

Industrial Product Guide

define
design
deliver

D – HOLE DIA
E – NO. OF HOLES
F – BOLT CIRCLE

WELCOME TO HAYWARD FLOW CONTROL

Hayward® Flow Control, a division of Hayward Industries, Inc., and based in Clemmons, NC, USA, has been a leading manufacturer of industrial thermoplastic valves and process control products for more than 60 years. In fact, Hayward was one of the originators of the first thermoplastic ball valves. Since then, we have remained committed to producing the highest quality products while providing outstanding service that exceeds customer expectations. Hayward has earned an unsurpassed reputation for product design, manufacturing precision, quality assurance, experience and know-how, and a total commitment to customer satisfaction and support. We serve a multitude of markets and industries worldwide with our products.

Founded in 1923 by Irving M. Hayward, Hayward Industries was a small company located in Brooklyn, NY, making specialty metal valves and industrial flow control products. When Mr. Hayward retired in 1964, new management acquired the company and a new period of growth and diversification began, one that continues to this day. Management realized an opportunity existed for thermoplastic, rather than metal, swimming pool filters and accessories, and diversified into the swimming pool market. Rapid growth in the pool business resulted in the creation of Hayward Pool Products, Inc. At the same time, through a combination of acquisitions, modernization of the manufacturing facilities and product innovations, the industrial thermoplastic flow control business grew as well—and became Hayward Flow Control.

RELIABLE BY DESIGN

Reliable by design, Hayward valves are designed using the latest state-of-the-art equipment. Our Computer Aided Design (CAD) system, linked to finite element software, provides accurate and essential stress analysis. Hayward valves are designed to be strong, with material where it counts allowing years of service. Hayward Flow Control products are backed up by our industry leading Two-Year Warranty.

WORLD CLASS QUALITY

As an ISO 9001:2008 certified company, Hayward Flow Control adheres to the strictest guidelines relative to component manufacture, assembly and testing. We employ the latest manufacturing technologies and continue to invest in new equipment and tooling. Our reputation for quality and reliability is unmatched. In addition to a tradition of quality and expertise, Hayward's highly qualified field sales organization also provides customer assistance, training and field support. We strive to provide our customers with products specific to their application criteria.

COMMITMENT TO THE FUTURE

Hayward remains dedicated to new product development and innovative process technology that produces high quality, reliable products and ultimately, total customer satisfaction. We will continue to advance fluid process technology as the leading American manufacturer of industrial thermoplastic flow control products.



BACKED BY HAYWARD FLOW
CONTROL'S EXCLUSIVE
TWO YEAR WARRANTY



THE BENEFITS OF HAYWARD THERMOPLASTIC FLOW CONTROL PRODUCTS:

Since the introduction of PVC in the U.S. during the 1940s, thermoplastic valves, pipes and fittings have gained broad acceptance. Thermoplastic valves, pipes and fittings are often the material of choice for systems that were traditionally designed in metal. Unlike metal, thermoplastic valves and piping components have a high resistance to corrosion, will not scale or rust and will not contaminate sensitive fluids.

Hayward manufactures products from compounds of PVC, CPVC, natural PP, Glass Filled PP (GFPP), PVDF, Eastar® and Polyetherimide. These materials are nonconductors and, as such, are immune to electrolytic and galvanic corrosion. Equally important, they contain nothing to leach out and contaminate sensitive fluids. Benefits of Hayward thermoplastic valves and flow control products include:

NONTOXIC

Hayward PVC and CPVC products are suitable for use with potable water and are consistent with National Sanitation Foundation (NSF). Where applicable, Hayward products are made to ASTM and ANSI standards. See specific products in this catalog for NSF / ANSI 61 and 372 compliance.

CORROSION RESISTANCE

Hayward thermoplastic flow control products are resistant to corrosion in applications where metal valves may corrode. They are dielectric, meaning they will not support a charge, and will remain free from the ionization and corrosion that may occur with metal valves.

EXTENDED SERVICE LIFE

Hayward thermoplastic valves will outlast most metal valves and are not affected by normal weather conditions. They will provide years of maintenance-free service.

LOW THERMAL CONDUCTIVITY

Hayward thermoplastic products have much less thermal conductivity than metal valves so that heat gain or loss is greatly reduced. Pipe insulation is rarely required for thermoplastic piping systems.

IMPROVED FLOW RATES

Hayward thermoplastic valves have a high flow coefficient and, as compared to metal, will not pit, rust or corrode. Their interior walls are molded with an ultra-smooth finish that will remain smooth throughout the valve's service life—resulting in a more consistent flow rate over time.

HIGH TEMPERATURE SERVICE

Hayward flow control products are capable of handling corrosive chemicals at elevated temperatures—up to 240°F with Glass Filled PP (GFPP).

EASY INSTALLATION

Hayward thermoplastic flow control products are generally 1/3 to 1/2 the weight of similar size and type metal valves. They are simple to install and result in reduced handling, labor and installation costs.

ECONOMICS

When evaluating the economics of Hayward thermoplastic flow control products over metal equals, consider not only the initial cost savings, but the reduced freight, lower installation and maintenance costs and the extended service life of the valves. Hayward thermoplastic flow controls are a cost effective alternative to metal products.

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Disclaimer: Products and Dimensional data are subject to change without notice. Consult factory for possible updates.



Certified to
NSF/ANSI 61 & 372

Actuator
Ready

TBH Series True Union Ball Valves

1/4" TO 2" / DN8 TO DN50 PVC AND CPVC

KEY FEATURES & BENEFITS

- System2™ Sealing Technology provides longer cycle life
- 250 PSI / 16 Bar, non-shock at 70°F / 23°C full pressure rating
- Consistent operating torque with adjustment-free design
- Lockout/Tagout mechanism that secures directly to valve body for enhanced safety
- Ergonomic handle for improved grip and comfort
- ISO mounting flange simplifies actuation
- Permanent markings, eliminates labels
- Integral footpad for skid or panel mount
- FPM or EPDM seals
- Double O-Ring stem seals
- Reversible PTFE seats – Standard
- Easy replacement for existing Hayward TB Series
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

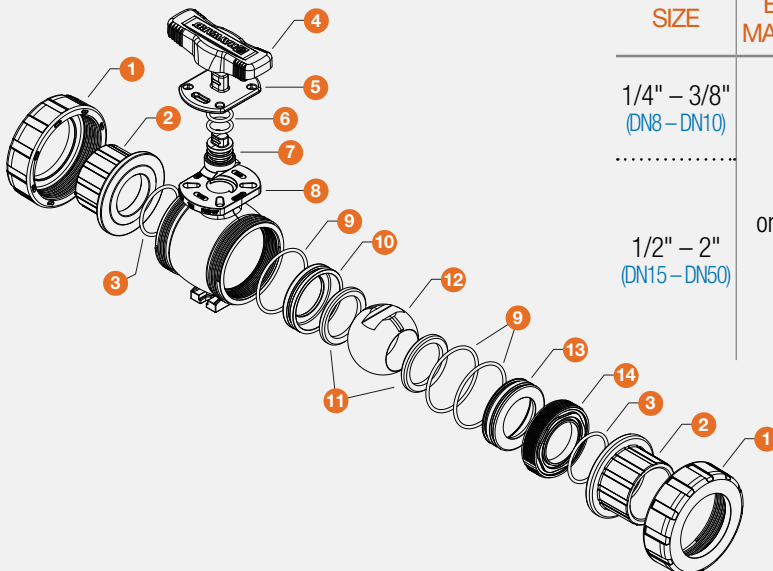
- Pneumatic or Electric Actuators
- Stem Extensions
- Manual Limit Switch
- Coupling for Actuator

MATERIALS

- PVC per ASTM D1784 Cell Class 12454
- CPVC per ASTM D1784 Cell Class 23447
- GFPP per ASTM D4101 Cell Class 85580 (Handle & Lock Plate)

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	BODY MATERIAL	SEALS	END CONNECTION	PRESSURE RATING
1/4" – 3/8" (DN8 – DN10)	PVC or CPVC	FPM or EPDM	Socket or Threaded	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
1/2" – 2" (DN15 – DN50)			Socket or Threaded	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
			Flanged	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN / EN PN10.

"Patent Pending"

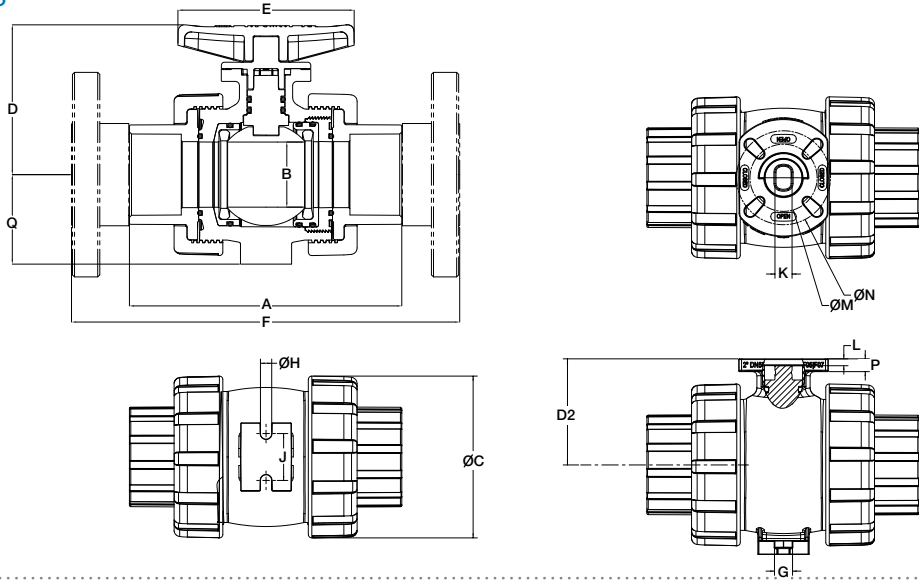
TBH Series True Union Ball Valves

1/4" TO 2" / DN8 TO DN50 PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST / 2D DRAWINGS

1. Nut (2)
2. End Connector (2)
3. End Connector O-Ring (2)
4. Handle
5. Lock Plate
6. Stem O-Rings (2)
7. Stem
8. Body
9. Seat Carrier O-Ring (3)
10. Closed End Seat Carrier
11. Seats (2)
12. Ball
13. Open End Seat Carrier
14. Seat Retainer



DIMENSIONS – INCHES / MILLIMETERS

SIZE	A	B	C	D1	D2	E	F	G	H	J	K	L	M	N	P	Q
inches / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
1/4 / 8	4.63 / 118	0.53 / 13	2.25 / 57	2.82 / 72	1.75 / 44	3.50 / 89	N/A	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.37 / 35
3/8 / 10	4.63 / 118	0.53 / 13	2.25 / 57	2.82 / 72	1.75 / 44	3.50 / 89	N/A	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.37 / 35
1/2 / 15	4.65 / 118	0.53 / 13	2.25 / 57	2.82 / 72	1.75 / 44	3.50 / 89	6.65 / 169	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.37 / 35
3/4 / 20	4.79 / 122	0.72 / 18	2.62 / 67	2.98 / 76	1.91 / 49	3.50 / 89	7.17 / 182	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.56 / 40
1 / 25	5.34 / 136	0.94 / 24	3.00 / 76	3.25 / 83	2.18 / 55	4.00 / 102	8.05 / 204	0.45 / 11	0.27 / 7	1.00 / 25	0.50 / 13	0.20 / 5	1.97 / 50	N/A	0.29 / 7	1.75 / 44
1-1/4 / 32	6.83 / 173	1.48 / 38	4.00 / 102	3.89 / 99	2.60 / 66	5.17 / 131	9.61 / 244	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.25 / 57
1-1/2 / 40	7.39 / 188	1.48 / 38	4.00 / 102	3.89 / 99	2.60 / 66	5.17 / 131	10.65 / 271	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.25 / 57
2 / 50	7.99 / 203	1.91 / 49	4.75 / 121	4.40 / 112	3.11 / 79	5.17 / 131	11.51 / 292	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.63 / 67

* 1-1/4" and 1-1/2" are 0.56" (14mm) longer than TB Series.

** Dimensions are subject to change without notice - consult factory for installation information.

WEIGHT – LBS / KG

SIZE	Weight with Socket/Threaded Ends	Weight with Flanged Ends	Weight Bare Stem with Socket/Threaded Ends	Weight Bare Stem with Flanged Ends
inches / DN	lbs / kg	lbs / kg	lbs / kg	lbs / kg
1/2 / 15	0.70 / 0.32	1.12 / 0.51	0.59 / 0.27	1.01 / 0.46
3/4 / 20	0.90 / 0.41	1.50 / 0.68	0.79 / 0.36	1.39 / 0.63
1 / 25	1.18 / 0.54	1.98 / 0.90	1.05 / 0.48	1.85 / 0.84
1-1/4 / 32	2.57 / 1.17	3.51 / 1.59	2.32 / 1.05	3.26 / 1.48
1-1/2 / 40	2.62 / 1.19	3.82 / 1.73	2.37 / 1.08	3.57 / 1.62
2 / 50	3.87 / 1.76	6.37 / 2.89	3.62 / 1.64	6.12 / 2.78

CV VALUES

SIZE	Cv VALUES
in / DN	
1/4 / 8	1.0
3/8 / 10	2.8
1/2 / 15	8.0
3/4 / 20	16.0
1 / 25	29.0
1-1/4 / 32	75.0
1-1/2 / 40	90.0
2 / 50	150.0

PRESSURE LOSS
CALCULATION FORMULA

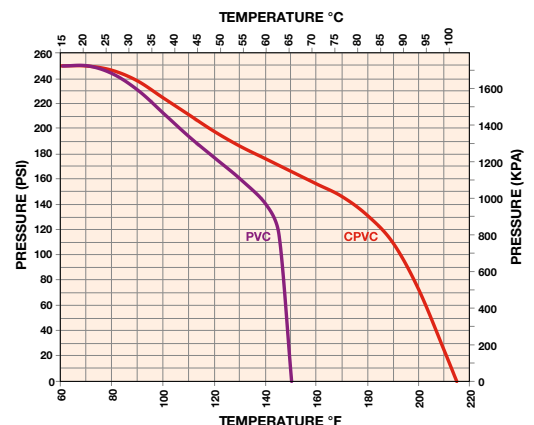
$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

PRESSURE / TEMPERATURE CHART*



* Flanged valves rated to 150 PSI at 70°F non-shock



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Visit us at: haywardflowcontrol.com



TB Series True Union Ball Valves

1/4" TO 3/8" PVC AND
1/2" TO 2" PVC, CPVC AND GFPP

KEY FEATURES

- Available in PVC, CPVC and GFPP
- Full Port Design
- Reversible PTFE Seats
- Double O-Ring Stem Seals
- Easily Actuated
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

- Lockouts Available
- 2" Square Operating Nut
- Stem Extensions
- Pneumatic and Electric Actuators
- Spring Return Handle

MATERIALS

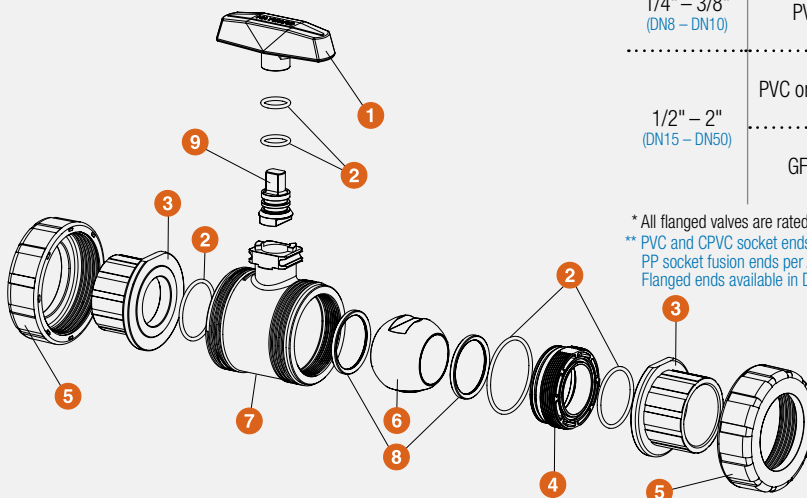
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- FPM and EPDM O-Ring Seals



Certified to
NSF/ANSI 61 & 372
PVC and CPVC

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 3/8" (DN8 – DN10)	PVC	Socket and Threaded		250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded or Flanged*	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
	GFPP	Threaded, Socket Fusion or Flanged		

* All flanged valves are rated to 150 PSI @ 70°F Non-Shock (10 Bar @ 21°C)
** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN / EN PN10.

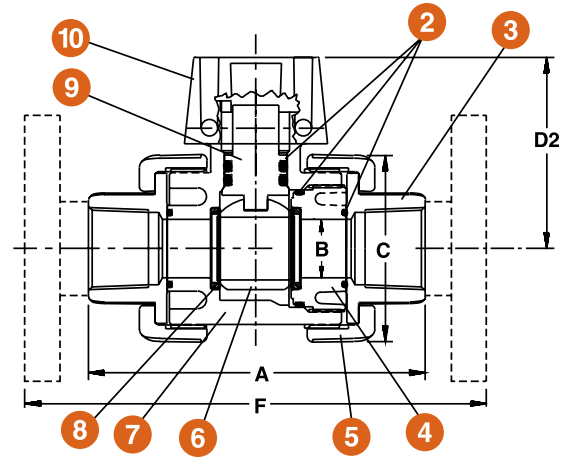
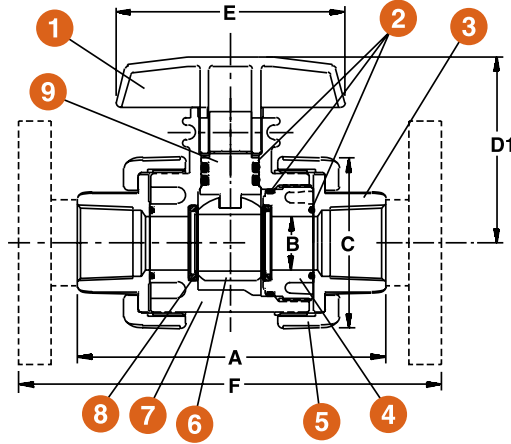
TB Series True Union Ball Valves

1/4" TO 2" PVC, CPVC AND GFPP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Handle
 2. O-Ring Seals
 3. End Connector
 4. Seal Retainer
 5. Union Nut
 6. Ball
 7. Body
 8. PTFE Seat
 9. Stem
 10. Actuator Mounting Pad
- * Mounting bracket sold separately



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D1 in / mm	D2 in / mm	E in / mm	F in / mm	WEIGHT lbs / kg	
								SOC / THD	FLANGED
1/4 / 8	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	2.63 / 67	3.50 / 89	N/A	.75 / .34	N/A
3/8 / 10	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	2.63 / 67	3.50 / 89	N/A	.75 / .34	N/A
1/2 / 15*	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	2.63 / 67	3.50 / 89	6.75 / 171	.75 / .34	1.00 / .45
3/4 / 20*	4.85 / 123	.75 / 19	2.63 / 67	3.02 / 77	2.81 / 71	3.50 / 89	7.13 / 181	.75 / .34	1.00 / .45
1 / 25*	5.44 / 138	.93 / 24	3.00 / 76	3.26 / 83	3.05 / 77	4.00 / 102	8.09 / 205	1.15 / .52	2.15 / .98
1-1/4 / 32*	6.30 / 160	1.50 / 38	4.00 / 102	3.92 / 100	3.48 / 88	5.00 / 127	9.19 / 233	2.15 / .98	3.50 / 1.59
1-1/2 / 40*	6.85 / 174	1.50 / 38	4.00 / 102	3.92 / 100	3.48 / 88	5.00 / 127	9.88 / 251	2.15 / .98	3.75 / 1.70
2 / 50*	8.00 / 203	1.94 / 49	4.75 / 121	4.43 / 113	4.00 / 102	5.00 / 127	11.4 / 290	3.80 / 1.72	6.30 / 2.86

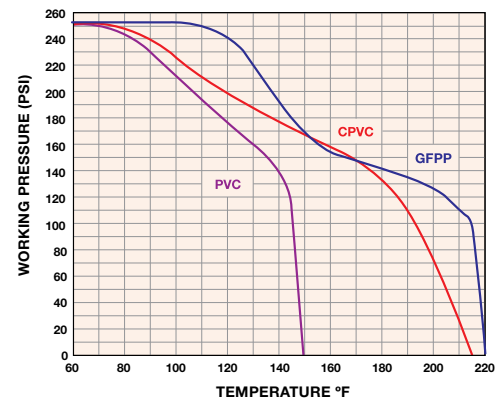
Dimensions are subject to change without notice – consult factory for installation information

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES	PRESSURE LOSS CALCULATION FORMULA
1/4 / 8	1.0	1 / 25	29.0	
3/8 / 10	2.8	1-1/4 / 32	75.0	
1/2 / 15	8.0	1-1/2 / 40	90.0	
3/4 / 20	16.0	2 / 50	150.0	

OPERATING TEMPERATURE/PRESSURE



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Visit us at: haywardflowcontrol.com



Certified to
NSF/ANSI 61 & 372
2-1/2" – 4"

TB Series True Union Ball Valves

2-1/2" TO 6" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Full Port Design Through 4"
- Reversible PTFE Seats
- Double O-Ring Stem Seals
- Easily Actuated
- NSF / ANSI 61 and NSF / ANSI 372 Listed*
- Actuator-Ready Design

OPTIONS

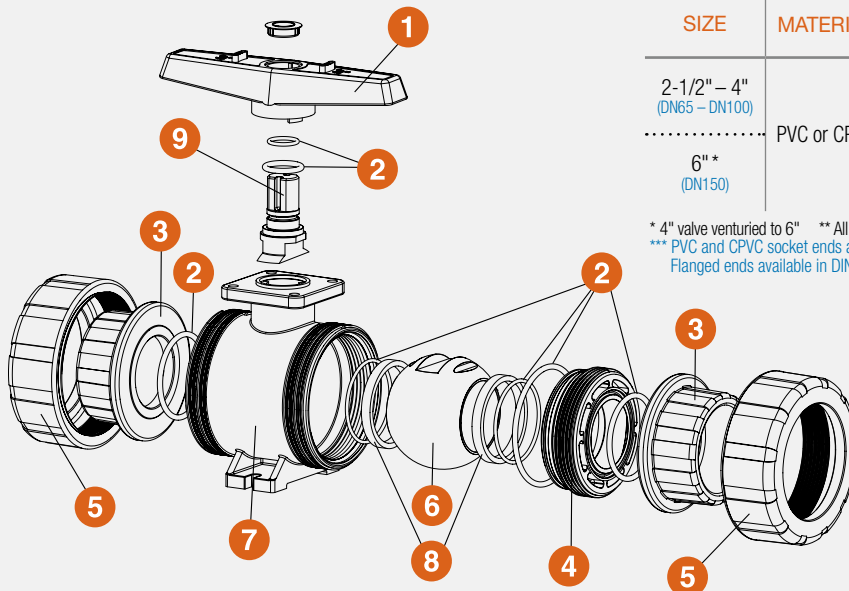
- Pneumatic and Electric Actuators
- Lockouts Available
- Gear Operator
- 2" Square Operating Nuts
- Stem Extensions
- Spring Return Handle

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
2-1/2" – 4" (DN65 – DN100)	PVC or CPVC	Socket, Threaded or Flanged**	FPM or EPDM	235 PSI @ 70°F 16 Bar @ 21°C Non-Shock
6"* (DN150)		Flanged		150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* 4" valve venturied to 6" ** All flanged valves are rated to 150 PSI @ 70°F Non-Shock (10 Bar @ 21°C)
*** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
Flanged ends available in DIN / EN PN10.

