



TOP-FLO[®] Hygienic Diaphragm Valves



Engineered Valve Solutions for
High Purity Industries

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TOP-FLO[®] Hygienic Diaphragm Valves

“Our Name Says It All”



Top Line Process Equipment Company is well known for providing its customers with products that will meet or exceed the quality standards found in the many markets we serve. **Top Line** competes with the major suppliers in the industry in North and South America for weir type diaphragm valves and we have recently gained approval to mark CE on our valves in accordance to the PED on this product line. Pricing is very competitive and our lead times are typically outstanding compared to our competition.

TOP-FLO[®] diaphragm valves, because of their unique design, reliability, versatility, and ease of maintenance have been the ideal choice for high purity process piping applications. We combine world class industry experience with engineering and manufacturing facilities located in the USA and Canada. Our R&D, engineering, and manufacturing groups are committed to providing high quality valves that are unsurpassed by any of our competitors.

Here are some key standard features to consider for your next requirement:

- Low ferrite DIN 1.4435 316L forged body sizes 1/4”-4” with controlled sulfur content to BPE 0.005-0.017 with 3.1B Material Certification
- Autoclaveable FKM o-ring sealed 304SS stainless steel manual bonnet with adjustable PPS thermoplastic handwheel
- Thermoplastic piston type pneumatic actuators with your choice of popular controls for feedback (Westlock, Stonel, Burkert, etc.)
- FDA and USP Class VI (Sections 87 & 88) conforming steam grade EPDM, MPTFE/EPDM, and MPTFE/FKM backed diaphragms
- Specialty fabricated sterile access and GMP style valves
- ZERODL[™] machined block body style valve types - Point of Use, T-pattern, Divert style, Tank Bottom, and many others specialties as designed
- Interchangeable diaphragms and topworks with most other manufacturers
- Extensive on the shelf inventory for project support

Top Line’s name adds essential value, including specification assistance, outstanding delivery performance, and on-site technical support. All of these benefits allow Top Line to offer a wide range of products and services designed specifically to meet your every requirement.

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BIOPRO[®] Forged

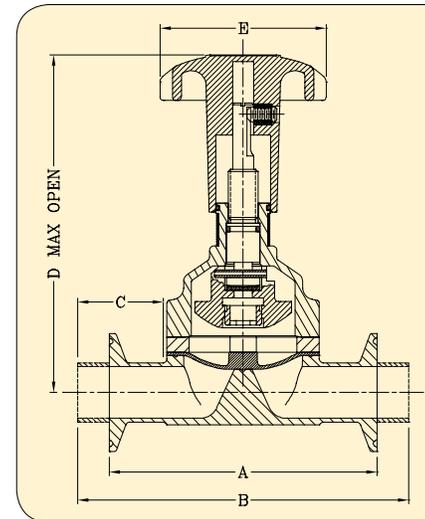
The forged body has always been the optimum choice for applications within the bioprocessing and pharmaceutical industries.

BIOPRO[®] forged body diaphragm valves will be the valves of choice when high purity mechanical and electropolished surface finishes are required.

BIOPRO[®] forged bodies are manufactured from ASTM A182 GR F316L material with additional controls in regards to chemical content. The sulfur content is maintained to meet and exceed the stringent requirements of BPE. All forgings are solution annealed to maintain the ferrite content to be .05% or less. This low ferrite content eliminates the concern for contaminants and migration of oxides throughout the system. Machining of the contours are performed by using state of the art cad/cam system assuring repeatability of the weir and valve cavity profiles for full drainability. Each forging contains two hash marks clearly indicating the drain angle plane for ease of installation.

BIOPRO[®] forged bodies are in compliance with FDA guidelines as well as cGMP principles, and are specifically designed for use in ultra pure applications where sterility is critical. **Top Line** provides these bodies with heat numbers etched into them for full traceability. Mill test summaries are provided with each shipment.

BIOPRO[®] forged diaphragm valves are available in sizes ranging from 1/2" through 6" with clamp or weld end connections and surface finishes ranging through 10Ra. **Top Line** can also manufacture valves in other material grades upon request.



STANDARD END CONNECTIONS

14-16-18 Gauge O.D. Tube	Tube end style valves have 0.75" Minimum tangent length to facilitate orbital welding
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OPTIONAL END CONNECTIONS

Schedule 5,10,40	Various clamp type connections including ISO 2852 (BS 4825-Part 3)
ISO 1127	Hygienic screwed connections inclusive of BS 1864, SMS, DIN 11851, ISO 2853, (BS4825-Part 4)
DIN 11850	
SMS 3008	

BIOPRO[®] Forged Manual Valve Dimensions

Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Handwheel	Drain Angle
1/2	3.50	4.88	1.50	4.47	3.00	30°
3/4	4.00	5.31	1.50	5.00	3.00	25°
1	4.50	5.56	1.50	5.69	3.00	28°
1-1/2	5.50	6.63	1.50	8.47	4.75	20°
2	6.25	7.50	1.63	9.88	4.75	20°
2-1/2	7.63	10.00	1.88	8.82	8.00	18°
3	8.75	10.00	1.88	10.00	8.00	20°
4	11.50	12.84	2.00	13.63	10.00	15°
6*	13.40	18.00	3.00	18.00	16.00	15°

* MACHINED FROM 316L BAR

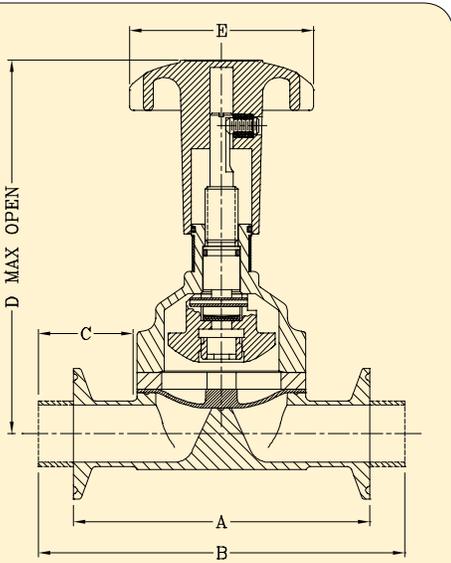
BIOPRO[®] Cast



BIOPRO[®] cast valves offer an economical alternative for less demanding service applications in food, beverage, dairy, cosmetics, biotechnology, pharmaceutical, and electronics processing industries.

BIOPRO[®] cast bodies are low carbon stainless steel investment castings that conform to ASTM A351 grade CF3M (316L) material. Castings are solution annealed to provide a sanitary and clean outside finish. Available in sizes 1-1/2" through 4" with either clamp or butt-weld end connections.

BIOPRO[®] cast bodies are available with 20Ra or 20Ra with electropolish internal surface finish. Hash marks are provided on each body to optimize drainability and facilitate installation. Heat numbers are marked on the bodies to provide full traceability with material test summaries being furnished with each order.



STANDARD END CONNECTIONS

14-16-18 Gauge O.D. Tube	Tube end style valves have 0.75" Minimum tangent length to facilitate orbital welding
-----------------------------	---

OPTIONAL END CONNECTIONS

Schedule 5,10,40	Various clamp type connections including ISO 2852 (BS 4825-Part 3)
ISO 1127 DIN 11850 SMS 3008	Hygienic screwed connections inclusive of BS 1864, SMS, DIN 11851, ISO 2853, (BS4825-Part 4)

