VM Series Pneumatic Diaphragm Valves

Product Data Sheet

introduction

< STANDARDS >

ASTM D4101-86
ASTM D3222
ASTM D2467
ASTM D2466
ASTM D1785
ASTM D1784
ASTM F441
ASTM F439

ISO 3609
ISO 10931

ANSI B16.5

IPEX VM Series Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or contaminated fluids in a variety of applications. The weir-style design allows for precise throttling while the compact design allows for installation in any orientation. This pneumatically actuated version provides automatic control with an extensive range of options and accessories. The modular nature of this valve results in many material, body style, and diaphragm options. VM 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, CPVC, PP, PVDF
Size Range:	1/2" through 4"
Pressure:	150 psi (1/2" to 2"), 90 psi (2-1/2" to 4")
Diaphragm:	EPDM, Viton® (FPM) or PTFE (EPDM backed)
Control Style:	Pneumatically Actuated
End Connections:	Spigot, True Union (Socket), Flanged (ANSI 150)

VM Series Pneumatic Diaphragm Valves

Sample Specification

1.0 Diaphragm Valves - VM Pneumatic

1.1 Material

- The valve body, including end connectors and unions, shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, including end connectors and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

or The valve body, including end connectors and unions, shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The valve body, including end connectors and unions, shall be made of virgin, non-regrind PVDF compound which shall meet or exceed the requirements of Table 1 according to ASTM D3222.

- These compounds shall comply with standards that are equivalent to NSF Standard 61 for potable water.
- The valve bonnet assembly shall be made of high temperature, high strength, glass-filled polypropylene.

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 Viton® (FPM) which shall comply with standards that are equivalent to NSF Standard 61 for potable water.

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

1.3 All other wetted and non-wetted parts of the valves shall comply with standards that are equivalent to NSF Standard 61 for potable water.

2.0 Connections

2.1 Spigot style

- The IPS spigot PVC end connectors shall conform to the dimensional standard ASTM D1785.

or The IPS spigot CPVC end connectors shall conform to the dimensional standard ASTM F441.

or The Metric spigot PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric spigot PVDF end connectors shall conform to the dimensional standard ISO 10931.

VM Series Pneumatic Diaphragm Valves

Sample Specification (cont'd)

2.2 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

or The Metric socket PP end connectors shall conform to the dimensional standard ISO 3609.

or The Metric socket PVDF end connectors shall conform to the dimensional standard ISO 10931.

2.3 Flanged style

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

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PP end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged PVDF end connectors shall conform to the dimensional standard ANSI B16.5.

3.0 Design Features

- All valves shall be weir-style for throttling applications.
- All bodies to be used with EPDM or Viton® diaphragms shall feature raised molded sealing rings (concentric).
- All bodies to be used with PTFE diaphragms shall be machined flat.
- All PTFE diaphragms shall feature a raised molded ring to combine sealing performance and longer life.
- All through bolts shall be made of 304 stainless steel.
- Bodies of all sizes and materials shall have mounting brass inserts.

3.1 Actuators

- All actuators shall be made of glass-filled polypropylene.
- All actuators shall feature a smooth top (no nut holes) for cleanliness.
- The edge of the actuator membrane shall be inside of the actuator protective housing.
- All springs shall be cut from spring grade steel for maximum memory life and epoxy coated for maximum chemical resistance.

- Fail safe to open and double-acting actuators shall feature weak springs located in the center of the actuator.
- Fail safe to close actuators shall feature three concentric springs located in the middle of the actuator.
- The following accessories shall be available for all actuators: position indicator, stroke limiter, stroke limiter with position indicator, limit switch, limit switch box, 3-15 psi positioner, 4-20 mA positioner, solenoid pilot valve.

3.2 Pressure Rating

- Valve sizes 1/2" through 2" shall be rated at 150 psi at 73ºF.
- Valve sizes 2-1/2" through 4" shall be rated at 90 psi at 73ºF.

3.3 Markings

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

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.

or All CPVC valves shall be color-coded light gray.

or All PP valves shall be color-coded beige gray.

or All PVDF valves shall not be color-coded and be white in appearance.

- All bonnet assemblies shall be color-coded red.

4.0 All valves shall be Xirtec® 140, Corzan®, PP or PVDF by IPEX or approved equal.

VM Series Pneumatic Diaphragm Valves

Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number						Pressure Rating @ 73ºF
			Normally Open & Air to Air			Normally Closed			
			Spigot	True Union	ANSI Flanged	Spigot	True Union	ANSI Flanged	
1/2	PVC	EPDM	054410	054437	054455	054644	054671	054689	150 psi
		Viton®	054419	054443	054464	054653	054677	054698	
		PTFE	054428	054449	054473	054662	054683	054707	
	CPVC	EPDM	054482	054509	054527	054716	054743	054761	
		Viton®	054491	054515	054536	054725	054749	054770	
		PTFE	054500	054521	054545	054734	054755	054780	
3/4	PVC	EPDM	054411	054438	054456	054645	054672	054690	
		Viton®	054420	054444	054465	054654	054678	054699	
		PTFE	054429	054450	054474	054663	054684	054708	
	CPVC	EPDM	054483	054510	054528	054717	054744	054762	
		Viton®	054492	054516	054537	054726	054750	054771	
		PTFE	054501	054522	054546	054735	054756	054781	
1	PVC	EPDM	054412	054439	054457	054646	054673	054691	
		Viton®	054421	054445	054466	054655	054679	054700	
		PTFE	054430	054451	054475	054664	054685	054709	
	CPVC	EPDM	054484	054511	054529	054718	054745	054763	
		Viton®	054493	054517	054538	054727	054751	054772	
		PTFE	054502	054523	054547	054736	054757	054782	
1-1/4	PVC	EPDM	054413	054440	054458	054647	054674	054692	
		Viton®	054422	054446	054467	054656	054680	054701	
		PTFE	054431	054452	054476	054665	054686	054710	
	CPVC	EPDM	054485	054512	054530	054719	054746	054764	
		Viton®	054494	054518	054539	054728	054752	054773	
		PTFE	054503	054524	054548	054737	054758	054783	
1-1/2	PVC	EPDM	054414	054441	054459	054648	054675	054693	
		Viton®	054423	054447	054468	054657	054681	054702	
		PTFE	054432	054453	054477	054666	054687	054711	
	CPVC	EPDM	054486	054513	054531	054720	054747	054765	
		Viton®	054495	054519	054540	054729	054753	054774	
		PTFE	054504	054525	054549	054738	054759	054784	
2	PVC	EPDM	054415	054442	054460	054649	054676	054694	
		Viton®	054424	054448	054469	054658	054682	054703	
		PTFE	054433	054454	054478	054667	054688	054712	
	CPVC	EPDM	054487	054514	054532	054721	054748	054766	
		Viton®	054496	054520	054541	054730	054754	054775	
		PTFE	054505	054526	054550	054739	054760	054785	
2-1/2	PVC	EPDM	054416	n/a	054461	054650	n/a	054695	
		Viton®	054425		054470	054659		054704	
		PTFE	054434		054479	054668		054713	
	CPVC	EPDM	054488		054533	054722		054767	
		Viton®	054497		054542	054731		054776	
		PTFE	054506		054551	054740		054786	
3	PVC	EPDM	054417		054462	054651		054696	
		Viton®	054426		054471	054660		054705	
		PTFE	054435		054480	054669		054714	
	CPVC	EPDM	054489		054534	054723		054768	
		Viton®	054498		054543	054732		054778	
		PTFE	054507		054552	054741		054787	
4	PVC	EPDM	054418		054463	054652		054697	
		Viton®	054427		054472	054661		054706	
		PTFE	054436		054481	054670		054715	
	CPVC	EPDM	054490		054535	054724		054769	
		Viton®	054499		054544	054733		054779	
		PTFE	054508		054553	054742		054788	

