



EnviZion™

Hygienic Diaphragm Valve



ITT

ENGINEERED FOR LIFE

EnviZion Valve

Experience the Future with EnviZion

The Biopharm industry relies on hygienic diaphragm valves for demanding process applications due to their unique balance of clean-ability, drain-ability and pressure/temperature capability. For more than 40 years the technology of these valves has changed very little. Advances in performance have been nominal as the basic design concept has remained the same: body, diaphragm, topworks, and four fasteners. This design requires experienced personnel and stringent maintenance practices to assure consistent, reliable valve performance. All while the industry is forced to increase productivity, extend preventative maintenance intervals, and reduce operating costs.

ITT's breakthrough technology, the Pure-Flo® EnviZion™ valve, sets a new standard for the future of hygienic diaphragm valves. The EnviZion valve is designed specifically to help customers install, operate, and maintain their valves more efficiently. This unique design provides a significant reduction in total cost of ownership while supporting the industries' goals to increase productivity, improve reliability and enhance clean-ability.



NO LOSS OF SEAL INTEGRITY DURING THERMAL CYCLING



MINIMIZE RISK OF CONTAMINATION



MAINTAINS SEAL: NO LEAKAGE



NO TOOLS REQUIRED

EnviZion Valve

Valve maintenance as easy as 1-2-3



1. Unscrew Cover CCW



2. Rotate Bonnet



3. Lift Bonnet off Studs

The EnviZion valve utilizes a breakthrough mount and turn design that allows for quick and easy valve disassembly.

- Tool-less maintenance - no tools required for valve installation and diaphragm replacement, simplifying the maintenance process.
- Fasteners eliminated - no more handling loose parts or accessing fasteners in tight spaces.
- Save time - diaphragm changes reduced from an industry average of 23 minutes to 3 minutes, resulting in a 90% reduction in maintenance time.



Reliable Sealing and Improved Cleanability with No Re-Torques

The EnviZion valve eliminates the effects of thermal cycling with an integrated thermal compensation system.

- Active sealing technology - the constant force of the thermal compensation system provides a reliable seal that does not degrade over time (unlike other diaphragm valve designs that use passive sealing technology).
- No retorquing - the seal is maintained over varying operating conditions, eliminating the need to adjust fasteners after thermal cycling.

The EnviZion valve improves clean-ability by reducing the potential for fluid entrapment.

- Diaphragm seal - the valve body and diaphragm create a seal on the leading edge of the D-section, preventing fluid from getting into areas which would be difficult to clean and possibly lead to process contamination.

Net result - reduced maintenance hours, commissioning costs and potential for system contamination.

EnviZion Valve

Total Cost of Ownership

The EnviZion valve platform was developed with one overarching goal – to reduce the customer’s total cost of ownership (TCO). Costs associated with installation, validation, operation, and maintenance are significantly reduced with the EnviZion valve.

- Over 90% annual maintenance cost savings is achieved by reducing the time required to change diaphragms.
- No retorquing after thermal cycling reduces start up time and maintenance cost.
- Body seal reliability eliminates the potential for system contamination, which can save significant production time and lost revenue.
- Preventative maintenance intervals can be extended, saving time and cost.



Cost Savings Example

Cost for Maintenance	Today's Valve	EnviZion Valve
Number of Diaphragm Changes Per Year	2	1
Diaphragm Replacement Time	23 Minutes	3 Minutes
Thermal Cycle Time	4 Hrs/System	0 Hrs/System
Time to Re-Torque Valve	5 Minutes	0 Minutes
Annual Diaphragm Replacement Time for 500 Valves	383 Hours	25 Hours
Total Annual Re-Torque Time	83 Hours	0 Hours
Total Annual Thermal Cycle Time	80 Hours	0 Hours
Total Annual Maintenance Time	547 Hours	25 Hours
Total Valve Related Annual Maintenance Cost*	\$82,000	\$3,750

Actual savings may vary depending on customer specific costs and protocols

* \$150/hour rate

Over 90% Reduction in Maintenance Costs

EnviZion Valve

Valve Bodies

Forged (2-Way)

Size: 0.5-2inch (DN15-50)
End Connections: Tri-Clamp®,
16 O.D. Gauge Tubing, DIN
11850

Material: Tri-certified 316L
stainless steel, sulfur
controlled per ASME BPE
(ASTM A182 grade 316L, S9,
EN 10222-5 EN 1.4435, BN2)

Dimensional Standards: USOD Tubing, DIN
Patent



Wrought (Block Bodies)

Size: 0.5-2 inch (DN15-50)
End Connections:
Tri-Clamp®, 16 O.D.
Gauge Tubing, Schedule
piping (5, 10, 40), ISO,
DIN 11850

Material: 316L stainless
steel ASTM A479, A240,
316L

Special Alloys¹: C22, C276, AL6XN

Dimensional Standards: USOD Tubing, Pipe, ISO/DIN

¹ Other materials available upon request
Patent



Surface Finishes

10 – 25 Ra* (.25µm - 0.6 µm)

Interior & exterior electropolish available

*25 Ra standard polish

Topworks

Manual Bonnet

Type: ZH, ZHS (sealed)

Size: .5-2 inch (DN15-50)

Bonnet Material: Stainless steel

Handwheel/Bonnet Cover: FDA

21CFR177.1660 compliant PES

Corrosion Resistance: Resistant to
common industry washdowns.

