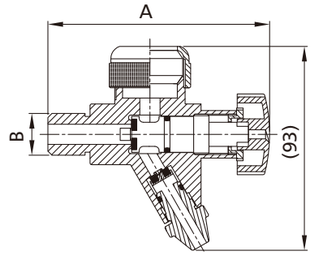
CSE Sample Cock Valve

Upper Valve



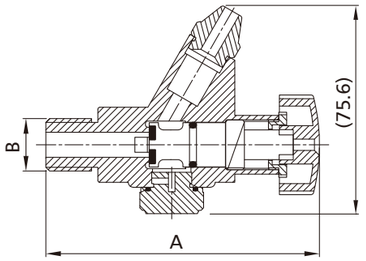
Type	A	B
16AMP	51	ø50.5
Ferrule	66.4	ø50.5
Male	51	1/2"-PF
Flange	52.6	60x29

Level Valve



Type	A	B
16AMP	81.8	ø50.5
Ferrule	95.2	ø50.5
Male	109	1/2"-PF
Flange	81.5	60x29

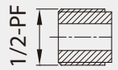
Test Valve



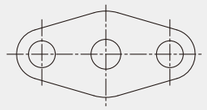
Type	A	B
16AMP	81.8	ø50.5
Ferrule	95.33	ø50.5
Male	109	1/2"-PF
Flange	81.5	60x29

Connecting End

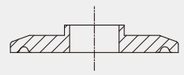
(1) PF Thread End



(2) Welding Flange End

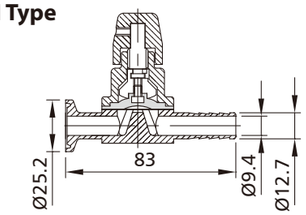


(2) Welding Ferrule End

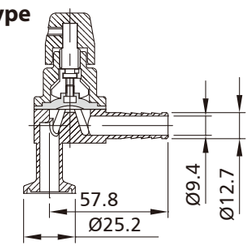


CSE Diaphragm Sample Valve

I Type

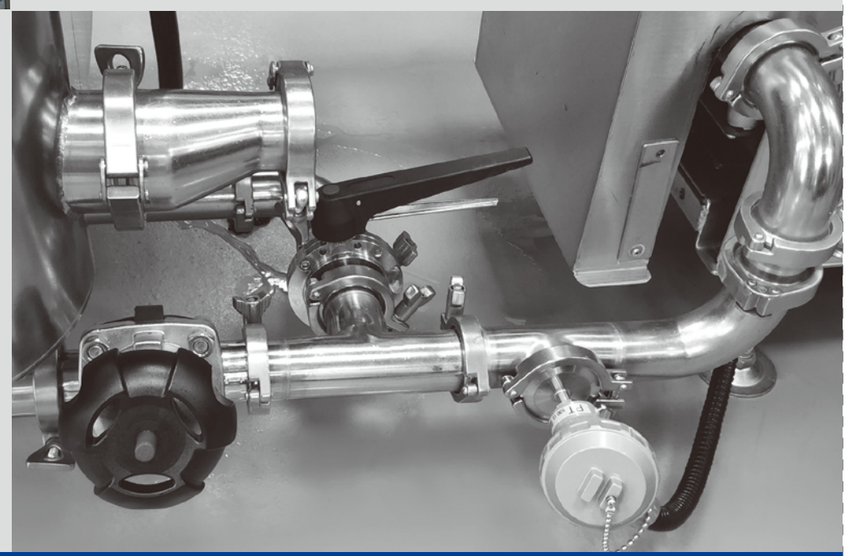


L Type



Auto Control Valve & Manual Control Valve

For Joint any
Tube fitting-3A, SMS, DIN, BS, Elbow, Tee, Reducer
Clamp-Union-Weld/Expanding Ferrule, Clamp, Valve-Butterfly, Check, Sight Glass, Ball Valve with our Orbitol weld Equipment



CSE Innovative Control Valve Range

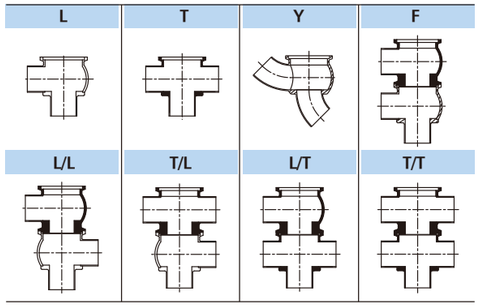
CSE Width Range Products:

- Auto Control Divert Valve
- Actuator for Butterfly Valve
- Wide Range Butterfly Valve
- Sight Glass & Non-return Valve
- 3A,BS,AS,NZS,DIN,SMS,RJT,CIP,IDF...etc. Standard Union & Ferrule & Fitting
- 3A,DIN,SMS...etc. ASTM-A270 Sanitary Tube
- OEM Valve and Sanitary Ball Valve
- OEM/ODM Service

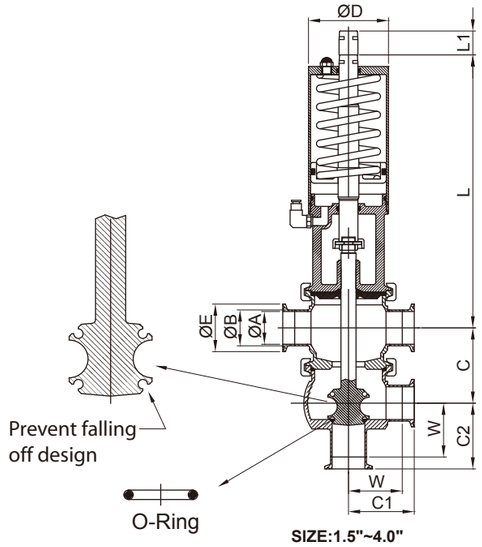
CSE Auto Control Divert Valve

Opening/closing time will be effected by the following
The air supply(air pressure).
The length and dimensions of the air hose.
Number of valves connected to same air hose.
Use of single solenoid valve for serial connected
air actuator functions.
Product pressure.
Air connections
Compressed air:
R1/8"(BSP), internal thread.
Technical data
Air pressure:---------- 5 to7 bar.

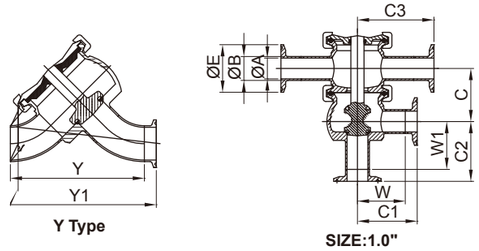
Type:L,T,Y and L/L, T/L,L/T,T/T



SIZE	1"	1.5"	2"	2.5"	3"	4"
ØA	22.1	34.8	47.5	60.2	72.9	97.4
ØB	25.4	38.1	50.8	63.5	76.2	101.6
C	56.7	80	92.4	120	128	150.8
C1	63.5	69.9	88.9	88.9	95.3	114.3
C2	63.5	69.9	88.9	88.9	95.3	114.3
C3	81.4	—	—	—	—	—
E	50.5	50.5	64	77.5	91	119
W	50.8	57.2	76.2	76.2	82.6	98.5
W1	50.8	57.2	76.2	76.2	82.6	98.5
ØD	60	85	85	133	133	133
L	153.6	290	296.3	365.8	368.9	645.7
L1	17	25	25	32	36	38
Y	96.1	142.3	168.6	211.6	244.7	303.1
Y1	121.5	167.7	194	237	270.1	334.7
(W/W1)+SMS male	19	23	23	27	27	—
(W/W1)+IDF male	21.5	21.5	21.5	21.5	21.5	—
(W/W1)+RJT male	27	27	27	27	27	—



SIZE:1.5"~4.0"



SIZE:1.0"

CSE Auto Control Divert Valve

Operation Instruction

CSE pneumatic valve can be equipped with different type of flow design,(as drawing A) to get various flow control.

Available for SMS, DIN, IDF, RJT, 3A....., Welding; Clamp; Unions.....connect end.

Material

- All parts connect with fluid are made of stainless steel AISI 316/316L(1.4401/1.4404).
- The other parts in AISI 304 (1.4301).
- The valve stem is sealed by a special EPDM/ Silicone/ Viton (FKM)/ PTFE seal and according to international standard for using on food or pharmaceutical.

Operating air pressure:

5bar-8bar compressed air.

Control ways

- Designed different types for controlling control various flow, as type L; T; F...etc.
- Choose appropriate dimensions and type, as 2".....clamp or welding.
- Choose appropriate control ways (manual or pneumatic):
  a. Manual control valve to be equipped with a rapid pitch screw with protection against unscrewing.
  b. Or choose air/spring(simple effect); or air/air (double effect) for pneumatic control.
  c. Can use CSE automatic control box to get signal transfer and complete individual valve control.
  c-1. Signal transfer:
  ●. with 10-30VDC proximity switch connection: 1 or 2pcs (PNP OR NPN)
  ●. Or 3A 125VAC,30VDC micro switch connection: 1 or 2pcs
  c-2. Complete individual valve control:
  Choose (a) or (b) +DC24 3.0W electric valve:
  1pc & air manifold (for complete control box).

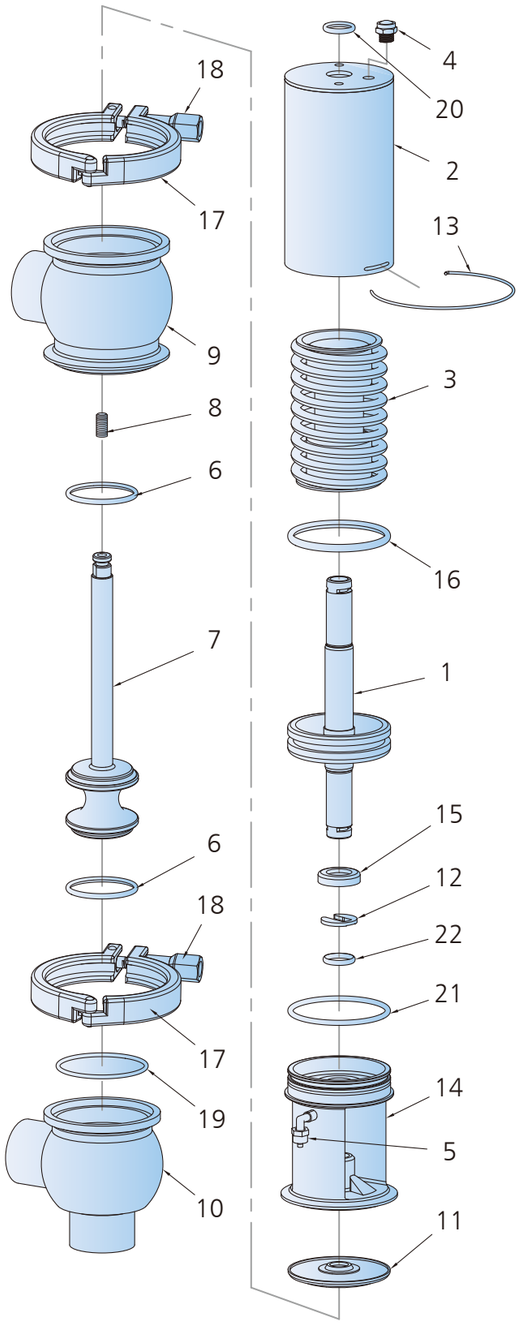
(Drawing A)