BIOPRO[®] Manual Valve Cast Dimensions

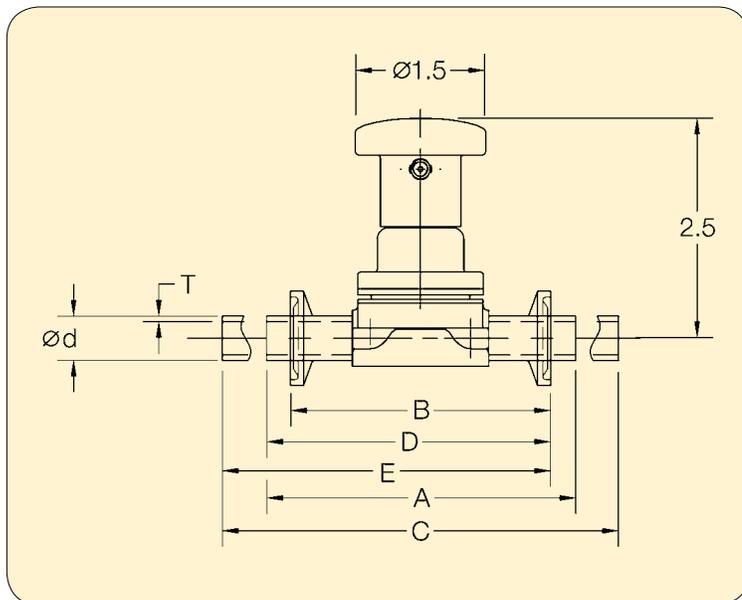
Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Handwheel	Drain Angle
1/2						See Forged Valves
3/4						See Forged Valves
1						See Forged Valves
1-1/2	5.50	6.25	1.31	8.47	4.75	20°
2	6.25	7.50	1.59	9.88	4.75	20°
2-1/2						See Forged Valves
3	8.75	10.00	1.75	10.00	8.00	20°
4	11.50	12.50	1.63	13.63	10.00	15°
6						See Forged Valves

BIOFLO® II

BIOFLO® II diaphragm valves are compact, forged, and lightweight valves designed to meet the stringent requirements within high purity systems. Applications include sampling, drain ports, steam ports, and specialty fabrications.

BIOFLO® II valve bodies are manufactured from the same forged 316L material as the standard BIOPRO® forged bodies. All **BIOFLO® II** valve sizes are machined from a common raw forging with controlled chemistry per BPE. Bodies are available with clamp or butt-weld ends and surface finishes through 10Ra.

BIOFLO® II manual 304 stainless steel bonnets are provided with adjustable PPS handwheel, sanitary internals, and FKM o-ring seal. Bonnets are autoclavable and can withstand elevated temperatures to 300°F.



STANDARD END CONNECTIONS

16-18-20 Gauge
O.D. Tube

Tube end style valves have 0.75"
Minimum tangent length to
facilitate orbital welding

A = Standard Butt-Weld

B = Standard Clamp

C = Extended Butt-Weld*

D = Standard Clamp X Butt-Weld

E = Standard Clamp X Extended Butt-Weld*

*per BPE

BIOFLO® II Dimensions

Size	DN	Ød	T	A	B	C	D	E
1/4	8	0.250	0.035	3.06	2.563	3.89	2.81	3.23
3/8	10	0.375	0.035	3.06	2.563	3.89	2.81	3.23
1/2	15	0.500	0.065	3.06	2.563	3.89	2.81	3.23

All dimensions are in inches unless otherwise noted.

Specialty Valve Assemblies

Top Line for years has specialized in manufacturing custom fabricated products designed specifically to meet our customers requirements.

Our primary objective has always been to design and manufacture these specialty products by using state-of-the-art manufacturing practices and technologies.

Top Line and its affiliates employ engineers with a vast range of expertise and knowledge in the bioprocessing and pharmaceutical industries. The benefit of this is our ability to provide quick and accurate solutions to even the most complicated problems that occur in the field.

All specialty products are manufactured using good manufacturing practices and are put through a very rigid quality control inspection before leaving our facility. These practices ensure that our customers receive quality parts ready for immediate installation.

In addition to the standard 2-way valve bodies,

TOP-FLO® diaphragm valves offer various configurations and assembly types.

- Tank Bottom
- Access Valves
- T-Pattern
- Point-of-Use Valves
- L-Pattern Valves



ZERODL™ T-Pattern Type

T-pattern type valves improve drainability and greatly eliminate deadleg. Typically installed in a horizontal position, this valve also provides for excellent sampling or diverting of critical process fluids throughout the process system.

ZERODL™ T-pattern valves are available in sizes ranging from 1/4" through 6". These valves are machined from a solid block of 316L stainless steel with T characteristics through 6". A wide variety of end connections and surface finishes are offered to meet your specifications.

Integral sample valves available upon request.



ZERODL™ Point of Use Valve

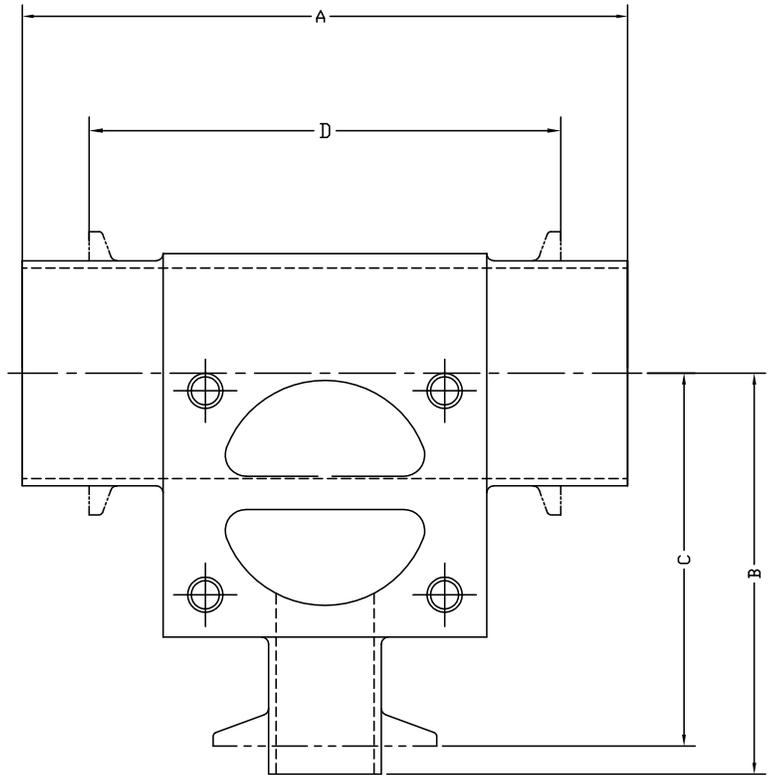
The ZERODL™ Point-of-Use Valve utilizes the T-pattern design to promote efficient installation when used on clean water loops. The main valve body is machined from a solid block of 316L stainless steel. It's design improves drainability and eliminates deadlegs within a processing system. Available in valve sizes 1/2" - 6" with tubing run sizes through 6" in clamp, butt-weld ends, and other specialty connections.

Integral sample valves, and downstream purge ports available upon request.