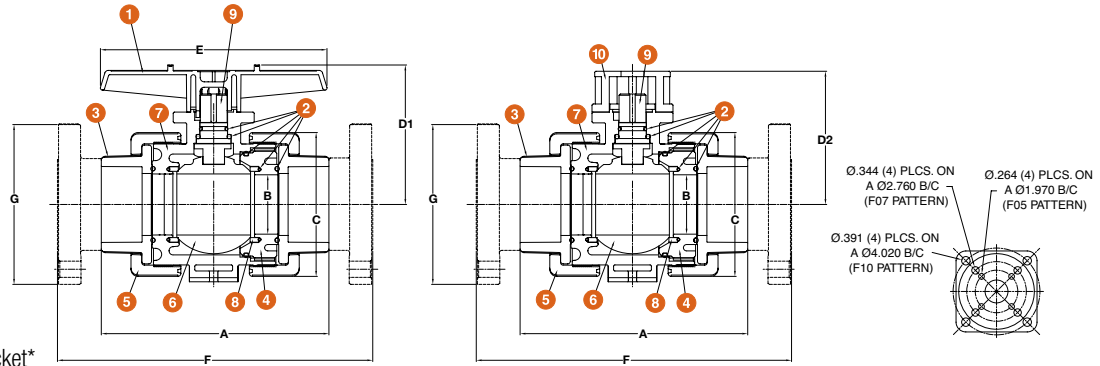
TB Series True Union Ball Valves

2-1/2" TO 6" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Handle
2. O-Ring Seals
3. End Connector
4. Seal Retainer
5. Union Nut
6. Ball
7. Body
8. PTFE Seat
9. Stem
10. Actuator Mounting Bracket*



* Mounting bracket sold separately

DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D1 in / mm	D2 in / mm	E in / mm	F in / mm	G in / mm	WEIGHT lbs / kg	
									SOC / THD	FLANGED
2-1/2 / 65	10.68 / 271	2.75 / 70	6.66 / 169	6.46 / 164	6.17 / 157	10.50 / 267	14.65 / 372	7.00 / 178	11.30 / 5.13	15.30 / 6.94
3 / 80*	10.56 / 268	2.75 / 70	6.66 / 169	6.46 / 164	6.17 / 157	10.50 / 267	14.60 / 371	7.90 / 200	11.30 / 5.13	15.30 / 6.94
4 / 100*	12.30 / 312	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 168	10.50 / 267	17.26 / 438	8.96 / 228	18.50 / 8.39	25.70 / 11.66
6 / 150*	N/A	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 168	10.50 / 267	19.26 / 489	11.00 / 279	N/A	30.75 / 13.95

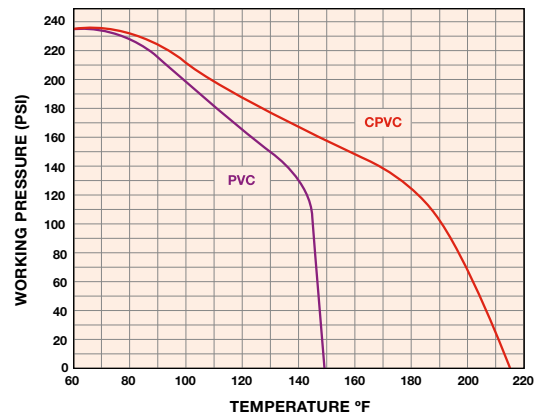
Dimensions are subject to change without notice – consult factory for installation information

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
2-1/2 / 65	340.0	4 / 100	600.0
3 / 80	490.0	6 / 150	550.0

OPERATING TEMPERATURE/PRESSURE



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Actuator Ready



Certified to NSF/ANSI 61 & 372

TBH Series with “Z-Ball” True Union Ball Valves

1/2" TO 2" / DN15 TO DN50 PVC AND CPVC

KEY FEATURES & BENEFITS

- Drilled Ball for Sodium Hypochlorite applications
- 250 PSI / 16 Bar, non-shock at 70°F / 23°C full pressure rating
- Consistent operating torque with adjustment-free design
- Lockout/Tagout mechanism that secures directly to valve body for enhanced safety
- Ergonomic black identifiable handle for improved grip and comfort
- ISO mounting flange simplifies actuation
- Permanent markings, eliminates labels
- Integral footpad for skid or panel mount
- FPM seals
- Double O-Ring stem seals
- Reversible PTFE seats – Standard
- Easy replacement for existing Hayward TB-Z Series
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

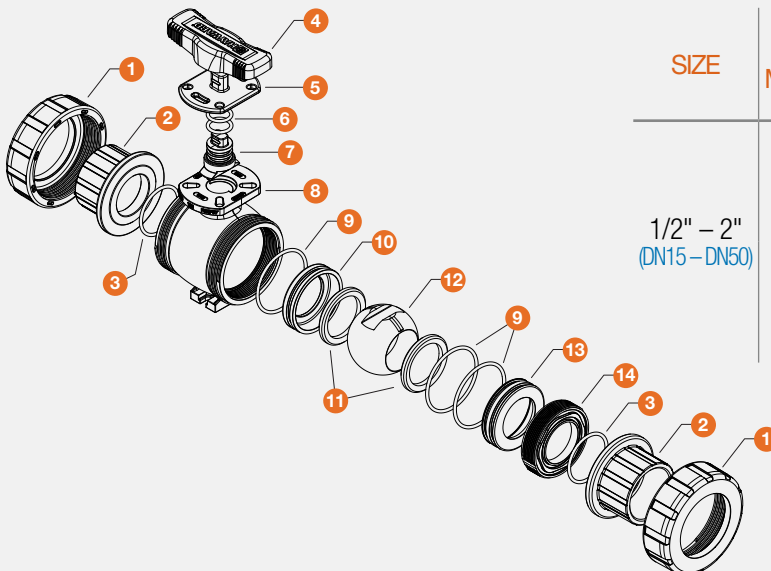
- Pneumatic or Electric Actuators
- Stem Extensions
- Manual Limit Switch
- Coupling for Actuator

MATERIALS

- PVC per ASTM D1784 Cell Class 12454
- CPVC per ASTM D1784 Cell Class 23447
- GFPP per ASTM D4101 Cell Class 85580 (Handle & Lock Plate)

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	BODY MATERIAL	SEALS	END CONNECTION	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	FPM	Socket or Threaded	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
			Flanged	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN / EN PN10.

"Patent Pending"

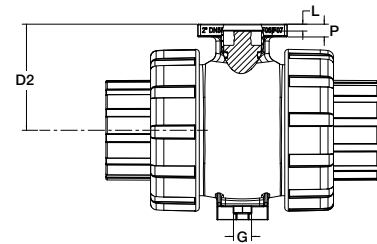
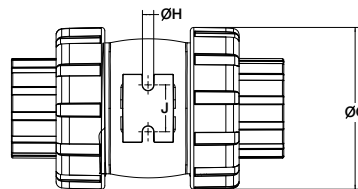
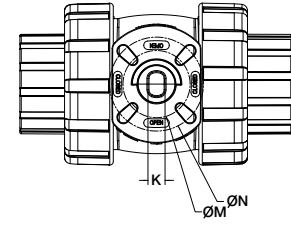
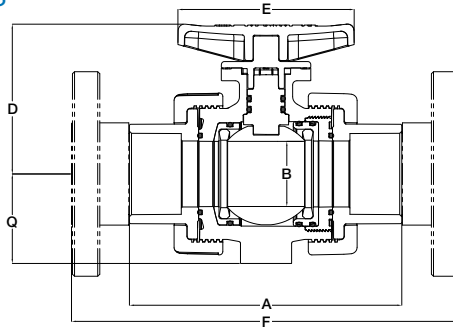
TBH Series with "Z-Ball" True Union Ball Valves

1/2 TO 2" / DN15 TO DN50 PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST / 2D DRAWINGS

1. Nut (2)
2. End Connector (2)
3. End Connector O-Ring (2)
4. Handle
5. Lock Plate
6. Stem O-Rings (2)
7. Stem
8. Body
9. Seat Carrier O-Ring (3)
10. Closed End Seat Carrier
11. Seats (2)
12. Ball (drilled)
13. Open End Seat Carrier
14. Seat Retainer



DIMENSIONS – INCHES / MILLIMETERS

SIZE	A	B	C	D1	D2	E	F	G	H	J	K	L	M	N	P	Q
inches / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
1/2 / 15	4.65 / 118	0.53 / 13	2.25 / 57	2.82 / 72	1.75 / 44	3.50 / 89	6.65 / 169	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.37 / 35
3/4 / 20	4.79 / 122	0.72 / 18	2.62 / 67	2.98 / 76	1.91 / 49	3.50 / 89	7.17 / 182	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.56 / 40
1 / 25	5.34 / 136	0.94 / 24	3.00 / 76	3.25 / 83	2.18 / 55	4.00 / 102	8.05 / 204	0.45 / 11	0.27 / 7	1.00 / 25	0.50 / 13	0.20 / 5	1.97 / 50	N/A	0.29 / 7	1.75 / 44
1-1/4 / 32	6.83 / 173	1.48 / 38	4.00 / 102	3.89 / 99	2.60 / 66	5.17 / 131	9.61 / 244	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.25 / 57
1-1/2 / 40	7.39 / 188	1.48 / 38	4.00 / 102	3.89 / 99	2.60 / 66	5.17 / 131	10.65 / 271	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.25 / 57
2 / 50	7.99 / 203	1.91 / 49	4.75 / 121	4.40 / 112	3.11 / 79	5.17 / 131	11.51 / 292	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.63 / 67

* 1-1/4" and 1-1/2" are 0.56" (14mm) longer than TB Series.

** Dimensions are subject to change without notice - consult factory for installation information.

WEIGHT – LBS / KG

SIZE	Weight with Socket/Threaded Ends	Weight with Flanged Ends	Weight Bare Stem with Socket/Threaded Ends	Weight Bare Stem with Flanged Ends
inches / DN	lbs / kg	lbs / kg	lbs / kg	lbs / kg
1/2 / 15	0.70 / 0.32	1.12 / 0.51	0.59 / 0.27	1.01 / 0.46
3/4 / 20	0.90 / 0.41	1.50 / 0.68	0.79 / 0.36	1.39 / 0.63
1 / 25	1.18 / 0.54	1.98 / 0.90	1.05 / 0.48	1.85 / 0.84
1-1/4 / 32	2.57 / 1.17	3.51 / 1.59	2.32 / 1.05	3.26 / 1.48
1-1/2 / 40	2.62 / 1.19	3.82 / 1.73	2.37 / 1.08	3.57 / 1.62
2 / 50	3.87 / 1.76	6.37 / 2.89	3.62 / 1.64	6.12 / 2.78

CV VALUES

SIZE	Cv VALUES
in / DN	
1/2 / 15	8.0
3/4 / 20	16.0
1 / 25	29.0
1-1/4 / 32	75.0
1-1/2 / 40	90.0
2 / 50	150.0

PRESSURE LOSS CALCULATION FORMULA

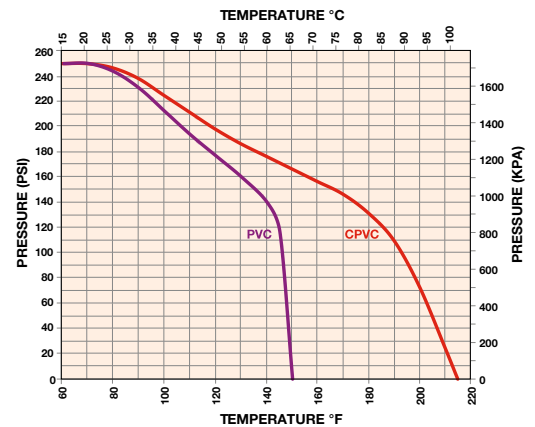
$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

PRESSURE / TEMPERATURE CHART*



* Flanged valves rated to 150 PSI at 70°F non-shock



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TBZ Series with “Z-Ball” True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Full Port Design
- Reversible PTFE Seats
- Double O-Ring Stem Seals
- For Sodium Hypochlorite Applications
- Adjustable Seat Retainer

OPTIONS

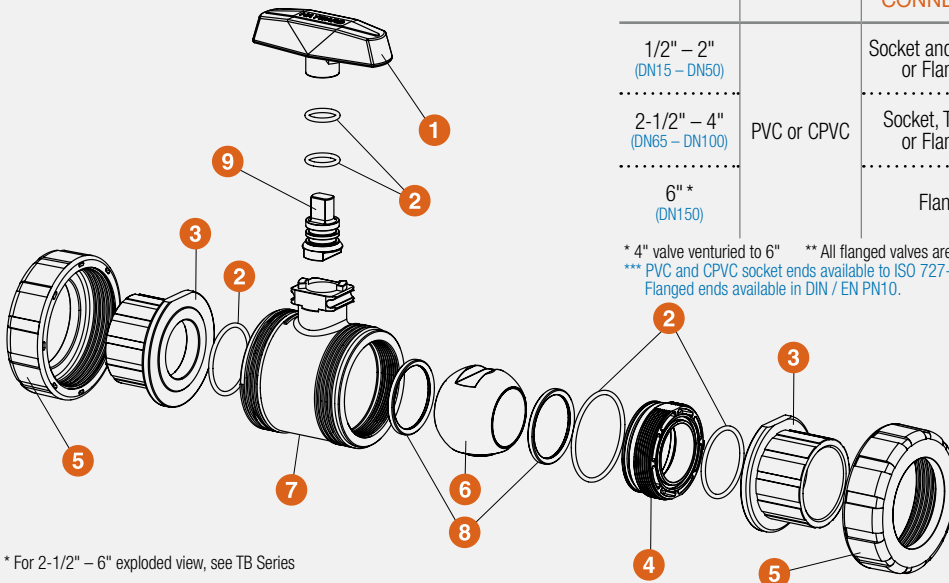
- Lockouts Available
- Stem Extensions
- Spring Return Handle
- Pneumatic and Electric Actuators
- 2" Square Operating Nut

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW*



* For 2-1/2" – 6" exploded view, see TB Series

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded or Flanged**	FPM	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
2-1/2" – 4" (DN65 – DN100)		Socket, Threaded or Flanged**		235 PSI @ 70°F 16 Bar @ 21°C Non-Shock
6"* (DN150)		Flanged		150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* 4" valve venturied to 6" ** All flanged valves are rated to 150 PSI @ 70°F Non-Shock (10 Bar @ 21°C)
 *** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
 Flanged ends available in DIN / EN PN10.

TBZ Series with "Z-Ball" True Union Ball Valves

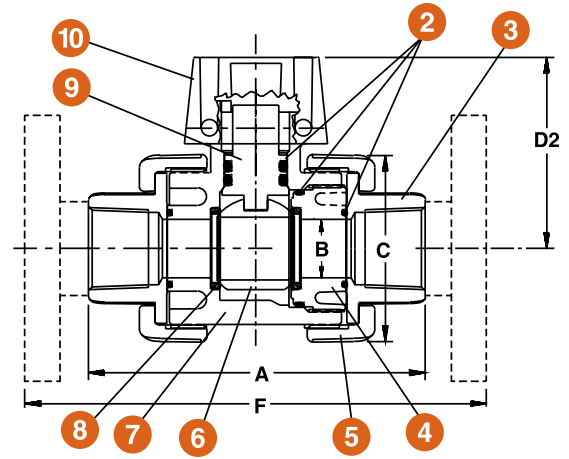
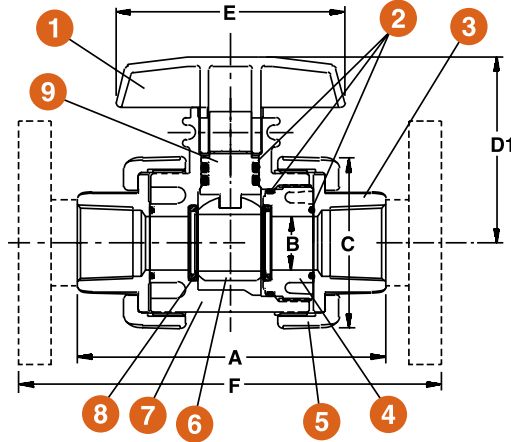
1/2" TO 6" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

1. Handle
2. O-Ring Seals
3. End Connector
4. Seal Retainer
5. Union Nut
6. Ball
7. Body
8. PTFE Seat
9. Stem
10. Actuator Mounting Pad

* For 2-1/2" – 6" Sizes, See TB Series
** Mounting bracket sold separately



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D1 in / mm	D2 in / mm	E in / mm	F in / mm	WEIGHT lbs / kg	
								SOC / THD	FLANGED
1/2 / 15*	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	2.63 / 67	3.50 / 89	6.75 / 171	.75 / .34	1.00 / .45
3/4 / 20*	4.85 / 123	.75 / 19	2.63 / 67	3.02 / 76	2.81 / 71	3.50 / 89	7.13 / 181	.75 / .34	1.00 / .45
1 / 25*	5.44 / 138	.93 / 24	3.00 / 76	3.26 / 83	3.05 / 77	5.00 / 127	8.09 / 205	1.15 / .52	2.15 / .98
1-1/4 / 32*	6.30 / 160	1.50 / 38	4.00 / 102	3.92 / 100	3.48 / 88	5.00 / 127	9.19 / 233	2.15 / .98	3.50 / 1.6
1-1/2 / 40*	6.85 / 174	1.50 / 38	4.00 / 102	3.92 / 100	3.48 / 88	5.00 / 127	9.88 / 250	2.15 / .98	3.75 / 1.7
2 / 50*	8.00 / 203	1.94 / 50	4.75 / 121	4.43 / 113	4.00 / 102	5.00 / 127	11.4 / 290	3.80 / 1.7	6.30 / 2.9
2-1/2 / 65	10.68 / 271	2.75 / 70	6.66 / 169	6.46 / 164	6.17 / 157	10.50 / 267	14.65 / 372	11.30 / 5.12	15.30 / 6.94
3 / 80*	10.56 / 268	2.75 / 70	6.66 / 169	6.46 / 164	6.17 / 157	10.50 / 267	14.60 / 371	11.30 / 5.12	15.30 / 6.94
4 / 100*	12.30 / 312	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 169	10.50 / 267	17.26 / 438	18.50 / 8.39	25.70 / 11.65
6 / 150*	N/A	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 169	10.50 / 267	19.26 / 489	N/A	30.75 / 13.95

Dimensions are subject to change without notice – consult factory for installation information

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

Cv VALUES

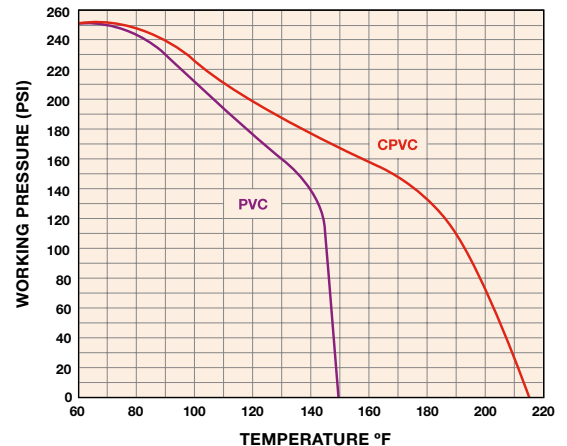
SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	8.0	2 / 50	150.0
3/4 / 20	16.0	2-1/2 / 65	340.0
1 / 25	29.0	3 / 80	490.0
1-1/4 / 32	75.0	4 / 100	600.0
1-1/2 / 40	90.0	6 / 150	550.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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 Visit us at: haywardflowcontrol.com



Actuator Ready



Certified to
NSF/ANSI 61 & 372

CVH Series Profile2™ Proportional Control Ball Valves

1/2" TO 2" / DN15 TO DN50 PVC AND CPVC

KEY FEATURES & BENEFITS

- Profile2™ Characterized Ball
- System2™ Sealing Technology provides longer cycle life
- 250 PSI / 16 Bar, non-shock at 70°F/23°C full pressure rating
- Consistent operating torque with adjustment-free design
- Lockout/Tagout mechanism that secures directly to valve body for enhanced safety
- Ergonomic handle for improved grip and comfort
- ISO mounting flange simplifies actuation
- Permanent markings, eliminates labels
- Integral footpad for skid or panel mount
- FPM or EPDM seals
- Double O-Ring stem seals
- Reversible PTFE seats – Standard
- Easy replacement for existing Hayward TB and CV Series
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

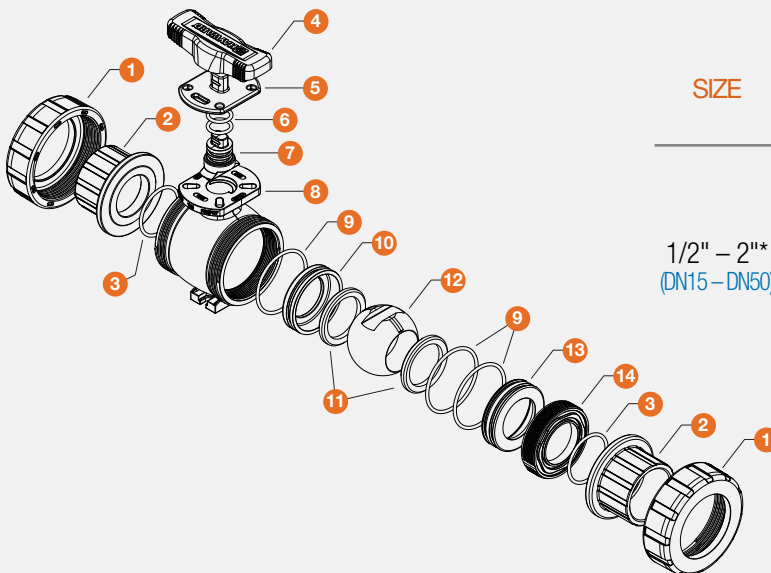
- Pneumatic or Electric Actuators
- Stem Extensions
- Manual Limit Switch
- Coupling for Actuator

MATERIALS

- PVC per ASTM D1784 Cell Class 12454
- CPVC per ASTM D1784 Cell Class 23447
- GFPP per ASTM D4101 Cell Class 85580 (Handle & Lock Plate)

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	BODY MATERIAL	SEALS	END CONNECTION	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	FPM or EPDM	Socket or Threaded	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
			Flanged	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Does not include sizes 1-1/4" and 1-1/2".

