DV Series Diaphragm Valves

Product Data Sheet

introduction

< STANDARDS >

ASTM D1784

ANSI B16.5

IPEX DV Series Diaphragm Valves are rugged industrial products ideal for throttling or use in abrasive slurry lines. The raising position indicator also functions as an adjustable travel stop. This feature can be used to avoid over-compression of the diaphragm, or as a travel limiter allowing different settings for the "closed" position. The molded flanged body eliminates potentially leaky joints while featuring end-to-end dimensions identical to most plastic lined metal diaphragm valves, allowing for direct replacement. DV Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

Valve Availability

Body Material:	PVC
Size Range:	1/2" through 6"
Pressure:	150 psi
Diaphragm:	EPDM or Teflon® (PTFE)
End Connections:	Flanged (ANSI 150)

DV Series Diaphragm Valves

Sample Specification

1.0 Diaphragm Valves - DV

1.1 Material

- The valve body shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.
- This compound shall comply with standards that are equivalent to NSF Standard 61 for potable water.

1.2 Diaphragm

- The diaphragm shall be made of EPDM which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

or The diaphragm shall be made of Teflon® (PTFE) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

2.0 Connections

2.1 Flanged style

- The ANSI 150 flanged PVC end connections shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall have integrally molded flanged ends.
- All valves shall have a clear position indicator.
- All valves shall have an adjustable travel stop.
- All valves shall have face-to-face dimensions to the industry standard.
- The valve shall have no wetted metal parts.
- Service of the valve shall be possible without removal from the system line.

3.1 Pressure Rating

- Valve sizes 1/2" through 3" shall be rated at 150 psi at 73°F.
- Valve sizes 4" through 6" shall be rated at 75 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All PVC valves shall be color-coded dark gray.
- All hand wheels shall be color-coded red.

4.0 All valves shall be Xirtec® 140 by IPEX or approved equal.

DV Series Diaphragm Valves

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number FNPT Threaded	Pressure Rating @ 73ºF
1/2	PVC	EPDM	052196	150 psi
		Viton®	052296	
3/4	PVC	EPDM	052197	
		Viton®	052297	
1	PVC	EPDM	052198	
		Viton®	052298	
1-1/2	PVC	EPDM	052207	
		Viton®	052299	
2	PVC	EPDM	052208	
		Viton®	052354	
3	PVC	EPDM	052209	
		Viton®	052355	
4	PVC	EPDM	052217	75 psi
		Viton®	052356	
6	PVC	EPDM	052218	
		Viton®	052357	

Size (inches):

- ❑ 1/2
- ❑ 3/4
- ❑ 1
- ❑ 1-1/2
- ❑ 2
- ❑ 3
- ❑ 4
- ❑ 6

Diaphragm:

- ❑ EPDM
- ❑ Teflon® (PTFE)

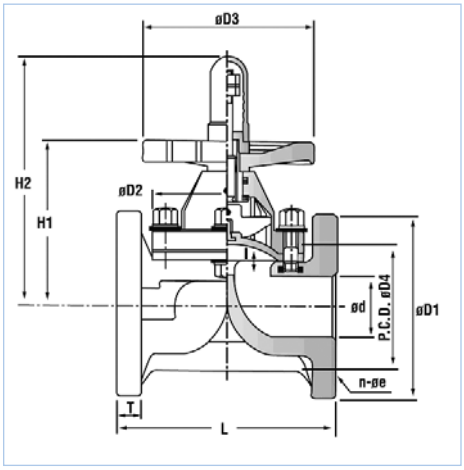
IPEX Part Number:

_____

DV Series Diaphragm Valves

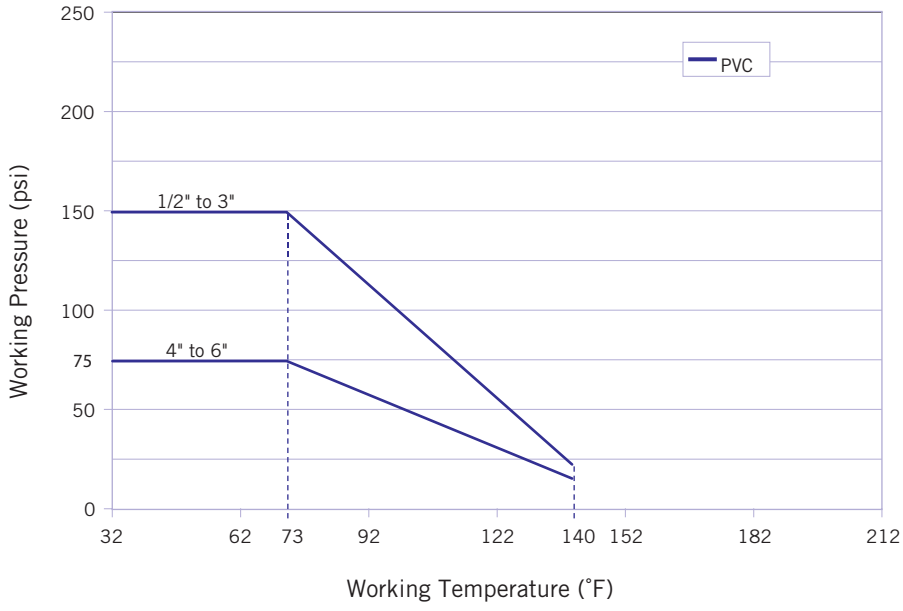
Technical Data

dimensions and weights



Dimension (inches)												
Size	D_1	D_2	D_3	D_4	d	H_1	H_2	L	I	n-ϕe	T	W (lbs)
1/2	3.50	2.13 x 2.76	3.74	2.36	0.51	3.35	4.96	4.25	0.39	4-0.63	0.51	1.79
3/4	3.86	2.48 x 3.07	3.74	2.76	0.71	3.70	5.39	5.91	0.47	4-0.63	0.59	2.20
1	4.25	2.48 x 3.46	4.33	3.11	0.98	3.86	5.67	5.91	0.59	4-0.63	0.52	3.67
1-1/2	5.00	4.92	5.91	3.86	1.61	5.12	8.66	6.93	0.87	4-0.63	0.67	4.91
2	5.98	5.83	5.91	4.76	2.05	5.83	8.86	7.95	1.22	4-0.75	0.67	6.45
3	7.52	7.99	8.27	5.98	3.07	9.84	13.50	10.39	1.89	4-0.75	0.79	15.43
4	9.02	10.04	9.84	7.52	3.94	10.83	15.08	12.95	2.36	8-0.75	0.87	24.25
6	10.98	15.16	16.14	9.49	5.83	13.15	18.74	18.90	2.76	8-0.87	0.94	65.04

pressure – temperature ratings



DV Series Diaphragm Valves

Technical Data (cont'd)

flow coefficients

The flow coefficient (CV) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

Where,

f is the pressure drop (friction loss) in psi,

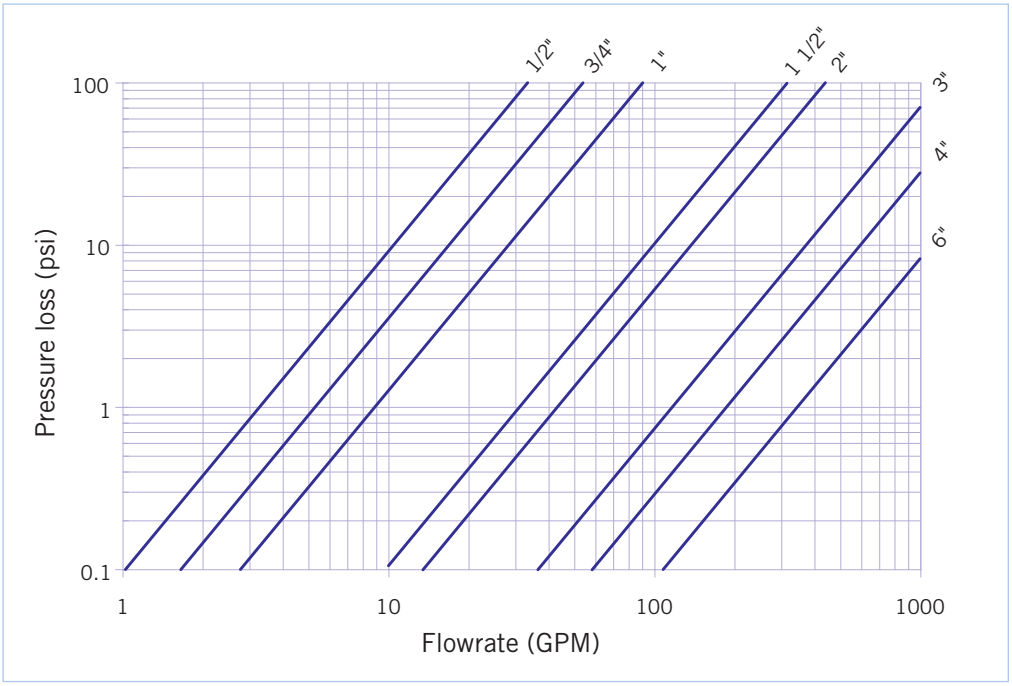
sg is the specific gravity of the fluid,

Q is the flow rate in GPM,

C_V is the flow coefficient.