ZERODL™ T-Pattern Dimensions

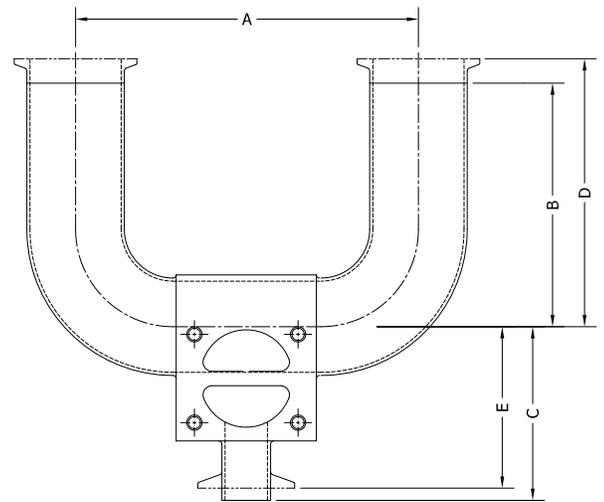
ZERODL™ T-PATTERN TABLE					
OUTLET VALVE SIZE	RUN SIZE	A	B	C	D
½	½	5.38	2.94	2.56	4.63
½	¾	5.38	3.06	2.69	4.63
½	1	5.38	3.19	2.81	4.63
½	1-1/2	5.38	3.44	3.06	4.63
½	2	5.38	3.69	3.31	4.63
½	2-1/2	5.38	3.94	3.56	4.63
½	3	5.88	4.19	3.81	4.63
½	4	6.38	4.69	4.31	4.63
½	6	8.38	5.69	5.32	5.38
½	¾	5.88	3.28	2.91	5.13
¾	1	5.88	3.41	3.03	5.13
¾	1-1/2	5.88	3.66	3.28	5.13
¾	2	5.88	3.91	3.53	5.13
¾	2-1/2	5.88	4.16	3.78	5.13
¾	3	6.38	4.41	4.03	5.13
¾	4	6.88	4.91	4.53	5.13
¾	6	8.88	5.92	5.55	5.88
1	1	6.25	3.56	3.18	5.50
1	1-1/2	6.25	3.81	3.43	5.50
1	2	6.25	4.06	3.68	5.50
1	2-1/2	6.25	4.31	3.93	5.50
1	3	6.75	4.56	4.18	5.50
1	4	7.25	5.06	4.68	5.50
1	6	9.25	6.09	5.72	6.25
1-1/2	1-1/2	7.38	4.40	4.02	6.63
1-1/2	2	7.38	4.65	4.27	6.63
1-1/2	2-1/2	7.38	4.90	4.52	6.63
1-1/2	3	7.88	5.15	4.77	6.63
1-1/2	4	8.38	5.65	5.27	6.63
1-1/2	6	10.38	6.66	6.29	7.38
2	2	8.38	5.11	4.73	7.63
2	2-1/2	8.38	5.36	4.98	7.63
2	3	8.88	5.61	5.23	7.63
2	4	9.38	6.11	5.73	7.63
2	6	11.38	7.50	7.13	8.38
2-1/2	2-1/2	10.88	6.16	5.78	10.13
2-1/2	3	11.38	6.41	6.03	10.13
2-1/2	4	11.88	6.91	6.53	10.13
2-1/2	6	13.88	8.81	8.44	10.88
3	3	11.38	6.76	6.14	10.13
3	4	11.88	7.26	6.64	10.13
3	6	13.88	9.06	8.44	10.88
4	4	13.00	8.25	7.27	11.25
4	6	15.00	10.44	9.56	12.00
6	6	15.00	13.11	11.61	12.00



MATERIAL: 316LSS
 ID FINISH: AS SPECIFIED BY CUSTOMER
 OD FINISH: 32Ra (STANDARD) OTHER FINISHES UPON REQUEST

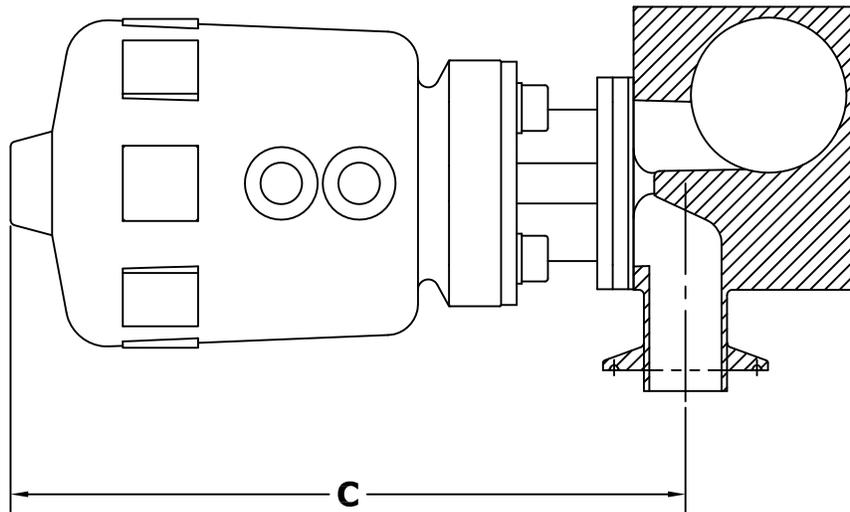
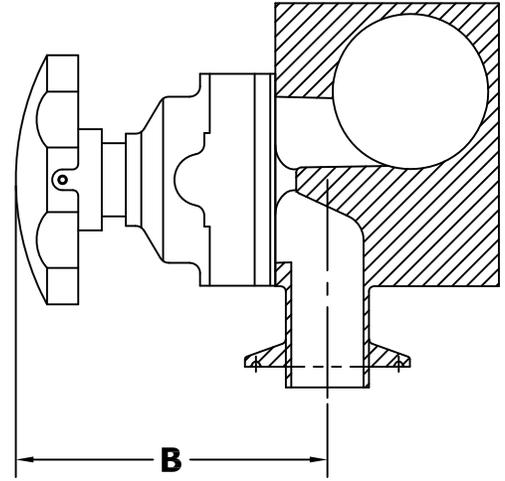
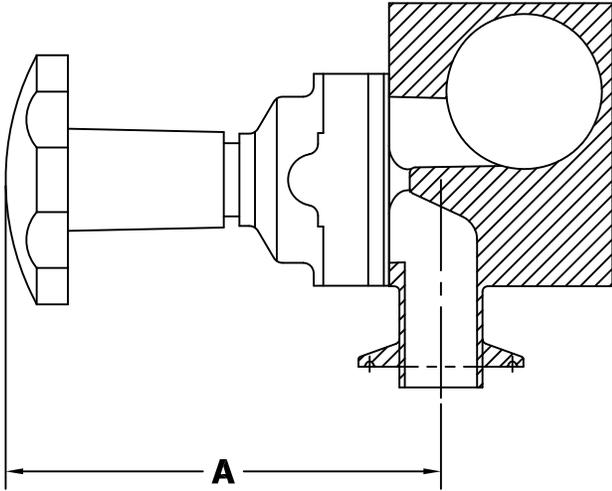
ZERODL™ POU Dimensions

OUTLET VALVE SIZE	RUN SIZE	A	B	C	D	E
1/2	1/2	4.50	3.00	2.94	3.50	2.56
1/2	3/4	4.50	3.00	3.06	3.50	2.69
1/2	1	5.38	3.00	3.19	3.50	2.81
1/2	1-1/2	6.88	4.50	3.44	5.00	3.06
1/2	2	8.38	5.00	3.69	5.50	3.31
1/2	2-1/2	9.88	5.75	3.94	6.50	3.56
1/2	3	11.38	6.50	4.19	7.00	3.81
1/2	4	14.38	8.50	4.69	9.13	4.31
1/2	6	20.75	13.00	5.69	21.75	5.31
3/4	3/4	4.50	3.00	3.28	3.50	2.91
3/4	1	5.88	3.00	3.41	3.50	3.03
3/4	1-1/2	7.38	4.50	3.66	5.00	3.28
3/4	2	8.88	5.00	3.91	5.50	3.53
3/4	2-1/2	10.38	5.75	4.16	6.50	3.78
3/4	3	11.88	6.50	4.41	7.00	4.03
3/4	4	14.88	8.50	4.91	9.13	4.53
3/4	6	20.88	13.00	5.92	21.75	5.55
1	1	6.25	3.00	3.56	3.50	3.18
1	1-1/2	7.75	4.50	3.81	5.00	3.43
1	2	9.25	5.00	4.06	5.50	3.68
1	2-1/2	10.75	5.75	4.31	6.50	3.93
1	3	12.25	6.50	4.56	7.00	4.18
1	4	15.25	8.50	5.06	9.13	4.68
1	6	21.25	13.00	6.09	21.75	5.72
1-1/2	1-1/2	8.88	4.50	4.40	5.00	4.02
1-1/2	2	10.38	5.00	4.65	5.50	4.27
1-1/2	2-1/2	11.88	5.75	4.90	6.50	4.52
1-1/2	3	13.38	6.50	5.15	7.00	4.77
1-1/2	4	16.38	8.50	5.65	9.13	5.27
1-1/2	6	22.38	13.00	6.66	21.75	6.29
2	2	11.38	5.00	5.11	5.50	4.73
2	2-1/2	12.88	5.75	5.36	6.50	4.98
2	3	14.38	6.50	5.61	7.00	5.23
2	4	17.38	8.50	6.11	9.13	5.73
2	6	23.38	13.00	7.50	21.75	7.13
2-1/2	2-1/2	13.13	5.75	6.16	6.50	5.78
2-1/2	3	14.63	6.50	6.41	7.00	6.03
2-1/2	4	17.63	8.50	6.91	9.13	6.53
2-1/2	6	25.88	13.00	7.50	21.75	7.13
3	3	16.88	6.50	6.76	7.00	6.14
3	4	19.88	8.50	7.26	9.13	6.64
3	6	25.88	13.00	9.06	21.75	8.44
4	4	21.00	8.50	8.15	9.13	7.27
4	6	27.38	13.00	10.44	21.75	9.56
6	6	30.88	13.00	13.11	21.75	11.61