CSE Auto Control Divert Valve

F type construction assembly drawing

Parts List

Item	Parts name	Q'TY	Material
1	Piston	1	St.St 304
2	Cylinder	1	St.St 304
3	Spring assembly	1	St.St 304
4	Silencer	1	Cupler
5	Air connect	1	Cupler
6	O-Ring	2	EPDM
7	Stem-F	1	St.St 316L
8	Screws	1	St.St 304
9	Valve body-upper	1	St.St 316L
10	Valve body-lower	1	St.St 316L
11	Lip seal	1	304/EPDM
12	Clip complete	1	St.St 304
13	Lock wire clip	1	St.St 304
14	Bracket	1	St.St 304
15	Stop ring	1	PE
16	O-ring	1	NBR
17	Clamp	2	St.St 304
18	Wing nut	2	St.St 304
19	Valve body-seal ring	1	EPDM
20	O-ring	1	NBR
21	O-ring	1	NBR
22	O-ring	1	NBR



Please reference the detail by YouTube

CSE Auto Control Divert Valve

Operation instruction

Max. flow tube pressure without leakage of valve seat.
If over table Max. pressure suggestion add proof Mix. valve

Actuator type / function:

(10) SA. Pneumatic downward movement, spring retum (NO/ lower seat)

(20) AS. Pneumatic upward movement, spring retum (NC/ lower seat)

(30) AA. Pneumatic upward and downward movement (A/A)

NO : Normal open
NC : Normal close
A/A : Air/Air doubt action

Stop and change-over valves- Max. pressure without leakage at the valve seat

⬭ = Max. air input pressure is 8 bar
➡ = Tube-Line flow pressues

Actuator/Valve body combination and direction of pressure

Spring closes | Air closes | Air closes | Spring closes | Air closes | Air closes

Air pressure (bar) / Actuator Type/Function		10 (NO)	5 10	8 (NO)	5 20 (NC)	20 (NC)	5 30	8 30	5 30	8 30
Valve size (Max. Pressure)	DN25 (1.0")	9.5	10	10	9.5	10	10	10	10	10
	DN38 (1.5")	4.5	7.0	10	4.5	7.0	9.0	10	10	10
	DN51 (2.0")	4.5	4.0	5.0	4.5	5.0	9.0	10	9.0	10
	DN63.5 (2.5")	3.0	3.0	4.0	3.0	7.0	8.0	9.0	6.0	7.0
	DN76 (3.0")	5.0	4.0	6.0	4.5	6.0	10	10	10	10

CSE Manual Divert Valve

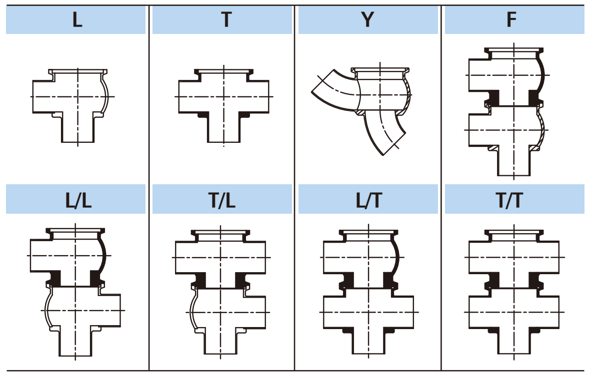
Materials:

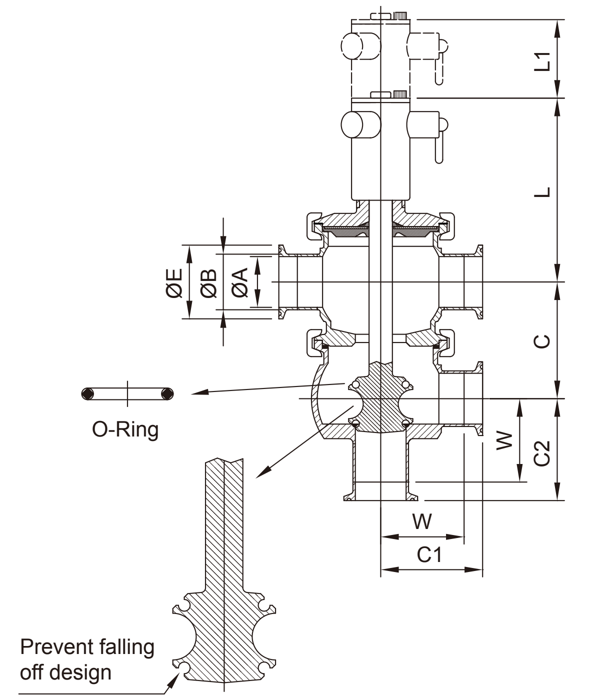
- Flow area：AISI 316L
- Other steel parts：AISI 304
- Plug stem：AISI 316L with Chromium Plated Surface
- Gasket for Fiow Area：EPDM/NBR/FKM/PTFE
- Other seals：NBR and EPDM
- OD Surface：Mirror/Satin/Sand Blaste

Technical data:

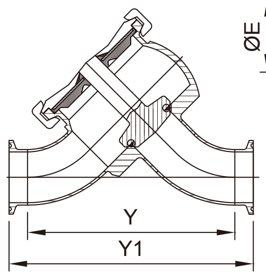
- Max. production pressure：1000kpa(10bar).
- Temperature range：-10°C to+104°C (EPDM).

Type:L,T,Y and L/L, T/L,L/T,T/T

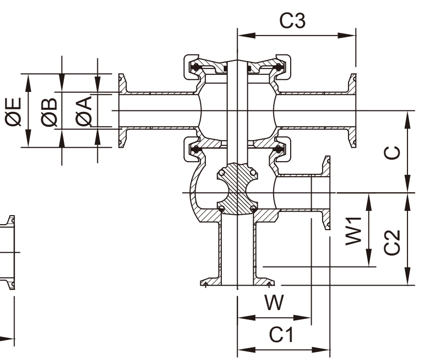




SIZE	1"	1.5"	2"	2.5"	3"	4"
ØA	22.1	34.8	47.5	60.2	72.9	97.4
ØB	25.4	38.1	50.8	63.5	76.2	101.6
C	56.7	80	92.4	120	128	150.8
C1	63.5	69.9	88.9	88.9	95.3	114.3
C2	63.5	69.9	88.9	88.9	95.3	114.3
C3	81.4	—	—	—	—	—
E	50.5	50.5	64	77.5	91	119
L	101	126	135	167	170	645.7
L1	17	25	25	32	36	38
W	50.8	57.2	76.2	76.2	82.6	98.5
W1	50.8	57.2	76.2	76.2	82.6	98.5
Y	96.1	142.3	168.6	211.6	244.7	303.1
Y1	121.5	167.7	194	237	270.1	334.7
(W/W1)+SMS male	19	23	23	27	27	—
(W/W1)+IDF male	21.5	21.5	21.5	21.5	21.5	—
(W/W1)+RJT male	27	27	27	27	27	—



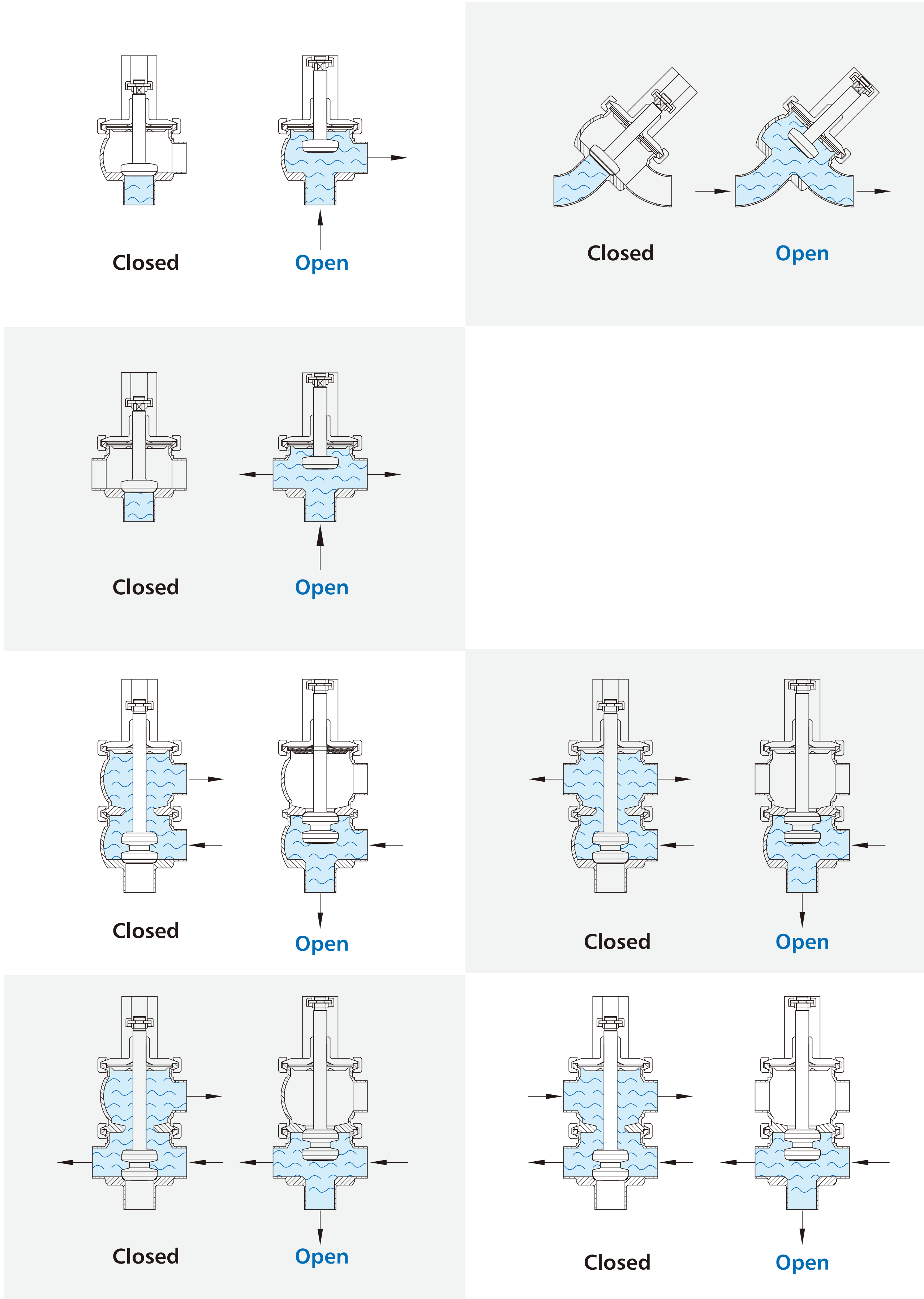
Y Type



SIZE:1.0"

重規劃

Configuration and Flow Direction



CSE Hygienic Filter & OEM for BPE

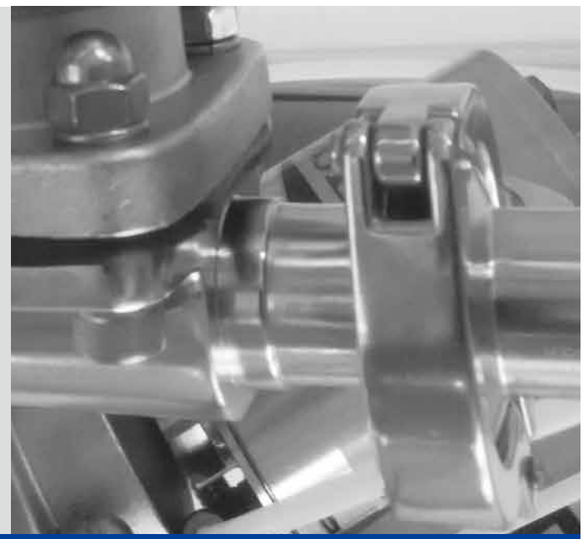
OEM series valves

(Mf) Membrane Filter

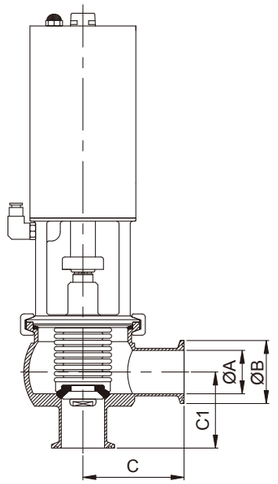
Mini-filter

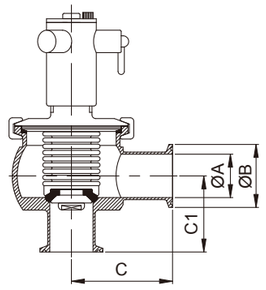
Filling Valve

Steam Trap



Bellow Sterile Valves



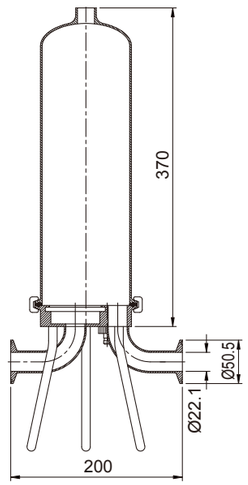


SIZE	ØA	ØB	C	C1
1.0"	22.1	50.5	58.5	50.6
1.5"	34.8	50.5	81.2	61
2.0"	47.5	64	85.7	65.4
2.5"	60.2	77.5	103.1	72.1
3.0"	72.9	91	116.4	79.7