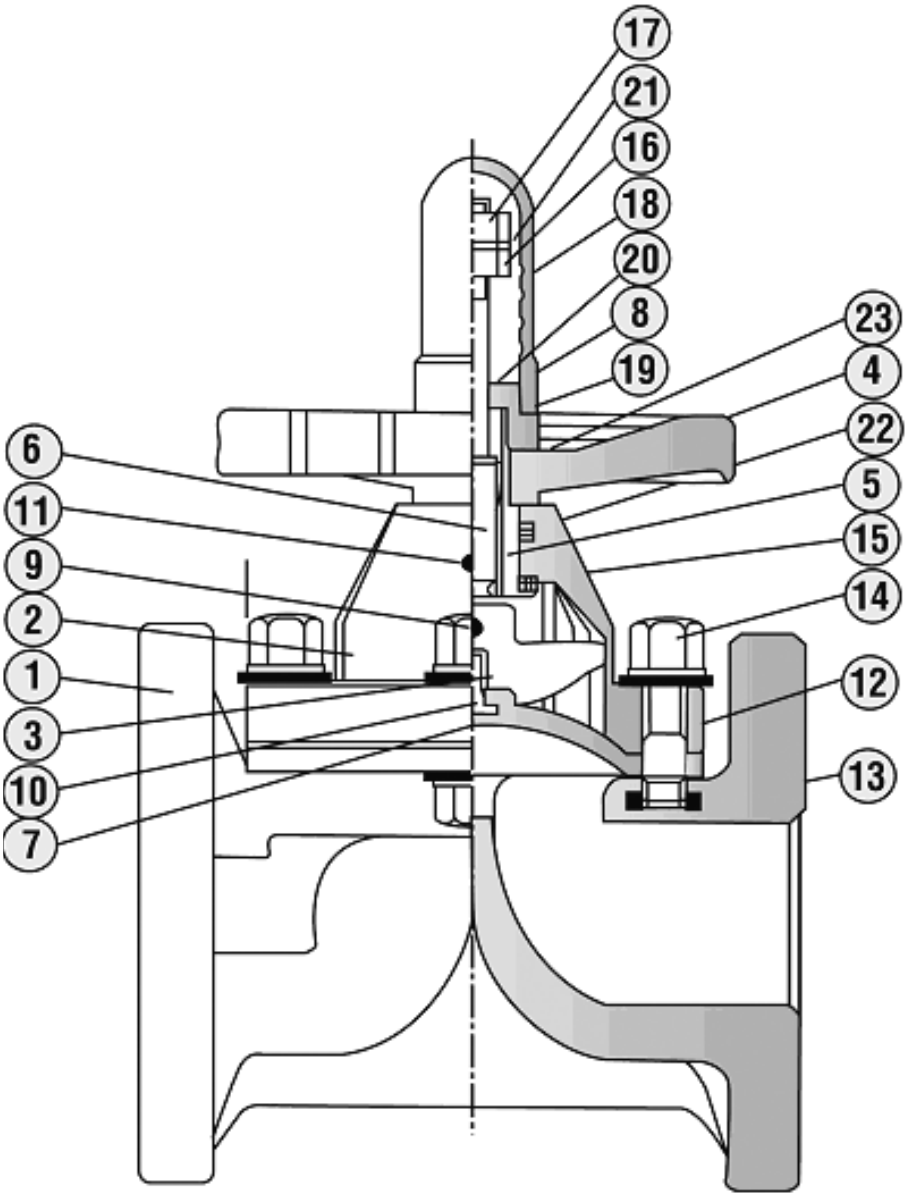
Size	C_V
1/2	3.27
3/4	5.29
1	8.87
1-1/2	31.1
2	43.2
3	117
4	187
6	345

pressure loss chart



DV Series Diaphragm Valves

Components



#	Component	Material	Qty
1	body	PVC	1
2	bonnet	PVC	1
3	compressor	FC, SUS	1
4	hand wheel	PP	1
5	sleeve	C3602	1
6	stem	C3602	1
7	diaphragm	EPDM or Teflon®	1
8	cap	PVC	1
9	compressor pin	SUS 304	1
10	inserted metal	C3604, SUS 304	1
11	grease nipple	C3604 (65-150)	1
12	bolt & washer	150	12 ea
13	inserted nut	65-125	8 ea
14	nut & washer	25-50	6 ea
15	thrust bearing	Standard (100-150)	1
16	stopper nut	SUS 304	1
17	set nut	SUS304	1
18	gauge cover	AS	1
19	sheet gasket	EPDM	1
20	sheet ring	SUS 304	1
21	spring washer	SUP	1
22	o-ring	NBR	1
23	name plate	PVC	1

DV Series Diaphragm Valves

Installation Procedures

1. Remove the protective seals from either end of the valve then carefully place into the system between the two pipe flanges.