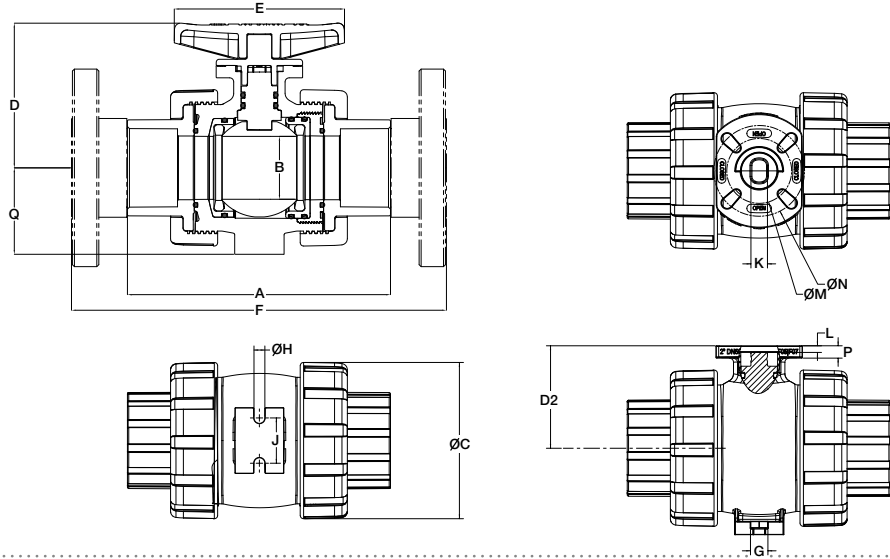
CVH Series Profile2™ Proportional Control Ball Valves

1/2 TO 2" / DN15 TO DN50 PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST / 2D DRAWINGS

1. Nut (2)
2. End Connector (2)
3. End Connector O-Ring (2)
4. Handle
5. Lock Plate
6. Stem O-Rings (2)
7. Stem
8. Body
9. Seat Carrier O-Ring (3)
10. Closed End Seat Carrier
11. Seats (2)
12. Ball (control)
13. Open End Seat Carrier
14. Seat Retainer

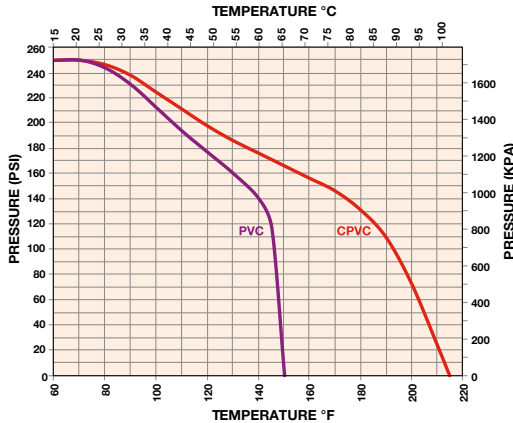


DIMENSIONS – INCHES / MILLIMETERS

SIZE	A	B	C	D1	D2	E	F	G	H	J	K	L	M	N	P	Q
inches / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
1/2 / 15	4.65 / 118	0.53 / 13	2.25 / 57	2.82 / 72	1.75 / 44	3.50 / 89	6.65 / 169	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.37 / 35
3/4 / 20	4.79 / 122	0.72 / 18	2.62 / 67	2.98 / 76	1.91 / 49	3.50 / 89	7.17 / 182	0.45 / 11	0.27 / 7	0.75 / 19	0.50 / 13	0.17 / 4	1.97 / 50	N/A	0.29 / 7	1.56 / 40
1 / 25	5.34 / 136	0.94 / 24	3.00 / 76	3.25 / 83	2.18 / 55	4.00 / 102	8.05 / 204	0.45 / 11	0.27 / 7	1.00 / 25	0.50 / 13	0.20 / 5	1.97 / 50	N/A	0.29 / 7	1.75 / 44
2 / 50	7.99 / 203	1.91 / 49	4.75 / 121	4.40 / 112	3.11 / 79	5.17 / 131	11.51 / 292	0.53 / 13	0.33 / 8	1.38 / 35	0.50 / 13	0.20 / 5	1.97 / 50	2.76 / 70	0.34 / 9	2.63 / 67

* Dimensions are subject to change without notice - consult factory for installation information.

PRESSURE / TEMPERATURE CHART*



* Flanged valves rated to 150 PSI at 70°F non-shock

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

PROPORTIONAL VALVE FLOW COEFFICIENTS

1/2" PROFILE2 PROPORTIONAL CONTROL VALVE				3/4" PROFILE2 PROPORTIONAL CONTROL VALVE			
OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.10	.10	.10	15°	.10	.10	.10
30°	.30	.50	.30	30°	.70	1.2	.70
45°	1.4	2.7	1.1	45°	2.8	5.3	2.5
60°	2.6	4.3	2.5	60°	5.3	8.5	5.3
75°	4.9	5.2	7.2	75°	9.4	10.1	14.4
90°	5.4	5.4	8.0	90°	10.4	10.4	16.0

1" PROFILE2 PROPORTIONAL CONTROL VALVE				2" PROFILE2 PROPORTIONAL CONTROL VALVE			
OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.50	1.0	1.2	15°	1.0	2.5	10.0
30°	1.9	3.4	3.5	30°	4.0	11.0	16.0
45°	3.7	7.0	7.5	45°	11.0	25.0	35.0
60°	8.0	13.0	15.3	60°	21.0	44.0	72.0
75°	14.7	18.8	27.8	75°	37.0	54.0	117.0
90°	21.0	21.0	29.0	90°	56.0	56.0	150.0

WEIGHT – LBS / KG

SIZE	Weight with Socket/Threaded Ends	Weight with Flanged Ends	Weight Bare Stem with Socket/Threaded Ends	Weight Bare Stem with Flanged Ends
	lbs / kg	lbs / kg	lbs / kg	lbs / kg
1/2 / 15	0.70 / 0.32	1.12 / 0.51	0.59 / 0.27	1.01 / 0.46
3/4 / 20	0.90 / 0.41	1.50 / 0.68	0.79 / 0.36	1.39 / 0.63
1 / 25	1.18 / 0.54	1.98 / 0.90	1.05 / 0.48	1.85 / 0.84
2 / 50	3.87 / 1.76	6.37 / 2.89	3.62 / 1.64	6.12 / 2.78



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 Visit us at: haywardflowcontrol.com



CV Series Profile2™ Proportional Control Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Reversible Seats - Standard
- True Union Design
- Provides Two Linear Flow Curves - Fast Opening and Slow Opening
- Precise Flow Control

OPTIONS

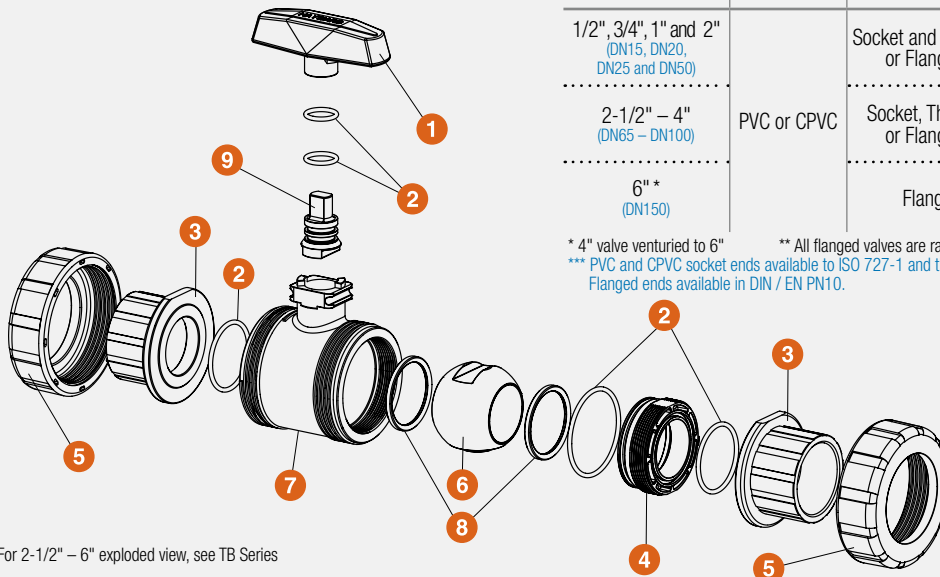
- Pneumatic or Electric Actuators
- Stem Extensions
- Manual Limit Switch

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW*



* For 2-1/2" – 6" exploded view, see TB Series

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2", 3/4", 1" and 2" (DN15, DN20, DN25 and DN50)		Socket and Threaded or Flanged**		250 PSI @ 70°F 16 Bar @ 21°C Non-Shock
2-1/2" – 4" (DN65 – DN100)	PVC or CPVC	Socket, Threaded or Flanged**	FPM or EPDM	235 PSI @ 70°F 16 Bar @ 21°C Non-Shock
6"* (DN150)		Flanged		150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* 4" valve venturied to 6"

** All flanged valves are rated to 150 PSI @ 70°F Non-Shock (10 Bar @ 21°C)

*** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN / EN PN10.

CV Series Profile2™ Proportional Control Ball Valves

1/2" TO 6" PVC AND CPVC

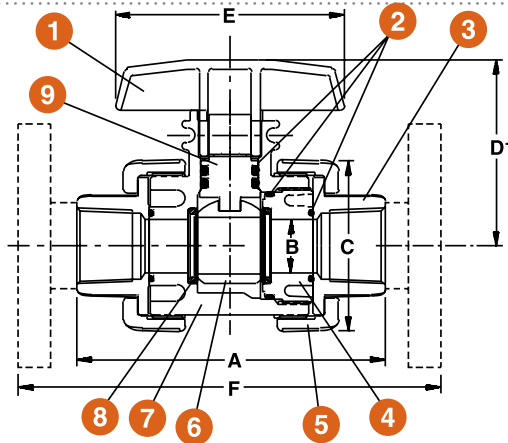
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

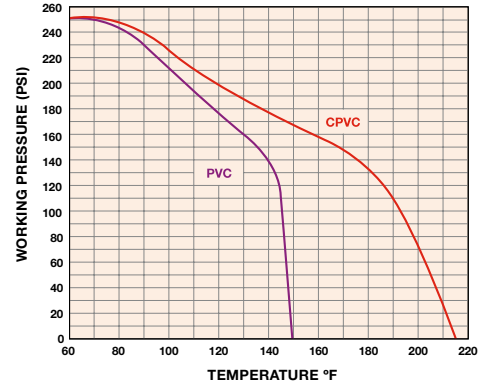
1. Handle
2. O-Ring Seals
3. End Connector
4. Seal Retainer
5. Union Nut
6. Ball
7. Body
8. PTFE Seat
9. Stem

* Actuator Mounting Pad

** For 2-1/2" – 6" Sizes, See TB Series



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D1 in / mm	E in / mm	F in / mm
1/2 / 15	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	3.50 / 89	6.75 / 171
3/4 / 20	4.85 / 123	.75 / 19	2.63 / 67	3.02 / 77	3.50 / 89	7.13 / 181
1 / 25	5.44 / 138	.93 / 24	3.00 / 76	3.26 / 83	4.00 / 102	8.00 / 203
2 / 50	8.00 / 203	1.94 / 49	4.75 / 120	4.43 / 113	5.00 / 127	11.38 / 289
3 / 80*	10.56 / 268	2.75 / 70	6.66 / 169	6.46 / 164	10.50 / 267	14.60 / 371
4 / 100*	12.30 / 312	3.81 / 97	8.56 / 217	7.62 / 194	10.50 / 267	17.26 / 438
6 / 150*	N/A	3.81 / 97	8.56 / 217	7.62 / 194	10.50 / 267	19.26 / 489

Dimensions are subject to change without notice – consult factory for installation information

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

PROPORTIONAL VALVE FLOW COEFFICIENTS

1/2" PROFILE2 PROPORTIONAL CONTROL VALVE				3/4" PROFILE2 PROPORTIONAL CONTROL VALVE				1" PROFILE2 PROPORTIONAL CONTROL VALVE			
OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.10	.10	.10	15°	.10	.10	.10	15°	.50	1.0	1.2
30°	.30	.50	.30	30°	.70	1.2	.70	30°	1.9	3.4	3.5
45°	1.4	2.7	1.1	45°	2.8	5.3	2.5	45°	3.7	7.0	7.5
60°	2.6	4.3	2.5	60°	5.3	8.5	5.3	60°	8.0	13.0	15.3
75°	4.9	5.2	7.2	75°	9.4	10.1	14.4	75°	14.7	18.8	27.8
90°	5.4	5.4	8.0	90°	10.4	10.4	16.0	90°	21.0	21.0	29.0

2" PROFILE2 PROPORTIONAL CONTROL VALVE				3" PROFILE2 PROPORTIONAL CONTROL VALVE				4" PROFILE2 PROPORTIONAL CONTROL VALVE			
OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE	OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	1.0	2.5	10.0	15°	3.0	10.0	10.0	15°	5.0	18.0	38.0
30°	4.0	11.0	16.0	30°	12.0	26.0	26.0	30°	30.0	55.0	90.0
45°	11.0	25.0	35.0	45°	30.0	50.0	55.0	45°	65.0	114.0	165.0
60°	21.0	44.0	72.0	60°	60.0	79.0	110.0	60°	120.0	183.0	250.0
75°	37.0	54.0	117.0	75°	89.0	112.0	212.0	75°	185.0	200.0	458.0
90°	56.0	56.0	150.0	90°	128.0	128.0	490.0	90°	215.0	215.0	600.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient



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TW Series Horizontal Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Position Indicator
- Easily Actuated
- PTFE Seats
- FPM or EPDM O-Rings
- Double O-Ring Stem Seal

OPTIONS

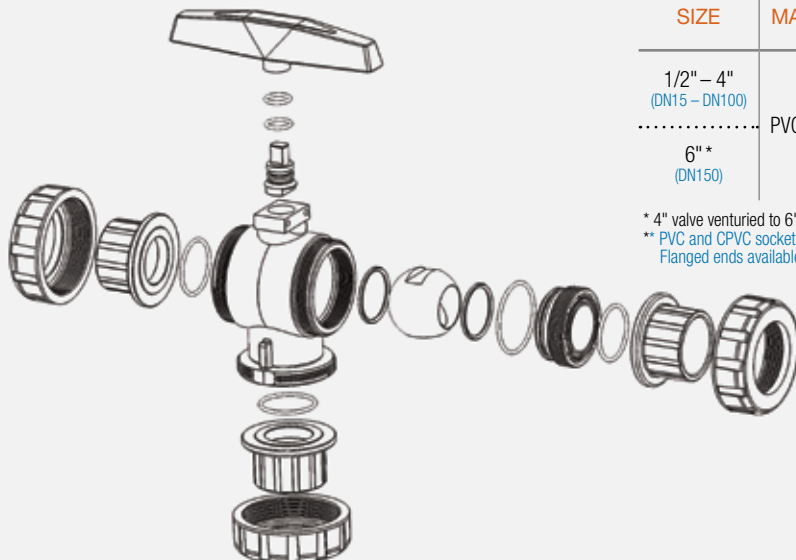
- Lockouts Available
- Pneumatic and Electric Actuators
- Cross-Flow Ball
- TN Ball
- TP Ball

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
6"* (DN150)		Flanged		

* 4" valve venturied to 6"

** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN / EN PN10.

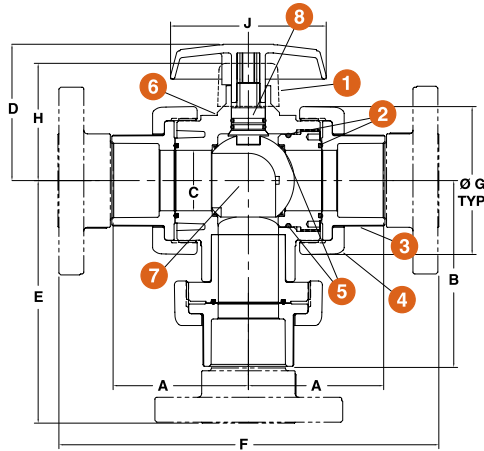
TW Series Horizontal Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

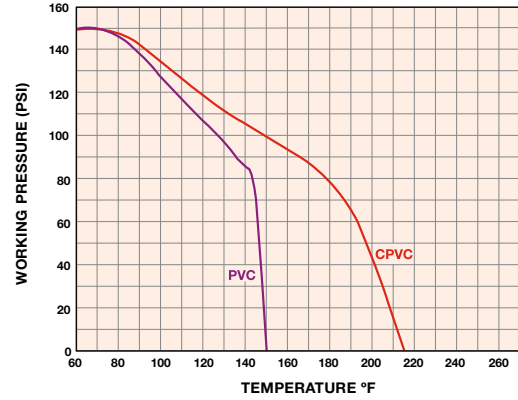
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Actuation Mount
2. O-Ring Seals
3. End Connector
4. Assembly Nut
5. PTFE Seats
6. Body
7. Ball
8. Stem



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS












SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm
1/2 / 15	2.30 / 58	3.29 / 84	0.50 / 13	2.94 / 75	3.87 / 98	6.72 / 171	2.25 / 57	2.53 / 64	3.50 / 89
3/4 / 20	2.56 / 65	3.57 / 91	0.75 / 19	2.97 / 75	4.60 / 117	7.50 / 191	2.63 / 67	2.82 / 72	3.50 / 89
1 / 25	2.98 / 76	4.14 / 105	1.00 / 25	3.21 / 82	4.77 / 121	8.50 / 216	3.00 / 76	3.08 / 78	4.00 / 102
1-1/4 / 32	4.39 / 112	5.94 / 151	2.00 / 51	3.63 / 92	5.19 / 132	11.54 / 293	4.00 / 102	3.50 / 89	4.00 / 102
1-1/2 / 40	4.30 / 109	5.87 / 149	2.00 / 51	3.63 / 92	6.00 / 152	11.85 / 301	4.00 / 102	3.50 / 89	4.00 / 102
2 / 50	4.38 / 111	6.00 / 152	2.00 / 51	4.31 / 109	6.75 / 171	12.25 / 311	4.75 / 121	3.95 / 100	5.00 / 127
2-1/2 / 65	5.90 / 150	7.59 / 193	3.00 / 76	7.02 / 178	8.68 / 220	15.92 / 404	6.40 / 163	5.88 / 149	10.50 / 267
3 / 80	5.90 / 150	7.59 / 193	3.00 / 76	7.02 / 178	8.72 / 221	16.00 / 406	6.40 / 163	5.88 / 149	10.50 / 267
4 / 100	7.00 / 178	9.33 / 237	4.00 / 102	8.02 / 204	10.44 / 265	18.88 / 480	8.56 / 217	8.88 / 226	10.50 / 267
6 / 150	N/A	N/A	4.00 / 102	8.02 / 204	11.25 / 286	20.25 / 514	8.56 / 217	8.88 / 226	10.50 / 267

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	3.0	2 / 50	58.0
3/4 / 20	7.0	3 / 80	190.0
1 / 25	10.0	4 / 100	450.0
1-1/2 / 40	30.0	6 / 150	340.0

FLOW SCHEMATICS – TOP VIEW

FLOW AT	TN BALL	FLOW AT	CROSS FLOW BALL
0°	Port A  Port B	0°	Port A  Port B
45° <i>No Deadhead</i>	Port A  Port B	90°	Port A  Port B
90°	Port A  Port B	180°	Port A  Port B
FLOW AT	TW BALL	FLOW AT	TP BALL
0°	Port A  Port B	0°	Port A  Port B
90° <i>Center-Off</i>	Port A  Port B	90°	Port A  Port B
180°	Port A  Port B		

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient



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LA Series Lateral Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- PTFE Seats
- FPM or EPDM O-Rings
- Double O-Ring Stem Seal
- Simplifies Lateral Connections
- Replaces Valve/Tee Connection Combinations
- Quick, Easy to Install
- Replacement for Zero Dead-Leg Valves

OPTIONS

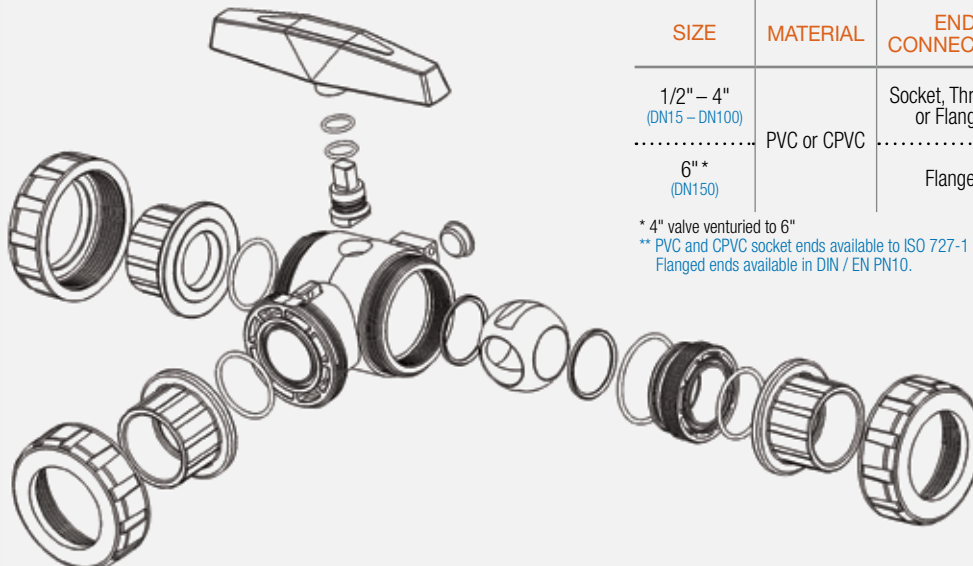
- Lockouts Available
- Pneumatic and Electric Actuators
- 90° Ball

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
6"* (DN150)		Flanged		

* 4" valve venturied to 6"

** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN / EN PN10.

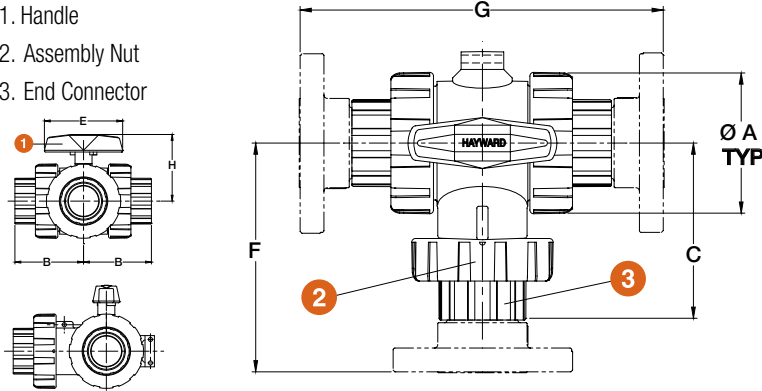
LA Series Lateral Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

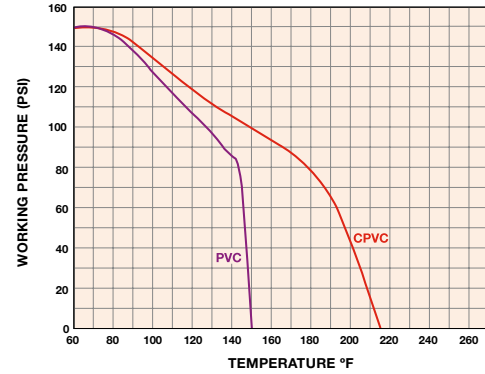
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Handle
2. Assembly Nut
3. End Connector