S TYPE

Micro-Filter

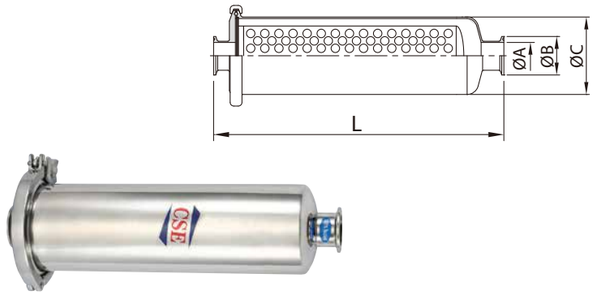
- Material
  Housing: 304/316L
- Connection
  Clamp End/Weld End/ IDF Male End
- Surface
  ID/OD Mirror Polished



CSE S-TRAINERS

- Material: SUS304/SUS316L
- Mesh: 20～400
- Aperture Size: 1～10(mm)
- P.D.Press(MPa): 0.05～0.2
- Types: Weld end/ Clamp end/ Male end/ Female end

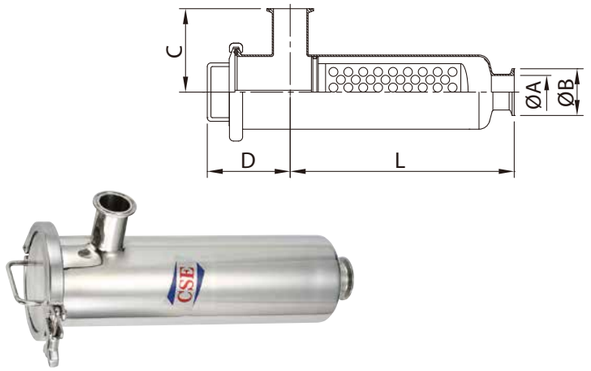
INLINE STRAINER　I TYPE



STRAINER INLINE TYPE (I)

SIZE	ØA	ØB	ØC	L
1.0"	22.2	50.5	101.6	380
1.5"	34.8	50.5	101.6	380
2.0"	47.5	64	101.6	380
2.5"	60.2	77.5	101.6	450
3.0"	72.9	91	101.6	550

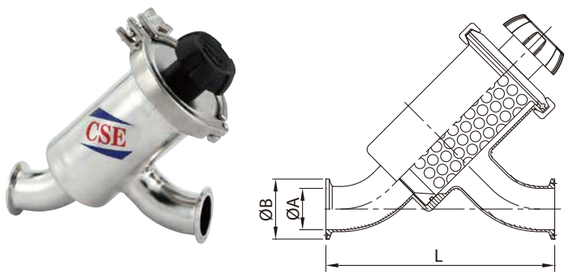
SIDE OUTLET STRAINER　L TYPE



STRAINER SIDE OUTLET TYPE (L)

SIZE	ØA	ØB	C	D	L
1"	22.1	50.5	104.8	110	310
1.5"	34.8	50.5	104.8	110	310
2"	47.5	64	114.3	110	310
2.5"	60.2	77.5	108	110	410
3"	72.9	91	108	110	490

Y TYPE

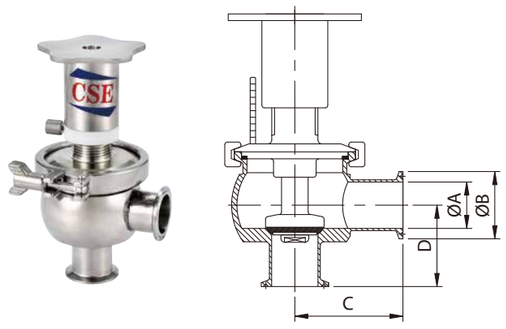


STRAINER Y TYPE

SIZE	ØA	ØB	L
1.0"	22.1	50.5	155.65
1.5"	34.8	50.5	192.63
2.0"	47.5	64	208.17
2.5"	60.2	77.5	271.26
3.0"	72.9	91	300.83

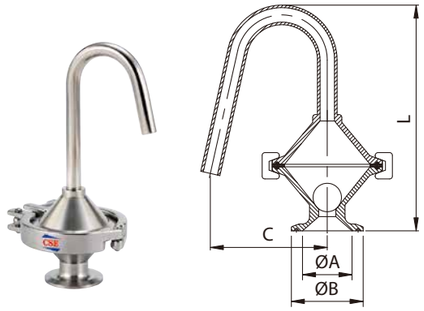
CSE Kinds of Special Valve

- Material: SUS304 or SUS316L.
  Forged or Solid Bar Body.
- Surface: Polished, Electric Polished.
  ID Ra＜0.8μm. or 0.4μm.
- Can be made by your requirement design.



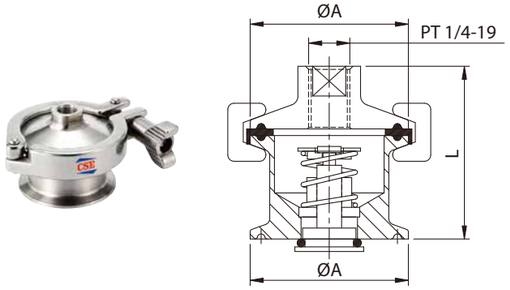
For your safety relief poessure.
(Working pressure-0.1~7kgs/cm².)
Relief Valve

SIZE	ØA	ØB	C	D
1.0"	22.1	50.5	63.5	63.5
1.5"	34.8	50.5	69.85	69.85
2.0"	47.5	64	88.9	88.9
2.5"	60.2	77.5	88.9	88.9
3.0"	60.2	91	95.25	95.25



Relief out over-load Air pressure
on your Tank or Pipe Line.
Air Release Valve

SIZE	ØA	ØB	C	L
1.0"	22.1	50.5	82	158
1.5"	34.8	50.5	82	158
2.0"	47.5	64	82	158



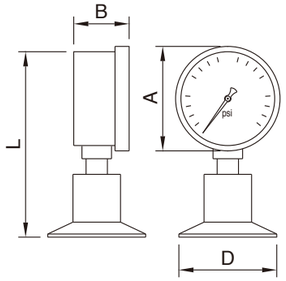
For Air Clean out the pipe Line.
Air Blow Valve

SIZE	ØA	L
1.0"	50.5	55
1.5"	50.5	55
2.0"	64	55

Sanitary Standard Pressure Gauge

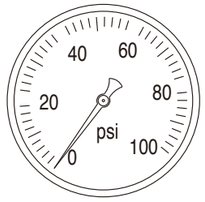
Note:

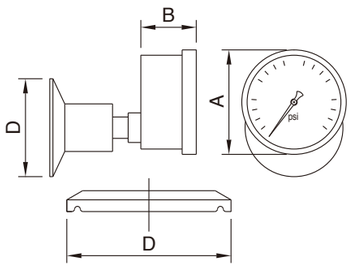
Sanitary pressure gauges are stainless steel products specifically designed to meet the demanding sanitary requirements for food dairy, beverage, pharmaceutical and biotech applications. Complies with 3A sanitary standard, water-proof, shock resistant, and closed structures are durable durable and accurate, good for long time running. All series are liquid-filled, special materials movement and bourdon tube have lasting durability. It is applicable to the places of both strong fluctuation and non-corrosive fluid, such as air, water and oil.



SIZE	A	B	L
Ø50	56	30	100
Ø63	69	30	122
Ø80	89	30	140
Ø100	112	47	166
Ø160	160	50	224

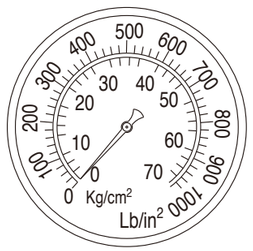
CSE-PG1





SIZE	D (Tri-clamp)
1.0"	50.5
1.5"	50.5
2.0"	64
2.5"	77.5
3.0"	91
4.0"	119

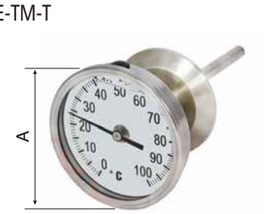
CSE-PG2



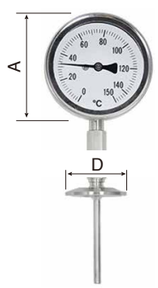
- Process connection: 1-1/2" , 2.0" , 2-1/2" Quick-release clamp piping system
- Suitable Pressure Ranges: 15psi to 600psi
- Instrument Connection: 1/4"NPT /BSPT or 1/2"NPT /BSPT
- Case & Movement Materia: SS304
- Connection Material: SUS316L
- Diaphragm Material: SUS316L
- Fill Fluid: Glycerined (Vegetable oil)
- Bourdon Tube Material: SUS316L
- Ferrule Material: SUS304/SUS316L
- Lens：Safety Glass
- Max temperature: tandard-120°C，special-150°C

Thermometer

CSE-TM-T



CSE-TM-I



- Process connection: 1-1/2" ~ 4" Quick-release clamp piping system
- Case & Movement Material: SS304
- Ferrule Material: SS304/ SUS316
- Lens: Safety Glass

CSE Hygienic Sight Glass

CSE Hygienic Sight Glass:

Glass: Clean, High Press Pyrex Glass. Max Work 10 bar. Can be changeable.

Body: SUS304, 316L Precision Machined Body. With Width Connection End.3A, DIN, SMS, RJT, IDF Male/Male.Weld and Female End.

Screw Blot: Full Stainless Steel.

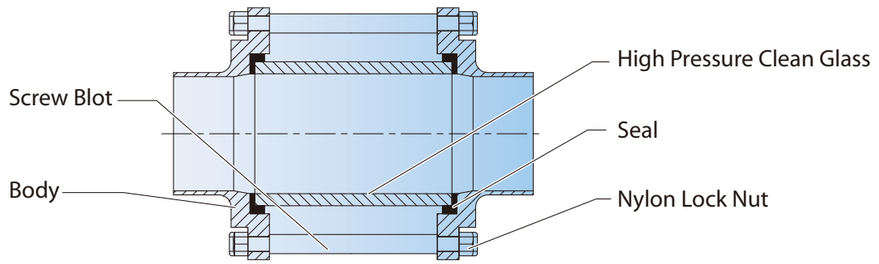
Seal: EPDM, Silicone and FKM.