Body Material:

- ❑ PVC
- ❑ PP
- ❑ CPVC
- ❑ PVDF

Size (inches):

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

Diaphragm:

- ❑ EPDM
- ❑ Viton® (FPM)
- ❑ PTFE

Control Style:

- ❑ Pneumatic (Normally Open & Air to Air)
- ❑ Pneumatic (Normally Closed)

End Connections:

- ❑ Spigot
- ❑ True Union (Socket)
- ❑ Flanged (ANSI 150)

IPEX Part Number:

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VM Series Pneumatic Diaphragm Valves

Valve Selection (cont'd)

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number				Pressure Rating @ 73ºF
			Normally Open & Air to Air		Normally Closed		
			Spigot	True Union	Spigot	True Union	
20	PP	EPDM	054554	054581	054789	054816	150 psi
		Viton®	054563	054587	054798	054824	
		PTFE	054572	054593	054807	054830	
	PVDF	EPDM	054599	054626	054836	054863	
		Viton®	054608	054632	054845	054868	
		PTFE	054617	054638	054854	054874	
25	PP	EPDM	054555	054582	054790	054819	
		Viton®	054564	054588	054799	054825	
		PTFE	054573	054594	054808	054831	
	PVDF	EPDM	054600	054627	054837	054864	
		Viton®	054609	054633	054846	054869	
		PTFE	054618	054639	054855	054875	
32	PP	EPDM	054556	054583	054791	054820	
		Viton®	054565	054589	054800	054826	
		PTFE	054574	054595	054809	054832	
	PVDF	EPDM	054601	054628	054838	054864	
		Viton®	054610	054634	054847	054870	
		PTFE	054619	054640	054856	054876	
40	PP	EPDM	054557	054584	054792	054821	
		Viton®	054566	054590	054801	054827	
		PTFE	054575	054596	054810	054833	
	PVDF	EPDM	054602	054629	054839	054865	
		Viton®	054611	054635	054848	054871	
		PTFE	054620	054641	054857	054877	
50	PP	EPDM	054558	054585	054793	054822	
		Viton®	054567	054591	054802	054828	
		PTFE	054576	054597	054811	054834	
	PVDF	EPDM	054603	054630	054840	054866	
		Viton®	054612	054636	054849	054872	
		PTFE	054621	054642	054858	054878	
63	PP	EPDM	054559	054586	054794	054823	
		Viton®	054568	054592	054803	054829	
		PTFE	054577	054598	054812	054835	
	PVDF	EPDM	054604	054631	054841	054867	
		Viton®	054613	054637	054850	054873	
		PTFE	054622	054643	054859	054879	
75	PP	EPDM	054560		054795		
		Viton®	054569		054804		
		PTFE	054578		054813		
	PVDF	EPDM	054605		054842		
		Viton®	054614		054851		
		PTFE	054623		054860		
90	PP	EPDM	054561		054796		
		Viton®	054570		054805		
		PTFE	054579	n/a	054814	n/a	
	PVDF	EPDM	054606		054843		
		Viton®	054615		054852		
		PTFE	054624		054861		
110	PP	EPDM	054562		054797		
		Viton®	054571		054806		
		PTFE	054580		054815		
	PVDF	EPDM	054607		054844		
		Viton®	054616		054853		
		PTFE	054625		054862		

Body Material:

- ❑ PVC
- ❑ PP
- ❑ CPVC
- ❑ PVDF

Size (inches):

- ❑ 20mm
- ❑ 63mm
- ❑ 25mm
- ❑ 75mm
- ❑ 32mm
- ❑ 90mm
- ❑ 40mm
- ❑ 110mm
- ❑ 50mm

Diaphragm:

- ❑ EPDM
- ❑ Viton® (FPM)
- ❑ PTFE

Control Style:

- ❑ Pneumatic (Normally Open & Air to Air)
- ❑ Pneumatic (Normally Closed)

End Connections:

- ❑ Spigot
- ❑ True Union (Socket)
- ❑ Flanged (ANSI 150)

IPEX Part Number:

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VM Series Pneumatic Diaphragm Valves

Valve Selection (cont'd)

options and accessories

Electrical Position Indicator – 1 Switch Mechanical, Accessory B		
Style	Dimension (in)	IPEX Part Number
CM / NC	1/2	054952
VM / NC	1/2 - 1	054953
VM / NC	1-1/4 - 1-1/2	054954
VM / NC	2	054955
VM / NC	2-1/2 - 4	054956
VM Manual (*)	1/2 - 1	054962
VM Manual (*)	1-1/4 - 1-1/2	054963
VM Manual (*)	2	054964
VM Manual (*)	2-1/2 - 3	054965
VM Manual (*)	4	054966
(*) Special machining needed for the valve bonnet and compressor.		

Microswitches (NEMA 4X) – 2 Switches Electromechanical, Accessory C		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054967
VM / NC	2 - 4	054968
VM / NO	1/2 - 4	054969

Microswitches (NEMA 4X) – 2 Switches Inductive, Accessory CI		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054970
VM / NC	2 - 4	054971
VM / NO	1/2 - 4	054972

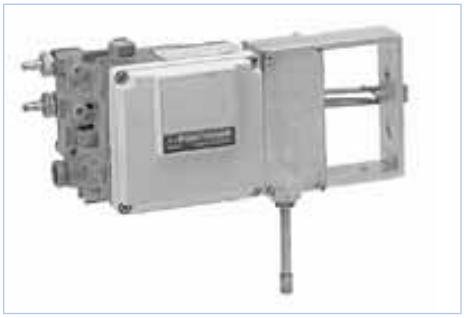
Microswitches (NEMA 4X) – 2 Switches Electromechanical, Accessory D		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054973
VM / NC	1-1/4 - 1-1/2	054974
VM / NC	2	054975
VM / NO	1/2 - 1	054976
VM / NO	1-1/4 - 1-1/2	054977
VM / NO	2	054978
CM / NC - NO	1/2	054979

VM Series Pneumatic Diaphragm Valves

Valve Selection (cont'd)

options and accessories (cont'd)

Microswitches (NEMA 4X) – 2 Switches Inductive, Accessory DI		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054980
VM / NC	1-1/4 - 1-1/2	054981
VM / NC	2	054982
VM / NO	1/2 - 1	054983
VM / NO	1-1/4 - 1-1/2	054984
VM / NO	2	054985
CM / NC - NO	1/2	054986



Electro-Pneumatic Positioner – 4-20mA, Accessory E		
Style	Dimension (in)	IPEX Part Number
VM Single Acting	1/2 - 4	054987
VM Double Acting	1/2 - 4	054988
Without mounting bracket (see next item).		