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	E in / mm	F in / mm	G in / mm	H in / mm
1/2 / 15	2.25 / 57	2.30 / 58	3.29 / 84	3.50 / 89	3.87 / 98	6.72 / 170	1.70 / 43
3/4 / 20	2.63 / 67	2.56 / 65	3.57 / 91	3.50 / 89	4.60 / 117	7.50 / 191	2.93 / 74
1 / 25	3.00 / 76	2.98 / 76	4.14 / 105	4.00 / 102	4.77 / 121	8.50 / 216	3.23 / 82
1-1/4 / 32	4.75 / 121	4.39 / 112	5.94 / 151	4.00 / 102	5.19 / 132	11.54 / 293	4.19 / 106
1-1/2 / 40	4.75 / 121	4.30 / 109	5.87 / 149	4.00 / 102	6.00 / 152	11.85 / 301	4.19 / 106
2 / 50	4.75 / 121	4.38 / 111	6.00 / 152	5.00 / 127	6.75 / 171	12.25 / 311	4.19 / 106
2-1/2 / 65	6.40 / 163	5.90 / 150	7.59 / 193	10.50 / 267	8.68 / 220	15.92 / 404	5.35 / 136
3 / 80	6.40 / 163	5.90 / 150	7.59 / 193	10.50 / 267	8.72 / 221	16.00 / 406	5.35 / 136
4 / 100	8.56 / 217	7.00 / 178	9.33 / 237	10.50 / 267	10.44 / 265	18.88 / 480	6.85 / 174
6 / 150	8.56 / 217	N/A	N/A	10.50 / 267	11.25 / 286	20.25 / 514	6.85 / 174

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

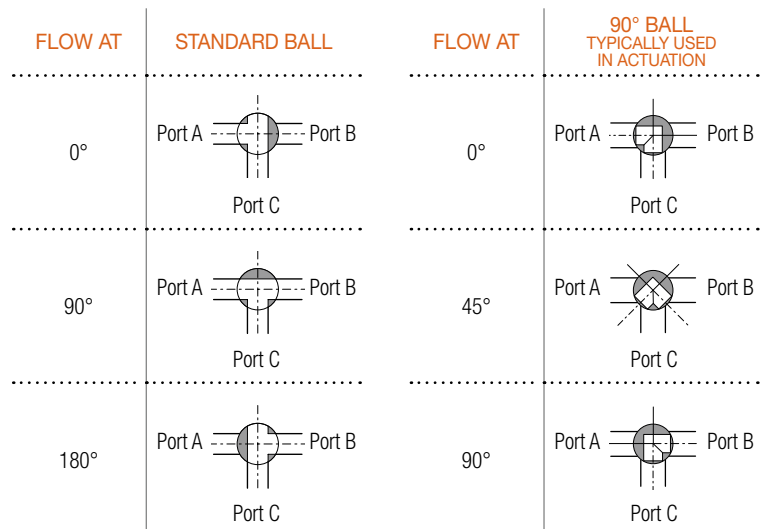
SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	3.0	2 / 50	58.0
3/4 / 20	7.0	3 / 80	190.0
1 / 25	10.0	4 / 100	450.0
1-1/2 / 40	30.0	6 / 150	340.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

FLOW SCHEMATICS – TOP VIEW



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TBB Series Commercial True Union Ball Valves

1/2" TO 4" PVC, CPVC, PP* AND PVDF

KEY FEATURES

- PVC, CPVC, PP and PVDF Materials
- Full Port Design
- FPM or EPDM Seals
- PTFE Seats
- Double O-Ring Stem Seals
- Adjustable Seat Retainer

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- PVDF
- FPM and EPDM O-Ring Seals



TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC, CPVC	Socket, Threaded or Flanged*	FPM or EPDM	225 PSI @ 70°F 15 Bar @ 21°C Non-Shock
	PVDF	Threaded or Flanged*		
2-1/2" – 4" (DN65 – DN100)	PP*	Threaded or Flanged*		

* All flanged valves are rated to 150 PSI @ 70°F Non-Shock (10 Bar @ 21°C)

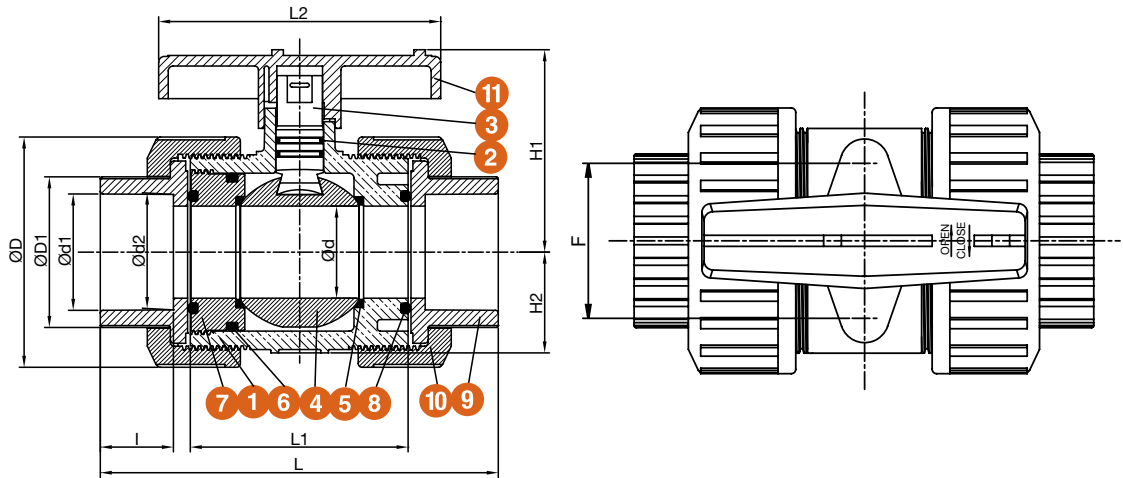
TBB Series Commercial True Union Ball Valves

1/2" TO 4" PVC, CPVC, PP* AND PVDF

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Stem O-Ring
3. Stem
4. Ball
5. Seat Seal
6. Carrier O-Ring
7. Seal Carrier
8. Union O-Ring
9. End Connector
10. Union Nut
11. Handle

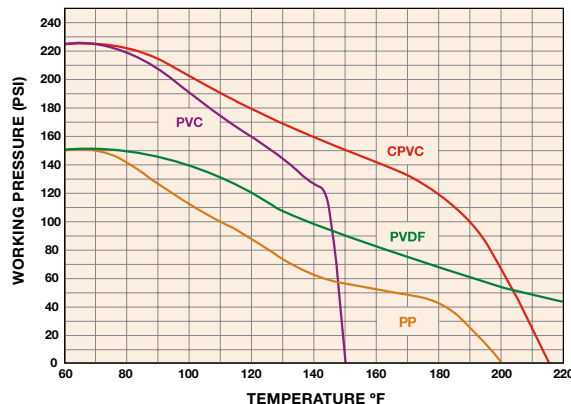


DIMENSIONS

SIZE in / DN	d1 in / mm	d2 in / mm	I in / mm	D in / mm	D1 in / mm	d in / mm	L in / mm	L1 in / mm	L2 in / mm	H1 in / mm	H2 in / mm	F in / mm
1/2 / 15	.85 / 22	.84 / 21	.87 / 22	1.83 / 46	1.23 / 31	.51 / 13	4.49 / 114	2.36 / 60	3.07 / 78	1.85 / 47	.81 / 21	1.2 / 30
3/4 / 20	1.06 / 27	1.05 / 27	1.00 / 25	2.17 / 55	1.46 / 37	.71 / 18	5.31 / 135	2.87 / 73	3.62 / 92	2.24 / 57	1.02 / 26	1.3 / 33
1 / 25	1.32 / 34	1.31 / 33	1.13 / 29	2.60 / 66	1.75 / 44	.91 / 23	5.87 / 149	3.11 / 79	3.94 / 100	2.60 / 66	1.30 / 33	1.6 / 41
1-1/4 / 32	1.67 / 42	1.66 / 42	1.25 / 32	3.23 / 82	2.13 / 54	1.18 / 30	6.61 / 168	3.46 / 88	4.33 / 110	2.91 / 74	1.50 / 38	1.9 / 48
1-1/2 / 40	1.91 / 49	1.89 / 48	1.38 / 35	3.86 / 98	2.54 / 65	1.50 / 38	6.89 / 175	3.72 / 94	4.76 / 121	3.43 / 87	1.57 / 40	2.0 / 51
2 / 50	2.39 / 61	2.37 / 60	1.50 / 38	4.72 / 120	3.09 / 78	1.89 / 48	8.15 / 207	4.47 / 114	5.79 / 147	4.17 / 106	2.09 / 53	2.8 / 71
2-1/2 / 65	2.89 / 73	2.87 / 73	1.75 / 44	5.51 / 140	3.60 / 91	2.40 / 61	10.83 / 275	5.43 / 138	7.09 / 180	4.57 / 116	N/A	N/A
3 / 80	3.52 / 89	3.49 / 89	1.88 / 48	6.42 / 163	4.23 / 107	2.70 / 69	11.97 / 304	6.22 / 158	8.82 / 224	5.12 / 130	N/A	N/A
4 / 100	4.52 / 115	4.49 / 114	2.25 / 57	8.86 / 225	5.73 / 146	3.90 / 99	13.03 / 331	6.93 / 176	10.94 / 278	7.01 / 178	N/A	N/A

Dimensions are subject to change without notice – consult factory for installation information *PP only available from 2-1/2" - 4"

OPERATING TEMPERATURE/PRESSURE



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QV Series QIC2™ Compact Ball Valves

1/2" TO 2" PVC

KEY FEATURES

- Gray PVC
- Rugged, Compact and Lightweight Design
- Full Port Design
- Socket or Threaded Ends
- PTFE Seats
- EPDM O-Ring Seals
- Low Torque, Easy 1/4-Turn Operation
- No Integral Parts to Replace
- Perfect for OEM Requirements

QTA Series True Union Compact Ball Valves

1/2" TO 2" PVC

KEY FEATURES

- Gray and White PVC
- True Union End Connections
- Rated at a Full 150 PSI
- Santoprene® (TPV) Seats
- EPDM O-Ring Seals
- No Internal Parts to Replace
- Low Torque Easy 1/4-Turn Operation
- Perfect for OEM Applications
- Socket and Threaded End Connections



QVC Series Compact Ball Valves

1/2" TO 4" PVC

KEY FEATURES

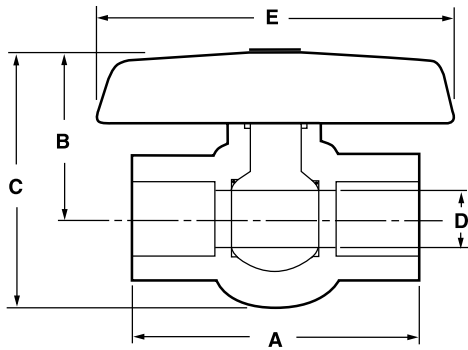
- Gray and White PVC
- Compact and Lightweight Design
- Low Torque Easy 1/4-Turn Operation
- Santoprene® (TPV) Seats
- EPDM O-Ring Seals
- No Internal Parts to Replace

*Note: 4" Sizes have Lever Handle not T-handle

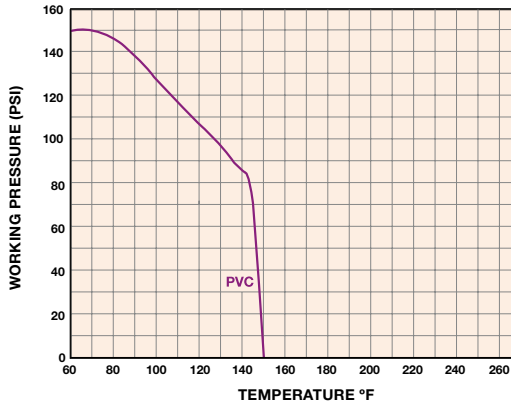
QV Series, QTA Series & QVC Series

TECHNICAL INFORMATION

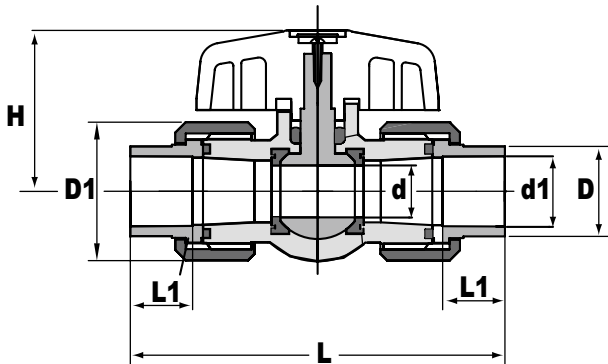
QV SERIES QIC2™ COMPACT BALL VALVES



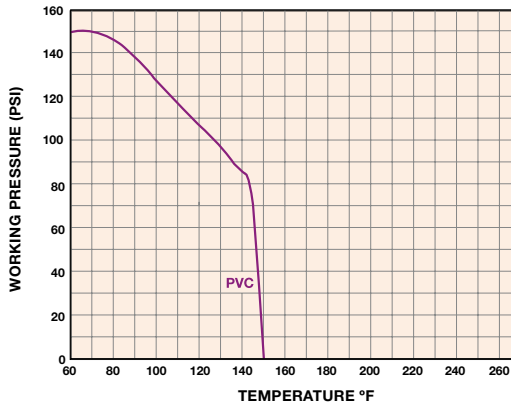
OPERATING TEMPERATURE/PRESSURE



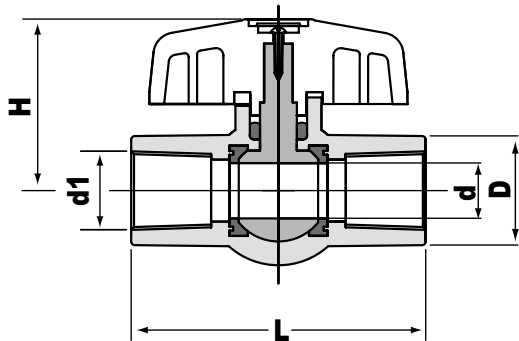
QTA SERIES TRUE UNION COMPACT BALL VALVES



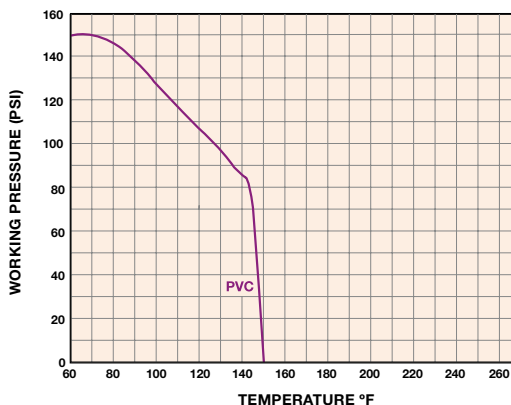
OPERATING TEMPERATURE/PRESSURE



QVC SERIES COMPACT BALL VALVES



OPERATING TEMPERATURE/PRESSURE



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Certified to
NSF/ANSI 61 & 372
1/4" - 4"



Ball check valve with foot valve screen installed

TC Series True Union Ball Check Valves

1/4" - 6" PVC, 1/2" - 6" CPVC AND 1/2" - 2" PP

KEY FEATURES

- Available in PVC, CPVC and PP
- For Horizontal or Vertical Installation
- 1/2" to 6" are Sure Block Design
- Square Cut Seat for Positive Sealing
- Seats with Minimum Back Pressure
- 1/4" and 3/8" are Trim Check Design
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

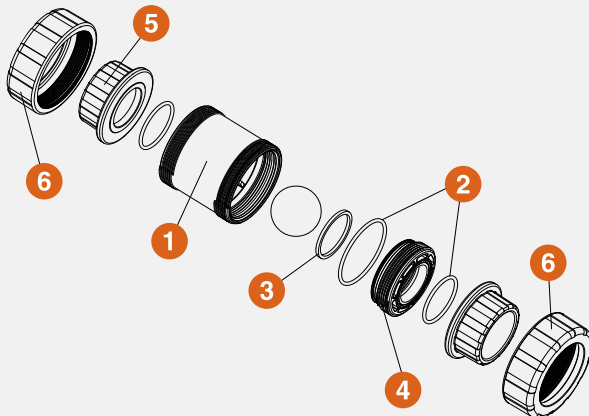
- Foot Valve Screens

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" - 3/8" * (DN8 - DN10)	PVC	Socket or Threaded	FPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
1/2" - 2" (DN15 - DN50)	PVC or CPVC	Socket and Threaded or Flanged****	FPM or EPDM	235 PSI @ 70°F 16 Bar @ 21°C Non-Shock
	PP**	Threaded or Socket Fusion		
2-1/2" - 4" (DN65 - DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
6" *** (DN150)		Flanged		

* Trim Checks ** 2" PP is rated to 100 PSI @ 70°F Non-Shock *** 4" valve venturied to 6"

**** All flanged valves are rated to 150 PSI @ 70°F Non-Shock

***** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. PP socket fusion ends per ASTM F2389 and threaded ends per BS21. Flanged ends available in DIN / EN PN10.

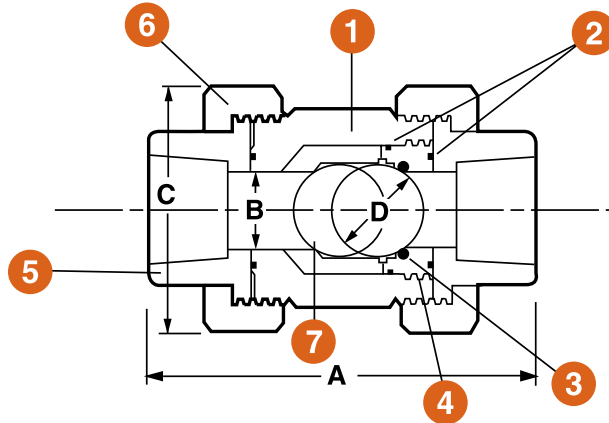
TC Series True Union Ball Check Valves

1/4" - 6" PVC, 1/2" - 6" CPVC AND 1/2" - 2" PP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. O-Ring Seals
3. Square Cut O-Ring Seat
4. Seal Retainer
5. End Connector
6. Union Nut



Ball check valve with foot valve screen installed

DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	WEIGHT lbs / kg	
								SOC / THD	FLANGED
1/4 / 8	3.06 / 78	.31 / 8	1.38 / 35	.50 / 13	N/A	N/A	N/A	.13 / .06	N/A
3/8 / 10	3.06 / 78	.31 / 8	1.38 / 35	.50 / 13	N/A	N/A	N/A	.13 / .06	N/A
1/2 / 15	4.63 / 118	.50 / 13	2.25 / 57	.75 / 19	6.75 / 171	4.88 / 124	2.32 / 59	.75 / .34	1.00 / .45
3/4 / 20*	4.75 / 121	.75 / 19	2.63 / 67	1.00 / 25	7.13 / 181	5.00 / 127	2.60 / 66	.75 / .34	1.38 / .63
1 / 25*	5.25 / 133	1.00 / 25	3.00 / 76	1.25 / 32	7.75 / 197	5.88 / 149	2.88 / 73	1.25 / .57	2.13 / .97
1-1/4 / 32*	6.30 / 160	1.25 / 32	4.00 / 102	1.75 / 44	9.19 / 233	6.94 / 176	3.75 / 95	2.00 / .91	3.75 / 1.70
1-1/2 / 40*	6.75 / 171	1.50 / 38	4.00 / 102	1.75 / 44	9.75 / 248	7.06 / 179	3.75 / 95	2.00 / .91	3.75 / 1.70
2 / 50*	8.00 / 203	1.94 / 49	4.75 / 121	2.25 / 57	11.25 / 286	8.56 / 217	4.50 / 114	3.75 / 1.70	5.75 / 2.61
2-1/2 / 65*	10.68 / 271	2.88 / 73	6.56 / 167	3.25 / 83	14.38 / 365	11.25 / 286	2.50 / 64	10.00 / 4.54	14.00 / 6.35
3 / 80	10.56 / 268	2.88 / 73	6.56 / 167	3.25 / 83	14.38 / 365	11.25 / 286	2.50 / 64	10.00 / 4.54	14.00 / 6.35
4 / 100	12.94 / 329	4.00 / 102	8.56 / 217	4.25 / 108	17.00 / 432	14.63 / 372	4.25 / 108	17.00 / 7.71	25.00 / 11.34
6 / 150	N/A	4.00 / 102	N/A	4.25 / 108	19.19 / 487	N/A	N/A	N/A	30.20 / 13.70

Dimensions are subject to change without notice – consult factory for installation information

Hayward TC Ball Check Valves require a minimum of 2 PSI to seat and 1-1/2 PSI cracking pressure to open

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket for PVC and CPVC Valves Only

Cv VALUES

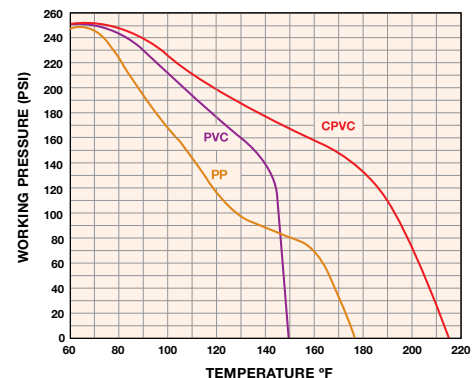
SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/4 / 8	1.0	1-1/2 / 40	45.0
3/8 / 10	3.0	2 / 50	130.0
1/2 / 15	4.8	2-1/2 / 65	170.0
3/4 / 20	7.7	3 / 80	250.0
1 / 25	11.0	4 / 100	400.0
1-1/4 / 32	25.0	6 / 150	340.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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WCV Series Full Pattern Wafer Check Valves

2" TO 8" PVC AND CPVC

KEY FEATURES

- Robust Full Pattern Body
- Available in PVC and CPVC
- No Special Spacers or Flanges Required
- High Cv Rating, Saves on Energy and Pump Wear
- FPM or EPDM Gasket and Face Seal
- One-Piece Disc and Shaft Design
- Designed for ANSI150 and PN10 Flanges*
- Contoured Inlet Port for Reduced Head Loss
- Lower Closing Pressure than Swing Check Valves
- Integral Bolt Eyes for Ease of Installation for Large Sizes (4" - 8")
- Can be Installed in Vertical or Horizontal Position
- Pressure Rated to 150 PSI/PN10 in All Sizes

OPTIONS

- 316 Stainless Steel or Hastelloy® Disc Spring

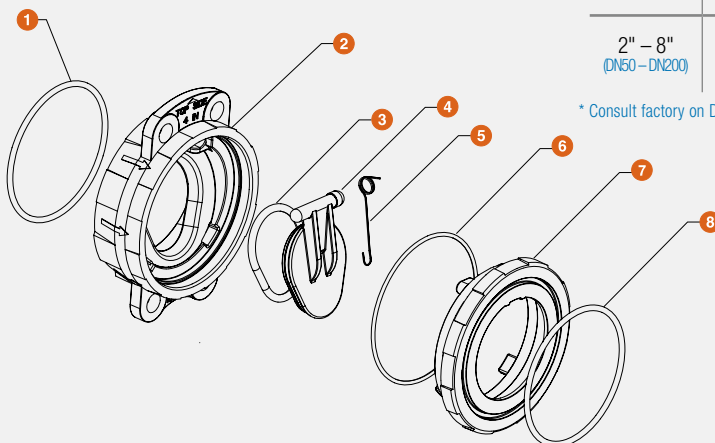
MATERIALS

- PVC per ASTM D1784 Cell Class 12454
- CPVC per ASTM D1784 Cell Class 23447
- FPM and EPDM Gasket and Disc Seals

* Patent No. 8,887,757

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	O-RING	SPRING	PRESSURE RATING
2" – 8" (DN50 – DN200)	PVC and CPVC	Wafer	FPM or EPDM	316 SS, Hastelloy®	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Consult factory on DN100 Size