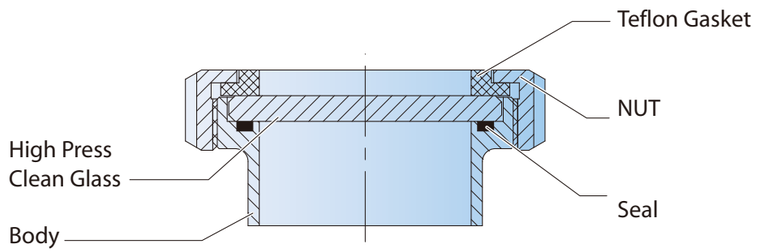
Pyrex Glass data:

Pyrex Borosilicate Glass Composition

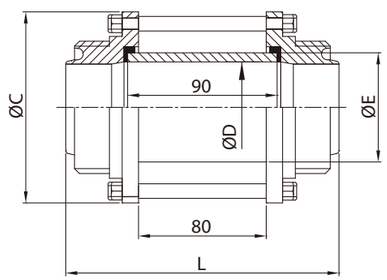
Contect	SiO_2	Al_2O_3	Fe_2O_3	B_2O_3	Na_2O	K_2O
%	80.9	2.3	0.03	12.7	4.0	0.04

Physical Properties	
Young's module	$6.4x10^5$ kg/cm^3
Poisson's ratio	0.20
Shear modules	$2.7x10^5$ kg/cm^2
Knoop hardness (100g)	418KHN
Bending strength	$4~7x10^5$ kg/cm^2
Design stress (Safety factor)	67 kg/cm^2



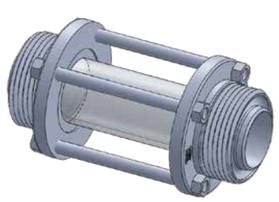


CSE Hygienic Sight Glass

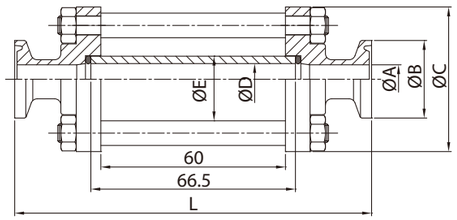


RJT/SMS/DIN/IDF MALE END SIGHT CLASS

SIZE	ØC	ØD	ØE	L
25	79	26	32	148
38	85	34	40	156
50	105	50	60	160
63	112	65	75	160
76	125	75.4	85	162
100	157	100	110	168



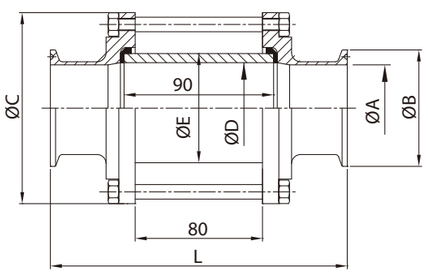
1/2″~3/4″



3A/BS CLAMP END SIGHT GLASS

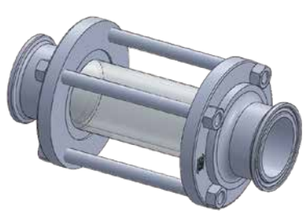
SIZE	ØA	ØB	ØC	ØD	ØE	L
1/2"	9.4	25.2	47	10.2	15	116
3/4"	15.75	25.2	47	17	22	116
1.0"	22.1	50.5	79	26	32	143
1.5"	34.8	50.5	85	34	40	146
2.0"	47.5	64	105	50	60	150
2.5"	60.2	77.5	112	65	75	150
3.0"	72.9	91	125	75.4	85	156
4.0"	97.6	119	157	100	110	156

1″~4″



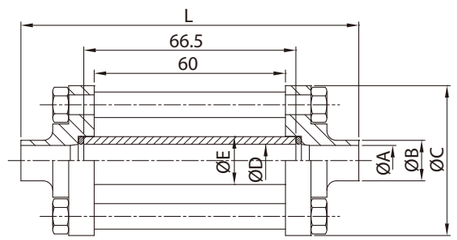
SMS CLAMP END GIHT GLASS

SIZE	ØA	ØB	ØC	ØD	ØE	L
DN25	22.5	50.5	79	26	32	143
DN38	35.4	50.5	85	34	40	146
DN50	48	64	105	50	60	150
DN63	60.2	77.5	112	65	75	150
DN76	72	91	125	75.4	85	156
DN100	100	119	157	100	110	156



CSE Hygienic Sight Glass

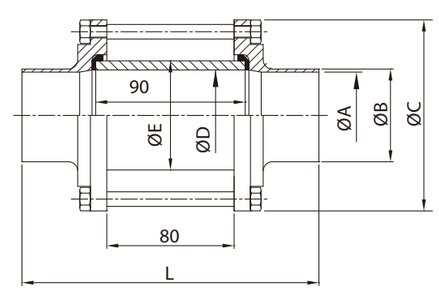
1/2″~3/4″



3A/BS WELD END SIGHT GLASS

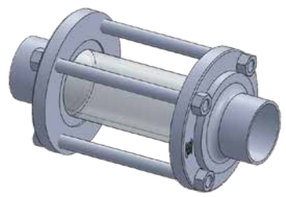
SIZE	ØA	ØB	ØC	ØD	ØE	L
1/2"	9.4	12.7	47	10.2	15	106
3/4"	15.75	19.05	47	17	22	106
1.0"	22.1	25.4	79	26	32	148
1.5"	34.8	38.1	85	34	40	156
2.0"	47.5	50.8	105	50	60	160
2.5"	60.2	63.5	112	65	75	160
3.0"	72.9	76.2	125	75.4	85	162
4.0"	97.6	101.6	157	100	110	167

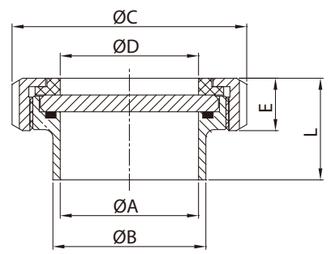
1″~4″



SMS WELD END GIHT GLASS

SIZE	ØA	ØB	ØC	ØD	ØE	L
DN25	22.5	25	79	26	32	148
DN38	35.4	38	85	34	40	156
DN50	48	51	105	50	60	160
DN63	60.2	63.5	112	65	75	160
DN76	72	76	125	75.4	85	162
DN100	100	104	157	100	110	168





DIN WELD END SIGHT GLASS

SIZE	ØA	ØB	ØC	ØD	E	L
DN25	26	35	63	26	21	37
DN32	32	41	70	32	21	40
DN40	38	48	78	38	21	41
DN50	50	61	92	50	22	42.5
DN65	66	79	112	66	25	48.5
DN80	81	93	127	82	29	52.5
DN100	100	114	148	100	31	61.5

SMS WELD END SIGHT GLASS

SIZE	ØA	ØB	ØC	ØD	E	L
DN25	22.5	25	51	22.5	19	34
DN38	35.5	38	74	35.5	23	40
DN50	48.5	51	84	48.5	24	42
DN63	60.5	63.5	100	60.5	28	46
DN76	72.9	76.1	114	72.9	30	47
DN100	100	105	138	100	31	49

BPE Pharmaceutical / Biotechnology Fitting & Tube

CSE offer series of high capacity product in pharmaceutical flowing control system, we use the special material on BPE welding: low sulphur ASTM SS 316L, S≤0.005%~0.017% which meets the standard of orbital welding. We also off electro-polished in ID to satisfy your demands.

＋Description

＋Description

＋Description

＋Description

＋Description

CSE HIGH PURITY TUBE & FITTING VALVE (ASME BPE STANDARD)

Pharmaceutical/Biotechnology fitting. CSE have over 15 years hygienic fitting experiences for developing out the ASME bioprocessing equipment (BPE) standard tube, fitting, valve components for high purity application such as water for injection, pharmaceutical, cosmetics use. Material：low sulphur ASTM SS316L, S：≦ 0.005% ~ 0.017%,

MTR certificate will be offered.

Surface options:

Ra Reading for Tubing

As drawing and / or mechanically polished			Mechanically Polished and Electropolished or Electropolished		
Surface Designation	Ra Average		Surface Designation	Ra Average	
	μ-in	μ-m		μ-in	μ-m
SF1	20	0.5	SF4	15	0.38
SF2	25	0.63	SF5	20	0.5
SF3	30	0.76	SF6	25	0.63

Ra Reading for Fitting

Mechanically polished			Mechanically Polished and Electropolished		
Surface Designation	Ra Average		Surface Designation	Ra Average	
	μ-in	μ-m		μ-in	μ-m
SF1	20	0.5	SF4	15	0.38
SF2	25	0.63	SF5	20	0.5
SF3	30	0.76	SF6	25	0.63

Outer surface: Tubes and fittings Ra≤ 32uin (0.8μm)

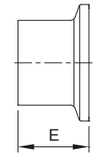
Dimension & tolerance：

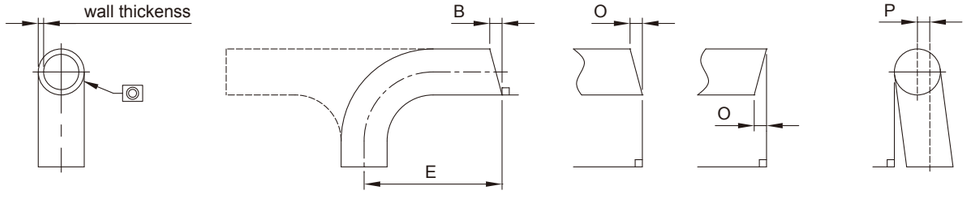
SIZE	OD	Wall thickenss		Squareness face To tangent，B	Off angle O	Off plane P
		Mechanical polish	Electropolish			
1/2"	±0.13	+0.13/-0.2	+0.13/-0.25	0.13	0.36	0.76
3/4"	±0.13	+0.13/-0.2	+0.13/-0.25	0.13	0.46	0.76
1.0"	±0.13	+0.13/-0.2	+0.13/-0.25	0.2	0.64	0.76
1.5"	±0.2	+0.13/-0.2	+0.13/-0.25	0.2	0.86	1.27
2.0"	±0.2	+0.13/-0.2	+0.13/-0.25	0.2	1.09	1.27
2.5"	±0.25	+0.13/-0.2	+0.13/-0.25	0.25	1.37	1.27
3.0"	±0.25	+0.13/-0.2	+0.13/-0.25	0.41	1.73	1.27
4.0"	±0.38	+0.2/-0.25	+0.2/-0.30	0.41	2.18	1.52

General Notes：

Tolerance on E end-to-end and center-to-end：1.27mm

Toerance for centerline radius (CLR) is ±10% of the nominal dimension.





BPE Stainless Steel Tubing

Absolutely hygienic conditions are necessary for the entire production cycle of pharmaceutical and ultra-high industries.
Therefore, tubes, fittings, and valves with a smooth internal surface are extensively installed with the advantages of cleaning easily and avoiding bacteria contamination.

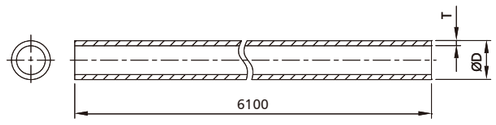
CSE only offers tubes that are manufactured, quality controlled, marked, and certified according to the highest standards for hygienic equipment design and guarantees extended quality and traceability.
CSE BPE tubing significantly reduces inspection requirements prior to installation by utilizing only the highest quality stainless steel materials.

CSE delivers directly from stock the following stainless steel tubes in grade TP316L with low sulfur content of 0.005% to 0.0017% and SF1 and SF4 finishes (according to the ASME BPE specification)

STANDARDS:
ASTM A270-2015 S2

SURFACE FINISH: SF0~SF6
SF1 ID Pol. Ra<0.5μm/
OD Pol. Ra<0.8μm
SF4 ID EP Finished Ra<0.38μm/
OD Pol. Ra<0.8μm

CSE BPE EP products with following advantages:
- Homogeneously EP layer to minimize rouging
- Higher chrome concentration for better corrosion resistance
- Guaranteed smoothness of all internal surfaces to reduce Bio film



SIZE	ØD	T
1/8"	3.18	0.56
1/4"	6.35	0.89
3/8"	9.53	0.89
1/2"	12.7	1.65
3/4"	19.05	1.65
1.0"	25.4	1.65
1.5"	38.1	1.65
2.0"	50.8	1.65
2.5"	63.5	1.65
3.0"	76.2	1.65
4.0"	101.6	2.11
6.0"	152.4	2.77

Marking

ASME BPE (BPE REFERENCE NO.)
TP316L size SFX
(H.T.NO.)