Bracket w/ Spindle and Connection Piece for Positioners		
Style	Dimension (in)	IPEX Part Number
VM Single Acting	1/2 - 4	054989
VM Double Acting	1/2 - 4	054990

Stroke Limiter – Accessory F		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054991
VM / NC	2	054992
VM / NC (*)	2-1/2 - 4	054993
VM / NO - DA	1-1/2 - 2	054994
VM / NO - DA	2-1/2 - 4	054995
CM / NC	1/2	054996
Protection cap included for VM. (*) Actuator must have the metal cap.		

Position Indicator – Accessory G		
Style	Dimension (in)	IPEX Part Number
VM / NC - NO - DA	1/2 - 2	054997
VM / NC - NO - DA	2-1/2 - 4	054998
Protection cap included, see assembly instructions.		

VM Series Pneumatic Diaphragm Valves

Valve Selection (cont'd)

options and accessories (cont'd)

Stroke Limiter w/ Position Indicator – Accessory H		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054999
VM / NC	1-1/4 - 1-1/2	053063
VM / NC	2	053064
VM / NC (*)	2-1/2 - 4	053065
VM / NO - DA	1/2 - 2	053066
VM / NO - DA	2-1/2 - 4	053067
CM / NC	1/2	053068

Protection cap included for VM. (*) Actuator must have the metal cap.

Stroke Limiter w/ Position Indicator and Manual Override – Accessory I		
Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	053069
VM / NC	1-1/4 - 1-1/2	053070
VM / NC	2	053071
VM / NO - DA	1/2 - 1	053072
VM / NO - DA	1-1/4 - 2	053073

Protection cap included.

PS Pilot Valve - Direct Mount – Direct mount solenoid pilot valve for VM and CM series valves			
Style	Dimension (in)	Seal Material	IPEX Part Number
VM Series	1/4	Viton®	053074
CM Series	1/8	Viton®	053075

Standard voltage is 110 VAC. Other voltages available upon request.

PS Pilot Valve - Gang or Remote Mount – Gang mount solenoid pilot valve for VM and CM series valves			
Style	Dimension (in)	Seal Material	IPEX Part Number
Gang Mount	1/4	Viton®	053076

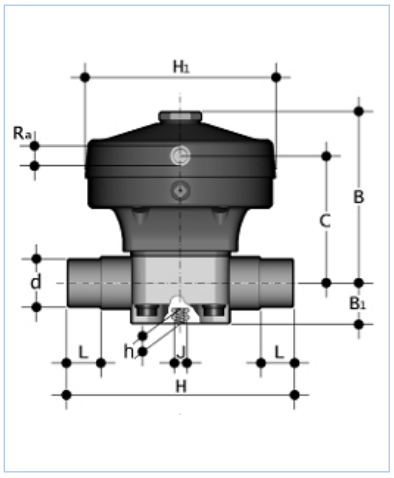
Standard voltage is 110 VAC. Other voltages available upon request.

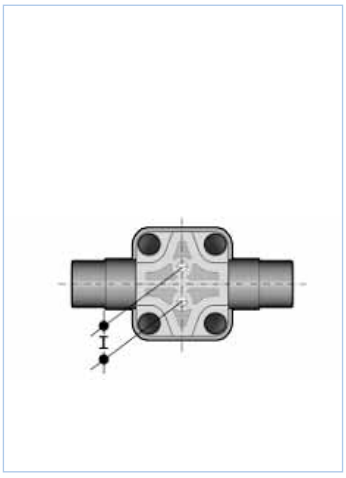
VM Series Pneumatic Diaphragm Valves

Technical Data

dimensions

normally open & air to air – spigot connections

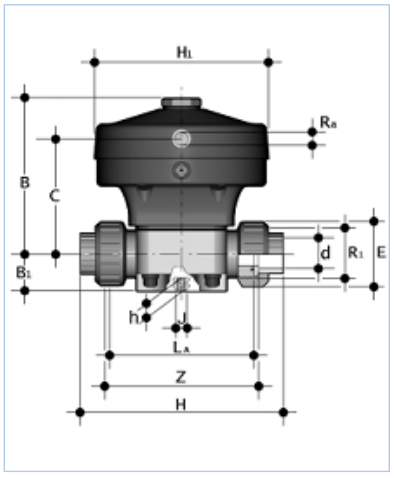


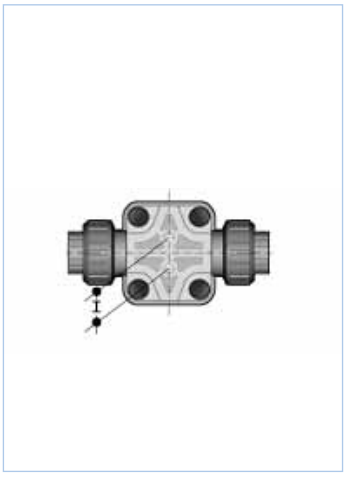


Dimension (inches)					
Size	PVC / CPVC d (in)	PP / PVDF d (mm)	H	L	B_1
1/2	0.84	20	4.88	0.63	1.02
3/4	1.05	25	5.67	0.75	1.02
1	1.32	32	6.06	0.87	1.02
1-1/4	1.66	40	6.85	1.02	1.57
1-1/2	1.90	50	7.64	1.22	1.57
2	2.38	63	8.82	1.50	1.57
2-1/2	2.88	75	11.18	1.73	2.17
3	3.50	90	11.81	2.01	2.17
4	4.50	110	13.39	2.40	2.72

Dimension (inches)							
Size	C	R_a	B	H_1	J	h	I
1/2	4.72	1/4	5.67	4.96	M6	0.47	0.98
3/4	4.75	1/4	5.67	4.96	M6	0.47	0.98
1	4.72	1/4	5.67	4.96	M6	0.47	0.98
1-1/4	5.24	1/4	7.91	6.10	M8	0.71	1.75
1-1/2	5.24	1/4	7.91	6.10	M8	0.71	1.75
2	6.14	1/4	9.33	8.27	M8	0.71	1.75
2-1/2	9.92	1/4	12.01	10.16	M12	0.91	3.94
3	9.92	1/4	12.01	10.16	M12	0.91	3.94
4	10.55	1/4	12.99	10.16	M12	0.91	4.72

normally open & air to air – true union connections





Dimension (inches)						
Size	d	PVC / CPVC		PP / PVDF		L_A	B_1
		H	Z	H	Z		
1/2	0.84	6.30	4.53	5.79	4.53	4.25	1.02
3/4	1.05	6.57	4.53	6.06	4.57	4.25	1.02
1	1.32	7.09	4.80	6.61	4.88	4.57	1.02
1-1/4	1.66	8.19	5.67	7.56	5.51	5.28	1.57
1-1/2	1.90	9.21	6.46	8.74	6.30	6.06	1.57
2	2.38	10.71	7.68	10.47	7.48	7.24	1.57