Consult factory for specific
chemical resistance.

Standard Features:

- Autoclavable
- Thermal compensation system
- Safety lock-pin
- Travel stop
- Visual position indication
- Weep hole

Patent



Actuated Bonnet

Type: ZA1, ZA2, ZA3, ZA1S (sealed),

ZA2S (sealed), ZA3S (sealed)

Size: .5-2 inch (DN15-50)

Operating Modes: Fail Closed, Fail Open,
Double Acting

Actuator Material: Stainless steel

Bonnet Material: Stainless steel

Corrosion Resistance: Resistant to
common industry washdowns. Consult
factory for specific chemical resistance

Standard Features:

- Autoclavable
- Thermal compensation system
- Safety lock-pin
- Visual position indication
- Weep hole
- 360 degree air port rotation (excludes .5" (DN15))

Patent



EnviZion Valve

Diaphragms

The EnviZion diaphragm has been developed to withstand the wear of today's production cycles and maintains a reliable seal, avoiding the risk of leakage and batch contamination. It combines advanced technology with proven materials that are used extensively in the Pharmaceutical and Biopharm industries.

Featuring a robust 2-piece construction, the EnviZion diaphragm utilizes the same modified PTFE material as the Pure-Flo series of valves with an enhanced EPDM backing cushion. The diaphragm design has been optimized to maximize sealing efficiency while minimizing stresses during operation.

Type: TMZ
Patent

Temperature Rating:

- 20°C to 165°C (-4°F to 329°F)
- 30°C to 140°C (-22°F to 285°F) for continuous steam
- 30°C to 150°C (-22°F to 302°F) for intermittent steam

Material (2-Piece Construction):

- Product Contact Surface: Modified PTFE
- Backing Cushion: Grade B1 EPDM
- Lot code traceable

Regulatory Compliance:

- PTFE: 21CFR 177.1550 (a)
- EPDM Backing cushion: 21 CFR 177.2600
- USP Class VI, Chapter <87>, <88> (70°C and 121°C)
- EMA 410 compliant