"Patented" Pat. No.: 8,887,757

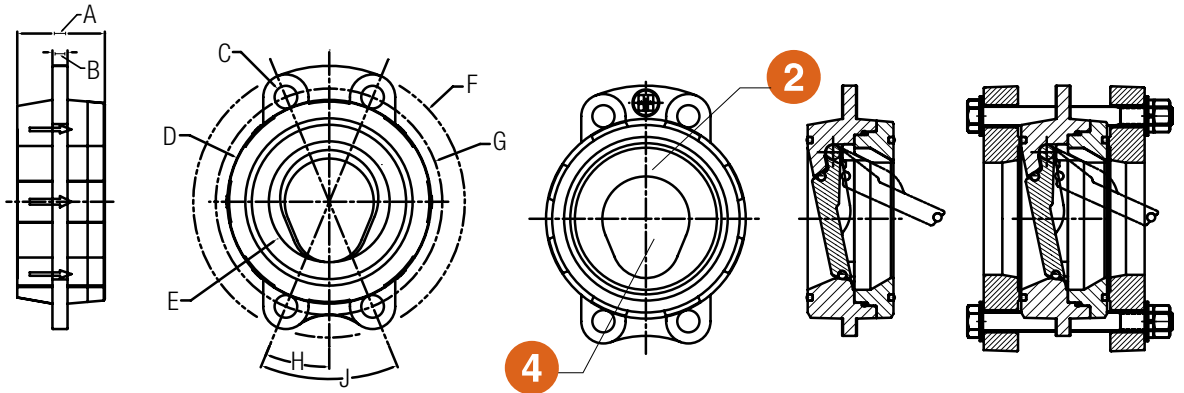
WCV Series Full Pattern Wafer Check Valves

2" TO 8" PVC AND CVPC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Face Seal O-Ring
2. Body
3. Wafer Disc O-Ring
4. Wafer Disc
5. Wafer Disc Spring
6. Body O-Ring
7. Body
8. Face Seal O-Ring



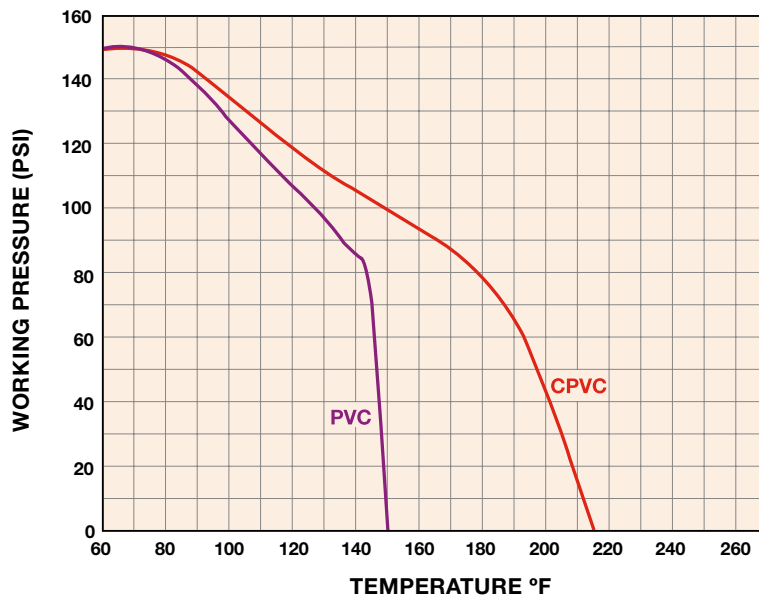
DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm
2 / 50	1.80 / 45	.25 / 6	—	4.00 / 101	2.03 / 51	5.25 / 133	—	—	—
2-1/2 / 65	2.30 / 58	.25 / 6	—	4.75 / 120	2.43 / 61	6.00 / 152	—	—	—
3 / 80	2.40 / 61	.25 / 6	—	5.25 / 133	3.00 / 76	6.50 / 165	—	—	—
4 / 100	2.90 / 73	.50 / 12	.75 / 19	6.75 / 171	4.00 / 101	9.00 / 228	.75 / 190	22.50 / 572	45.00 / 1143
6 / 150	3.00 / 76	.50 / 12	.88 / 22	8.63 / 219	5.77 / 146	11.13 / 282	9.50 / 241	22.50 / 572	45.00 / 1143
8 / 200	4.93 / 125	.75 / 19	.95 / 24	10.88 / 276	7.63 / 193	13.38 / 339	11.75 / 298	22.50 / 572	45.00 / 1143

Pressure Rating for ALL Sizes – 150 PSI @ 70°F Non-Shock
Consult Hayward for DN100 Wafer Check Dimension

***Sealing Pressure of 3psi (with or without spring)

OPERATING TEMPERATURE/PRESSURE



Cv VALUES

SIZE in / DN	Cv VALUES
2 / 50	93
2-1/2 / 65	144
3 / 80	87
4 / 100	346
6 / 150	848
8 / 200	1643

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient



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SW Series Swing Check Valves

3" TO 6" PVC, CPVC AND GFPP
AND 8" PVC AND GFPP

KEY FEATURES

- Available in PVC, CPVC and GFPP
- High Temperature/Pressure Ratings
- Horizontal or Vertical Installation
- Two-in-One Seat Design
- Built-in Flange Seals
- Two Drain Ports
- Self-Aligning Clapper Seals
- High Cv Rating and Full Flow Design

OPTIONS

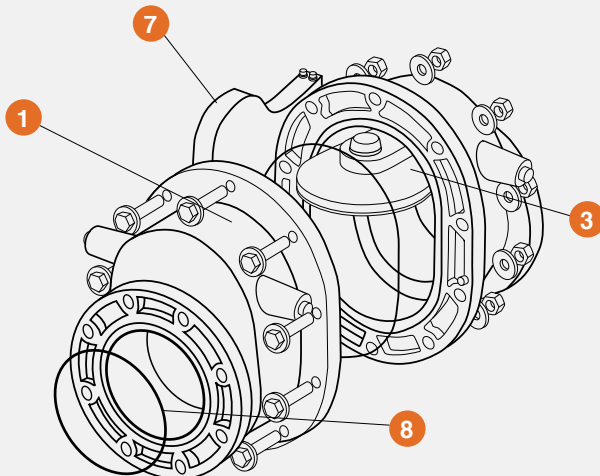
- Counterweight for Closing Assistance
- Limit Switch for Position Indication

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
3" – 6" (DN80 – DN150)	PVC, CPVC or GFPP	Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
8" (DN200)	PVC or GFPP			

* Flanged ends available in DIN / EN PN10.

SW Series Swing Check Valves

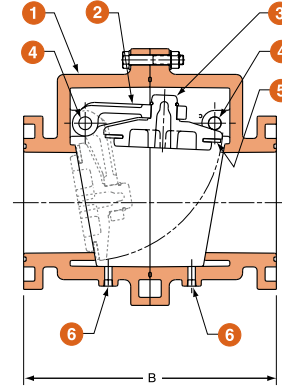
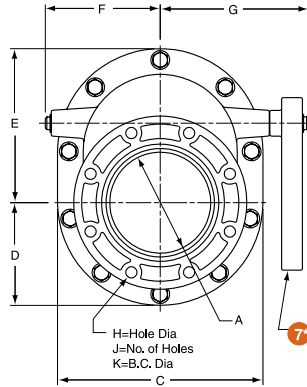
3" TO 6" PVC, CPVC AND GFPP AND 8" PVC AND GFPP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Swing Arm
3. Clapper
4. Shaft*
5. Body Seal
6. Drain Plug (2)
7. Counter Weight (Optional)
8. O-Ring Face Seal

* PVC with PVC valves
 PVDF with GFPP Valves
 CPVC with CPVC valves



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	MINIMUM BACK PRESSURE TO CLOSE - PSI	WEIGHT lbs / kg
3 / 80	3.00 / 76	10.24 / 260	7.50 / 191	3.75 / 95	5.21 / 132	3.90 / 99	4.91 / 125	.62 / 16	4.00 / 102	6.00 / 152	3	10.00 / 4.54
4 / 100	3.90 / 99	11.81 / 300	9.25 / 235	4.63 / 118	6.75 / 171	4.80 / 122	6.15 / 156	.62 / 16	8.00 / 203	7.50 / 191	3	21.00 / 9.53
6 / 150	5.91 / 150	15.75 / 400	12.75 / 324	6.38 / 162	9.25 / 235	6.47 / 164	8.30 / 211	.75 / 19	8.00 / 203	9.50 / 241	3	47.00 / 21.32
8 / 200	7.87 / 200	19.69 / 500	16.00 / 406	8.00 / 203	12.00 / 305	8.96 / 228	11.54 / 293	.75 / 19	8.00 / 203	11.75 / 298	3	90.00 / 40.82

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
3 / 80	328	6 / 150	1,278
4 / 100	514	8 / 250	2,549

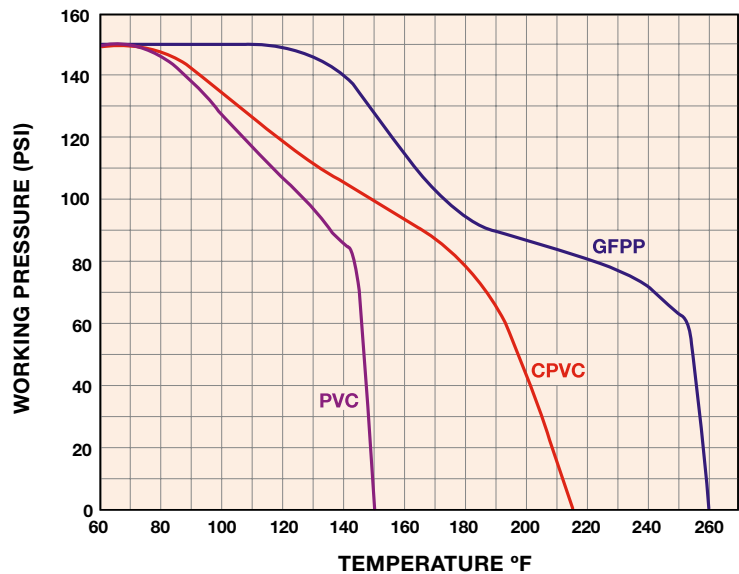
PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE

3" TO 8" SWING CHECK VALVE



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WC Series Wafer Check Valves

10" TO 14" PVC AND PP

KEY FEATURES

- PVC and PP Body and Disc
- FPM, EPDM or PTFE O-Ring Seats
- Compact and Lightweight
- Easy Installation
- Vertical or Horizontal Operation

OPTIONS

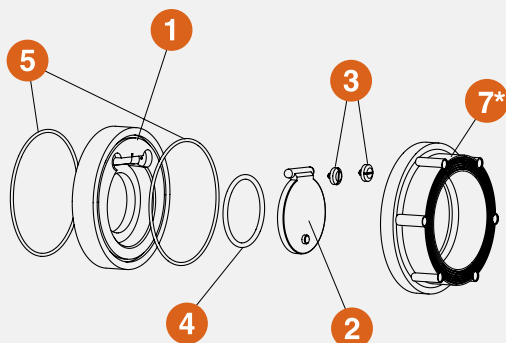
- Stainless Steel or Hastelloy® Disc Springs*



* Valve shown with spring option

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	O-RING	SPRING	PRESSURE RATING
10" – 14" (DN250 – DN350)	PVC or PP	Wafer	FPM, EPDM or PTFE*	316 SS, Hastelloy®	90 PSI @ 6 Bar @ 21°C 70°F Non-Shock

* PTFE encapsulated FPM

** Spacer Required All Sizes

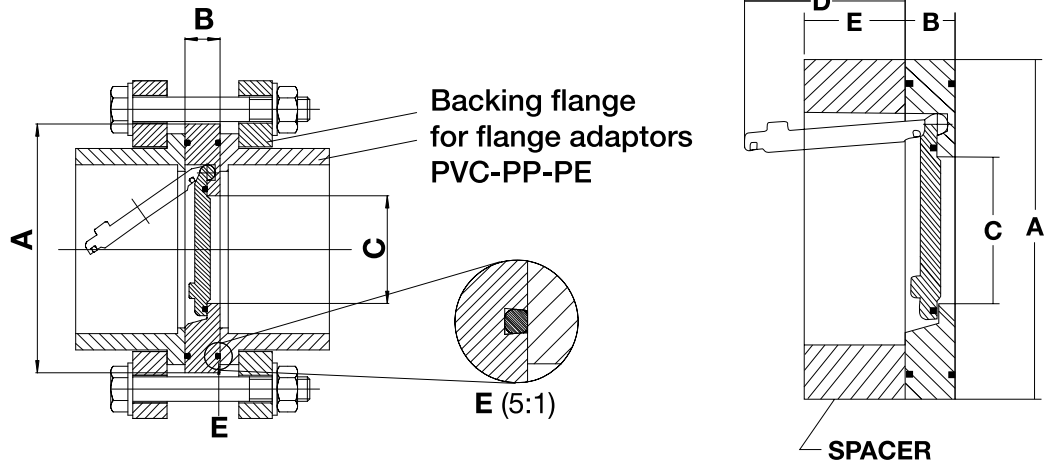
WC Series Wafer Check Valves

10" TO 14" PVC AND PP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Valve Flapper
3. Mounting Screw
4. Seat O-Ring
5. Body O-Ring
6. Support Ring
7. Spring (Optional)

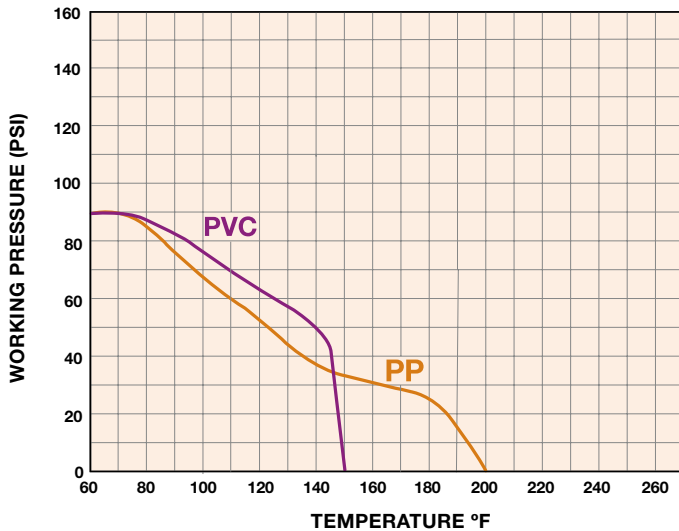


DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D (WITH SPRING) in / mm	E in / mm
10 / 250	13.00 / 330	1.60 / 41	7.50 / 191	9.00 / 229	4.00 / 102
12 / 300	15.00 / 381	1.80 / 46	8.94 / 227	10.20 / 259	5.90 / 150
14 / 350	17.32 / 440	1.93 / 49	10.47 / 266	9.64 / 245	6.30 / 160

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



Cv VALUES

SIZE in / DN	SCH 40	SCH 80
10 / 250	1880	2050
12 / 300	2520	2940
14 / 350		

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

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YC Series Y-Check Valves

1/2" TO 4" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Full Flow Design
- Minimum Pressure Drop
- PVC or CPVC Coil to Guide Piston to a Positive Seat
- Minimal Back Pressure Required to Seat Piston

OPTIONS

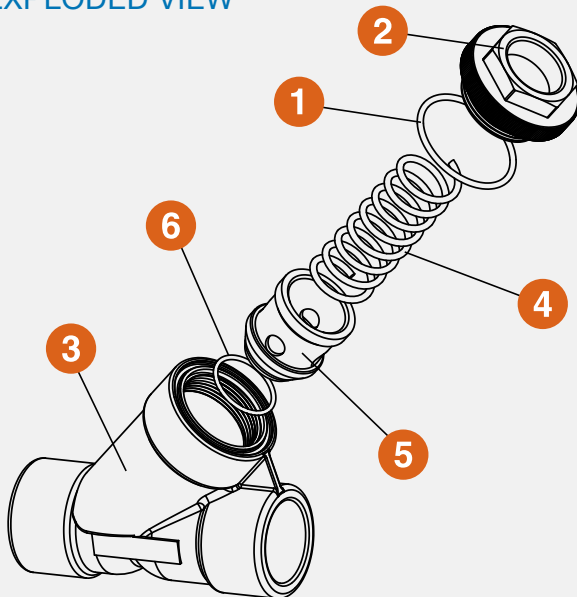
- Drilled Cap for Easy Drainage
- True Union End Connections

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded, Flanged or True Union	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.

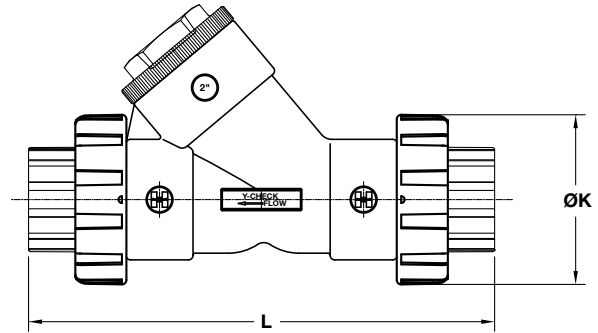
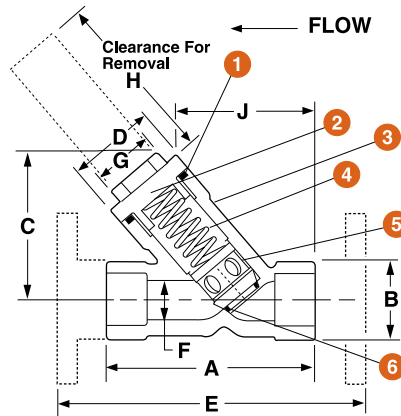
YC Series Y-Check Valves

1/2" TO 4" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. O-Ring Seal
2. Hex Cap
3. Body
4. Coil
5. Disc
6. O-Ring Disc Seal



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	L in / mm	WEIGHT lbs / kg	
												SOC/ THD	FLANGED
1/2 / 15	3.38 / 86	1.38 / 35	2.25 / 57	1.50 / 38	NA	0.56 / 14	1.00 / 25	1.50 / 38	2.50 / 64	2.25 / 57	6.64 / 169	0.25 / 0.11	NA
3/4 / 20	4.18 / 106	1.69 / 43	2.88 / 73	2.00 / 51	NA	0.81 / 21	1.25 / 32	1.75 / 44	3.00 / 76	2.63 / 67	7.42 / 188	0.63 / 0.29	NA
1 / 25	5.19 / 132	2.00 / 51	3.63 / 92	2.16 / 55	NA	1.00 / 25	1.50 / 38	2.25 / 57	3.32 / 84	3.00 / 76	8.97 / 228	0.88 / 0.40	NA
1-1/4 / 32	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	NA	1.25 / 32	2.00 / 51	3.00 / 76	4.45 / 113	4.75 / 121	13.01 / 330	1.75 / 0.79	NA
1-1/2 / 40	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	NA	1.56 / 40	2.00 / 51	3.00 / 76	4.45 / 113	4.75 / 121	12.07 / 307	1.63 / 0.74	NA
2 / 50	7.63 / 194	3.38 / 86	5.38 / 137	3.75 / 95	11.00 / 279	2.00 / 51	2.38 / 60	3.25 / 83	4.88 / 124	4.75 / 121	13.05 / 331	3.00 / 1.36	5.00 / 2.27
2-1/2 / 65	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	NA	2.90 / 74	3.50 / 89	4.25 / 108	6.54 / 166	6.40 / 163	16.77 / 426	7.75 / 3.52	NA
3 / 80	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	14.37 / 365	2.90 / 74	3.50 / 89	4.25 / 108	6.54 / 166	6.40 / 163	16.77 / 426	7.50 / 3.40	12.50 / 5.67
4 / 100	12.81 / 325	5.75 / 146	8.88 / 226	6.18 / 157	17.73 / 450	3.78 / 96	4.25 / 108	5.00 / 127	8.58 / 218	8.56 / 217	21.23 / 539	9.50 / 4.30	17.50 / 7.94

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

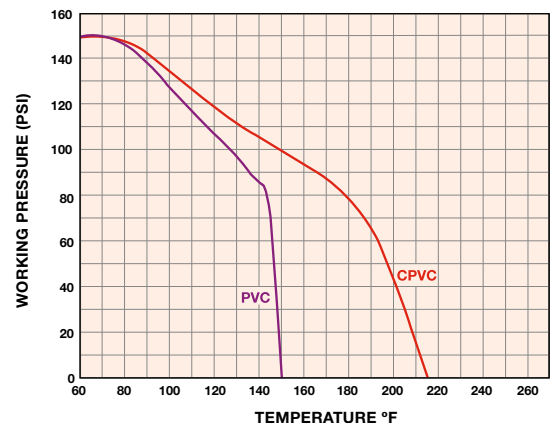
SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	0.8	2 / 50	65.0
3/4 / 20	3.0	2-1/2 / 65	75.0
1 / 25	9.0	3 / 80	110.0
1-1/4 / 32	26.0	4 / 100	240.0
1-1/2 / 40	45.0		

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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SLC Series Spring-Loaded Y-Check Valves

1/2" TO 4" PVC

KEY FEATURES

- Available in PVC
- Full Flow Design
- Closes with No Back Pressure
- Adjustable – Opens From 2 to 15 PSI
- Easy Maintenance
- Opens in Any Position

OPTIONS

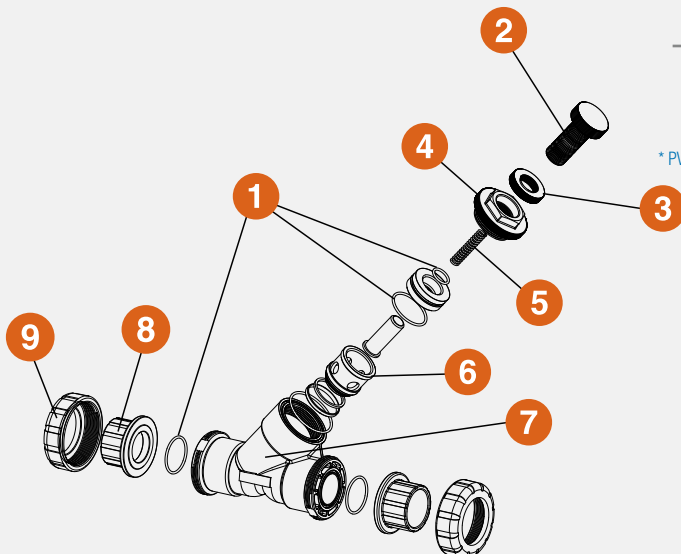
- True Union End Connections

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC	Socket, Threaded or True Union	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.