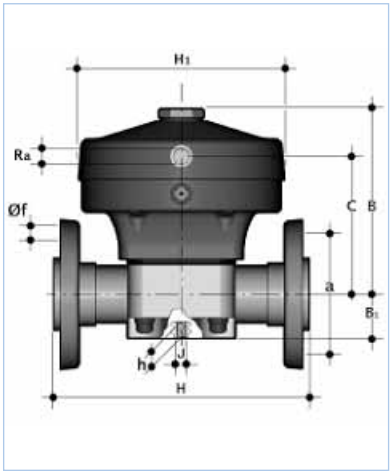
Dimension (inches)									
Size	C	R_a	B	H_1	E	R_1	J	h	I
1/2	4.92	1/4	5.67	4.96	1.61	1	M6	0.47	0.98
3/4	4.92	1/4	5.67	4.96	1.97	1-1/4	M6	0.47	0.98
1	4.92	1/4	5.67	4.96	2.28	1-1/2	M6	0.47	0.98
1-1/4	5.43	1/4	7.91	6.10	2.83	2	M8	0.63	1.75
1-1/2	5.43	1/4	7.91	6.10	3.11	2-1/4	M8	0.63	1.75
2	6.34	1/4	9.33	8.27	3.86	2-3/4	M8	0.63	1.75

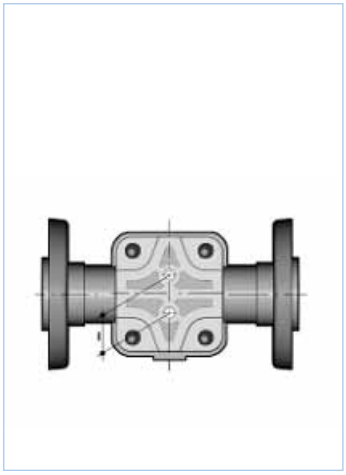
VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

dimensions cont'd

normally open & air to air – ANSI 150 flanged (vanstone) connections





Dimension (inches)							
Size	d	H	B_1	C	R_a	B	H_1
1/2	0.84	5.37	1.02	4.72	1/4	5.67	4.96
3/4	1.05	6.11	1.02	4.72	1/4	5.67	4.96
1	1.32	6.58	1.02	4.72	1/4	5.67	4.96
1-1/4	1.66	7.30	1.57	5.24	1/4	7.91	6.10
1-1/2	1.90	8.02	1.57	5.24	1/4	7.91	6.10
2	2.38	8.88	1.57	6.14	1/4	9.33	8.27
2-1/2	2.88	11.34	2.17	9.92	1/4	12.01	10.16
3	3.50	11.81	2.17	9.92	1/4	12.01	10.16
4	4.50	13.39	2.72	10.55	1/4	12.99	10.16

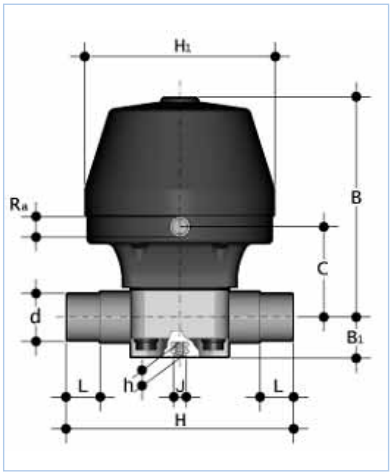
Dimension (inches)						
Size	# holes	f	F	J	h	I
1/2	4	5/8	2-3/8	M6	0.47	0.98
3/4	4	5/8	2-3/4	M6	0.47	0.98
1	4	5/8	3-1/8	M6	0.47	0.98
1-1/4	4	5/8	3-1/2	M8	0.71	1.75
1-1/2	4	5/8	3-7/8	M8	0.71	1.75
2	4	3/4	4-3/4	M8	0.71	1.75
2-1/2	4	3/4	5-1/2	M12	0.91	3.94
3	4	3/4	6	M12	0.91	3.94
4	4	3/4	7-1/2	M12	0.91	4.72

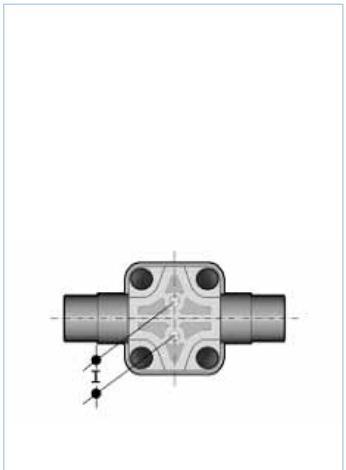
VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

dimensions cont'd

normally closed – spigot connections

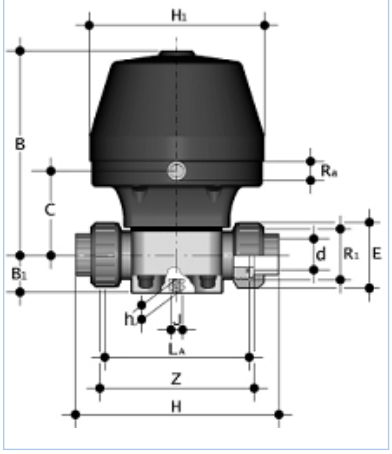


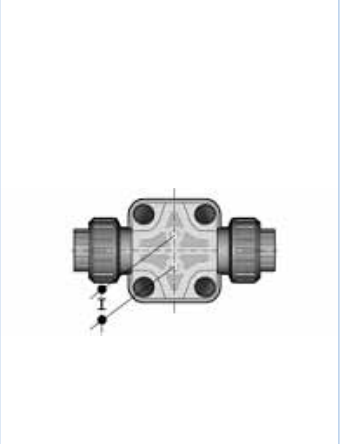


Dimension (inches)					
Size	PVC / CPVC d (in)	PP / PVDF d (mm)	H	L	B_1
1/2	0.84	20	4.88	0.63	1.02
3/4	1.05	25	5.67	0.75	1.02
1	1.32	32	6.06	0.87	1.02
1-1/4	1.66	40	6.85	1.02	1.57
1-1/2	1.90	50	7.64	1.22	1.57
2	2.38	63	8.82	1.50	1.57
2-1/2	2.88	75	11.18	1.73	2.17
3	3.50	90	11.81	2.01	2.17
4	4.50	110	13.39	2.40	2.72

Dimension (inches)							
Size	C	R_a	B	H_1	J	h	I
1/2	2.60	1/4	6.89	4.96	M6	0.47	0.98
3/4	2.60	1/4	6.89	4.96	M6	0.47	0.98
1	2.60	1/4	6.89	4.96	M6	0.47	0.98
1-1/4	4.06	1/4	9.61	6.10	M8	0.71	1.75
1-1/2	4.06	1/4	9.61	6.10	M8	0.71	1.75
2	4.92	1/4	11.50	8.27	M8	0.71	1.75
2-1/2	7.36	1/4	12.80	10.16	M12	0.91	3.94
3	7.36	1/4	12.80	10.16	M12	0.91	3.94
4	10.55	1/4	13.98	10.16	M12	0.91	4.72

normally closed – true union connections





Dimension (inches)						
Size	d	PVC / CPVC		PP / PVDF		L_A	B_1
		H	Z	H	Z		
1/2	0.84	6.30	4.53	5.79	4.53	4.25	1.02
3/4	1.05	6.57	4.53	6.06	4.57	4.25	1.02
1	1.32	7.09	4.80	6.61	4.88	4.57	1.02
1-1/4	1.66	8.19	5.67	7.56	5.51	5.28	1.57
1-1/2	1.90	9.21	6.46	8.74	6.30	6.06	1.57
2	2.38	10.71	7.68	10.47	7.48	7.24	1.57