ASTM A270 TP316L ASME-BPE DT-4-1 SF-X WLD NDE Size X length X Heat NO X

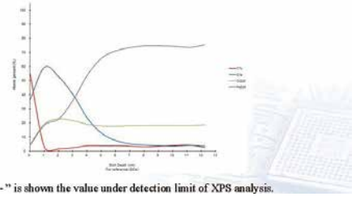
Package Type

SF1

SF4

Survey	O1s	Cr2p3	Fe2p3	Ni2p3	Mo3d	Cr : Fe
1.5" TEE 1810D (sputter 1.5nm)	56.28	19.74	19.02	3.94	1.02	1.04 : 1

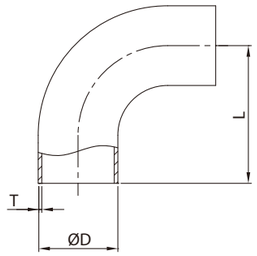
1.5" TEE 1810D Depth profile



Note: " - " is shown the value under detection limit of XPS analysis.

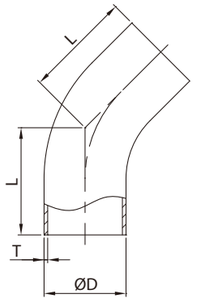
BPE Fittings

DT-4.1.1-1 LONG WELD 90° ELBOW (DT-7)



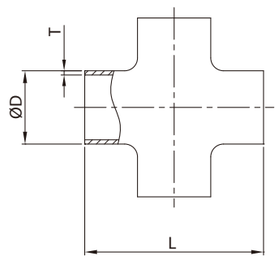
SIZE	ØD	L	T
1/2"	12.7	76.2	1.65
3/4"	19.05	76.2	1.65
1"	25.4	76.2	1.65
1.5"	38.1	95.25	1.65
2"	50.8	120.65	1.65
2.5"	63.5	139.7	1.65
3"	76.2	158.75	1.65
4"	101.6	203.2	2.11
6"	152.4	292.1	2.77

DT-4.1.1-4 LONG 45° ELBOW (DT-8)



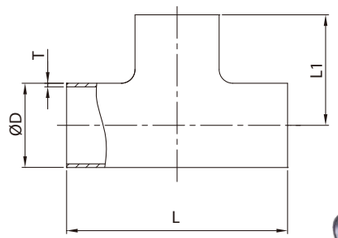
SIZE	ØD	L	T
1/2"	12.7	57.15	1.65
3/4"	19.05	57.15	1.65
1"	25.4	57.15	1.65
1.5"	38.1	63.5	1.65
2"	50.8	76.2	1.65
2.5"	63.5	85.73	1.65
3"	76.2	92.08	1.65
4"	101.6	114.3	2.11
6"	152.4	158.75	2.77

DT-4.1.2-1C CROSS (DT-9)



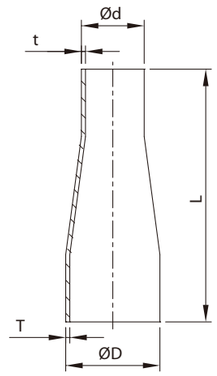
SIZE	ØD	L	T
1/2"	12.7	95.26	1.65
3/4"	19.05	101.6	1.65
1"	25.4	107.96	1.65
1.5"	38.1	120.66	1.65
2"	50.8	146.06	1.65
2.5"	63.5	158.76	1.65
3"	76.2	171.46	1.65
4"	101.6	209.56	2.11
6"	152.4	285.76	2.77

DT-4.1.2-1T TEE (DT-9)

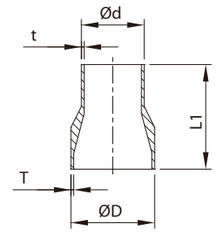


SIZE	ØD	L	L1	T
1/2"	12.7	95.26	47.63	1.65
3/4"	19.05	101.6	50.8	1.65
1"	25.4	107.96	53.98	1.65
1.5"	38.1	120.66	60.33	1.65
2"	50.8	146.06	73.03	1.65
2.5"	63.5	158.76	79.38	1.65
3"	76.2	171.46	85.73	1.65
4"	101.6	209.56	104.78	2.11
6"	152.4	285.76	142.88	2.77

(a)



(b)



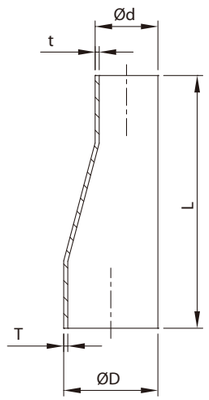
DT-4.1.3-1 CONCENTRIC REDUCER (DT11)

SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	101.6	53.93	1.65	1.65
1.0"*1/2"	25.4	12.7	114.3	63.5	1.65	1.65
1.0"*3/4"	25.4	19.05	101.6	53.93	1.65	1.65
1.5"*1/2"	38.1	12.7	139.7	76.2	1.65	1.65
1.5"*3/4"	38.1	19.05	127	76.2	1.65	1.65
1.5"*1.0"	38.1	25.4	127	63.5	1.65	1.65
2.0"*1/2"	50.8	12.7	196.9	85.73	1.65	1.65
2.0"*3/4"	50.8	19.05	184.2	85.73	1.65	1.65
2.0"*1.0"	50.8	25.4	184.2	85.73	1.65	1.65
2.0"*1.5"	50.8	38.1	133.4	63.5	1.65	1.65
2.5"*1/2"	63.5	12.7	247.7	—	1.65	1.65
2.5"*3/4"	63.5	19.05	235	—	1.65	1.65
2.5"*1.0"	63.5	25.4	235	85.73	1.65	1.65
2.5"*1.5"	63.5	38.1	184.2	85.73	1.65	1.65
2.5"*2.0"	63.5	50.8	139.7	63.5	1.65	1.65
3.0"*1.0"	76.2	25.4	285.8	107.95	1.65	1.65
3.0"*1.5"	76.2	38.1	235	107.95	1.65	1.65
3.0"*2.0"	76.2	50.8	190.5	85.73	1.65	1.65
3.0"*2.5"	76.2	63.5	139.7	66.68	1.65	1.65
4.0"*1.0"	101.6	25.4	393.7	—	2.11	1.65
4.0"*1.5"	101.6	38.1	342.9	—	2.11	1.65
4.0"*2.0"	101.6	50.8	298.5	130.18	2.11	1.65
4.0"*2.5"	101.6	63.5	247.7	107.95	2.11	1.65
4.0"*3.0"	101.6	76.2	196.9	98.43	2.11	1.65
6.0"*3.0"	152.4	76.2	—	184.15	2.77	1.65
6.0"*4.0"	152.4	101.6	254	142.88	2.77	2.11

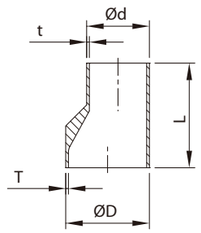
BPE Fittings

DT-4.1.3-1 ECCENTRIC REDUCER (DT11)

(a)

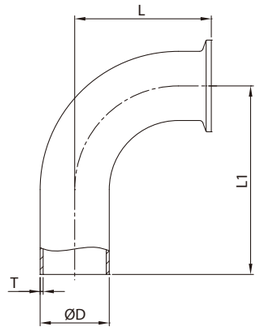


(b)



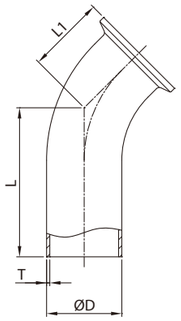
SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	101.6	53.93	1.65	1.65
1.0"*1/2"	25.4	12.7	114.3	63.5	1.65	1.65
1.0"*3/4"	25.4	19.05	101.6	53.93	1.65	1.65
1.5"*1/2"	38.1	12.7	139.7	76.2	1.65	1.65
1.5"*3/4"	38.1	19.05	127	76.2	1.65	1.65
1.5"*1.0"	38.1	25.4	127	63.5	1.65	1.65
2.0"*1/2"	50.8	12.7	196.9	85.73	1.65	1.65
2.0"*3/4"	50.8	19.05	184.2	85.73	1.65	1.65
2.0"*1.0"	50.8	25.4	184.2	85.73	1.65	1.65
2.0"*1.5"	50.8	38.1	133.4	63.5	1.65	1.65
2.5"*1/2"	63.5	12.7	247.7	—	1.65	1.65
2.5"*3/4"	63.5	19.05	235	—	1.65	1.65
2.5"*1.0"	63.5	25.4	235	85.73	1.65	1.65
2.5"*1.5"	63.5	38.1	184.2	85.73	1.65	1.65
2.5"*2.0"	63.5	50.8	139.7	63.5	1.65	1.65
3.0"*1.0"	76.2	25.4	285.8	107.95	1.65	1.65
3.0"*1.5"	76.2	38.1	235	107.95	1.65	1.65
3.0"*2.0"	76.2	50.8	190.5	85.73	1.65	1.65
3.0"*2.5"	76.2	63.5	139.7	66.68	1.65	1.65
4.0"*1.0"	101.6	25.4	393.7	—	2.11	1.65
4.0"*1.5"	101.6	38.1	342.9	—	2.11	1.65
4.0"*2.0"	101.6	50.8	298.5	130.18	2.11	1.65
4.0"*2.5"	101.6	63.5	247.7	107.95	2.11	1.65
4.0"*3.0"	101.6	76.2	196.9	98.43	2.11	1.65
6.0"*3.0"	152.4	76.2	—	184.15	2.77	1.65
6.0"*4.0"	152.4	101.6	254	142.88	2.77	2.11

DT-4.1.1-2 90° CLAMP/WELD ELBOW (DT-12)



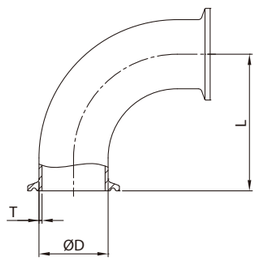
SIZE	ØD	L	L1	T
1/2"	12.7	41.28	76.2	1.65
3/4"	19.05	41.28	76.2	1.65
1"	25.4	50.8	76.2	1.65
1.5"	38.1	69.85	95.25	1.65
2"	50.8	88.9	120.65	1.65
2.5"	63.5	107.95	139.7	1.65
3"	76.2	127	158.75	1.65
4"	101.6	168.28	203.2	2.11
6"	152.4	266.7	292.1	2.77

DT-4.1.1-5 45° CLAMP/WELD ELBOW (DT-13)



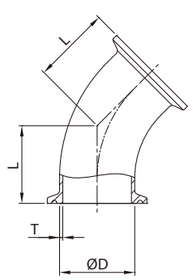
SIZE	ØD	L	L1	T
1/2"	12.7	57.15	25.4	1.65
3/4"	19.05	57.15	25.4	1.65
1"	25.4	57.15	28.58	1.65
1.5"	38.1	63.5	36.53	1.65
2"	50.8	76.2	44.45	1.65
2.5"	63.5	85.73	52.4	1.65
3"	76.2	92.08	60.33	1.65
4"	101.6	114.3	79.38	2.11
6"	152.4	158.75	133.35	2.77

DT-4.1.1-3 90° CLAMP ELBOW (DT-16)