MATERIAL: 316LSS
 ID FINISH: AS SPECIFIED BY CUSTOMER
 OD FINISH: 32Ra (STANDARD) OTHER FINISHES UPON REQUEST

ZERODL™ T-Pattern & POU Topworks Dimensions



VALVE OUTLET SIZE	"09" BONNET - A -	"12" BONNET - B -	FAIL CLOSE ACTUATOR - C -	ACTUATOR SERIES
1/2	4.47	3.38	6.43	50
3/4	5.00	3.73	8.05	50
1	5.69	4.20	8.28	50
1-1/2	8.47	6.40	12.33	50
2	9.88	7.50	12.78	50
2-1/2	10.00	-	15.04	50
3	10.00	-	15.71	50
4	13.63	-	16.11	50
6	18.00	-	37.00	30

ZERODL™ 45° Tank Bottom Diaphragm Valves

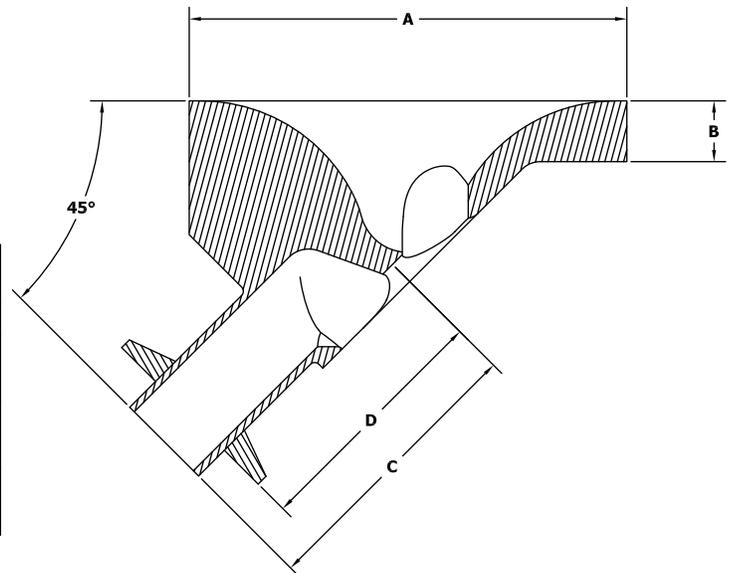
When bacteria entrapment or leaking gland seals associated with other types of valve problems in the system, the ZERODL™ tank bottom valve is a reliable solution that can be used to eliminate such concerns.

The ZERODL™ tank bottom valve, with its conical profile allows for complete drainability and the prevention of deadlegs or entrapment areas. These valves are installed by either bolting or welding to the tank surface.

ZERODL™ tank bottom valves are available in sizes ranging from 1/4" through 4". They are manufactured using type SA-479 316L stainless steel and are available with a wide variety of drain ports and end connections. Positive closure can be achieved by means of manual or pneumatic actuation.

Top Line offers many surface finish options to meet your specifications. In addition, heat numbers are etched into the body providing full traceability with mill test summaries provided.

45° outlet - standard

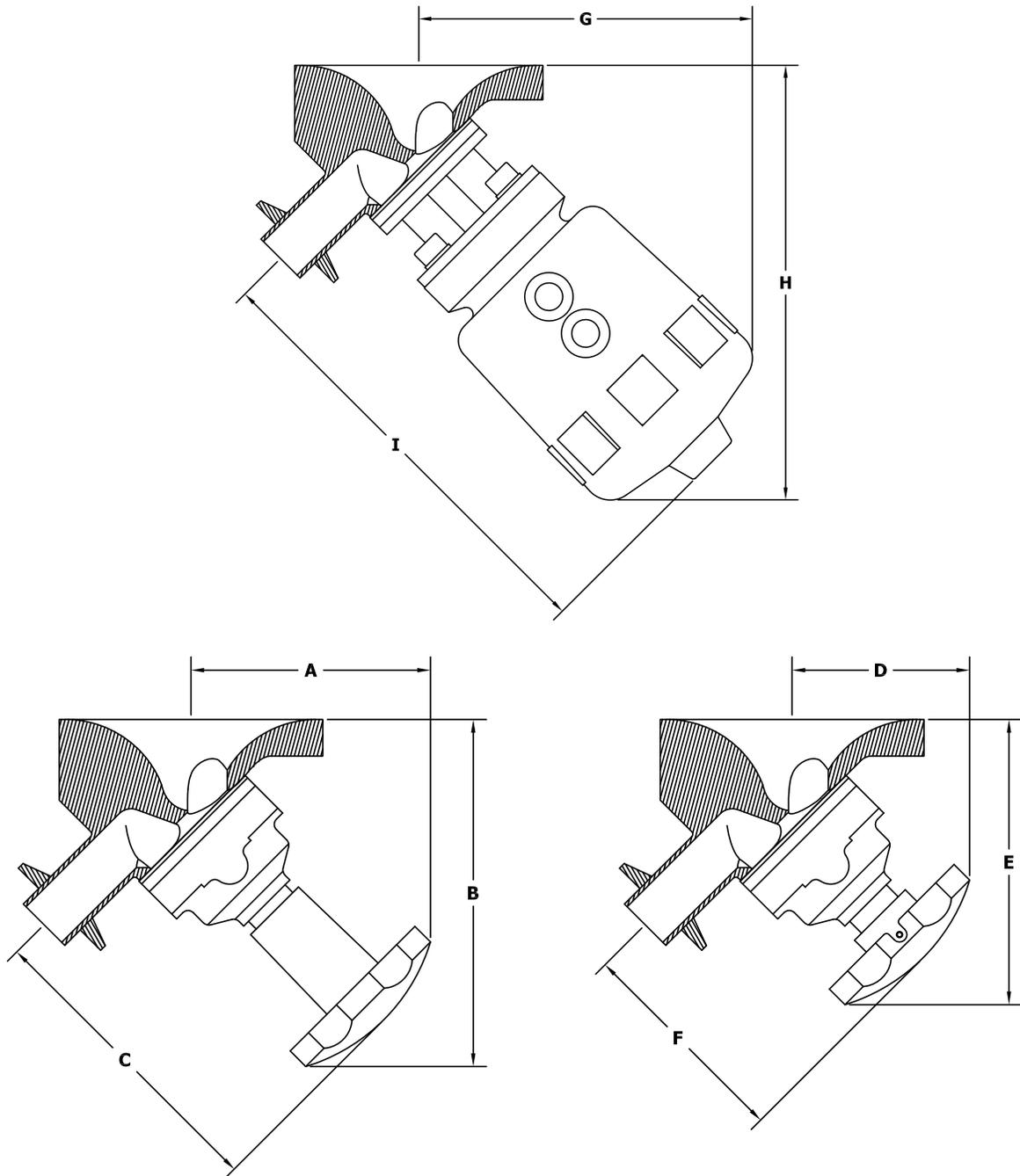


OUTLET VALVE SIZE	A	B	C	D
1/2	3.00	0.50	2.66	2.29
3/4	3.50	0.50	2.91	2.54
1	4.50	0.50	2.95	2.58
1-1/2	5.50	0.50	3.50	3.13
2	7.00	0.69	3.81	3.44
3	10.00	0.94	5.01	4.39
4	14.00	1.00	6.69	5.82

MATERIAL: 316L PER SA-479 (MAIN WELD FLANGE)
 ID FINISH: AS SPECIFIED BY CUSTOMER
 OD FINISH: 32Ra (STANDARD) OTHER FINISHES UPON REQUEST