2. Join each end of the valve to the pipe flanges. For correct joining procedure, please refer to the section entitled, *"Joining Methods – Flanging"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems".*

Travel Stop Adjustment

1. Loosen and remove the gauge cover (part #18 on previous page) from the position indicator assembly.

2. Remove and set aside the sheet gasket (19).

3. Loosen the stopper nut (16), spring washer (21), and set nut (17) from the stem (6).

4. Tighten the handwheel (4) slightly until the diaphragm completely seals.

5. Tighten down the stopper nut until it just touches the cap (8), then tighten the set nut and spring washer accordingly.

6. Fit the sheet gasket over the stem and down onto the cap, then replace the gauge cover and tighten.

Note: It is important not to over-tighten the valve during calibration as it may cause permanent damage to the diaphragm. The valve is completely closed when the handwheel cannot turn any further without using excessive torque.

DV Series Diaphragm Valves

Valve Maintenance

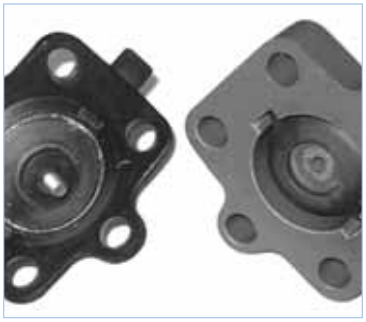
disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Loosen end of the valve from the pipe flanges. Please refer to the section entitled, “Joining Methods – Flanging” in the IPEX Industrial Technical Manual Series, “Volume I: Vinyl Process Piping Systems” for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
3. Ensure that the valve is in the fully open position.
4. Loosen and remove the gauge cover (part #18 on previous page) and the sheet gasket (19) from the position indicator assembly.
5. Loosen and remove the stopper nut (16), spring washer (21), and set nut (17) from the stem (6).
6. Loosen and remove the cap (8) then the handwheel (4).
7. Loosen and remove all bolts (12), nuts (14), and washers, then remove the bonnet – diaphragm assembly from the body (1).
8. To remove the diaphragm (7) from the bonnet (2), grip and gently turn in a counterclockwise direction.
9. To remove the compressor (3) from the bonnet, temporarily replace the handwheel and turn in a clockwise direction. The compressor will start to emerge from the cavity in the bonnet and eventually become loose enough to remove.
10. To remove the sleeve (5), gently push it into the cavity of the bonnet from above.
11. The valve components can now be checked for problems and/or replaced.

DV Series Diaphragm Valves

Valve Maintenance (cont'd)

assembly



Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Insert the sleeve (5) into the cavity of the bonnet (2) and push firmly into place.
2. Insert the compressor (3) into the bonnet (2) and gently rotate a few turns in a counterclockwise direction until the threads grip and the moldings line up with those on the bonnet.
3. Temporarily place the handwheel (4) on the bonnet assembly and rotate in a counterclockwise direction until the compressor is fully retracted into the cavity in the bonnet.
4. Insert the integral screw on the diaphragm (7) into the compressor and turn in a clockwise direction until tight then **back off two full turns.**
5. Line up the holes on the diaphragm with those on the bonnet then gently push on the center of the diaphragm to ensure that the sleeve is properly fitted in the bonnet cavity. **If the diaphragm is installed too tight, the sleeve will be pulled back into the bonnet cavity making installation of the handwheel impossible.**
6. Place the bonnet – diaphragm assembly on the body (1) then fasten with all bolts (12), nuts (14), and washers. It is recommended to tighten the bolts in a diagonal pattern to ensure even stress distribution and optimal sealing of the diaphragm.
7. Fit the handwheel on the bonnet, fasten in position with the cap (8), and then turn until the diaphragm completely seals.
8. Thread the stopper nut (16) onto the stem (6) then tighten down until it just touches the cap.
9. Place the spring washer (21) and set nut (17) on the stem and tighten down accordingly.
10. Fit the sheet gasket (19) over the stem and down onto the cap, then replace the gauge cover (18) and tighten.

DV Series Diaphragm Valves

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"* under the section entitled, *"Testing"*. The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **Use caution not to over-tighten the valve during cycling as it may cause permanent damage to the diaphragm. The valve is completely closed when the handwheel cannot turn any further without using excessive torque.**

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

DV Series Diaphragm Valves

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- Double containment systems
- Acid waste systems
- High purity systems
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