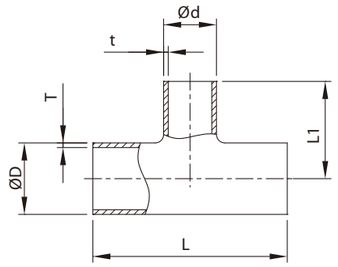
SIZE	ØD	L	T
1/2"	12.7	41.28	1.65
3/4"	19.05	41.28	1.65
1"	25.4	50.8	1.65
1.5"	38.1	69.85	1.65
2"	50.8	88.9	1.65
2.5"	63.5	107.95	1.65
3"	76.2	127	1.65
4"	101.6	168.28	2.11
6"	152.4	266.7	2.77

DT-4.1.1-6 45° CLAMP ELBOW (DT-17)



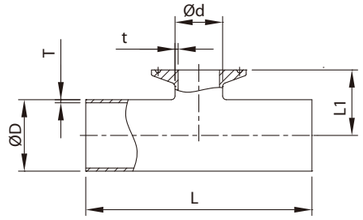
SIZE	ØD	L	T
1/2"	12.7	25.4	1.65
3/4"	19.05	25.4	1.65
1"	25.4	28.58	1.65
1.5"	38.1	36.5	1.65
2"	50.8	44.45	1.65
2.5"	63.5	52.4	1.65
3"	76.2	60.33	1.65
4"	101.6	79.38	2.11
6"	152.4	133.35	2.77

BPE Fittings



DT-4.1.2-6 REDUCING TEE (DT-10)

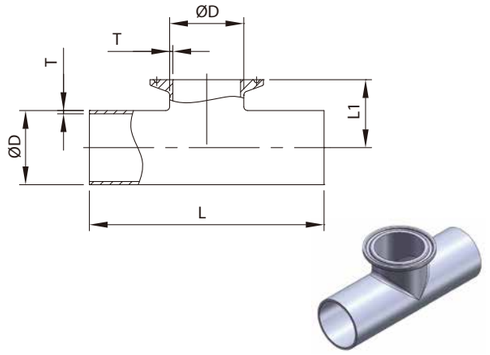
SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	101.6	50.8	1.65	1.65
1"*1/2"	25.4	12.7	107.96	53.98	1.65	1.65
1"*3/4"	25.4	19.05	107.96	53.98	1.65	1.65
1.5"*1/2"	38.1	12.7	120.66	60.33	1.65	1.65
1.5"*3/4"	38.1	19.05	120.66	60.33	1.65	1.65
1.5"*1"	38.1	25.4	120.66	60.33	1.65	1.65
2"*1/2"	50.8	12.7	146.06	66.68	1.65	1.65
2"*3/4"	50.8	19.05	146.06	66.68	1.65	1.65
2"*1"	50.8	25.4	146.06	66.68	1.65	1.65
2"*1.5"	50.8	38.1	146.06	66.68	1.65	1.65
2.5"*1/2"	63.5	12.7	158.76	73.03	1.65	1.65
2.5"*3/4"	63.5	19.05	158.76	73.03	1.65	1.65
2.5"*1"	63.5	25.4	158.76	73.03	1.65	1.65
2.5"*1.5"	63.5	38.1	158.76	73.03	1.65	1.65
2.5"*2"	63.5	50.8	158.76	73.03	1.65	1.65
3"*1/2"	76.2	12.7	171.46	79.38	1.65	1.65
3"*3/4"	76.2	19.05	171.46	79.38	1.65	1.65
3"*1"	76.2	25.4	171.46	79.38	1.65	1.65
3"*1.5"	76.2	38.1	171.46	79.38	1.65	1.65
3"*2"	76.2	50.8	171.46	79.38	1.65	1.65
3"*2.5"	76.2	63.5	171.46	79.38	1.65	1.65
4"*1/2"	101.6	12.7	209.56	92.08	2.11	1.65
4"*3/4"	101.6	19.05	209.56	92.08	2.11	1.65
4"*1"	101.6	25.4	209.56	92.08	2.11	1.65
4"*1.5"	101.6	38.1	209.56	92.08	2.11	1.65
4"*2"	101.6	50.8	209.56	98.43	2.11	1.65
4"*2.5"	101.6	63.5	209.56	98.43	2.11	1.65
4"*3"	101.6	76.2	209.56	98.43	2.11	1.65
6"*3"	152.4	76.2	285.76	123.83	2.77	1.65
6"*4"	152.4	101.6	285.76	130.18	2.77	2.11



DT-4.1.2-7 SHORT OUTLET W/C REDUCING TEE (DT-14)

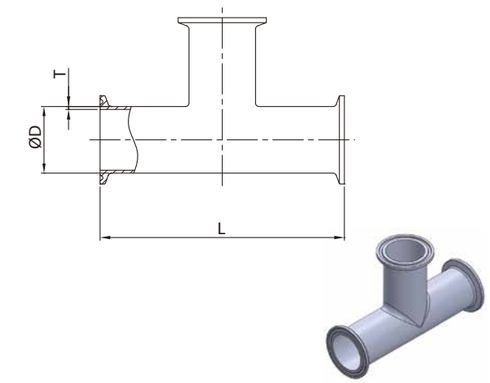
SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	101.6	25.4	1.65	1.65
1"*1/2"	25.4	12.7	107.96	28.58	1.65	1.65
1"*3/4"	25.4	19.05	107.96	28.58	1.65	1.65
1.5"*1/2"	38.1	12.7	120.66	34.93	1.65	1.65
1.5"*3/4"	38.1	19.05	120.66	34.93	1.65	1.65
1.5"*1"	38.1	25.4	120.66	34.93	1.65	1.65
2"*1/2"	50.8	12.7	146.06	41.28	1.65	1.65
2"*3/4"	50.8	19.05	146.06	41.28	1.65	1.65
2"*1"	50.8	25.4	146.06	41.28	1.65	1.65
2"*1.5"	50.8	38.1	146.06	41.28	1.65	1.65
2.5"*1/2"	63.5	12.7	158.76	47.63	1.65	1.65
2.5"*3/4"	63.5	19.05	158.76	47.63	1.65	1.65
2.5"*1"	63.5	25.4	158.76	47.63	1.65	1.65
2.5"*1.5"	63.5	38.1	158.76	47.63	1.65	1.65
2.5"*2"	63.5	50.8	158.76	47.63	1.65	1.65
3"*1/2"	76.2	12.7	171.46	53.98	1.65	1.65
3"*3/4"	76.2	19.05	171.46	53.98	1.65	1.65
3"*1"	76.2	25.4	171.46	53.98	1.65	1.65
3"*1.5"	76.2	38.1	171.46	53.98	1.65	1.65
3"*2"	76.2	50.8	171.46	53.98	1.65	1.65
3"*2.5"	76.2	63.5	171.46	53.98	1.65	1.65
4"*1/2"	101.6	12.7	209.56	66.68	2.11	1.65
4"*3/4"	101.6	19.05	209.56	66.68	2.11	1.65
4"*1"	101.6	25.4	209.56	66.68	2.11	1.65
4"*1.5"	101.6	38.1	209.56	66.68	2.11	1.65
4"*2"	101.6	50.8	209.56	66.68	2.11	1.65
4"*2.5"	101.6	63.5	209.56	66.68	2.11	1.65
4"*3"	101.6	76.2	209.56	66.68	2.11	1.65
6"*1/2"	152.4	12.7	285.76	92.08	2.77	1.65
6"*3/4"	152.4	19.05	285.76	92.08	2.77	1.65
6"*1"	152.4	25.4	285.76	92.08	2.77	1.65
6"*1.5"	152.4	38.1	285.76	92.08	2.77	1.65
6"*2"	152.4	50.8	285.76	92.08	2.77	1.65
6"*2.5"	152.4	63.5	285.76	92.08	2.77	1.65
6"*3"	152.4	76.2	285.76	92.08	2.77	1.65
6"*4"	152.4	101.6	285.76	92.25	2.77	2.11

BPE Fittings



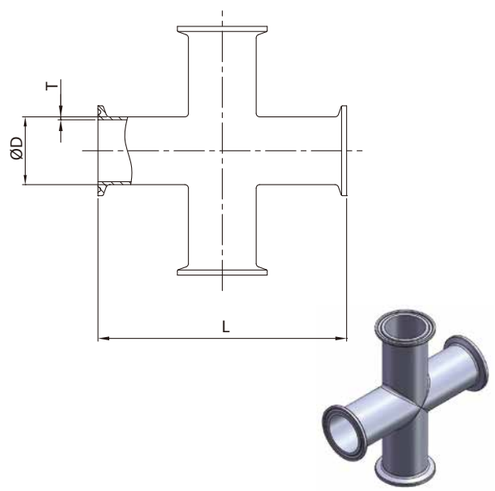
DT-4.1.2-2 EQUAL OUTLET WELD/CLAMP TEE (DT-15)

SIZE	ØD	L	L1	T
1/2"	12.7	95.26	25.4	1.65
3/4"	19.05	101.6	28.58	1.65
1"	25.4	107.96	28.59	1.65
1.5"	38.1	120.66	34.39	1.65
2"	50.8	146.06	41.28	1.65
2.5"	63.5	158.76	47.63	1.65
3"	76.2	171.46	53.98	1.65
4"	101.6	209.56	69.85	2.11
6"	152.4	285.76	117.48	2.77



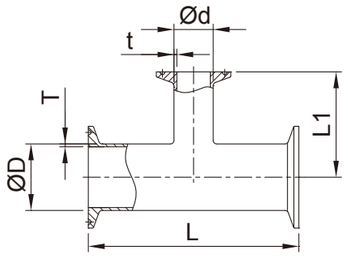
DT-4.1.2-4T CLAMP TEE (DT-18)

SIZE	ØD	L	T
1/2"	12.7	114.3	1.65
3/4"	19.05	120.66	1.65
1"	25.4	133.36	1.65
1.5"	38.1	146.06	1.65
2"	50.8	171.46	1.65
2.5"	63.5	184.16	1.65
3"	76.2	196.86	1.65
4"	101.6	241.3	2.11
6"	152.4	361.96	2.77



DT-4.1.2-4C CLAMP CROSS (DT-18)

SIZE	ØD	L	T
1/2"	12.7	114.3	1.65
3/4"	19.05	120.66	1.65
1"	25.4	133.36	1.65
1.5"	38.1	146.06	1.65
2"	50.8	171.46	1.65
2.5"	63.5	184.16	1.65
3"	76.2	196.86	1.65
4"	101.6	241.3	2.11
6"	152.4	361.96	2.77

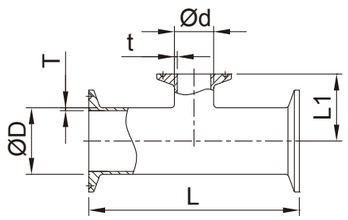


DT-4.1.2-8 REDUCING TEE CLAMP END (DT-19)

SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	127	63.5	1.65	1.65
1.0"*1/2"	25.4	12.7	133.36	66.68	1.65	1.65
1.0"*3/4"	25.4	19.05	133.36	66.68	1.65	1.65
1.5"*1/2"	38.1	12.7	146.06	73.03	1.65	1.65
1.5"*3/4"	38.1	19.05	146.06	73.03	1.65	1.65
1.5"*1.0"	38.1	25.4	146.06	73.03	1.65	1.65
2.0"*1/2"	50.8	12.7	171.46	79.38	1.65	1.65
2.0"*3/4"	50.8	19.05	171.46	79.38	1.65	1.65
2.0"*1.0"	50.8	25.4	171.46	79.38	1.65	1.65
2.0"*1.5"	50.8	38.1	171.46	79.38	1.65	1.65
2.5"*1/2"	63.5	12.7	184.16	85.73	1.65	1.65
2.5"*3/4"	63.5	19.05	184.16	85.73	1.65	1.65
2.5"*1.0"	63.5	25.4	184.16	85.73	1.65	1.65
2.5"*1.5"	63.5	38.1	184.16	85.73	1.65	1.65
2.5"*2.0"	63.5	50.8	184.16	85.73	1.65	1.65
3.0"*1/2"	76.2	12.7	196.86	92.08	1.65	1.65
3.0"*3/4"	76.2	19.05	196.86	92.08	1.65	1.65
3.0"*1.0"	76.2	25.4	196.86	92.08	1.65	1.65
3.0"*1.5"	76.2	38.1	196.86	92.08	1.65	1.65
3.0"*2.0"	76.2	50.8	196.86	92.08	1.65	1.65
3.0"*2.5"	76.2	63.5	196.86	92.08	1.65	1.65
4.0"*1/2"	101.6	12.7	241.3	104.78	2.11	1.65
4.0"*3/4"	101.6	19.05	241.3	104.78	2.11	1.65
4.0"*1.0"	101.6	25.4	241.3	104.78	2.11	1.65
4.0"*1.5"	101.6	38.1	241.3	104.78	2.11	1.65
4.0"*2.0"	101.6	50.8	241.3	111.13	2.11	1.65
4.0"*2.5"	101.6	63.5	241.3	111.13	2.11	1.65
4.0"*3.0"	101.6	76.2	241.3	111.13	2.11	1.65
6.0"*3.0"	152.4	76.2	361.96	136.53	2.77	1.65
6.0"*4.0"	152.4	101.6	361.96	146.05	2.77	2.11

BPE Fittings

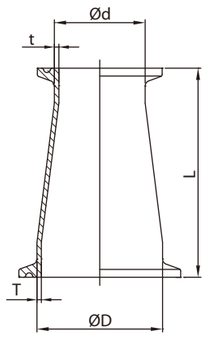
DT-4.1.2-9 REDUCING TEE CLAMP END (DT-20)



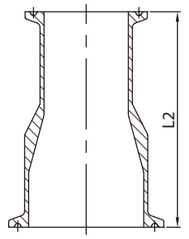
SIZE	ØD	Ød	L	L1	T	t
3/4"*1/2"	19.05	12.7	127	25.4	1.65	1.65
1.0"*1/2"	25.4	12.7	133.36	28.58	1.65	1.65
1.0"*3/4"	25.4	19.05	133.36	28.58	1.65	1.65
1.5"*1/2"	38.1	12.7	146.06	34.93	1.65	1.65
1.5"*3/4"	38.1	19.05	146.06	34.93	1.65	1.65
1.5"*1.0"	38.1	25.4	146.06	34.93	1.65	1.65
2.0"*1/2"	50.8	12.7	171.46	41.28	1.65	1.65
2.0"*3/4"	50.8	19.05	171.46	41.28	1.65	1.65
2.0"*1.0"	50.8	25.4	171.46	41.28	1.65	1.65
2.0"*1.5"	50.8	38.1	171.46	41.28	1.65	1.65
2.5"*1/2"	63.5	12.7	184.16	47.63	1.65	1.65
2.5"*3/4"	63.5	19.05	184.16	47.63	1.65	1.65
2.5"*1.0"	63.5	25.4	184.16	47.63	1.65	1.65
2.5"*1.5"	63.5	38.1	184.16	47.63	1.65	1.65
2.5"*2.0"	63.5	50.8	184.16	47.63	1.65	1.65
3.0"*1/2"	76.2	12.7	196.86	53.98	1.65	1.65
3.0"*3/4"	76.2	19.05	196.86	53.98	1.65	1.65
3.0"*1.0"	76.2	25.4	196.86	53.98	1.65	1.65
3.0"*1.5"	76.2	38.1	196.86	53.98	1.65	1.65
3.0"*2.0"	76.2	50.8	196.86	53.98	1.65	1.65
3.0"*2.5"	76.2	63.5	196.86	53.98	1.65	1.65
4.0"*1/2"	101.6	12.7	241.3	66.68	2.11	1.65
4.0"*3/4"	101.6	19.05	241.3	66.68	2.11	1.65
4.0"*1.0"	101.6	25.4	241.3	66.68	2.11	1.65
4.0"*1.5"	101.6	38.1	241.3	66.68	2.11	1.65
4.0"*2.0"	101.6	50.8	241.3	66.68	2.11	1.65
4.0"*2.5"	101.6	63.5	241.3	66.68	2.11	1.65
4.0"*3.0"	101.6	76.2	241.3	66.68	2.11	1.65
6.0"*1/2"	152.4	12.7	361.96	92.08	2.77	1.65
6.0"*3/4"	152.4	19.05	361.96	92.08	2.77	1.65
6.0"*1.0"	152.4	25.4	361.96	92.08	2.77	1.65
6.0"*1.5"	152.4	38.1	361.96	92.08	2.77	1.65
6.0"*2.0"	152.4	50.8	361.96	92.08	2.77	1.65
6.0"*2.5"	152.4	63.5	361.96	92.08	2.77	1.65
6.0"*3.0"	152.4	76.2	361.96	92.08	2.77	1.65
6.0"*4.0"	152.4	101.6	361.96	95.25	2.77	2.11

DT-4.1.3-3 CLAMP CONCENTRIC REDUCER (DT-21)

(a)



(b)

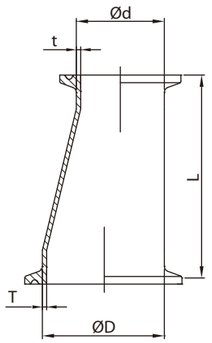


SIZE	ØD	Ød	L	T	t	L2
3/4"*1/2"	19.05	12.7	50.8	1.65	1.65	79.38
1"*1/2"	25.4	12.7	63.5	1.65	1.65	88.9
1"*3/4"	25.4	19.05	50.8	1.65	1.65	79.38
1.5"*1/2"	38.1	12.7	88.9	1.65	1.65	101.6
1.5"*3/4"	38.1	19.05	76.2	1.65	1.65	101.6
1.5"*1"	38.1	25.4	76.2	1.65	1.65	88.9
2"*1/2"	50.8	12.7	139.7	1.65	1.65	111.13
2"*3/4"	50.8	19.05	127	1.65	1.65	111.13
2"*1"	50.8	25.4	127	1.65	1.65	111.13
2"*1.5"	50.8	38.1	76.2	1.65	1.65	88.9
2.5"*1/2"	63.5	12.7	190.5	1.65	1.65	—
2.5"*3/4"	63.5	19.05	177.8	1.65	1.65	—
2.5"*1"	63.5	25.4	177.8	1.65	1.65	111.13
2.5"*1.5"	63.5	38.1	127	1.65	1.65	111.13
2.5"*2"	63.5	50.8	76.2	1.65	1.65	88.9
3"*1"	76.2	25.4	288.6	1.65	1.65	133.35
3"*1.5"	76.2	38.1	117.8	1.65	1.65	133.35
3"*2"	76.2	50.8	127	1.65	1.65	111.13
3"*2.5"	76.2	63.5	76.2	1.65	1.65	92.08
4"*1"	101.6	25.4	333.4	2.11	1.65	—
4"*1.5"	101.6	38.1	282.6	2.11	1.65	—
4"*2"	101.6	50.8	231.8	2.11	1.65	158.75
4"*2.5"	101.6	63.5	181	2.11	1.65	136.53
4"*3"	101.6	76.2	130.2	2.11	2.1	127
6"*3"	152.4	76.2	—	2.77	1.65	215.9
6"*4"	152.4	101.6	193.7	2.77	2.11	177.8

BPE Fittings

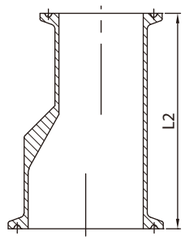
DT-4.1.3-3 CLAMP ECCENTRIC REDUCER (DT-21)

(a)



SIZE	ØD	Ød	L	T	t	L2
3/4"*1/2"	19.05	12.7	50.8	1.65	1.65	79.38
1"*1/2"	25.4	12.7	63.5	1.65	1.65	88.9
1"*3/4"	25.4	19.05	50.8	1.65	1.65	79.38
1.5"*1/2"	38.1	12.7	88.9	1.65	1.65	101.6
1.5"*3/4"	38.1	19.05	76.2	1.65	1.65	101.6
1.5"*1"	38.1	25.4	76.2	1.65	1.65	88.9
2"*1/2"	50.8	12.7	139.7	1.65	1.65	111.13
2"*3/4"	50.8	19.05	127	1.65	1.65	111.13
2"*1"	50.8	25.4	127	1.65	1.65	111.13
2"*1.5"	50.8	38.1	76.2	1.65	1.65	88.9
2.5"*1/2"	63.5	12.7	190.5	1.65	1.65	—
2.5"*3/4"	63.5	19.05	177.8	1.65	1.65	—
2.5"*1"	63.5	25.4	177.8	1.65	1.65	111.13
2.5"*1.5"	63.5	38.1	127	1.65	1.65	111.13
2.5"*2"	63.5	50.8	76.2	1.65	1.65	88.9
3"*1"	76.2	25.4	288.6	1.65	1.65	133.35
3"*1.5"	76.2	38.1	117.8	1.65	1.65	133.35
3"*2"	76.2	50.8	127	1.65	1.65	111.13
3"*2.5"	76.2	63.5	76.2	1.65	1.65	92.08
4"*1"	101.6	25.4	333.4	2.11	1.65	—
4"*1.5"	101.6	38.1	282.6	2.11	1.65	—
4"*2"	101.6	50.8	231.8	2.11	1.65	158.75
4"*2.5"	101.6	63.5	181	2.11	1.65	136.53
4"*3"	101.6	76.2	130.2	2.11	2.11	127
6"*3"	152.4	76.2	—	2.77	1.65	215.9
6"*4"	152.4	101.6	193.7	2.77	2.11	177.8

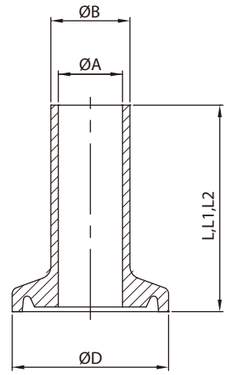
(b)



DT-4.1.4-1WELD FERRULE (DT-22)

(Type A)

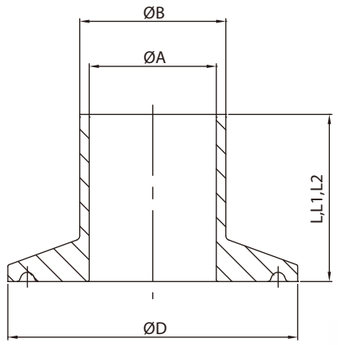
1/2"~1"



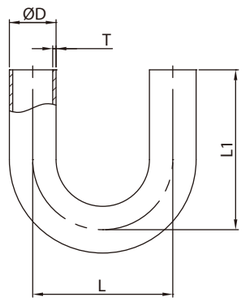
TYPE	SIZE	ØA	ØB	ØD	L	L1	L2
A	1/4"	4.57	6.35	25	12.7	28.58	44.45
	3/8"	7.75	9.53	25	12.7	28.58	44.45
	1/2"	9.4	12.7	25	12.7	28.58	44.45
	3/4"	15.75	19.05	25	12.7	28.58	44.45
	1.0"	22.1	25.4	34	12.7	28.58	44.45
B	1.0"	22.1	25.4	50.39	12.7	28.58	44.45
	1.5"	34.8	38.1	50.39	12.7	28.58	44.45
	2.0"	47.5	50.8	63.91	12.7	28.58	57.15
	2.5"	60.2	63.5	77.39	12.7	28.58	57.15
	3.0"	72.9	76.2	90.91	12.7	28.58	57.15
	4.0"	97.38	101.6	118.92	15.88	28.58	57.15
	6.0"	146.86	152.4	166.88	19.05	38.1	76.2