ZERODL™ 45° Tank Bottom Valves

Topworks Dimensions



VALVE OUTLET SIZE	"09" BONNET - A -	"09" BONNET - B -	"09" BONNET - C -	"12" BONNET - D -	"12" BONNET - E -	"12" BONNET - F -	FAIL CLOSE ACTUATOR - G -	FAIL CLOSE ACTUATOR - H -	FAIL CLOSE ACTUATOR - I -	ACTUATOR SERIES
1/2	3.57	5.00	4.47	2.91	4.32	3.38	4.70	6.13	6.43	50
3/4	3.83	5.09	5.00	3.11	4.62	3.73	5.88	7.39	8.05	50
1	4.09	5.35	5.69	3.37	5.18	4.20	6.04	7.85	8.28	50
1-1/2	6.57	8.92	8.47	5.36	7.57	6.40	9.28	11.47	12.33	50
2	7.44	9.94	9.88	5.93	8.37	7.50	9.35	11.84	12.78	50
3	7.99	11.76	10.00	-	-	-	12.34	16.36	15.71	50
4	9.84	14.87	13.63	-	-	-	12.62	17.33	16.11	50

Tandem Valve Assemblies

Sterile Access Valve

The Sterile Access Valve assembly provides access to the horizontal valve body at the lowest cross sectional point. The access port can be used for sampling, steam sterilization, purging or condensate drainage. Ports are furnished with butt-weld tube ends, clamp ends, or the utilization of a secondary valve.



L-Pattern Type

The L-pattern type diaphragm valve, due to its unique design, minimizes deadlegs in point-of-use outlets. The valve, while installed in a vertical position, serves as a 90° elbow. As fluid passes through the body, the valve can be opened to allow provision

of uncontaminated samples. The outlet can also serve as a drain or a divert port.



Manufactured from forged 316L stainless steel in sizes ranging from 1/4" through 6". The L-pattern type can be supplied with butt-weld or clamp end connections and a wide variety of finish options.

TOP-FLO® Divert Valve

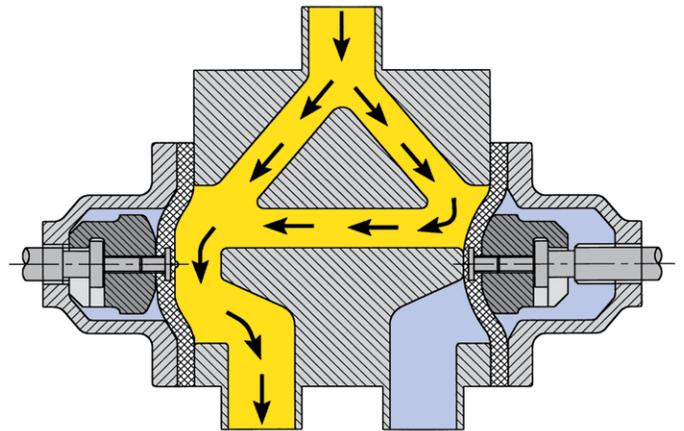


Top Line also offers a line of multi-ported divert valves that are very popular in process applications where space considerations are critical. These valves are compact and will significantly reduce the piping requirements and number of connections associated with more complex designs.

TOP-FLO® Divert Valves are available in two-way through eight-way configurations and can be supplied with actuated or manual bonnets. Bodies that make up the valve are machined from 316L stainless steel. Other material grades available provided upon request. These valves are supplied with a clamp or weld end connection in sizes ranging from 1/4" through 4". This patented design can be used to divert flow or as a mixing valve. The inlet flow passage with the divided flow prevents abrupt directional change and fluid impact, minimizing cell deterioration. **The TOP-FLO® 2-Way Divert Valve** will drain in either the horizontal or vertical position. All other combinations will fully drain in the vertical position.

Features and Benefits

- Manufactured from 316L stainless steel or other alloys
- Wide variety of inlet and outlet tubing configurations and polish combinations are available
- Design eliminates deadleg inherent in typical mixing or diverting applications
- Available with actuated or manual bonnets
- Significantly reduces overall spacing requirements



The flow pattern on the closed side of the valve will allow for a continuous flow to the open side providing zero deadleg.

Actuation

SRS 50 Actuators

The **TOP-FLO®** pneumatic actuator is highly suited for today's modern space-saving environment within the high purity industry. Simplicity of design and robust structure ensures long service life and economical operation. Molded from a high performance polymer to withstand the rigors of cleaning and sterilization temperatures, this lightweight actuator has no corrosive components exposed to atmosphere. All internal and external components are corrosion resistant. In-line retrofitting is easily achieved without the use of special tooling. Available in size ranging from 1/4" - 4".

Features and Benefits

- **Compact / Lightweight**
Space-saving. Ease of installation and maintenance and mounts without additional support
- **Fully Sealed**
Prevents contaminants from entering the housing while minimizing the risk of leakage between chambers
- **Durability**
Longer life expectancy. Higher cycle performance
- **Air Connections**
Perpendicular to piping system
 - 1/8" BSP thread (Compact valves)
 - 1/4" BSP thread (Standard size valves)
- **Visual Indicator**
Identifies valve position
- **Material of construction**
Molded from a high performance polymer capable of withstanding elevated temperatures common to cleaning protocols
- **Accessories**
 - Stroke Limiter
 - Electropneumatic 4-20MA positioner
 - Mechanical switch package
 - Proximity switch package

SRS 20-30-40 Actuators

Designed to be economical, featuring a rugged cast iron housing and steel diaphragm plates, TOP-FLO® actuators are ideally suited for automatic and remote control of sanitary weir type diaphragm valves.

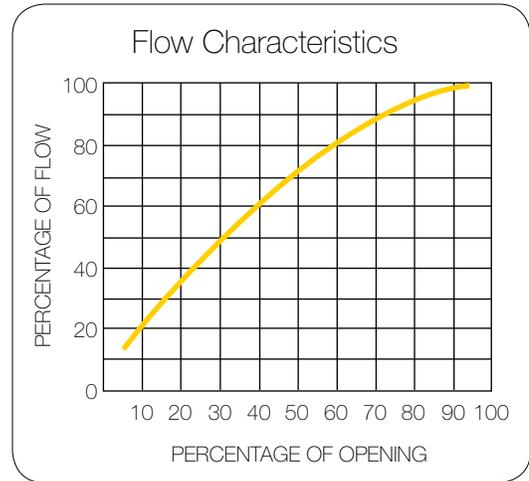
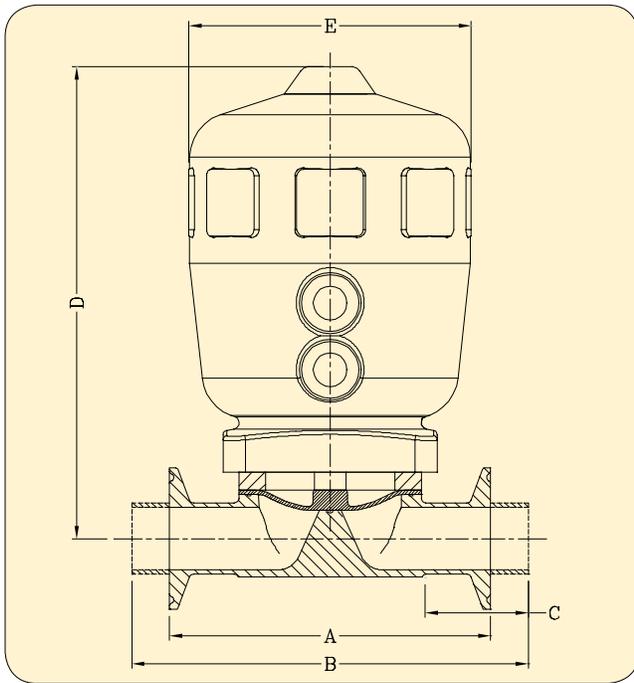
Features and Benefits

- **Cast Iron Housing**
Highly durable in demanding environments
- **Steel Diaphragm Plates**
Superior performance in high pressure service
- **Positive Stop**
Provides added safety when manual override is used
- **Actuator Diaphragm**
Highly flexible for repeated cycling
- **Bonnet**
Compact and integral to the actuator providing better alignment to insure exceptional cycling. This unique design allows for easy field installation and adapts to most diaphragm valve bodies
- **Stem Guide**
Unique seal arrangement prevents lateral stem movement
- **Position Indicator**
Indicates valve position (optional)
- **Spring Adjustment**
Spring tension can be externally adjusted to provide optimum performance to compensate for high internal line pressures

TOP-FLO® SRS 50 actuators provide the perfect solution to any valve automation requirement.