PTFE Product Contact Surface



EPDM Backing Cushion



EnviZion Diaphragm Connection as easy as 1-2-3



1. Align diaphragm stud head with compressor slot



2. Push diaphragm stud into compressor slot



3. Rotate 90°



EnviZion Valve

EnviZion Actuator Sizing

Valve Size		0.5" (DN 15)		0.75" (DN 20)		1" (DN 25)		1.5" (DN 40)		2.0" (DN 50)	
ΔP		100%	0%	100%	0%	100%	0%	100%	0%	100%	0%
Actuator Model		Fail Closed - Reverse Acting - Spring to Close Maximum Line Pressure (psi/(bar))									
ZA2/ZA2S		150 (10.3)	135 (9.3)	150 (10.3)	70 (4.8)	150 (10.3)	70 (4.8)	150 (10.3)	90 (6.2)	130 (9.0)	65 (4.5)
Actuator Model	Line Pressure	Fail Open - Direct Acting - Spring to Open Air pressure required to shut-off line pressure (psi/(bar))									
ZA1/ZA1S	20	45 (3.1)	45 (3.1)	45 (3.1)	45 (3.1)	45 (3.1)	45 (3.1)	32 (2.2)	35 (2.4)	42 (2.9)	50 (3.4)
ZA1/ZA1S	40	48 (3.3)	50 (3.4)	50 (3.4)	53 (3.7)	50 (3.4)	53 (3.7)	36 (2.5)	42 (2.9)	46 (3.2)	57 (3.9)
ZA1/ZA1S	60	51 (3.5)	54 (3.7)	54 (3.7)	62 (4.3)	54 (3.7)	62 (4.3)	40 (2.8)	49 (3.4)	50 (3.5)	64 (4.4)
ZA1/ZA1S	80	54 (3.7)	59 (4.1)	59 (4.1)	70 (4.8)	59 (4.1)	70 (4.8)	44 (3.0)	56 (3.9)	54 (3.8)	71 (4.9)
ZA1/ZA1S	100	57 (3.9)	63 (4.3)	63 (4.3)	79 (5.4)	63 (4.3)	79 (5.4)	47 (3.2)	63 (4.3)	59 (4.0)	78 (5.4)
ZA1/ZA1S	125	61 (4.2)	69 (4.8)	69 (4.8)	89 (6.1)	69 (4.8)	89 (6.1)	52 (3.6)	71 (4.9)	64 (4.4)	86 (5.9)
ZA1/ZA1S	150	65 (4.5)	75 (5.2)	75 (5.2)	100 (6.9)	75 (5.2)	100 (6.9)	57 (3.9)	80 (5.5)	69 (4.8)	95 (6.5)
Actuator Model	Line Pressure	Double Acting - Air to Open Air to Close Air pressure required to shut-off line pressure (psi/(bar))									
ZA3/ZA3S	20	30 (2.1)	30 (2.1)	30 (2.1)	30 (2.1)	30 (2.1)	30 (2.1)	17 (1.2)	18 (1.2)	27 (1.9)	27 (1.9)
ZA3/ZA3S	40	33 (2.3)	35 (2.4)	35 (2.4)	38 (2.6)	35 (2.4)	38 (2.6)	20 (1.4)	26 (1.8)	31 (2.1)	35 (2.4)
ZA3/ZA3S	60	36 (2.5)	39 (2.7)	39 (2.7)	47 (3.2)	39 (2.7)	47 (3.2)	23 (1.6)	35 (2.4)	34 (2.3)	44 (3.0)
ZA3/ZA3S	80	39 (2.7)	44 (3.0)	44 (3.0)	55 (3.8)	44 (3.0)	55 (3.8)	27 (1.9)	43 (3.0)	38 (2.6)	52 (3.6)
ZA3/ZA3S	100	42 (2.9)	48 (3.3)	48 (3.3)	64 (4.4)	48 (3.3)	64 (4.4)	30 (2.1)	51 (3.5)	41 (2.8)	61 (4.2)
ZA3/ZA3S	125	46 (3.2)	54 (3.7)	54 (3.7)	74 (5.1)	54 (3.7)	74 (5.1)	34 (2.3)	62 (4.3)	46 (3.1)	72 (5.0)
ZA3/ZA3S	150	50 (3.4)	60 (4.1)	60 (4.1)	85 (5.9)	60 (4.1)	85 (5.9)	38 (2.6)	72 (5.0)	50 (3.4)	83 (5.7)

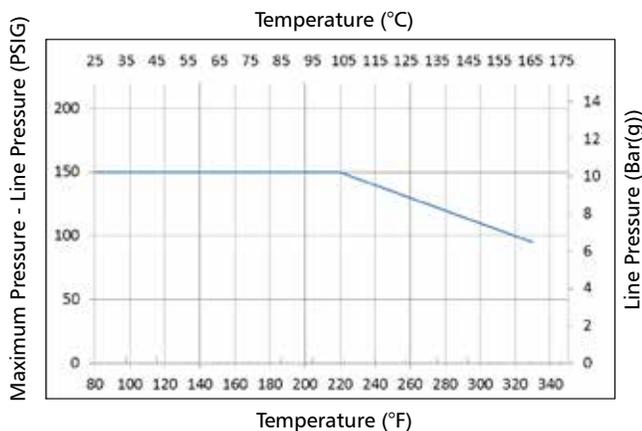
Note: Fail closed actuators require 90 psi (6 bar) instrument air to achieve full open with 0 psi/bar line pressure

Cv/Kv Ratings for EnviZion Manual and Actuated valves

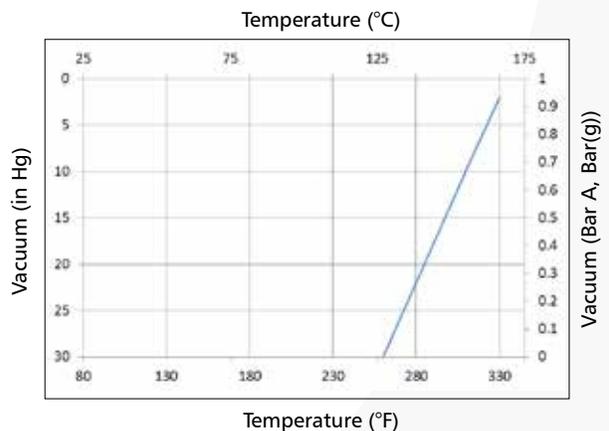
Size (in)	0.5" (DN 15)		0.75" (DN 20)		1" (DN 25)		1.5" (DN 40)		2" (DN 50)	
Cv/Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv
25% Open	1.4	1.21	3.9	3.37	4.4	3.81	6.3	5.45	9.1	7.88
50% Open	2.5	2.16	7.4	6.40	9.5	8.22	17.3	14.98	24.9	21.56
75% Open	2.9	2.51	9.6	8.30	12.4	10.73	29.4	25.45	42.7	36.97
100% Open	3	2.60	10	8.65	14	12.11	37.1	32.12	51.2	44.33