(Type B)

1"~6"

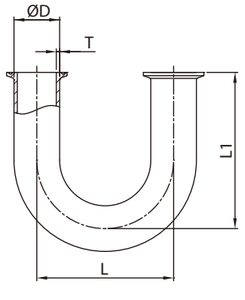


BPE Fittings



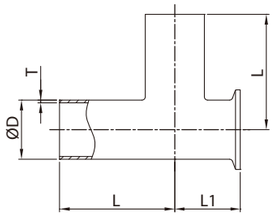
DT-4.1.1-7 180° WELD ELBOW (DT-23)

SIZE	ØD	L	L1	T
1/2"	12.7	114.3	76.2	1.65
3/4"	19.05	114.3	76.2	1.65
1"	25.4	76.2	76.2	1.65
1.5"	38.1	114.3	114.3	1.65
2"	50.8	152.4	127	1.65
2.5"	63.5	190.5	146.05	1.65
3"	76.2	228.6	165.1	1.65
4"	101.6	304.8	215.9	2.11
6"	152.4	457.2	292.1	2.77



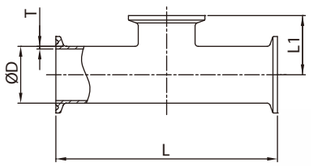
DT-4.1.1-8 180° CLAMP ELBOW (DT-24)

SIZE	ØD	L	L1	T
1/2"	12.7	114.3	88.9	1.65
3/4"	19.05	114.3	88.9	1.65
1"	25.4	76.2	88.9	1.65
1.5"	38.1	114.3	127	1.65
2"	50.8	152.4	139.7	1.65
2.5"	63.5	190.5	158.78	1.65
3"	76.2	228.6	177.8	1.65
4"	101.6	304.8	231.78	2.11
6"	152.4	457.2	330.2	2.77



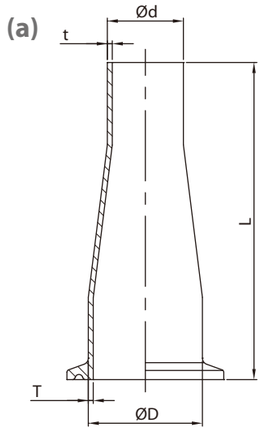
DT-4.1.2-3 SHORT OUTLET RUN WELD/CLAMP TEE (DT-25)

SIZE	ØD	L	L1	T
1/2"	12.7	47.63	22.23	1.65
3/4"	19.05	50.8	25.4	1.65
1"	25.4	53.98	28.58	1.65
1.5"	38.1	60.33	34.93	1.65
2"	50.8	73.03	41.28	1.65
2.5"	63.5	79.38	47.63	1.65
3"	76.2	85.73	53.98	1.65
4"	101.6	104.78	69.85	2.11
6"	152.4	142.88	117.48	2.77



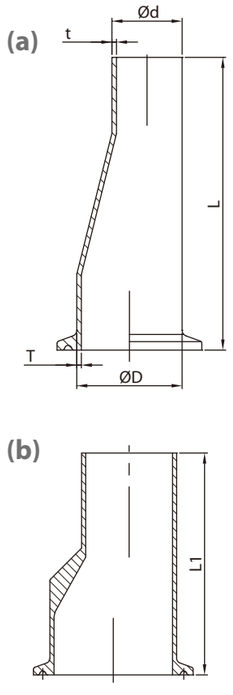
DT-4.1.2-5 SHORT OUTLET TEE CLAMP END (DT-27)

SIZE	ØD	L	L1	T
1/2"	12.7	114.3	25.4	1.65
3/4"	19.05	120.66	28.58	1.65
1"	25.4	133.36	28.58	1.65
1.5"	38.1	146.06	34.93	1.65
2"	50.8	171.46	41.28	1.65
2.5"	63.5	184.16	47.63	1.65
3"	76.2	196.86	53.98	1.65
4"	101.6	241.3	69.85	2.11
6"	152.4	361.96	117.48	2.77



DT-4.1.3-2AC CONCENTRIC REDUCER (DT-26)

SIZE	ØD	Ød	T	t	L	L1
3/4"*1/2"	19.05	12.7	1.65	1.65	76.2	66.68
1"*1/2"	25.4	12.7	1.65	1.65	88.9	76.2
1"*3/4"	25.4	19.05	1.65	1.65	76.2	66.68
1.5"*1/2"	38.1	12.7	1.65	1.65	—	88.9
1.5"*3/4"	38.1	19.05	1.65	1.65	101.6	88.9
1.5"*1"	38.1	25.4	1.65	1.65	101.6	76.2
2"*1/2"	50.8	12.7	1.65	1.65	—	98.43
2"*3/4"	50.8	19.05	1.65	1.65	—	98.43
2"*1"	50.8	25.4	1.65	1.65	152.4	98.43
2"*1.5"	50.8	38.1	1.65	1.65	101.6	76.2
2.5"*1"	63.5	25.4	1.65	1.65	—	98.43
2.5"*1.5"	63.5	38.1	1.65	1.65	152.4	98.43
2.5"*2"	63.5	50.8	1.65	1.65	107.9	76.2
3"*1"	76.2	25.4	1.65	1.65	—	120.65
3"*1.5"	76.2	38.1	1.65	1.65	203.2	120.65
3"*2"	76.2	50.8	1.65	1.65	158.8	98.43
3"*2.5"	76.2	63.5	1.65	1.65	108	79.38
4"*2"	101.6	50.8	2.11	1.65	263.5	146.05
4"*2.5"	101.6	63.5	2.11	1.65	212.7	123.83
4"*3"	101.6	76.2	2.11	1.65	161.9	114.3
6"*3"	152.4	76.2	2.77	2.77	228.6	203.2
6"*4"	152.4	101.6	2.77	2.77	228.6	161.93

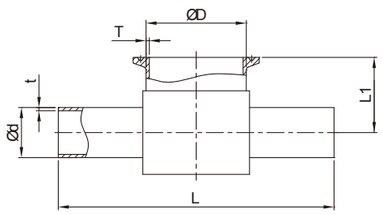


DT-4.1.3-2AE ECCENTRIC REDUCER (DT-26)

SIZE	ØD	Ød	T	t	L	L1
3/4"*1/2"	19.05	12.7	1.65	1.65	76.2	66.68
1"*1/2"	25.4	12.7	1.65	1.65	88.9	76.2
1"*3/4"	25.4	19.05	1.65	1.65	76.2	66.68
1.5"*1/2"	38.1	12.7	1.65	1.65	—	88.9
1.5"*3/4"	38.1	19.05	1.65	1.65	101.6	88.9
1.5"*1"	38.1	25.4	1.65	1.65	101.6	76.2
2"*1/2"	50.8	12.7	1.65	1.65	—	98.43
2"*3/4"	50.8	19.05	1.65	1.65	—	98.43
2"*1"	50.8	25.4	1.65	1.65	152.4	98.43
2"*1.5"	50.8	38.1	1.65	1.65	101.6	76.2
2.5"*1"	63.5	25.4	1.65	1.65	—	98.43
2.5"*1.5"	63.5	38.1	1.65	1.65	152.4	98.43
2.5"*2"	63.5	50.8	1.65	1.65	107.9	76.2
3"*1"	76.2	25.4	1.65	1.65	—	120.65
3"*1.5"	76.2	38.1	1.65	1.65	203.2	120.65
3"*2"	76.2	50.8	1.65	1.65	158.8	98.43
3"*2.5"	76.2	63.5	1.65	1.65	108	79.38
4"*2"	101.6	50.8	2.11	1.65	263.5	146.05
4"*2.5"	101.6	63.5	2.11	1.65	212.7	123.83
4"*3"	101.6	76.2	2.11	1.65	161.9	114.3
6"*3"	152.4	76.2	2.77	1.65	222.3	203.2
6"*4"	152.4	101.6	2.77	2.11	228.6	161.93

BPE Fittings

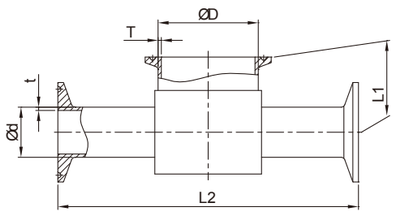
DT-4.1.2-10 (DT-28)

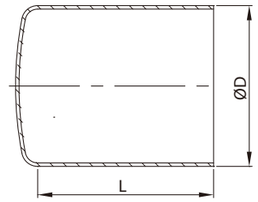


INSTRUMENT TEE WELD/CLAMP END

SIZE	ØD	Ød	L	L1	L2	T	t
1.5"*1/2"	38.1	12.7	127	22.23	152.4	1.65	1.65
1.5"*3/4"	38.1	19.05	127	25.4	152.4	1.65	1.65
1.5"*1"	38.1	25.4	127	28.58	152.4	1.65	1.65
2"*1/2"	50.8	12.7	139.7	25.4	165.1	1.65	1.65
2"*3/4"	50.8	19.05	139.7	28.58	165.1	1.65	1.65
2"*1"	50.8	25.4	139.7	31.75	165.1	1.65	1.65
2"*1.5"	50.8	38.1	139.7	38.1	165.1	1.65	1.65
2.5"*1/2"	63.5	12.7	170	35	195.4	1.65	1.65
2.5"*3/4"	63.5	19.05	170	38.1	195.4	1.65	1.65
2.5"*1"	63.5	25.4	170	41.3	195.4	1.65	1.65
2.5"*1.5"	63.5	38.1	170	44.5	195.4	1.65	1.65
2.5"*2"	63.5	50.8	170	48	195.4	1.65	1.65
3"*1/2"	76.2	12.7	180	38.1	205.4	1.65	1.65
3"*3/4"	76.2	19.05	180	41.3	205.4	1.65	1.65
3"*1"	76.2	25.4	180	44.5	205.4	1.65	1.65
3"*1.5"	76.2	38.1	180	48	205.4	1.65	1.65
3"*2"	76.2	50.8	180	50.8	205.4	1.65	1.65
3"*2.5"	76.2	63.5	180	54	205.4	1.65	1.65
4"*1/2"	101.6	12.7	220	79.4	245.4	1.65	1.65
4"*3/4"	101.6	19.05	220	82.6	245.4	1.65	1.65
4"*1"	101.6	25.4	220	85.7	245.4	2.11	1.65
4"*1.5"	101.6	38.1	220	88.9	245.4	2.11	1.65
4"*2"	101.6	50.8	220	95.2	245.4	2.11	1.65
4"*2.5"	101.6	63.5	220	98.4	245.4	2.11	1.65
4"*3"	101.6	76.2	220	101.6	245.4	2.11	1.65

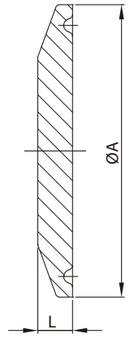
DT-4.1.2-11 (DT-29)





DT-4.1.5-1 AUTOMATIC TUBE WELD CAP(DT-30)

SIZE	ØD	L
1/2"	12.7	38.1
3/4"	19.05	38.1
1.0"	25.4	38.1
1.5"	38.1	38.1
2.0"	50.8	38.1
2.5"	63.5	38.1
3.0"	76.2	44.45
4.0"	101.6	50.8
6.0"	152.4	63.5



DT-4.1.5-2 SOLID END CAP HYGINIC CLAMP JOINE(DT-31)

SIZE	ØD	L
1/4"	25	4.75
3/8"	25	4.75
1/2"	25	4.75
3/4"	25	4.75
1.0"	34/50.39	6.35
1.5"	50.39	6.35
2.0"	63.91	6.35
2.5"	77.39	6.35
3.0"	90.91	6.35
4.0"	118.92	7.92
6.0"	166.88	11.1