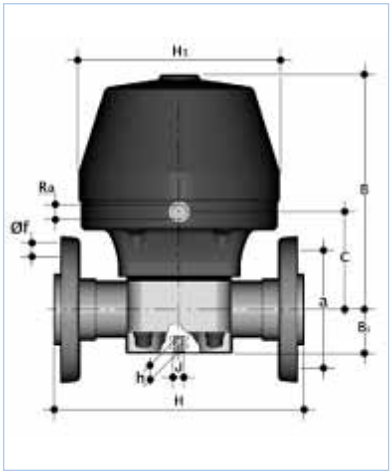
Dimension (inches)									
Size	C	R_a	B	H_1	E	R_1	J	h	I
1/2	2.60	1/4	6.89	4.96	1.61	1	M6	0.47	0.98
3/4	2.60	1/4	6.89	4.96	1.97	1-1/4	M6	0.47	0.98
1	2.60	1/4	6.89	4.96	2.28	1-1/2	M6	0.47	0.98
1-1/4	4.06	1/4	9.61	6.10	2.83	2	M8	0.63	1.75
1-1/2	4.06	1/4	9.61	6.10	3.11	2-1/4	M8	0.63	1.75
2	4.92	1/4	11.50	8.27	3.86	2-3/4	M8	0.63	1.75

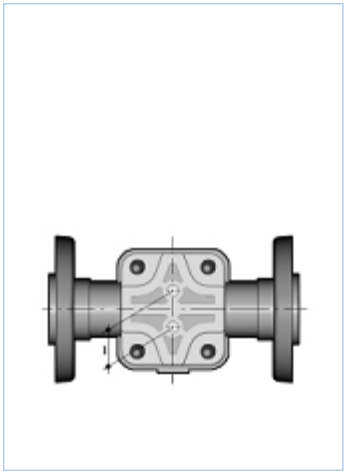
VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

dimensions cont'd

normally closed – ANSI 150 flanged (vanstone) connections

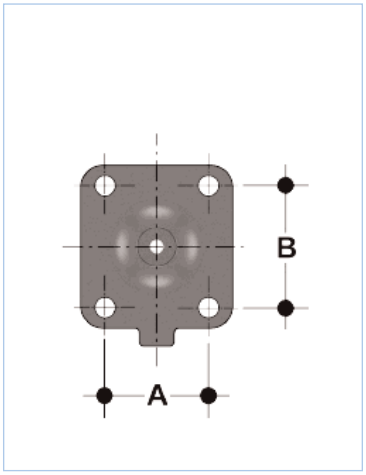




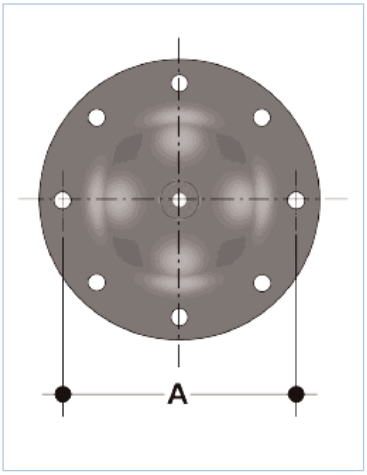
Dimension (inches)							
Size	d	H	B_1	C	R_a	B	H_1
1/2	0.84	5.37	1.02	2.60	1/4	6.89	4.96
3/4	1.05	6.11	1.02	2.60	1/4	6.89	4.96
1	1.32	6.58	1.02	2.60	1/4	6.89	4.96
1-1/4	1.66	7.30	1.57	4.06	1/4	9.61	6.10
1-1/2	1.90	8.02	1.57	4.06	1/4	9.61	6.10
2	2.38	8.88	1.57	4.92	1/4	11.50	8.27
2-1/2	2.88	11.34	2.17	7.36	1/4	12.80	10.16
3	3.50	11.81	2.17	7.36	1/4	12.80	10.16
4	4.50	13.39	2.72	10.55	1/4	13.98	10.16

Dimension (inches)						
Size	# holes	f	F	J	h	l
1/2	4	5/8	2-3/8	M6	0.47	0.98
3/4	4	5/8	2-3/4	M6	0.47	0.98
1	4	5/8	3-1/8	M6	0.47	0.98
1-1/4	4	5/8	3-1/2	M8	0.71	1.75
1-1/2	4	5/8	3-7/8	M8	0.71	1.75
2	4	3/4	4-3/4	M8	0.71	1.75
2-1/2	4	3/4	5-1/2	M12	0.91	3.94
3	4	3/4	6	M12	0.91	3.94
4	4	3/4	7-1/2	M12	0.91	4.72

sizes 1/2" to 3"



size 4"



diaphragm

Dimension (inches)			
Size (inches)	Size (mm)	A	B
1/2	20	1.81	2.13
3/4	25	1.81	2.13
1	32	1.81	2.13
1-1/4	40	2.56	2.76
1-1/2	50	2.56	2.76
2	63	3.07	3.23
2-1/2	75	4.49	5.00
3	90	4.49	5.00
4	110	7.60	-

VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

weights

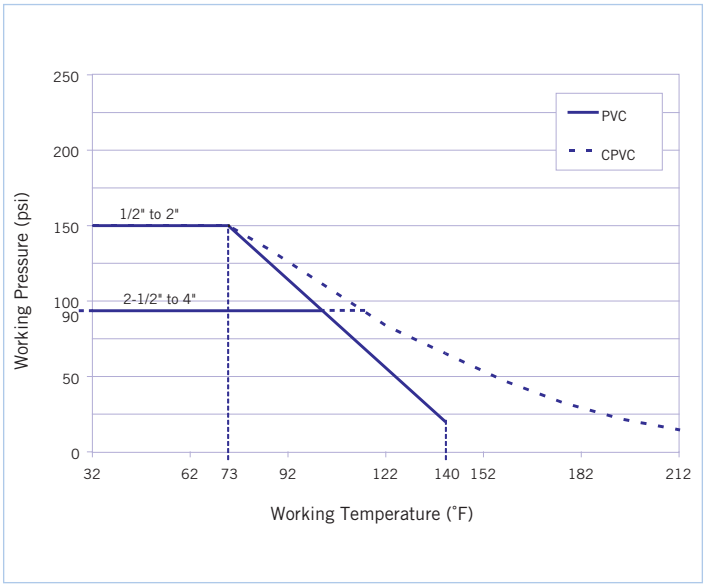
Approximate Weight (lbs) – Normally Open & Air to Air										
Size (inches)	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
1/2	2.87	3.15	3.25	2.91	3.22	3.31	2.65	2.89	3.02	3.65
3/4	2.87	3.15	3.39	2.91	3.30	3.46	2.65	2.98	3.02	3.80
1	2.87	3.15	3.59	2.91	3.37	3.67	2.65	3.04	3.02	3.94
1-1/4	6.17	6.61	7.09	6.31	6.66	7.27	5.51	6.00	6.63	7.46
1-1/2	6.17	6.61	7.39	6.31	6.83	7.59	5.51	6.08	6.63	7.66
2	10.14	11.02	12.16	10.36	11.28	12.48	9.04	10.10	10.83	12.45
2-1/2	27.56	n/a	30.36	28.13	n/a	31.07	25.35	n/a	29.40	n/a
3	28.66	n/a	31.83	29.23	n/a	32.56	26.46	n/a	30.37	n/a
4	48.50	n/a	53.69	49.29	n/a	54.74	45.19	n/a	51.01	n/a