Actuation Data (SRS 50)



BIOPRO® Forged Automated Valve Dimensions Elastomer Diaphragm Type

Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Act Ø	Drain Angle
1/2	3.50	4.88	1.50	4.60	2.50	30°
3/4	4.00	5.31	1.50	5.70	3.15	25°
1	4.50	5.56	1.50	6.10	3.15	28°
1-1/2	5.50	6.63	1.50	9.10	5.00	20°
2	6.25	7.50	1.63	9.60	5.00	20°
2-1/2	7.63	10.00	1.88	15.04	8.31	18°
3	8.75	10.00	1.88	15.71	8.31	20°
4	11.50	12.84	2.00	16.11	10.28	15°
6*	13.40	18.00	3.00	37.00	18.13	15°

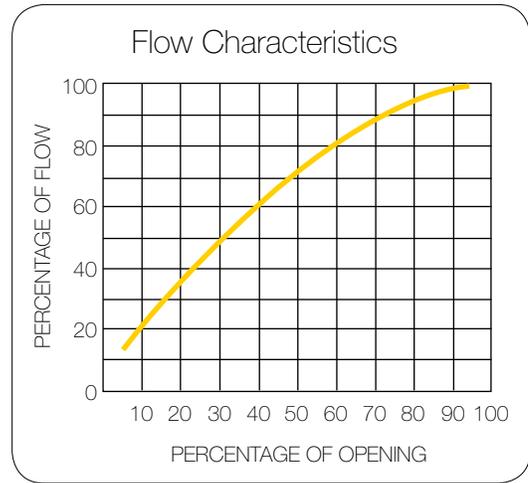
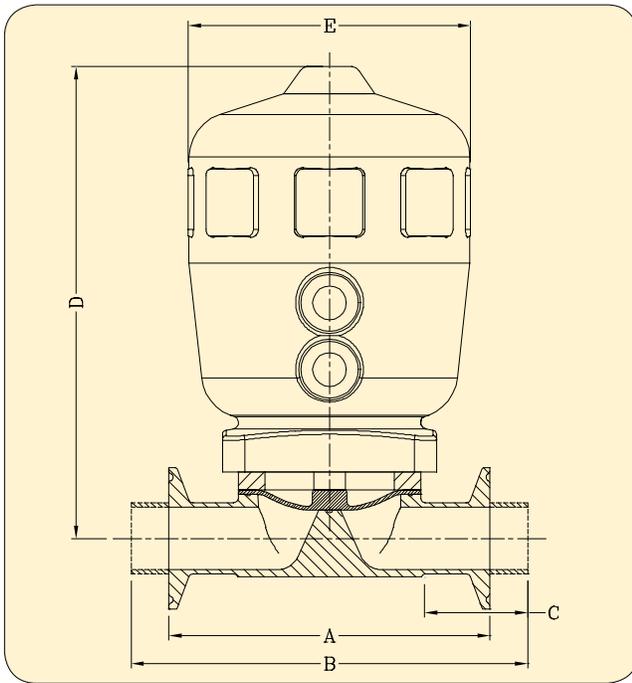
* Machined From 316L Wrought Bar

BIOPRO® Forged Automated Valve Dimensions MPTFE Faced Diaphragm Type

Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Act Ø	Drain Angle
1/2	3.50	4.88	1.50	5.30	3.15	30°
3/4	4.00	5.31	1.50	6.80	4.00	25°
1	4.50	5.56	1.50	6.90	4.00	28°
1-1/2	5.50	6.63	1.50	10.70	6.00	20°
2	6.25	7.50	1.63	10.90	6.00	20°
2-1/2	7.63	10.00	1.88	15.27	10.28	18°
3	8.75	10.00	1.88	15.51	10.28	20°
4	11.50	12.84	2.00	16.11	10.28	15°
6*	13.40	18.00	3.00	7.00	18.13	15°

* Machined From 316L Wrought Bar

Actuation Data (SRS 50)



BIOPRO® Cast Automated Valve Dimensions Elastomer Diaphragm Type

Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Act Ø	Drain Angle
1/2			See Forged Valves			
3/4			See Forged Valves			
1			See Forged Valves			
1-1/2	5.50	6.25	1.31	9.10	5.00	20°
2	6.25	7.50	1.59	9.60	5.00	20°
2-1/2			See Forged Valves			
3	8.75	10.00	1.75	10.00	8.00	20°
4	11.50	12.50	1.63	13.63	10.00	15°
6			See Forged Valves			

BIOPRO® Cast Automated Valve Dimensions MPTFE Faced Diaphragm Type

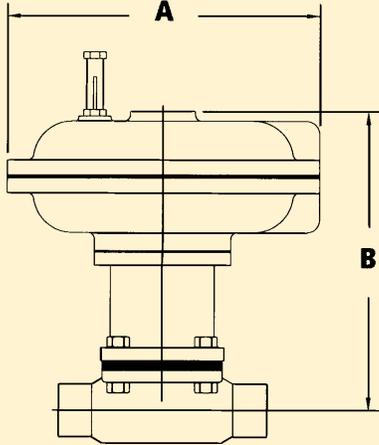
Size	A Clamp End	B Od Tube End	C Weld Tangent	D Center To Top	E Act Ø	Drain Angle
1/2			See Forged Valves			
3/4			See Forged Valves			
1			See Forged Valves			
1-1/2	5.50	6.25	1.31	10.70	6.00	20°
2	6.25	7.50	1.59	10.90	6.00	20°
2-1/2			See Forged Valves			
3	8.75	10.00	1.75	10.00	8.00	20°
4	11.50	12.50	1.63	13.63	10.00	15°
6			See Forged Valves			

Actuation Data (SRS 20, 30,40)

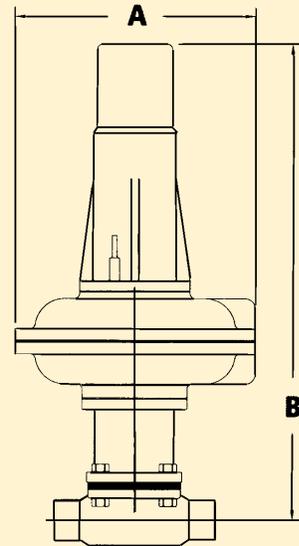
21 Series - Double acting:

Air to open/Air to close

47 Series Spring to open/Air to close



34 Series Air to open/Spring to close



20 Series - Double Acting Actuators

Model	Dia. (A)	Center to Top (B)						
		1	1-1/2	2	2-1/2	3	4	6
	6	8-15/16	-	-	-	-	-	-
	7-3/4	9-7/8	9-9/16	11-1/8	-	-	-	-
21	9-1/2	-	10-7/16	12	11-11/16	11-13/16	-	-
	12-1/4	-	-	12-7/8	12-9/16	12-11/16	13-7/8	-
	14-7/8	-	-	-	-	-	14-1/2	17-15/16

40 Series - Spring To Open Actuators

Model	Dia. (A)	Center to Top (B)						
		1	1-1/2	2	2-1/2	3	4	6
	6	8-15/16	-	-	-	-	-	-
	7-3/4	9-7/8	9-9/16	11-1/8	-	-	-	-
47	9-1/2	-	10-7/16	12	11-11/16	11-13/16	-	-
	12-1/4	-	-	12-9/16	12-9/16	12-11/16	13-7/8	-
	14-7/8	-	-	-	-	-	14-1/2	17-15/16

30 Series - Spring Close Actuators

Model	Dia. (A)	Center to Top (B)						
		1	1-1/2	2	2-1/2	3	4	6
	6	18-15/16	-	-	-	-	-	-
	7-3/4	19-7/8	19-9/16	-	-	-	-	-
34	9-1/2	20-3/4	20-7/16	22	-	-	-	-
	12-1/4	-	-	22-7/8	27-7/16	27-9/16	30-7/8	-
	14-7/8	-	-	-	28-1/16	28-3/16	31-1/2	-
	18-1/8	-	-	-	-	-	-	49-9/16

Bonnet Assemblies

TOP-FLO® manual bonnets offer many features that have been carefully designed with the user in mind. The advanced bonnet design takes into account environmental stresses such as cleanability, reliability, autoclave use, adjustment, and ease of maintenance.