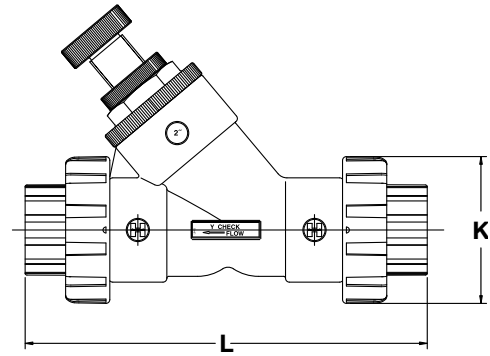
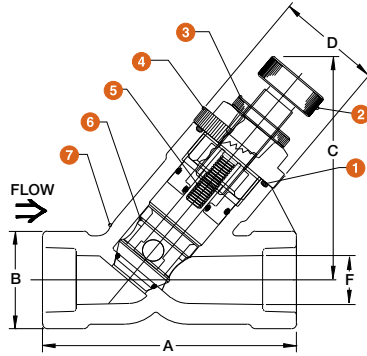
SLC Series Spring-Loaded Y-Check Valves

1/2" TO 4" PVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. O-Ring Seal
2. Adjustment Screw
3. Lock Nut
4. Hex Cap
5. Spring
6. Cartridge Assembly
7. Body
8. End Connector (True Union)
9. Assembly Nut (True Union)

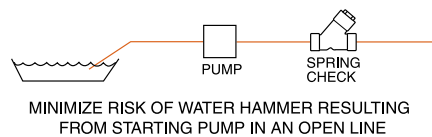
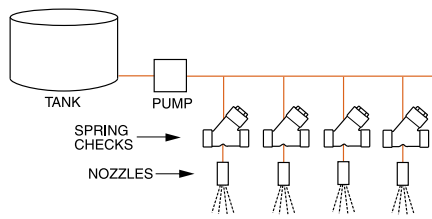
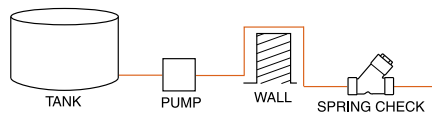


DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	F in / mm	K in / mm	L in / mm	WEIGHT lbs / kg SOC / THD
1/2 / 15	6.19 / 158	2.00 / 51	4.58 / 116	2.13 / 54	1.00 / 25	2.25 / 57	6.64 / 169	0.88 / 0.40
3/4 / 20	6.19 / 158	2.00 / 51	4.58 / 116	2.13 / 54	1.00 / 25	2.63 / 67	7.42 / 188	0.88 / 0.40
1 / 25	5.19 / 132	2.00 / 51	4.58 / 116	2.13 / 54	1.00 / 25	3.00 / 76	8.97 / 228	0.88 / 0.40
1-1/2 / 40	8.63 / 219	3.38 / 86	7.28 / 185	3.75 / 95	2.00 / 51	4.75 / 121	12.07 / 307	3.00 / 1.36
2 / 50	7.63 / 194	3.38 / 86	7.28 / 185	3.75 / 95	2.00 / 51	4.75 / 121	13.05 / 331	3.00 / 1.36
3 / 80	10.31 / 262	4.69 / 119	8.88 / 226	5.25 / 133	2.94 / 75	6.40 / 163	16.77 / 426	7.50 / 3.40
4 / 100	12.75 / 324	5.75 / 146	10.08 / 256	6.00 / 152	3.81 / 97	8.56 / 217	21.23 / 539	9.50 / 4.31

Dimensions are subject to change without notice – consult factory for installation information

TYPICAL APPLICATIONS



Cv VALUES

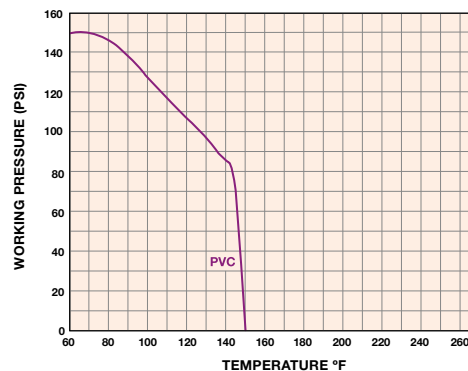
SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	0.8	2 / 50	65.0
3/4 / 20	3.0	3 / 80	110.0
1 / 25	9.0	4 / 100	240.0
1-1/2 / 40	45.0		

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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BYV Series Butterfly Valves

2" TO 12" PVC, CPVC AND GFPP

KEY FEATURES & BENEFITS

- One Piece Injection Molded PVC, CPVC or GFPP Body
- PVC, CPVC or GFPP Disc Materials
- Hand Lever with 19 Lockable Stop Positions & 360° Interlocking Splines
- External Disc Position and Flow Indication
- Hydro-dynamic Centric Disc for Increased Flow Performance
- Over-Sized Liner Face Maximizes Surface Contact with Flanges
- 1-Piece 316 Stainless Steel Stem with Threaded Retaining Gland
- Stem Bearing and Seal Retainer for Absolute Stem Position and Seal
- ISO 5211 Top Flange and Stem Drive
- All Sizes Meet ANSI B16.10 / ISO 5752 Narrow Face-to-Face Dimensions
- Pressure Rated at 150 PSI/10 Bar in All Sizes @ 70°F Non-Shock
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

- Over-Molded 316 Stainless Steel Lugs
- Titanium or Hastelloy™ Stem Materials
- Gear Operators
- Complete Range of Pneumatic or Electric Actuators
- Lock Out Caps
- Stem Extensions
- 2" Square Operating Nut
- Chain Operator for Gear Box

MATERIALS

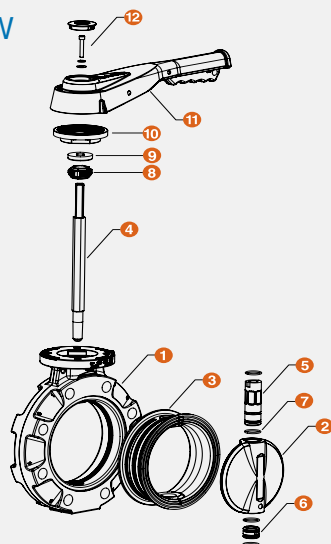
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- Viton®, EPDM or Nitrile Liners



Certified to
NSF/ANSI 61 & 372
PVC/EPDM 2" - 12"
CPVC/EPDM 4" - 12"

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	BODY MATERIAL	DISC MATERIAL	LINER MATERIAL	PRESSURE RATING
2" - 12" (DN50 - DN300)	PVC	PVC or GFPP	Viton®, EPDM or Nitrile	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
	CPVC	CPVC		
	GFPP	GFPP		

"Patented" & Other Patents Pending" Pat. No.: 9,695,947

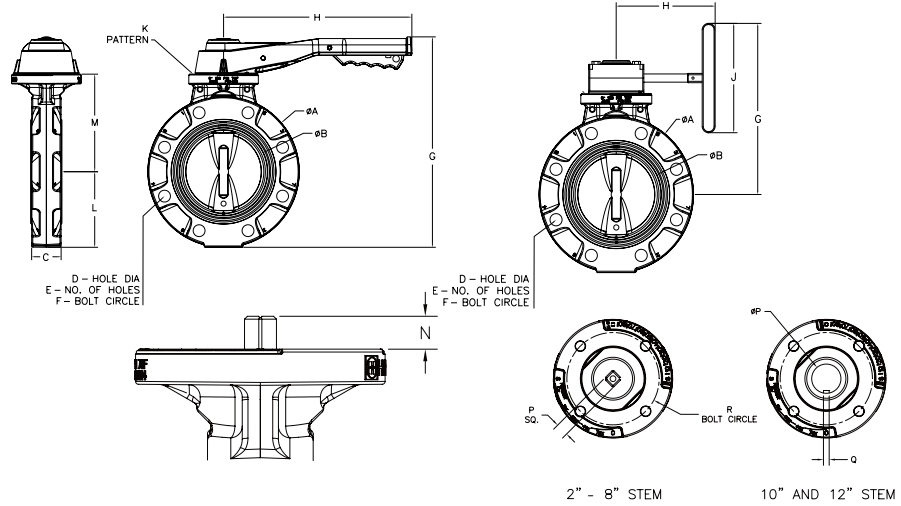
BYV Series Butterfly Valves

2" TO 12" PVC, CPVC AND GFPP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Disc
3. Liner
4. Stem
5. Upper Stem Bearings
6. Seal Retainer
7. O-Rings (4)
8. Threaded Retaining Gland
9. Weather Seal
10. Splined Throttle Plate (Ultem®)
11. Hand Lever Assembly
12. Bezel, Washers, Socket Head Cap Screw



DIMENSIONS

SIZE	A	B	C (1)	D, ANSI (2)	E	F, ANSI (2)	G	H	J	K (4) ISO 5211	L	M	N	P	Q, 10" & 12", SQUARE KEY	R	WEIGHT w LEVER	WEIGHT w GEAR		
in / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	lbs / Kg	lbs / Kg		
2 / 50	6.12 / 155	2.03 / 52	1.69 / 43	0.75 / 19	4 / 4	4.75 / 121	7.53 / 191	6.25 / 159	4.75 / 121	10.5 / 267	5 / 125	F07-D11	3.17 / 81	3.97 / 101	0.51 / 13	0.430-0.433 / 10.92-11	-	2.76 / 70	4.0 / 1.8	5.8 / 2.6
2.5 / 65	7.25 / 184	2.50 / 64	1.81 / 46	0.75 / 19	4 / 4	5.50 / 140	7.96 / 202	6.67 / 169	4.75 / 121	10.5 / 267	5 / 125	F07-D11	3.63 / 92	4.40 / 112	0.51 / 13	0.430-0.433 / 10.92-11	-	2.76 / 70	4.9 / 2.2	6.7 / 3.0
3 / 80	7.75 / 197	3.25 / 83	1.81 / 46	0.75 / 19	4 / 8	6.00 / 152	8.31 / 211	7.00 / 178	4.75 / 121	10.5 / 267	5 / 125	F07-D11	3.88 / 99	4.75 / 121	0.51 / 13	0.430-0.433 / 10.92-11	-	2.76 / 70	5.2 / 2.4	7.0 / 3.2
4 / 100	9.13 / 232	4.12 / 105	2.06 / 52	0.75 / 19	8 / 8	7.50 / 191	9.29 / 236	8.00 / 203	7.28 / 185	12.00 / 30	5 / 125	F07-D14	4.57 / 116	5.69 / 145	0.68 / 17	0.548-0.551 / 13.92-14	-	2.76 / 70	7.7 / 3.5	11.1 / 5
6 / 150	11.25 / 286	5.98 / 152	2.19 / 56	0.88 / 22	8 / 8	9.50 / 241	12.35 / 314	10.00 / 254	7.75 / 197	14.00 / 356	8 / 200	F10-D14	5.63 / 143	7.25 / 184	0.68 / 17	0.548-0.551 / 13.92-14	-	4.02 / 102	12.7 / 5.8	16.2 / 7.4
8 / 200	13.75 / 349	7.75 / 197	2.38 / 60	0.88 / 22	8 / 8	11.75 / 298	13.48 / 342	11.18 / 284	7.75 / 197	16.00 / 406	8 / 200	F10-D17	6.88 / 175	8.38 / 213	0.77 / 20	0.666-0.669 / 16.92-17	-	4.02 / 102	18.5 / 8.4	21.9 / 10.0
10 / 250	16.13 / 410	9.63 / 245	2.69 / 68	1.00 / 25	12 / 12	14.25 / 362	16.37 / 416	N/A	9.00 / 229	N/A	10 / 250	F12-V28	8.06 / 205	10.88 / 276	2.24 / 57	1.102 DIA / 28 DIA.	0.25 / 6.35	4.92 / 125	N/A	34.2 / 15.5
12 / 300	19.13 / 486	11.37 / 289	3.06 / 78	1.00 / 25	12 / 12	17.00 / 432	17.87 / 454	N/A	9.00 / 229	N/A	10 / 250	F12-V36	9.56 / 243	12.38 / 314	2.24 / 57	1.417 DIA / 36 DIA.	0.25 / 6.35	4.92 / 125	N/A	50.4 / 22.9

1) Dimension per ASME B16.10 Class 150, Steel, Narrow
4) ISO 5211 Flange and Drive

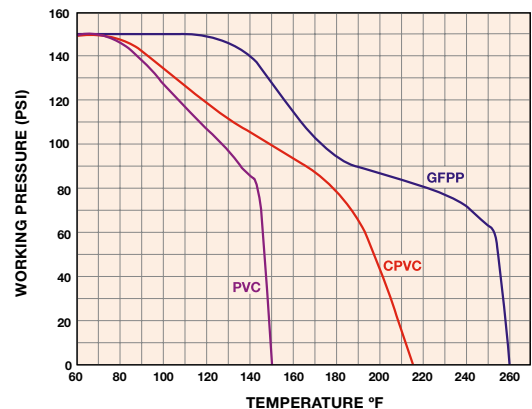
2) ANSI dimension per ASME B16.5, Class 150
5) All weights are for non-lugged versions

3) Dimension per DIN 2501, PN10

Cv VALUES

SIZE in / DN	DISC ANGLE					FULL OPEN POSITION	PRESSURE LOSS CALCULATION FORMULA
	15°	30°	45°	60°	75°		
2 / 50	0.2	15	37	65	88	92	$\Delta P = \left[\frac{Q}{C_v} \right]^2$ $\Delta P = \text{Pressure Drop}$ $Q = \text{Flow in GPM}$ $C_v = \text{Flow Coefficient}$
2-1/2 / 65	1.1	24	45	80	145	165	
3 / 80	3.1	28	36	83	182	250	
4 / 100	20	58	84	183	390	470	
6 / 150	30	105	200	458	1000	1510	
8 / 200	125	203	375	770	1650	2820	
10 / 250	123	289	644	1396	3003	4723	
12 / 300	154	435	1011	2189	4586	6400	

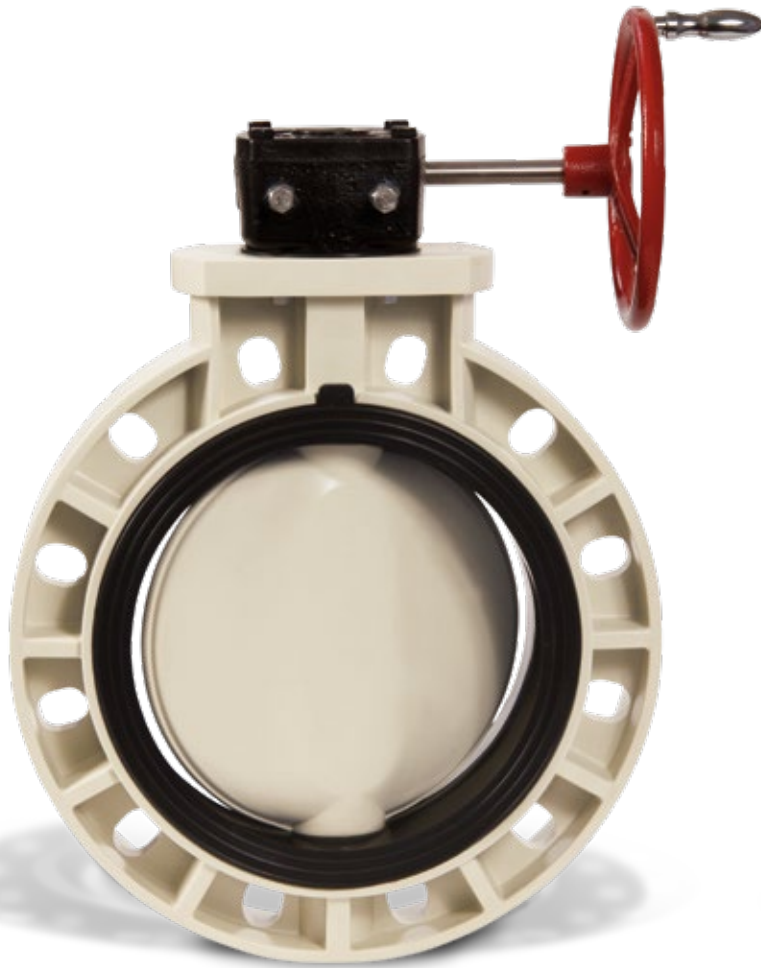
OPERATING TEMPERATURE/PRESSURE



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BYB Series Large Diameter Butterfly Valves

14" TO 24" PVC, CPVC, PP AND PVDF

KEY FEATURES

- PVC, CPVC, PP and PVDF Bodies
- PVC, CPVC, PP and PVDF Discs
- Heavy Duty Gear Operator
- 410 Grade Stainless Steel Stem
- Choice of FPM, EPDM or Nitrile Liners

OPTIONS

- Pneumatic or Electric Actuators
- Stem Extensions

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- PVDF
- FPM and EPDM Liners



TECHNICAL INFORMATION

SELECTION CHART

SIZE	BODY MATERIAL	DISC MATERIAL	LINER MATERIAL	PRESSURE RATING
14" – 16" (DN350 – DN400)				86 PSI @ 70°F 6 Bar @ 21°C Non-Shock
18" (DN450)	PVC, CPVC, PP or PVDF	CPVC, PP or PVDF	FPM, EPDM or Nitrile	72 PSI @ 70°F 5 Bar @ 21°C Non-Shock
20" – 24" (DN500 – DN600)				51 PSI @ 70°F 3 Bar @ 21°C Non-Shock

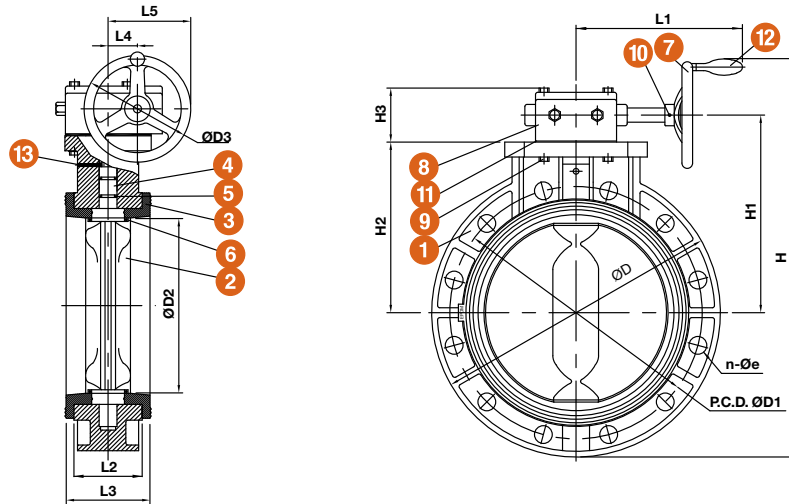
BYB Series Large Diameter Butterfly Valves

14" TO 24" PVC, CPVC, PP AND PVDF

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|----------------|------------------|
| 1. Body | 8. Gear Box |
| 2. Disc | 9. Bolt & Washer |
| 3. Seat Seal | 10. Spring Pin |
| 4. Stem | 11. Packing |
| 5. Stem O-Ring | 12. Small Handle |
| 6. Disc O-Ring | 13. Pin |
| 7. Handwheel | |

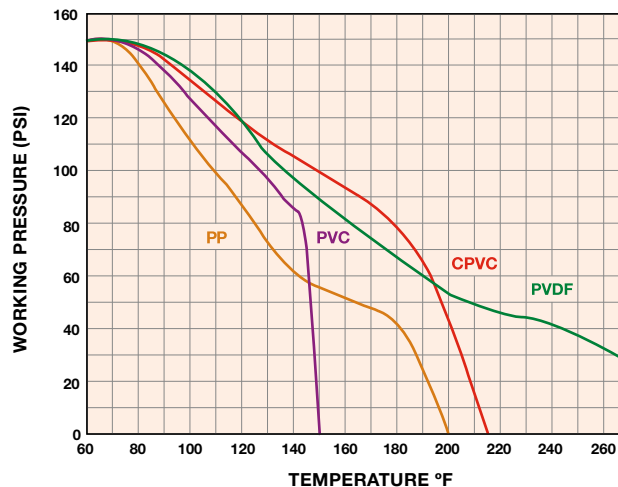


DIMENSIONS

SIZE in / DN	n-Øe	D in / mm	D1 in / mm	D2 in / mm	D3 in / mm	H in / mm	H1 in / mm	H2 in / mm	H3 in / mm	L1 in / mm	L2 in / mm	L3 in / mm	L4 in / mm	L5 in / mm
14 / 350	12-29	20.87 / 530	18.74 / 476	14.17 / 360	9.84 / 250	28.82 / 732	13.46 / 342	11.81 / 300	3.07 / 78	12.99 / 330	4.45 / 113	5.00 / 127	2.36 / 60	7.28 / 185
16 / 400	16-29	23.62 / 560	21.26 / 540	15.65 / 398	11.81 / 300	34.21 / 869	16.73 / 425	13.78 / 350	4.72 / 120	13.90 / 353	6.00 / 152	6.57 / 167	3.19 / 81	9.09 / 231
18 / 450	16-32	24.80 / 630	22.76 / 578	17.81 / 452	11.81 / 300	35.83 / 910	17.52 / 445	14.57 / 370	4.61 / 117	13.90 / 353	6.44 / 164	7.05 / 179	3.19 / 81	9.09 / 231
20 / 500	20-32	27.40 / 696	25.00 / 635	19.76 / 502	15.98 / 406	40.83 / 1037	19.13 / 486	16.14 / 410	5.63 / 143	15.35 / 390	6.69 / 170	7.44 / 189	4.72 / 120	12.72 / 323
24 / 600	20-35	32.01 / 813	29.80 / 757	23.74 / 603	15.98 / 406	44.00 / 1118	20.20 / 513	18.31 / 465	5.24 / 133	13.78 / 350	7.52 / 191	8.27 / 210	5.31 / 135	13.18 / 335

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



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BYCN / BYCS Series Butterfly Valves

3" TO 8" PVC

KEY FEATURES

- Distinctive Ergonomic Handle with Lockout Feature
- Wafer Body Design
- Fits ANSI 150 or PN10 Flange Patterns
- PVC Body with PVC Disc
- One-Piece Stainless Steel Stem 316 Grade for BYCN/410 Grade for BYCS
- ISO 5211 Mounting Pad
- NSF / ANSI-61 and NSF / ANSI 372 Listed (BYCN Series)

OPTIONS

- Gear Operators

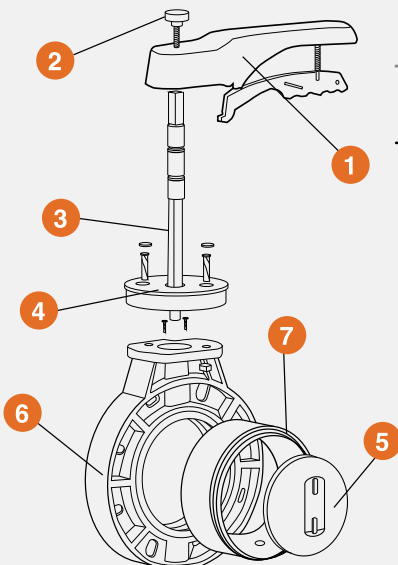
MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- EPDM Liner and Seals



TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SERIES	SIZE	BODY MATERIAL	DISC MATERIAL	STEM MATERIAL	LINERS	PRESSURE RATING
BYCN	3" - 8" (DN80 - DN200)	PVC	PVC	316 Grade Stainless Steel	EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
BYCS				410 Grade Stainless Steel		