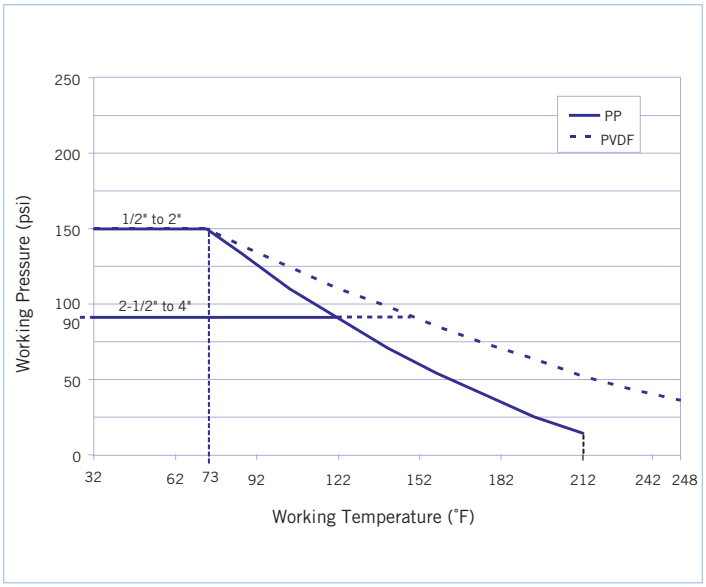
Approximate Weight (lbs) – Normally Closed										
Size (inches)	PVC			CPVC			PP		PVDF	
	Spigot	True Union	Flanged	Spigot	True Union	Flanged	Spigot	True Union	Spigot	True Union
1/2	4.08	4.37	4.46	4.12	4.43	4.52	3.86	4.10	4.24	4.86
3/4	4.08	4.37	4.60	4.12	4.51	4.67	3.86	4.19	4.24	5.02
1	4.08	4.37	4.80	4.12	4.59	4.88	3.86	4.25	4.24	5.15
1-1/4	8.82	9.26	9.74	8.95	9.30	9.92	8.16	8.64	9.28	10.11
1-1/2	8.82	9.26	10.04	8.95	9.48	10.23	8.16	8.73	9.28	10.30
2	15.32	16.20	17.34	15.54	16.46	17.66	14.22	15.28	16.01	17.63
2-1/2	33.07	n/a	35.87	33.64	n/a	36.58	30.86	n/a	34.92	n/a
3	34.17	n/a	37.34	34.74	n/a	38.07	31.97	n/a	35.89	n/a
4	56.22	n/a	61.41	57.01	n/a	62.46	52.91	n/a	58.72	n/a

VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

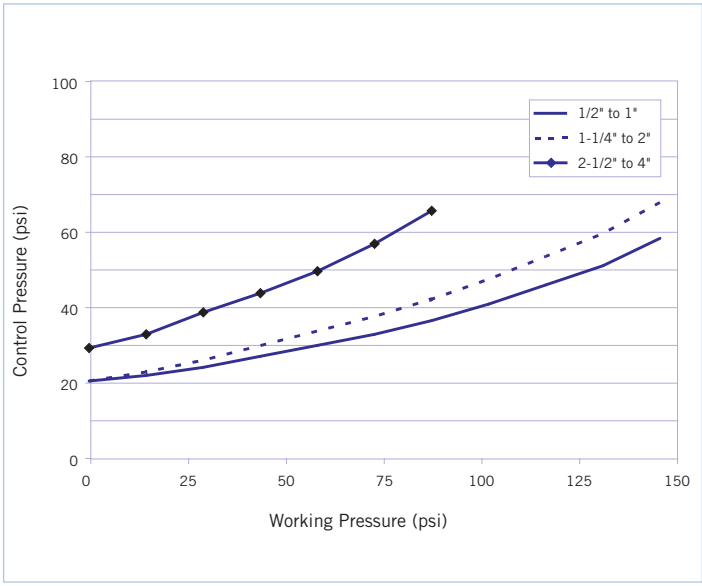
pressure – temperature ratings





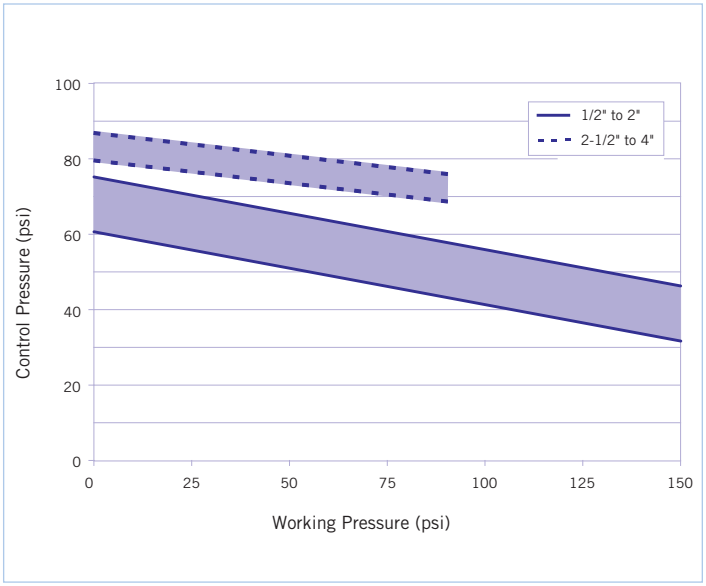
control pressure

normally open & air to air



Notes:
- The maximum working pressure is 150 psi for sizes 1/2" to 2" and 90 psi for sizes 2-1/2" to 4".
- The maximum control pressure allowed for all sizes is 90 psi.
- The control fluid temperature should not exceed 105ºF.
- The fluid capacity of the actuator is 8 in^3 for sizes 1/2" to 1", 17 in^3 for sizes 1-1/4" to 1-1/2", 31 in^3 for size 2", and 134 in^3 for sizes 2-1/2" to 4".

normally closed



Notes:
- The maximum working pressure is 150 psi for sizes 1/2" to 2" and 90 psi for sizes 2-1/2" to 4".
- The maximum control pressure allowed for all sizes is 90 psi.
- The control fluid temperature should not exceed 105ºF.
- The fluid capacity of the actuator is 10 in^3 for sizes 1/2" to 1", 22 in^3 for sizes 1-1/4" to 1-1/2", 70 in^3 for size 2", and 128 in^3 for sizes 2-1/2" to 4".