TOP-FLO® stainless steel bonnets are produced using the investment casting process resulting in a durable and lightweight valve operator. Stainless steel bonnets are electropolished externally providing a bright and sanitary exterior that also enhance its corrosion resistance. Ergonomically designed thermoplastic hand wheel and highly visible yellow indicator are standard on stainless steel bonnets sizes 1/2"-2". Bonnet sizes 2-1/2" – 4" have electropolished stainless steel bodies with stainless steel handwheels. All **TOP-FLO®** manual bonnet versions have sanitary internals as standard.

#09 Bonnet

Sizes 1/2" - 2"

- Adjustable Close Stop
- 304SS Base with PPS Hand wheel
- Dual FKM O-Ring Sealed
- Sanitary Internals



Sizes 2-1/2" - 4"

- 304SS Base with 304SS Hand wheel
- Dual FKM O-Ring Sealed
- Sanitary Internals

#10 Bonnet

Sizes 1/2" - 2"

- Adjustable Close Stop
- 304SS Base with 304SS Hand wheel
- Dual FKM O-Ring Sealed
- Sanitary Internals



#12 Bonnet

Sizes 1/2" - 2"

- Non-Adjustable Low Profile
- 304SS Base with Noryl Hand wheel
- Dual FKM O-Ring Sealed
- Sanitary Internals



#15 Bonnet

Sizes 1/2" - 2"

- Adjustable Open Stop
- 304SS Base with Noryl Hand wheel
- Brass Visual Indicator with position gradient



#18A Bonnet

Sizes 1/4" - 3/8" - 1/2"

- Adjustable Close Stop
- 304SS Base with PPS Hand wheel
- Dual FKM O-Ring Sealed
- Sanitary Internals



Diaphragms

Top Line understands that the most important factor of diaphragm valve reliability is the diaphragm itself. To achieve optimum diaphragm performance, only the highest-grade specially engineered materials are used in our diaphragm production. Steam cycle testing is performed on all grades of TOP-FLO® diaphragms to ensure the best possible life span of the diaphragms. All diaphragms are produced and controlled in the United States and Canada under a compliant and registered ISO 9001-2000 Quality Management System (QMS).

Grade 2E Peroxide Cured EPDM

Certifications & Approvals

TOP-FLO® Grade 2E diaphragms are fully compliant to FDA CFR Section (21) 177.2600 and have been fully tested and certified in accordance with U.S. Pharmacopoeia Class VI Section (87) in-vitro and Section (88) in-vivo biological reactivity tests by the accredited NAMSA.

Extractables & Production

Grade 2E EPDM compound has been developed to have the lowest extractable percentage and has been independently tested to be significantly less than commercial compounds and similar competitive products.

TOP-FLO® EPDM diaphragm compound is produced in just-in-time batches to meet tight diaphragm production and is stored for very short periods to ensure greater reliability of the mechanical properties of the diaphragm after production.

Grade 2V FKM

Certifications & Approvals

TOP-FLO® Grade 2V diaphragms are fully compliant to FDA CFR Section (21) 177.2600.

Applications

Grade 2V diaphragms are intended for non-steam/non-autoclave applications and are highly suited for applications where an elastomer diaphragm is preferred due to its inherent resistance to chemicals and oils.



Grade 1KS & 2KS MPTFE/EPDM

Certifications & Approvals

TOP-FLO® Grade 1KS & 2KS diaphragms are fully compliant to FDA CFR Section (21) 177.2600 and have been fully tested and certified in accordance with U.S. Pharmacopoeia Class VI Section (87) in-vitro and Section (88) in-vivo biological reactivity tests by the accredited NAMSA.

Production

TOP-FLO® Grade 1KS & 2KS diaphragms are manufactured utilizing a proprietary unique high pressure molding technique that ensures better density and is virtually non-permeable. More importantly, this process significantly increases the cycle life of the diaphragm under harsh conditions.

Diaphragm Traceability

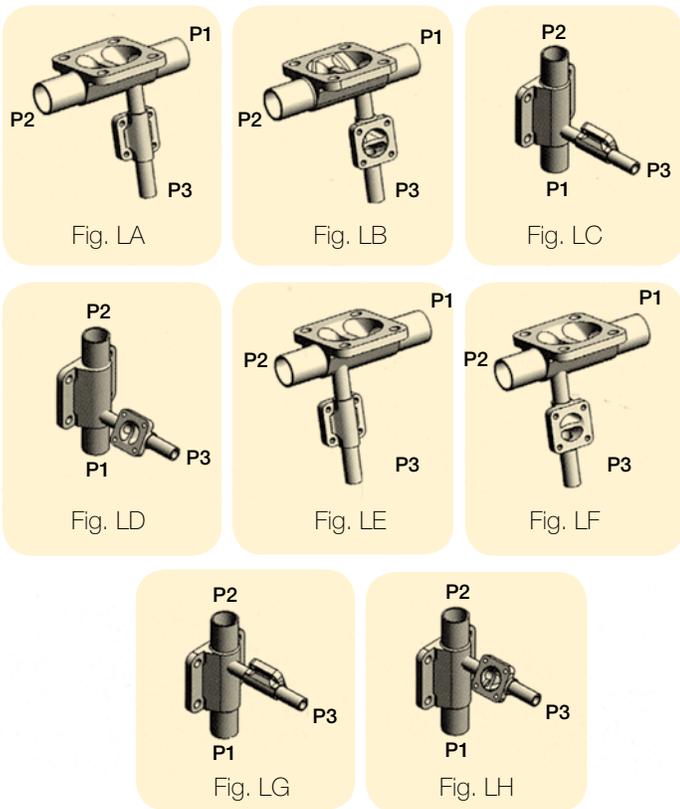
All TOP-FLO® diaphragms are fully traceable to a specific batch of the molded compound. Test certificates and compound properties for each specific batch are recorded and maintained within the QA system. Diaphragms are physically identified with the date of manufacture and the compound identification code.

Each **TOP-FLO®** diaphragm valve is supplied with your choice of elastomer or MPTFE/elastomer backed materials. Diaphragms are completely compliant with the most recent FDA codes, USP standards and are fully traceable.

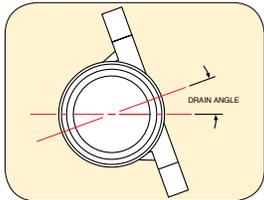
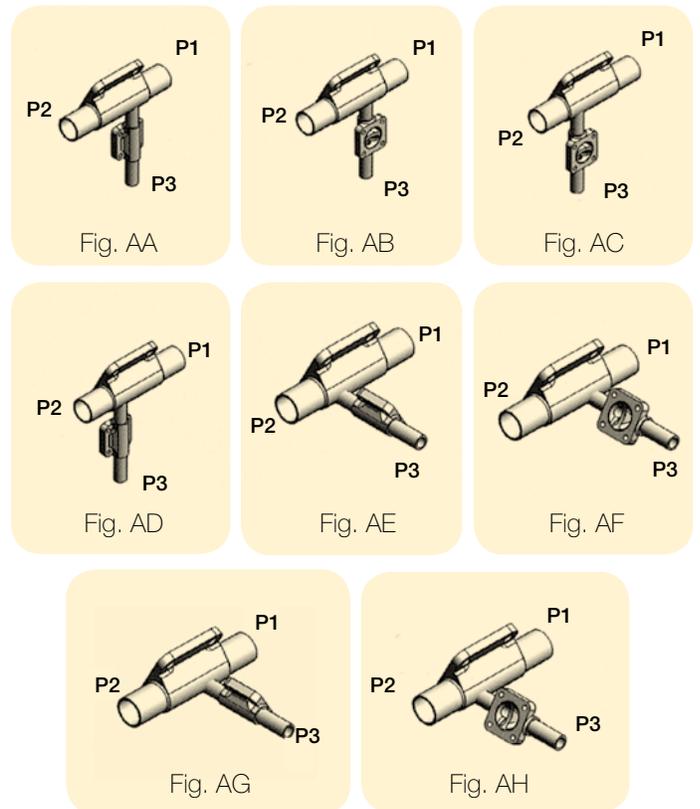
Elastomer diaphragms are molded in the open position, while MPTFE faced diaphragms are molded in the closed position. All elastomer type diaphragms are attached to the bonnet or actuator compressor via threaded stud. Top Line standard MPTFE faced diaphragms are attached by a bayonet type fixture that eliminates point loading, thus providing constant diaphragm compression across the weir resulting in a more uniform and reliable seal. Optional MPTFE faced diaphragms can be supplied with a threaded type fixture for interchangeability with other major manufacturers.