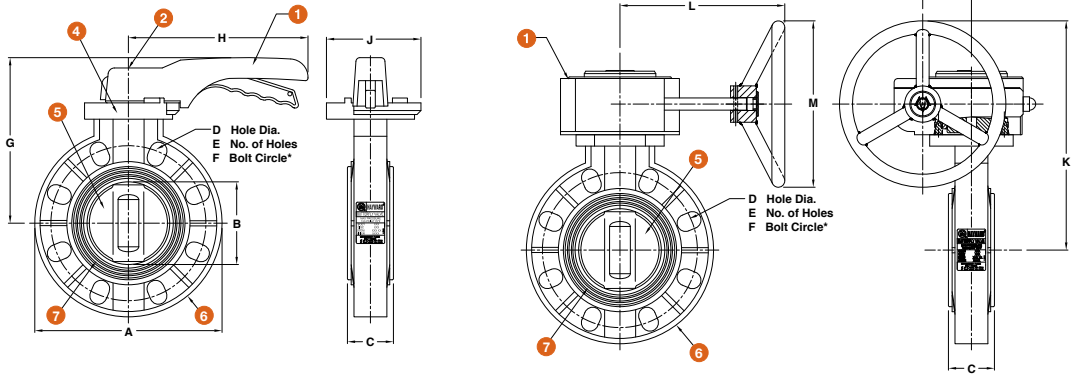
BYCN / BYCS Series Butterfly Valves

3" TO 8" PVC

TECHNICAL INFORMATION, CONTINUED

BYCN/BYCS PARTS LIST

1. Operator (Lever or Gear)
2. Bezel (Screw)
3. SSTL Stem
4. Throttle Plate with Screws
5. Disc
6. Body
7. Liner

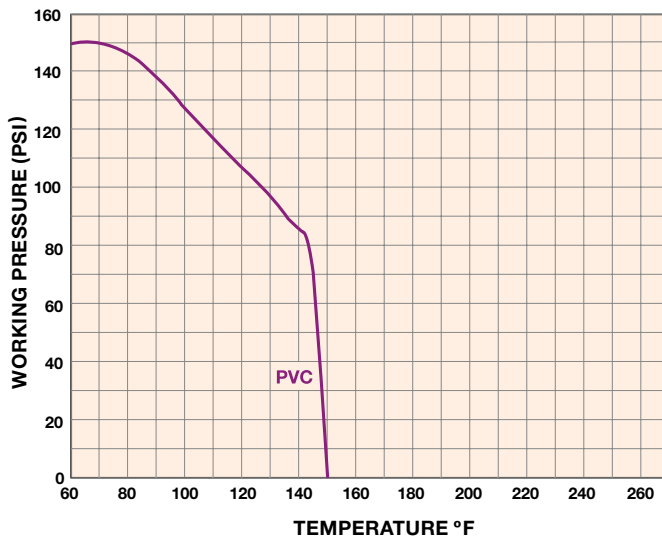


DIMENSIONS

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N
in / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
3 / 80	7.70 / 196	3.27 / 83	2.09 / 53	.75 / 19	4 / 102	6.00 / 152	7.44 / 189	9.80 / 249	8.43 / 214	10.59 / 269	9.69 / 246	8.00 / 203	2.36 / 60
4 / 100	9.06 / 230	3.98 / 101	2.24 / 57	.75 / 19	8 / 203	7.50 / 191	7.95 / 202	9.80 / 249	4.26 / 108	11.10 / 282	9.69 / 246	8.00 / 203	2.36 / 60
5 / 125	10.00 / 254	5.00 / 127	2.68 / 68	.88 / 22	8 / 203	8.50 / 216	9.96 / 253	12.60 / 320	5.84 / 148	12.34 / 313	9.69 / 246	8.00 / 203	2.36 / 60
6 / 150	11.19 / 284	5.98 / 152	2.87 / 73	.88 / 22	8 / 203	9.50 / 241	10.48 / 266	12.60 / 320	5.84 / 148	12.86 / 326	9.69 / 246	8.00 / 203	2.36 / 60
8 / 200	13.54 / 344	7.88 / 200	3.62 / 92	.88 / 22	8 / 203	11.75 / 298	12.17 / 309	12.60 / 320	5.84 / 148	14.55 / 370	9.69 / 246	8.00 / 203	2.36 / 60

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



Cv VALUES

SIZE in / DN	DISC ANGLE					FULL OPEN POSITION
	15°	30°	45°	60°	75°	
3 / 80	4	15	60	129	210	300
4 / 100	7	24	94	202	329	470
5 / 125	13	42	166	357	581	830
6 / 150	18	55	220	473	770	1,100
8 / 200	90	125	500	1,075	1,750	2,500

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient



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DAB Series True Union Diaphragm Valves

1/2" TO 2" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Position Indicator
- Sure-Grip Handwheel
- Choice of FPM, EPDM or PTFE Diaphragms*

OPTIONS

- Electric or Pneumatic Actuation
- PVDF Vapor Barrier**

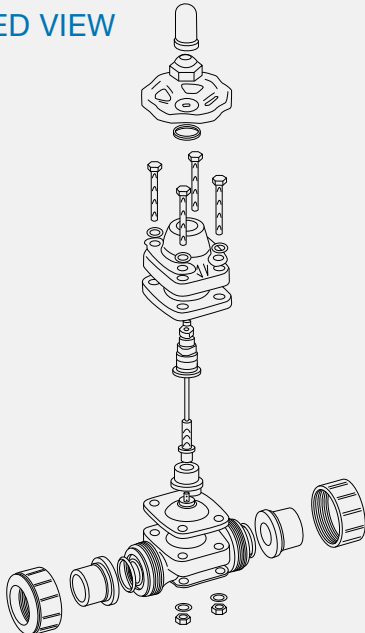
MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM, EPDM and PTFE O-Ring Seals

* All PTFE diaphragms are EPDM backed
 ** PVDF Vapor Barrier available with PTFE diaphragm only

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	SEALS	PRESSURE RATING
1/2" - 2"	PVC or CPVC	Socket and Threaded	FPM, EPDM or PTFE*	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* EPDM and PTFE diaphragms are available with a PVDF Vapor Barrier

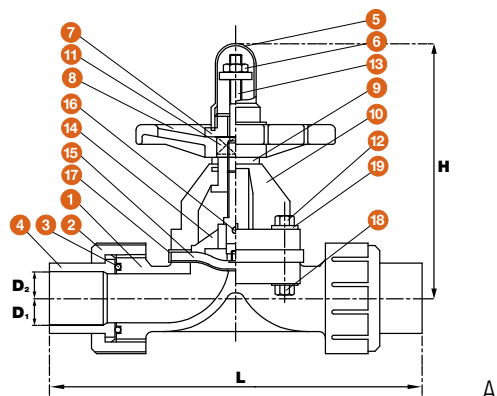
DAB Series True Union Diaphragm Valves

1/2" TO 2" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

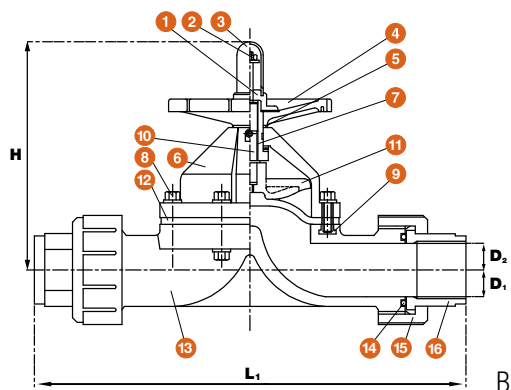
1/2" – 1" PARTS LIST (A)

- | | | |
|--------------------|------------------|---------------------------|
| 1. Union Body | 8. Hand Wheel | 15. Diaphragm |
| 2. Union Gland Cap | 9. Thrust Washer | 16. Pin |
| 3. Union O-Ring | 10. Bonnet | 17. Diaphragm Cover Plate |
| 4. Union Body Cap | 11. Sleeve | 18. Bolt |
| 5. Gauge Cap | 12. Nut | 19. Washer |
| 6. Stopper Nut | 13. Stem | |
| 7. Lock Nut | 14. Compressor | |



1-1/4" – 2" PARTS LIST (B)

- | | | |
|------------------|------------------|---------------------|
| 1. Lock Nut | 8. Bolt | 15. Union Gland Cap |
| 2. Stopper Nut | 9. Inserted Nut | 16. Union Body Cap |
| 3. Gauge Cap | 10. Sleeve | 17. Plate |
| 4. Hand Wheel | 11. Compressor | 18. Washer |
| 5. Thrust Washer | 12. Diaphragm | |
| 6. Bonnet | 13. Union Body | |
| 7. Stem | 14. Union O-Ring | |



DIMENSIONS

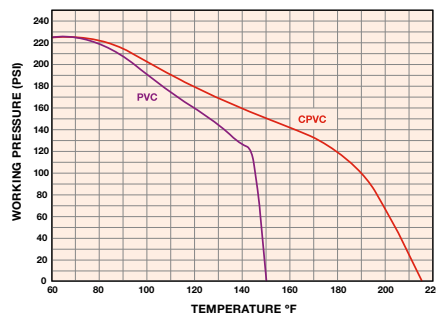
SIZE in / DN	L (Socket) in / mm	L1 (Thread) in / mm	d1 in / mm	d2 in / mm	H in / mm
1/2 / 15	5.90 / 150	5.55 / 141	.85 / 22	1/2 - NPT	3.74 / 95
3/4 / 20	6.69 / 170	6.22 / 158	1.06 / 27	3/4 - NPT	3.94 / 100
1 / 25	7.95 / 202	7.17 / 182	1.32 / 34	1 - NPT	4.33 / 110
1-1/4 / 30	11.22 / 285	10.63 / 270	1.91 / 48	1-1/4 - NPT	7.67 / 195
1-1/2 / 40	11.22 / 285	10.63 / 270	1.91 / 48	1-1/2 - NPT	7.67 / 195
2 / 50	12.79 / 325	12.13 / 308	2.39 / 61	2 - NPT	8.27 / 210

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	5.0	1-1/4 / 30	18.0
3/4 / 20	8.0	1-1/2 / 40	26.0
1 / 25	10.0	2 / 50	56.0

OPERATING TEMPERATURE/PRESSURE



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DAB Series Flanged Diaphragm Valves

1/2" TO 6" PVC / 1/2" TO 4" CPVC

KEY FEATURES

- Available in PVC and CPVC
- Position Indicator
- Sure-Grip Handwheel
- Choice of FPM, EPDM or PTFE Diaphragms*

OPTIONS

- Pneumatic or Electric Actuation
- Over 4" Actuation, Consult Factory
- PVDF Vapor Barrier***

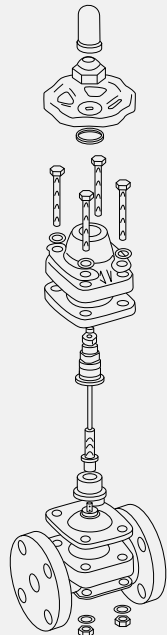
MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM, EPDM and PTFE O-Ring Seals

* All PTFE diaphragms are EPDM backed
 *** PVDF Vapor Barrier available with PTFE diaphragm only

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" - 4"	PVC	Flanged	FPM, EPDM or PTFE*	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
6"				75 PSI @ 70°F 5 Bar @ 21°C Non-Shock
1/2" - 4"	CPVC			150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

*EPDM and PTFE diaphragms are available with a PVDF Vapor Barrier

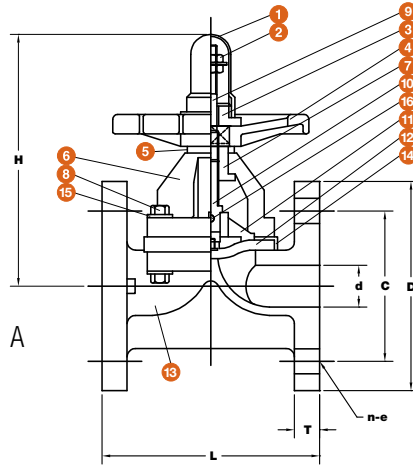
DAB Series Flanged Diaphragm Valves

1/2" TO 6" PVC / 1/2" TO 4" CPVC

TECHNICAL INFORMATION, CONTINUED

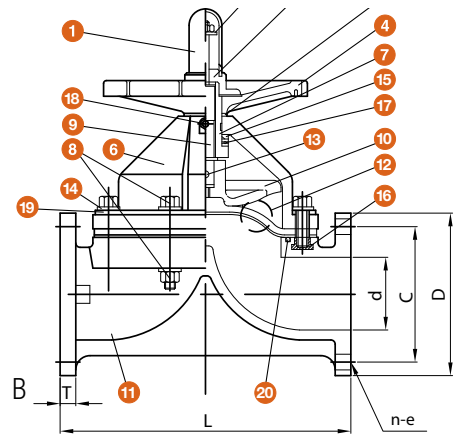
1/2" – 6" PARTS LIST (A)

- | | |
|------------------|------------------------------|
| 1. Gauge Cap | 10. Spindle |
| 2. Stopper Nut | 11. Compressor |
| 3. Lock Nut | 12. Diaphragm |
| 4. Hand Wheel | 13. Body |
| 5. Thrust Washer | 14. Diaphragm
Cover Plate |
| 6. Bonnet | 15. Washer |
| 7. Sleeve | 16. Pin |
| 8. Bolt and Nut | |
| 9. Stem | |



1/2" – 4" PARTS LIST (B)

- | | |
|------------------|-------------------------|
| 1. Gauge Cap | 11. Body |
| 2. Stopper Nut | 12. Diaphragm |
| 3. Lock Nut | 13. Pin |
| 4. Hand Wheel | 14. Washer |
| 5. Thrust Washer | 15. PTFE Ring |
| 6. Bonnet | 16. Inserted Nut |
| 7. Sleeve | 17. Thrust Ball Bearing |
| 8. Bolt and Nut | 18. Grease Nipple |
| 9. Stem | 19. SUS Plate |
| 10. Compressor | 20. Body O-Ring |



DIMENSIONS

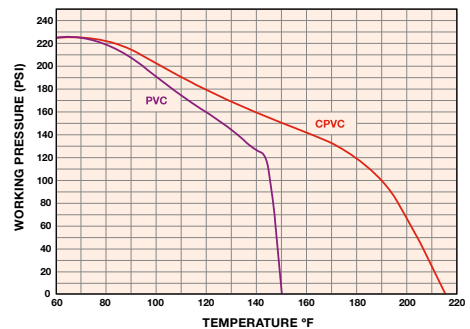
SIZE in / DN	C in / mm	d in / mm	D in / mm	H in / mm	L in / mm	T in / mm	n-e # x diameter
1/2 / 15	2.38 / 60	.63 / 16	3.50 / 89	3.78 / 96	4.33 / 110	.47 / 12	4-15.7
3/4 / 20	2.76 / 70	.79 / 20	3.86 / 98	3.94 / 100	4.72 / 120	.51 / 13	4-15.7
1 / 25	3.13 / 80	.98 / 25	4.25 / 108	4.25 / 108	5.20 / 132	.55 / 14	4-15.7
1-1/4 / 32	3.50 / 89	1.20 / 30	4.65 / 118	5.75 / 146	5.20 / 132	.55 / 14	4-15.7
1-1/2 / 40	3.85 / 98	1.60 / 41	5.00 / 127	7.76 / 197	7.09 / 180	.63 / 16	4-15.7
2 / 50	4.75 / 121	2.00 / 51	6.00 / 152	8.58 / 218	8.27 / 210	.70 / 18	4-19
2-1/2 / 65	5.50 / 140	2.55 / 65	6.90 / 175	10.24 / 260	9.88 / 251	.79 / 20	4-19
3 / 80	6.00 / 152	3.03 / 77	7.50 / 191	10.63 / 270	11.02 / 280	.83 / 21	4-19
4 / 100	7.50 / 191	3.94 / 100	9.00 / 229	11.81 / 300	13.50 / 343	.83 / 21	8-19
6 / 150	9.50 / 241	5.70 / 145	11.00 / 279	18.74 / 476	18.80 / 478	1.06 / 27	8-22

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	5.0	1-1/4 / 30	18.0	2-1/2 / 65	80.0	6 / 150**	400.0
3/4 / 20	8.0	1-1/2 / 40	26.0	3 / 80	115.0		
1 / 25	10.0	2 / 50	56.0	4 / 100	190.0		

OPERATING TEMPERATURE/PRESSURE



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LHB Series Manual Limit Switch

FOR BALL VALVES UP TO 6" AND
BUTTERFLY VALVES UP TO 8"

KEY FEATURES

- Remote Monitoring of Critical Services
- Retrofits to Existing Valves
- Robust GFPP Body, Cover and Plate
- 304 Stainless Steel Stem and FPM Seals
- Fits All Hayward® Ball Valves up to 6" and Butterfly Valves up to 8"
- Available with "Dead-Man" Spring Return Handle or Handlever (LHB-SR)
- Two Adjustable SPDT 10 Amp at 120 VAC Switches (Open/Close Position)
- 1/2" Conduit Port
- Terminal Blocks for Ease of Wiring
- Meets ISO5211, F05, F07 and F10 Patterns
- NEMA 4X
- Switches CSA Listed

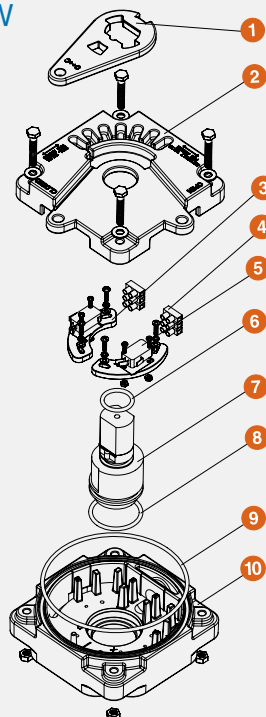
OPTIONS

- Additional Two Switches
- Optional Handles – Lever or T-Handle



TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

MANUAL LIMIT SWITCH MODEL	VALVE SIZE/SERIES
LHB-1	1/2" – 2" TB / TBH (DN15 – DN50) 1-1/2" – 4" BYV (DN40 – DN100)
LHB-2	2-1/2" – 6" TB / TBH (DN65 – DN150) 6" – 8" BYV (DN150 – DN200)
LHB-1-SR	1/2" – 2" TB (DN15 – DN50)
LHB-2-SR	2-1/2" – 6" TB (DN65 – DN150)

Pat. No's.: 9,010,721; and 9,0101, 722; 9, 702,480

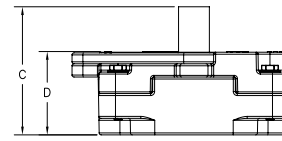
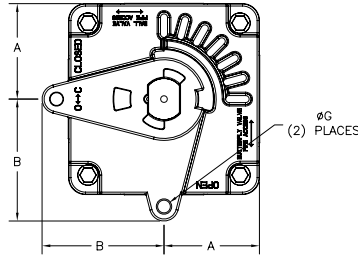
LHB Series Manual Limit Switch

FOR BALL VALVES UP TO 6" AND BUTTERFLY VALVES UP TO 8"

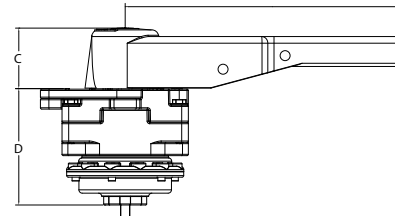
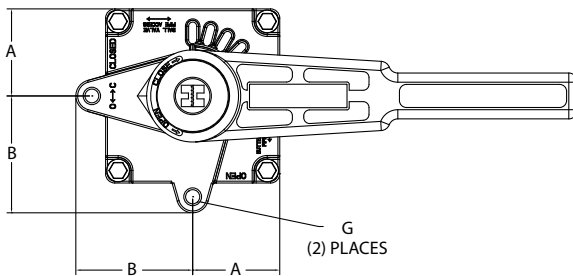
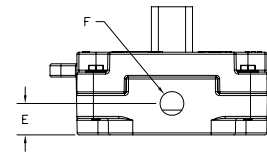
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

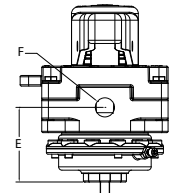
1. Lock Plate
2. Cover
3. Adjustment Plate
4. Terminal Block
5. Switch
6. Upper Shaft O-Ring
7. Shaft
8. Lower Shaft O-Ring
9. Body O-Ring
10. Body



LHB



LHB-SR



DIMENSIONS

MANUAL LIMIT SWITCH MODEL	VALVE SIZE/SERIES	A		B		C		D		E		F		G	
		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
LHB-1	1/2" – 2" TB / TBH 1-1/2" – 4" BYV	2.38	60	3.19	81	3.88	99	2.52	64	.95	24	1/2"	NPT	.38	10
LHB-2	2-1/2" – 6" TB / TBH 6" and 8" BYV	2.89	73	3.69	94	3.88	99	2.52	64	.95	24	1/2"	NPT	.38	10
LHB1-SR	1/2" – 2" TB / TBH	2.38	61	3.19	81	2.28	60	4.38	112	2.81	71	1/2"	NPT	.38	10
LHB2-SR	2-1/2" – 6" TB / TBH	2.89	73	3.69	94	2.28	60	2.52	64	112	71	1/2"	NPT	.38	10

Dimensions are subject to change without notice – consult factory for installation information



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SV Series True Union Solenoid Valves

1/4" TO 1" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Corrosion-Resistant Polyester Coil
- No Pressure Differential Required for Operation
- Both 1/2" Conduit or SJ-Type Cord Electrical Connection
- 110 VAC Standard
- Normally Closed Design

OPTIONS

- 12 VAC, 24 VAC, 220 VAC,
12 VDC, 24 VDC

OPERATING PARAMETERS

For optimum valve performance, inlet pressure must not exceed 120 PSI. Flow velocity must not exceed 5 ft. per second. Units are not to be operated on continuously. Maximum back pressure 25psi.

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 1" * (DN8 – DN25)	PVC or CPVC	Socket and Threaded	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.