VM Series Pneumatic Diaphragm Valves

Technical Data (cont'd)

flow coefficients

The flow coefficient (C_V) 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,

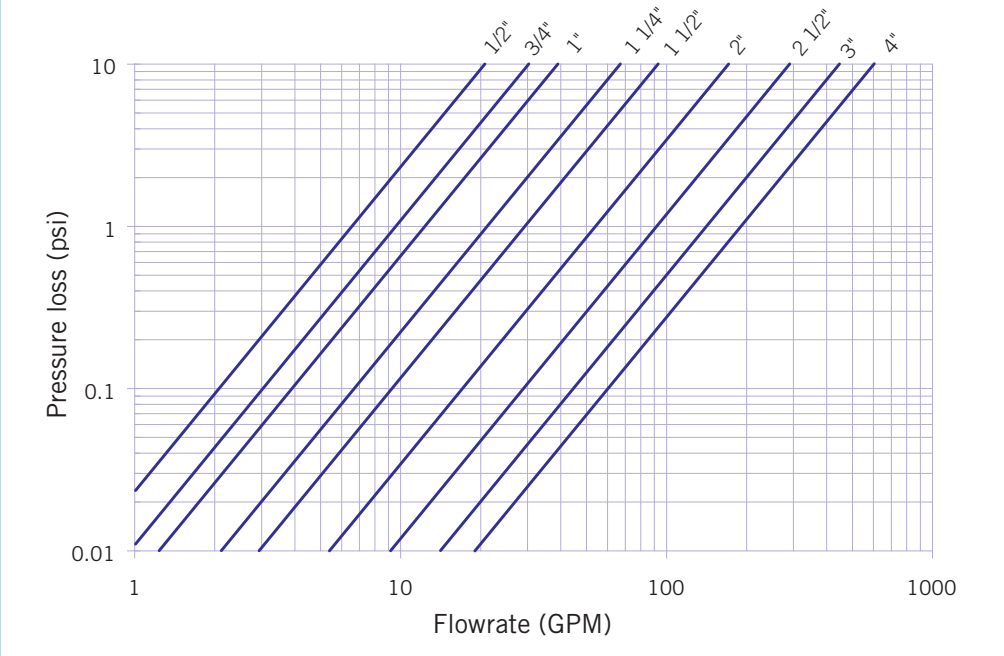
sg is the specific gravity of the fluid,

Q is the flow rate in GPM,

C_V is the flow coefficient.

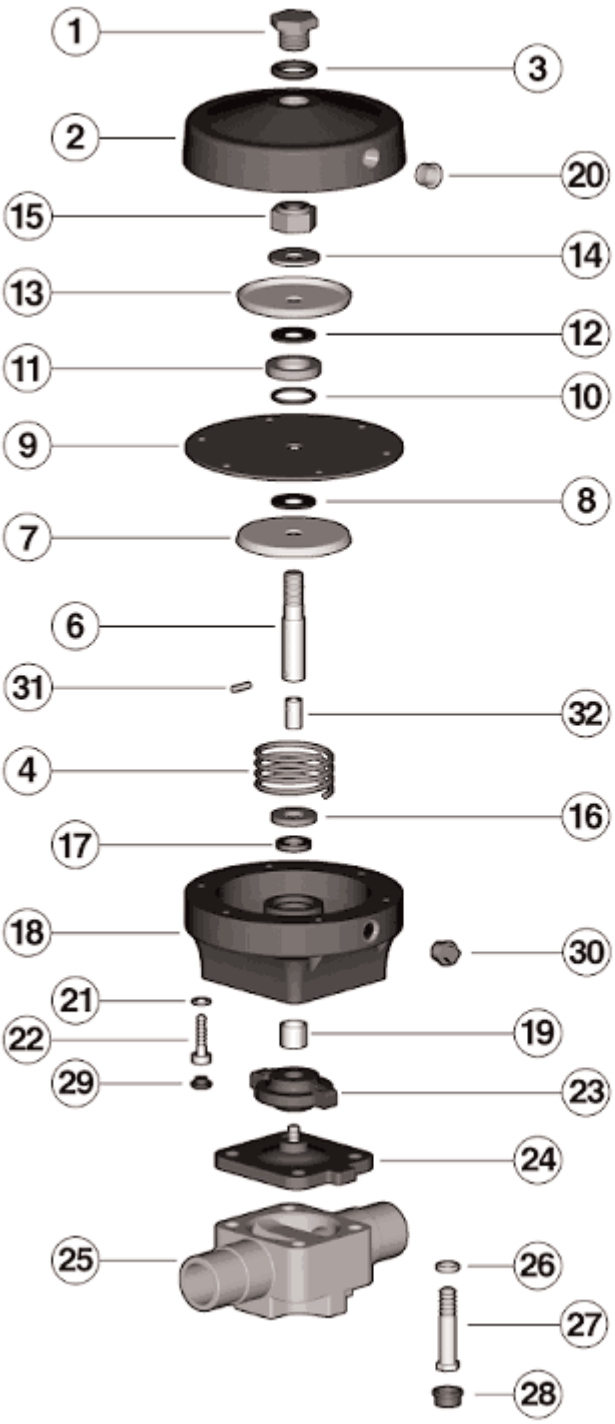
Size (in)	C_V
1/2	6.51
3/4	9.52
1	12.3
1-1/4	21.0
1-1/2	29.1
2	53.6
2-1/2	91.0
3	140
4	189