Cv units = GPM with 1 psi pressure drop across valve. Kv = m^3/hr with 1 Kg/cm² pressure drop across the valve

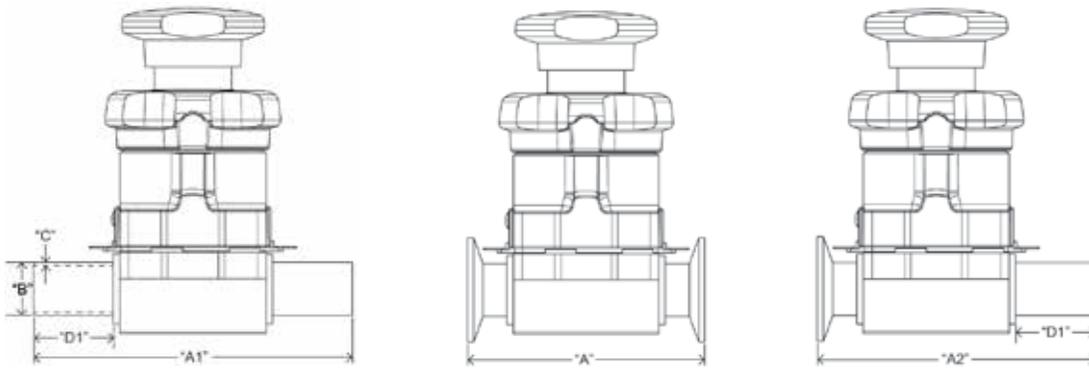
Pressure/Temperature Recommendations



EnviZion Diaphragms for Vacuum Service



Body Dimensions



USOD (ANSI)							Drain Angles		
B		A	A1	D1	A2	C	ANSI	ISO	DIN
End Connection Size		Overall Length	Overall Length	Weld Tangent	Overall Length	16 GA.			
IN	DN	Tri Clamp	Extended BW	Extended BW	TC x BW	Extended BW			
Forgings									
0.5"	DN15	3.5" (89)	5.22" (133)	1.5" (38)	4.36 (111)	.065	27°	TBD	TBD
0.75"	DN20	4" (102)	6.00" (152)	1.5" (38)	5.00 (127)	.065	36°	TBD	TBD
1"	DN25	4.5" (114)	6.00" (152)	1.5" (38)	5.25 (133)	.065	30°	TBD	TBD
1.5"	DN40	5.5 (140)	7.08 (180)	1.5 (38)	6.3 (160)	.065	25°	TBD	TBD
2"	DN50	6.25 (159)	7.42 (188)	1.5 (38)	6.84 (174)	.065	19°	TBD	TBD

Note: Drain angle tolerances of +/- 2° will assure optimal drainability
Dimensions in () are mm

How to Specify an Envizion Valve

Envizion configuration numbers follow the same format as the Pure-Flo platform, with the exception of adding the ENV prefix in front of the figure number. In addition, codes have been established for manual bonnets, actuators, and diaphragms as noted below.

Platform

Code	Description
ENV	Envizion

Envizion Manual Bonnets

Code	Description
ZH	Envizion Zero torque Manual
ZHS	Envizion Zero torque Manual sealed

Envizion Actuated Bonnets

Code	Description
ZA1	Envizion Zero torque Actuator - FO
ZA2	Envizion Zero torque Actuator - FC (90#)
ZA3	Envizion Zero torque Actuator - DA
ZA1S	Envizion Zero torque Actuator - FO sealed
ZA2S	Envizion Zero torque Actuator- FC (90#) sealed
ZA3S	Envizion Zero torque Actuator - DA sealed

Diaphragms

Code	Description
TMZ	Envizion modified PTFE diaphragm (FDA)/B1 backing cushion

For more information on how to order an Envizion valve, see B.ENV-ORD.2016-04.

Figure Number Example: ENV-1-F-428L-6-0-0-TMZ-ZH

Description: 1" Envizion manual valve, forged body, 16 gauge buttweld ends, 25 Ra interior polish with PTFE diaphragm with EPDM backing cushion



ENGINEERED FOR LIFE

Engineered Valves, LLC
33 Centerville Road
Lancaster, PA 176031
717.509.2200
www.engvalves.com

ITT Industries Ltd.
Weycroft Avenue, Millwey Rise Industrial Estate
Axminster, EX13 5HU
United Kingdom
Tel: +44 1297-639100
Fax: +44 1297-630476

© 2016 ITT Engineered Valves, LLC



B.ENV.en-US.2016-04