Engineering

Sterile L-Pattern Configurations



Sterile Access Configurations



Drain Angle

Size	1/4	3/8	1/2	3/4	1	1-1/2	2	2-1/2	3	4	6
BIOFLO® II	35°	30°	25°	-	-	-	-	-	-	-	-
BIOPRO®	-	-	30°	25°	28°	20°	20°	18°	20°	15°	15°

Flow Data - Forged & Cast 2-Way Valves

CV Values USGPM At One PSI

Size % Open	BIOFLO® II			BIOPRO®							
	1/4	3/8	1/2	1/2	3/4	1	1-1/2	2	2-1/2	3	4
12.5	0.47	0.49	0.50	0.52	1.75	2.60	9.80	13.50	29.00	38.30	49.00
25	0.61	0.68	0.71	0.87	3.28	5.65	18.60	35.00	54.00	68.90	12.00
50	0.67	1.56	1.66	1.87	5.47	12.50	35.50	54.30	77.60	136.40	270.00
75	0.69	1.84	2.23	2.48	6.78	16.70	44.60	68.00	88.60	167.00	376.00
100	0.78	1.90	2.45	3.32	7.60	18.70	46.80	71.00	91.90	177.60	404.00

KV Values Cubic Meter per Hour per At One Bar

Size % Open	BIOFLO® II			BIOPRO®							
	1/4	3/8	1/2	1/2	3/4	1	1-1/2	2	2-1/2	3	4
12.5	0.41	0.42	0.43	0.45	1.51	2.25	8.48	11.68	25.09	33.13	42.39
25	0.53	0.59	0.61	0.75	2.84	4.89	16.09	30.28	46.71	59.60	96.88
50	0.58	1.35	1.44	1.62	4.73	10.81	30.71	46.97	67.12	117.99	233.55
75	0.60	1.59	1.93	2.15	5.86	14.45	38.58	58.82	76.64	144.46	325.24
100	0.67	1.64	2.12	2.87	6.57	16.18	40.48	61.42	79.49	153.62	349.46

Engineering

One of the effective methods known for removal of minor surface abnormalities after mechanical polishing and to improve the finish on a product is the electropolish process.

Electropolishing reduces minor scratches and other surface imperfections by removing metal from the product. The process creates a smoother and more level surface finish which cannot be achieved by mechanical polishing alone. The end result is the reduction of such imperfections from the product thus making them easier to be cleaned and lessens the potential for corrosion or contamination to occur.

Diaphragm Materials And Temperature Range

Grade	Material	Temperature Range	
		Fahrenheit	Celsius
2E & BE	FDA/USP Black EPDM	-40° – 300°F	40° – 150°C
2V	FDA Black FKM	0° – 350°F	-15° – 150°C
BK	Compact MPTFE/EPDM	0° – 300°F	-15° – 150°C
1KS	Bayonet Steam MPTFE/EPDM	0° – 350°F	-15° – 175°C
2KS	Threaded Steam MPTFE/EPDM	0° – 350°F	-15° – 175°C
1PS	Bayonet Steam MPTFE/FKM	25° – 350°F	-4° – 175°C
2PS	Threaded Steam MPTFE/FKM	25° – 350°F	-4° – 175°C

Benefits of the electropolishing process:

- Peaks and scratched surfaces caused by mechanical polishing are greatly reduced
- The passivation process provides greater corrosion resistance
- Any defective welds or pitting on the surface of the product will be revealed
- The overall appearance of the product can be enhanced
- Cleaning and sterilization of the product is made easier
- Assists removal of surface entrapped contaminants

Surface finish in the pharmaceutical and bio-processing industries is normally measured in (Ra) or roughness average, expressed in terms of microinch or micrometer (micron) values.

Surface Finish Comparisons

MECHANICAL POLISH				MECHANICAL POLISH WITH ELECTROPOLISH			
Micron	Microinch (Ra)	Grit No.	BPE	Micron	Microinch (Ra)	Grit No.	BPE
0.75	30-35	150	SF3	0.62	25	180	SF6
0.62	25	180	SF2	0.50	20	240	SF5
0.50	20	240	SF1	0.37	15	320	SF4

Ordering Information

Top Line Sanitary Diaphragm Valves - figure number chart

Body Type	End Connection	Material / Finish	Bonnet	Diaphragm
6. Weir BIOFLO® II	4. Clamp End Std	L3. 20Ra (SF1)	09. Stainless/PPS Handwheel	2E. Black EPDM
7. Weir Forged	8. O.D. Tube End	L4. 20Ra EP (SF5)	10. Stainless/SS Handwheel	2V. Black FKM
8. Weir Cast	X. Specials	L5. 15Ra	12. Stainless/Noryl Handwheel	1KS. Bayonet Steam MPTFE/EPDM
91. 45° Tank Bottom	C. Combination	L6. 15Ra EP (SF6)	15. Stainless/Noryl Handwheel	2KS. Threaded Steam MPTFE/EPDM
2. L Pattern		L7. 10Ra	18A. BIOFLO® II Sealed Bonnet	1PS. Bayonet Steam MPTFE/FKM
4. T Pattern Valve		L8. 10Ra EP	21. Double Acting Actuator	2PS. Threaded Steam MPTFE/FKM
0. Divert Valve			34. Spring/Close Actuator	BE. Black EPDM - BIOFLO® II
A. Access			47. Spring/Open Actuator	BK. MPTFE/EPDM - BIOFLO® II
U. Point Of Use			51. D.A. Compact Actuator	
			54. N.C. Compact Actuator	
			57. N.O. Compact Actuator	

EXAMPLE:

316 L Forged Body Valve	Clamp Ends	20Ra Finish (SF5)	Sealed Stainless, Bonnet W/PPS Handwheel	MPTFE/ EPDM	Valve Size
7	4	L4	09	1KS	10



. . . the source for
all your product needs
in the process industries

Contact your Top Line Representative for Assistance

Office: P.O. Box 264 · Bradford, PA 16701

Plant: 21 Valley Hunt Drive · Lewis Run, PA 16738

800-458-6095

814-362-4626

Fax: 814-362-4453

Top Line has been supplying high quality stainless steel products to the dairy, food, beverage, pharmaceutical and other process industries for 50 years. Our commitment to fine craftsmanship, responsible service and realistic pricing has led to our company's successive years of growth.

Top Line specializes in stainless steel materials – type 304 and 316L. Our modern, well equipped manufacturing facilities are staffed by skilled and dedicated craftsmen. Consistently meeting important tolerances and finish specifications is of primary concern to us. Before any products leave our plant they are subjected to rigid quality assurance checks.

Top Line should always be considered your first choice for both standard and custom fabricated stainless steel products.

Limited Warranty

Top Line Process Equipment Company products are warranted to be free of defects in material or workmanship for a period of one year from date of shipment. Warranty covers those Top Line products used in an approved installation and maintained in strict accordance with recognized standard industry practice. If, after properly authorized return, Top Line determines that products are defective, Top Line may at its option, repair or replace such defective products.

Top Line shall not be liable for consequential, indirect or incidental damages. The above warranty is in lieu of all other warranties, expressed or implied.

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