pressure loss chart



VM Series Pneumatic Diaphragm Valves

Components



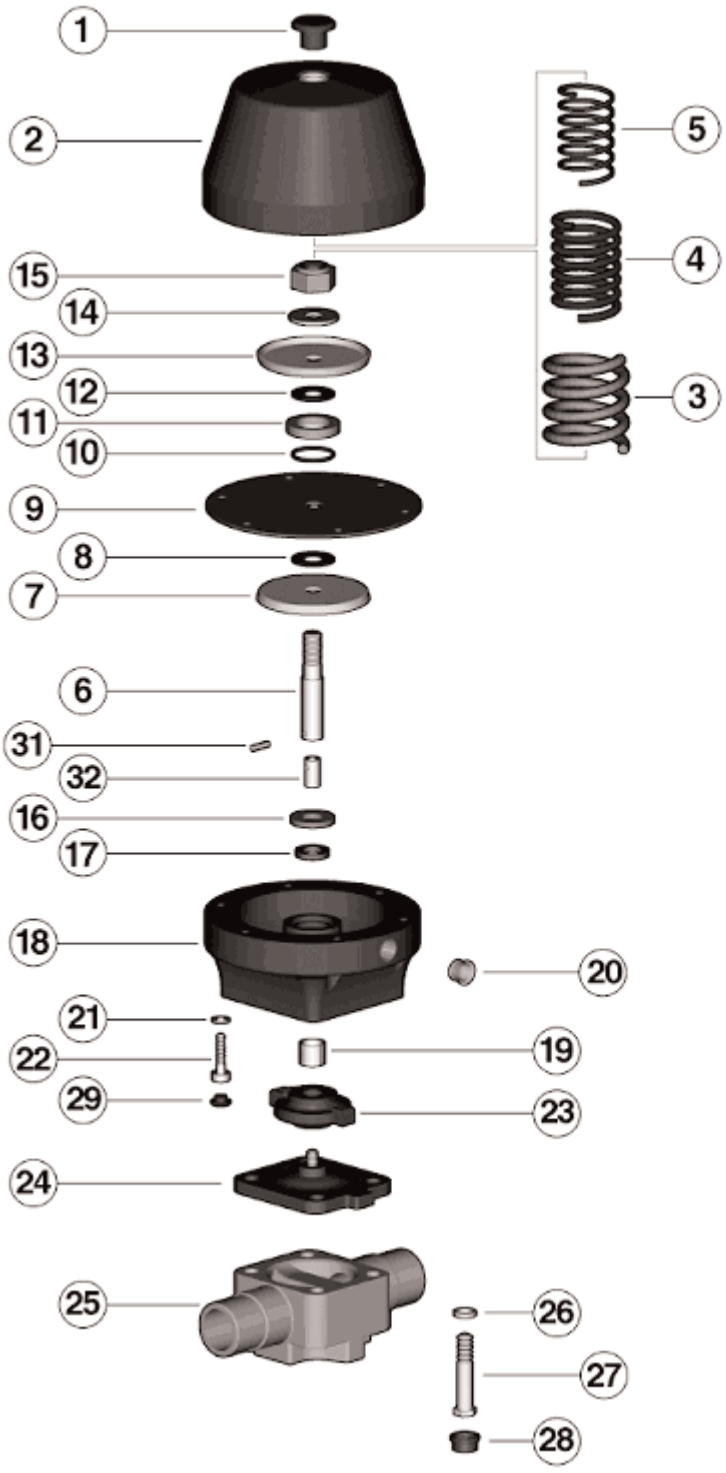
normally open & air to air

#	Component	Material	Qty
1	threaded plug	AL	1
2	actuator – upper part	GRPP	1
3	o-ring	NBR	1
4	spring	carbon steel	1
6	spindle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel[1]	4
27	hex bolt	zinc plated steel[1]	4
28	protective cap	PE	4
29	protective cap	PP	6
30	threaded plug	brass	1
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.
Items 1 through 7 are supplied as an assembly.
Contact IPEX for availability of spare components for True Union and Flanged style valves.
[1] stainless steel for PVDF valves.

VM Series Pneumatic Diaphragm Valves

Components *(cont'd)*



normally closed

#	Component	Material	Qty
1	plug	PP	1
2	actuator – upper part	GRPP	1
3	spring	carbon steel	1
4	spring	carbon steel	1
5	spring	carbon steel	1
6	spingle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel[1]	4
27	hex bolt	zinc plated steel[1]	4
28	protective cap	PE	4
29	protective cap	PP	6
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.
Items 1 through 7 are supplied as an assembly.
Contact IPEX for availability of spare components for True Union and Flanged style valves.
[1] stainless steel for PVDF valves.

VM Series Pneumatic Diaphragm Valves

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
    a. For spigot style, solvent cement each pipe onto the ends of the valve body. **Ensure that excess solvent does not run into the body of the valve.**
    b. For true union style, remove the union nuts and slide them onto the pipe.
        i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, *"Joining Methods - Solvent Cementing"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"*. **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
        ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, *"Joining Methods - Threading"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"*.
        iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
        iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
    c. For flanged style, join both flanges 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"*.
3. Anchoring is strongly recommended due to the weight of the actuator. The valve can be fixed to the supporting structure using the mounting holes on the bottom of the valve body.
4. Connect any accessories then a suitable air supply and pilot system to the actuator. **Be sure to check that both the working and control pressure are in accordance with the specifications.**

disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch. Depressurize and disconnect the pneumatic control line before continuing with disassembly.**
2. Detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (25).
3. Please refer to the appropriate connection style sub-section:
   a. For spigot style, cut the pipe on either side of the valve and remove from the line.
   b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
   c. For flanged style, loosen each bolt holding the valve to 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.
4. Remove the protective caps (28), then loosen and remove the bolts (27) and washers (26) from the bottom of the valve body.
5. The valve components can now be checked for problems and/or replaced.

Note: For safety reasons, it is not recommended to attempt to disassemble the actuator. However if necessary, proceed as follows:

6. Using a spring release (or press) to maintain pressure on the internal springs, remove the protective caps (29) then carefully loosen and remove the bolts (22) and washers (21).
7. Back off the pressure on the spring release (or press) to separate the upper (2) and lower (18) parts of the actuator and remove the springs (4 for Normally Open, 3-5 for Normally Closed).
8. Loosen and remove the locknut (15) to disassemble the diaphragm control components (7 through 14).
9. Remove the spindle (6, 31, and 32) - compressor (23) - diaphragm (24) assembly, taking care not to damage the quad-ring (17).
10. Loosen and remove both the diaphragm and compressor.

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. Assemble the compressor (23) with the diaphragm (24) and thread onto the spindle (6, 31, and 32).
2. Insert the spindle into the lower part (18) of the actuator, ensuring proper placement of the quad-ring (17).
3. For Normally Open actuators, reposition the spring (4) in the lower part of the actuator.
4. Properly assemble the diaphragm control components (7-14) on the spindle and fasten in place using the locknut (15).
5. Carefully line up the holes of the control diaphragm (9) with the proper holes of the lower part of the actuator.
6. For Normally Closed actuators, reposition the springs (3-5) on the press-diaphragm plate (13).
7. Properly position the upper part (2) of the actuator on the lower portion, then clamp in place using a spring release tool or press. Insert and tighten all bolts (22) and washers (21) then replace all protective caps (29).
8. Sufficiently tighten the diaphragm (24) then back off slightly until the bolt holes line up.
9. Position the assembled actuator on the valve body (25) while ensuring that the sealing surfaces properly line up. Insert and tighten all bolts (27) and washers (26) then replace all protective caps (28).

VM Series Pneumatic 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.
- **An unnecessarily high control pressure may shorten the life of the actuator. Pressure reducers are recommended.**
- **Slow cycle times will contribute to a longer actuator life.**

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

VM Series Pneumatic Diaphragm Valves

About IPEX

IPEX is a leading supplier of thermoplastic piping systems. We provide our customers with one of the world's largest and most comprehensive product lines. All IPEX products are backed by over 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, the IPEX name is synonymous with quality and performance.

Our products and systems have been designed for a broad range of customers and markets. Contact us for information on:

- PVC, CPVC, PP, FR-PVDF, ABS, PEX and PE pipe and fittings (¼" to 48")
- Industrial process piping systems
- Double containment systems
- Acid waste systems
- High purity systems
- Industrial, plumbing and electrical cements
- Municipal pressure and gravity piping systems
- Plumbing and mechanical pipe systems
- Electrical systems
- Telecommunications systems
- Irrigation systems
- PE Electrofusion systems for gas and water
- Radiant heating systems

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