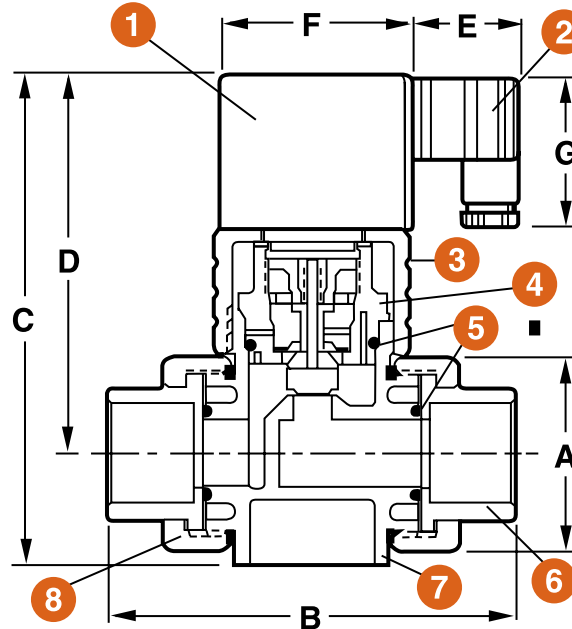
SV Series True Union Solenoid Valves

1/4" TO 1" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Solenoid Coil
2. Electrical Connector
3. Bonnet Nut
4. Seal Cartridge
5. O-Rings
6. End Connector
7. Body
8. Union Nut



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	WEIGHT lbs / kg
1/4 / 8	2.25 / 57	5.30 / 135	6.30 / 160	4.60 / 117	1.60 / 41	2.60 / 66	2.00 / 51	2.79 / 1.27
1/2 / 15*	2.25 / 57	5.30 / 135	6.30 / 160	4.60 / 117	1.60 / 41	2.60 / 66	2.00 / 51	2.81 / 1.27
3/4 / 20*	2.63 / 67	5.50 / 140	6.60 / 168	5.10 / 130	1.60 / 41	2.60 / 66	2.00 / 51	3.01 / 1.37
1 / 25*	2.63 / 67	5.50 / 140	6.60 / 168	5.10 / 130	1.60 / 41	2.60 / 66	2.00 / 51	3.03 / 1.37

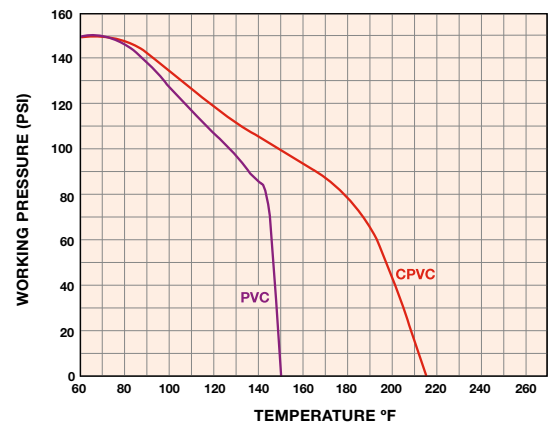
Dimensions are subject to change without notice – consult factory for installation information

* Metric End Connections Available In: BSP – Straight Thread, BSP TR – Tapered Thread and Metric Socket

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES	PRESSURE LOSS CALCULATION FORMULA
1/4 / 8	1.3	3/4 / 20	3.2	$\Delta P = \left[\frac{Q}{C_v} \right]^2$ $\Delta P = \text{Pressure Drop}$ $Q = \text{Flow in GPM}$ $C_v = \text{Flow Coefficient}$
1/2 / 15	2.3	1 / 25	3.8	

OPERATING TEMPERATURE/PRESSURE



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EA Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

- Available in PVC and CPVC
- EPDM Seals
- PTFE Seats
- Full Port Design
- Fully Serviceable
- Double O-Ring Stem Seals

ACTUATOR FEATURES

- UL/CSA Listed Motor
- Thermoplastic NEMA 4 / 4X enclosure
- 2.5 Second, 90° Cycle Time
- Thermal Overload Protection
- Permanently Lubricated Gear Train
- Actuator Brake
- No Need for Manual Adjustments
- Blind Leads Connection
- Standard 120 VAC
- Unidirectional, Not Reversing

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- EPDM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE	VALVE MATERIAL	END CONNECTION	VALVE SEALS	VALVE PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded	EPDM	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
Not for use with "Z" Ball.

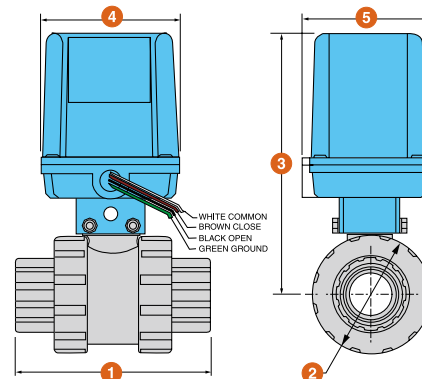
EA Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

SIZE in / DN	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm	WEIGHT lbs / kg
1/2 / 15	4.63 / 118	2.25 / 57	8.30 / 211	4.75 / 121	4.34 / 110	6.80 / 3.08
3/4 / 20	4.75 / 121	2.63 / 67	8.46 / 215	4.75 / 121	4.34 / 110	6.80 / 3.08
1 / 25	5.25 / 133	3.00 / 76	8.73 / 222	4.75 / 121	4.34 / 110	7.10 / 3.22
1-1/4 / 32	6.30 / 160	4.00 / 102	9.50 / 241	4.75 / 121	4.34 / 110	8.00 / 3.63
1-1/2 / 40	6.75 / 171	4.00 / 102	9.15 / 232	4.75 / 121	4.34 / 110	8.10 / 3.67
2 / 50	8.00 / 203	4.75 / 121	9.65 / 245	4.75 / 121	4.34 / 110	9.80 / 4.45



Dimensions are subject to change without notice – consult factory for installation information

ACTUATOR SPECIFICATIONS

MODEL	EA
Torque Output (in-lbs)	120
Standard Voltage	120 VAC
Duty Cycle	25%
Thermal Overload	Standard
Cycle Time (secs @ 90°)	2.5
Conduit Entry	1/2" NPT
Enclosure	NEMA 4 / 4X
Enclosure Material	Polypropylene
Max Current Amps @ 115 VAC	1.8

VALVE SPECIFICATIONS

VALVE TYPE	TRUE UNION
Material of Construction	PVC, CPVC
Seals	FPM/EPDM
Seats	PTFE
End Connections	Socket or Threaded
Sizes	1/2", 3/4", 1", 1-1/4", 1-1/2" and 2"
Pressure Rating	250 PSI @ 70°F non-shock
Design	Full Port

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	8.0	1-1/4 / 32	75.0
3/4 / 20	15.0	1-1/2 / 40	90.0
1 / 25	29.0	2 / 50	140.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient



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EAU Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

- Available in PVC and CPVC
- FPM or EPDM Seals
- PTFE Seats
- Full Port Design
- Fully Serviceable
- Double O-Ring Stem Seals

ACTUATOR FEATURES

- UL/CSA Listed Motor
- Thermoplastic NEMA 4 / 4X Enclosure
- 2.5 Second, 90° Cycle Time
- Permanently Lubricated Gear Train
- Actuator Brake
- 90 or 180° Operation
- Unidirectional, Not Reversing
- Terminal Block Connections
- Standard 120 VAC
- End of Travel Dry Contact Limit Switch
- Thermal Overload Protection
- Lightweight, Compact and Inexpensive

OPTIONS

- 24VAC / VDC
- 230 VAC

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE	VALVE MATERIAL	END CONNECTION	VALVE SEALS	VALVE PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded	FPM or EPDM	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
Not for use with "Z" Ball.

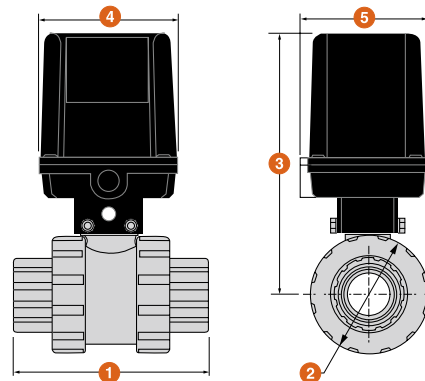
EAU Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

SIZE in / DN	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm	WEIGHT lbs / kg
1/2 / 15	4.63 / 118	2.25 / 57	8.40 / 213	4.88 / 124	4.13 / 105	6.80 / 3.08
3/4 / 20	4.75 / 121	2.63 / 67	8.60 / 218	4.88 / 124	4.13 / 105	6.80 / 3.08
1 / 25	5.25 / 133	3.00 / 76	9.10 / 231	4.88 / 124	4.13 / 105	7.10 / 3.22
1-1/4 / 32	6.30 / 160	4.00 / 102	9.50 / 241	4.88 / 124	4.13 / 105	8.00 / 3.63
1-1/2 / 40	6.75 / 171	4.00 / 102	9.50 / 241	4.88 / 124	4.13 / 105	8.10 / 3.67
2 / 50	8.00 / 203	4.75 / 121	10.10 / 257	4.88 / 124	4.13 / 105	9.80 / 4.45



Dimensions are subject to change without notice – consult factory for installation information

ACTUATOR SPECIFICATIONS

MODEL	EAU
Torque Output (in-lbs)	120
Standard Voltage	120 VAC
Duty Cycle	25%
Thermal Overload	Standard
Cycle Time (secs*)	2.5 / 5.0
Conduit Entry	1/2" NPT
Enclosure	NEMA 4 / 4X
Enclosure Material	Polypropylene
Max Current Amps @ 115 VAC	1.8 (60 Hz), 2.8 (50 Hz)

* EAU28 = 180° (5.0 sec), EAU29 = 90° (2.5 sec.)

VALVE SPECIFICATIONS

VALVE TYPE	TRUE UNION
Material of Construction	PVC, CPVC
Seals	FPM/EPDM
Seats	PTFE
End Connections	Socket or Threaded
Sizes	1/2", 3/4", 1", 1-1/4" 1-1/2" and 2"
Pressure Rating	250 PSI @ 70°F non-shock
Design	Full Port

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	8.0	1-1/4 / 32	75.0
3/4 / 20	15.0	1-1/2 / 40	90.0
1 / 25	29.0	2 / 50	140.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient



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PM Series Automated TBH True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

- System2™ Sealing Technology provides longer cycle life
- 250 PSI / 16 Bar, non-shock at 70°F / 23°C full pressure rating
- Consistent operating torque with adjustment-free design
- Lockout/Tagout mechanism that secures directly to valve body for enhanced safety
- Ergonomic handle for improved grip and comfort
- ISO mounting flange simplifies actuation
- Permanent markings, eliminates labels
- Integral footpad for skid or panel mount
- FPM or EPDM seals
- Double O-Ring stem seals
- Reversible PTFE seats – Standard
- Easy replacement for existing Hayward TB Series
- NSF / ANSI 61 and NSF / ANSI 372 Listed

ACTUATOR FEATURES

- Corrosion-Resistant Thermoplastic Housing
- Permanently Lubricated Gear Train
- Manual Override
- Two-Piston Rack and Pinion Design
- Namur Compliant Accessory Mount
- Position Indicator
- Lightweight
- Air-to-Air (Double Acting) or Spring Return (Single Acting)

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SPECIFICATIONS

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded	FPM or EPDM	250 PSI @ 70°F 16 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.

PM Series Automated TBH True Union Ball Valves

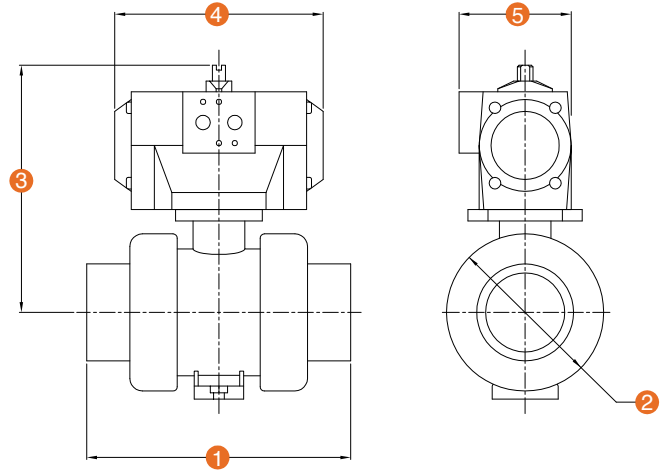
1/2" TO 2" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

SIZE in / DN	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm
SPRING RETURN (PMS)					
1/2 / 15	4.65 / 118	2.25 / 57	6.13 / 156	6.30 / 160	3.39 / 86
3/4 / 20	4.79 / 122	2.63 / 67	6.29 / 160	6.30 / 160	3.39 / 86
1 / 25	5.39 / 136	3.00 / 76	6.55 / 167	6.30 / 160	3.39 / 86
1-1/4 / 32	6.83 / 174	4.00 / 102	6.98 / 178	6.30 / 160	3.39 / 86
1-1/2 / 40	7.39 / 188	4.00 / 102	6.98 / 178	6.30 / 160	3.39 / 86
2 / 50	8.00 / 203	4.75 / 121	7.98 / 190	6.30 / 160	3.39 / 86
DOUBLE ACTING (PMD)					
1/2 / 15	4.65 / 118	2.25 / 57	5.39 / 136	4.69 / 119	2.64 / 67
3/4 / 20	4.79 / 122	2.63 / 67	5.50 / 140	4.69 / 119	2.64 / 67
1 / 25	5.39 / 136	3.00 / 76	5.76 / 147	4.69 / 119	2.64 / 67
1-1/4 / 32	6.83 / 174	4.00 / 102	6.19 / 158	4.69 / 119	2.64 / 67
1-1/2 / 40	7.39 / 188	4.00 / 102	6.19 / 158	4.69 / 119	2.64 / 67
2 / 50	8.00 / 203	4.75 / 121	6.69 / 170	4.69 / 119	2.64 / 67

Dimensions are subject to change without notice – consult factory for installation information



ACTUATOR SPECIFICATIONS

MODEL	PMD15	MODEL	PMS15
Torque Output (in-lbs) @ 80 PSI	275	Torque Output (in-lbs) @ End of Spring Return	107
Enclosure Material	Polyamide	Enclosure Material	Polyamide
Output Shaft	Carbon Steel	Output Shaft	Carbon Steel
Air Port Connections	1/4" NPT	Air Port Connections	1/4" NPT
Air Consumption (cu. in.)	13.5	Air Consumption (cu. in.)	10.8
Air Transfer	Internal	Air Transfer	Internal
Stroke Time (seconds)	.5	Stroke Time (seconds)	.5
Cycle Time	1/2 Second	Cycle Time	1/2 Second
Minimum Air Pressure	80 PSI	Minimum Air Pressure	80 PSI
Maximum Air Pressure	120 PSI	Maximum Air Pressure	120 PSI
Operation	Rack and Pinion	Operation	Rack and Pinion
Weight (lbs / kg)	1.15 / .52	Weight (lbs / kg)	3.1 / 1.4

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	8.0	1-1/4 / 32	75.0
3/4 / 20	15.0	1-1/2 / 40	90.0
1 / 25	29.0	2 / 50	140.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient



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EAU Series Electric Actuators

FOR BALL VALVES UP TO 2"

KEY FEATURES

- UL/CSA Listed Motor
- Thermoplastic NEMA 4 / 4X Enclosure
- 2.5 Second, 90° Cycle Time, 5.0 sec 180° Cycle Time
- Permanently Lubricated Gear Train
- Actuator Brake
- 90 or 180° Operation
- Unidirectional, Not Reversing
- Terminal Block Connections
- Standard 120 VAC
- End of Travel Dry Contact Limit Switch
- Thermal Overload Protection
- Lightweight, Compact and Inexpensive

OPTIONS

- Voltage Options of 12, 24 or 220 VAC and 12 or 24 VDC

MATERIALS

- PP per ASTM D4101

TECHNICAL INFORMATION

SPECIFICATIONS

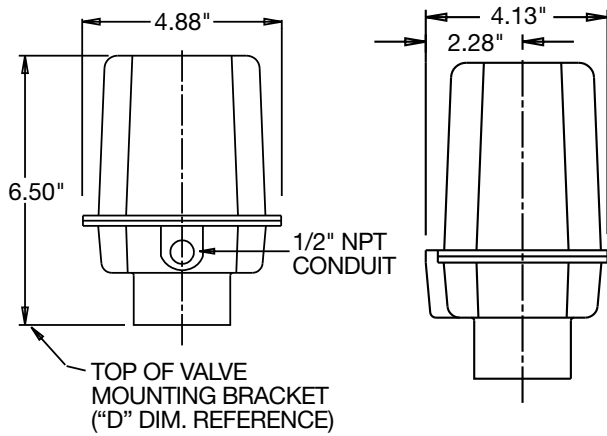
HOUSING	GFPP
OPERATION	Unidirectional
CONDUIT SIZE	1/2"
DUTY CYCLE	25%
CYCLE TIMES	2-1/2 Seconds, 90° Rotation; 5 Seconds, 180° Rotation
ENCLOSURE	NEMA 4 / 4X
VOLTAGE	120 VAC
THERMAL OVERLOAD PROTECTION MECHANICAL BRAKE MOTOR	UL Listed
AUXILIARY LIMIT SWITCHES	Rated 10A @ 230 VAC Resistive

EAU Series Electric Actuators

FOR BALL VALVES UP TO 2"

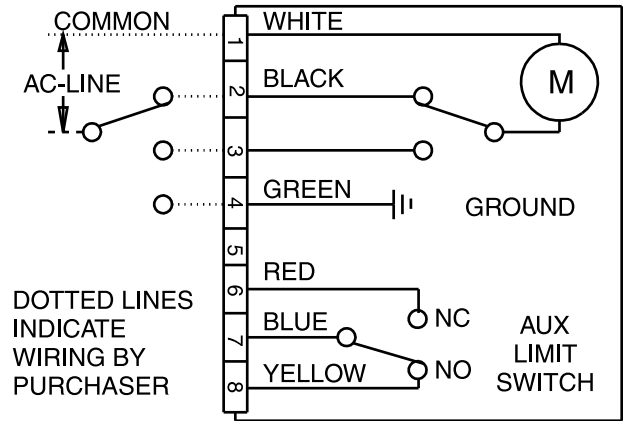
TECHNICAL INFORMATION, CONTINUED

DIMENSIONS



Dimensions are subject to change without notice – consult factory for installation information

WIRING DIAGRAM



ACTUATOR SPECIFICATIONS

MODEL	EAU
Torque Output (in-lbs)	120
Standard Voltage	120 VAC
Duty Cycle	25%
Thermal Overload	Standard
Cycle Time (in seconds)*	2.5 / 5.0
Auxiliary Switch Limit Rating	SPDT 10A Resistive @ 230 VAC
Conduit Entry	1/2" NPT
Enclosure	NEMA 4 / 4X
Enclosure Material	Polypropylene
Max Current Amps @ 120 VAC	1.8
Weight (lbs / kg)	6.2 / 2.7

* EAU28 = 180° (5.0 sec) EAU29 = 90° (2.5 sec)

VALVE SELECTION CHART

SIZE in / DN	TB / TBH / TN / LA90 SERIES BALL VALVES	TW / LA SERIES BALL VALVES
1/2 – 2 / 15 – 50	EAU29 (90°)	EAU28 (180°)

* Actuator size selections based on clean water at 70°F



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ECP Series Glass Filled Polypropylene Electric Actuators

FOR BALL VALVES 1/2" - 6"

BUTTERFLY VALVES 2" - 6"

KEY FEATURES

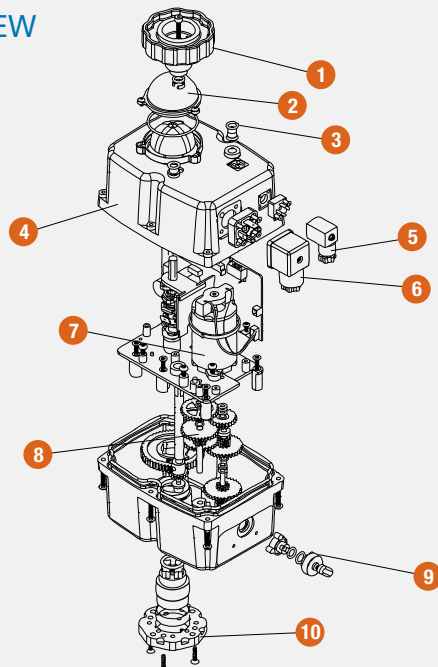
- Ideal for Corrosive Atmosphere and Environments
- Corrosion-Resistant GFPP Housing
- LED Status Light
- Anti-Condensation Heater
- Manual Override
- Position Indicator
- 4 SPDT Micro Limit Switches
- Lightweight - Easy for Installation
- ISO 5211 Mounting Base
- Stainless Steel Fasteners 303 SS
- 100% Factory Tested
- CE Mark
- Thermal Overload Protection
- Auto Switching Power Supply

OPTIONS

- Digital Positioner 4-20mA or 2-10V
- Battery Fail Safe Kit

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION	1/4 Turn
DUTY RATING	75%
ENCLOSURE	NEMA 4 / 4X
PROTECTION	IP67 265
VOLTAGE	Single Phase 24V~V AC/DC
HOUSING	GFPP (Glass Filled Polypropylene) per 314ASTM D4101 Cell Class 85580
OUTPUT SHAFT	303 Stainless Steel per ASTM A314

ECP Series Electric Actuators

FOR BALL VALVES 1/2" - 6" AND BUTTERFLY VALVES 2" - 6"

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|-----------------------------------|----------------------------|
| 1. Manual Override | 6. Power DIN Connector |
| 2. Position Indicator Assembly | 7. DC Drive Motor |
| 3. LED Indicator | 8. Hardened Steel Gear Set |
| 4. Housing | 9. Declutch Lever |
| 5. Auxiliary Switch DIN Connector | 10. ISO5211 Mount Plate |

DIMENSIONS

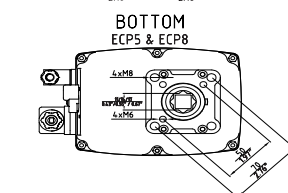
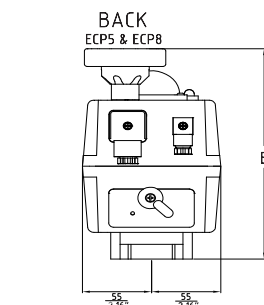
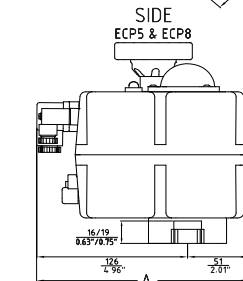
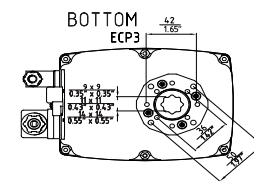
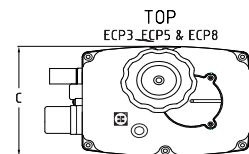
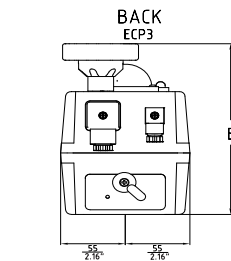
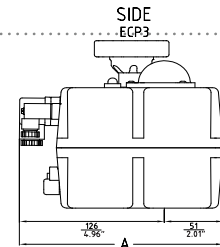
MODEL	A in / mm	B in / mm	C in / mm	ISO PATTERN
ECP3	6.96 / 177	6.73 / 171	4.33 / 110	F05 X 14 mm
ECP5	6.96 / 177	7.72 / 196	4.33 / 110	F07 X 14 mm
ECP8	6.96 / 177	7.72 / 196	4.33 / 110	F07 X 14 mm

ACTUATOR SPECIFICATIONS

	ECP3	ECP5	ECP8
Torque Output (in / lbs / Nm)	359 / 40	530 / 60	796 / 90
Enclosure Material	Glass Filled Polypropylene		
Output Shaft	303 Stainless Steel		
Cycle Time	11 sec.	14 sec.	30 sec.
Operating Temperature	4° F to 160° F / 16° C to 71° C		
Weight (lbs / kg)	1.90 / 0.86	2.40 / 1.09	3.00 / 1.36

VALVE SELECTION CHART

VALVE TYPE	SIZE	ECP3	ECP5	ECP8
TB / TBH Series Ball Valves	1/2"	•		
	3/4"	•		
	1"	•		
	1-1/4"	•		
	1-1/2"	•		
	2"	•	•	•
TW/LA Series Three Way Valves	2-1/2" - 3"	•	•	•
	4" - 6"	•	•	•
	1/2"	•		
	3/4"	•		
	1"	•		
	1-1/4"	•	•	
BYV Series Butterfly Valves	1-1/2"	•	•	
	2"	•	•	•
	2-1/2" - 3"	•	•	•
	4" - 6"	•	•	•
	2"	•		
	3"	•		
	4"		•	
	6"			•



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NEW



HZSN1 Series On/Off Proportional Electric Actuators

KEY FEATURES

- Equipped with two 2 Volt-free Form A Auxiliary Switches Rated at up to 1A 250VAC (on/off models only)
- Proportional Models have 4-20mA or 2-10vdc Feedback Output Standard
- ISO5211 Compliant with an 11mm Double Square Female Drive
- Furnished with a 39" (1M) Cable to Facilitate Field Connections Outside the Compact Enclosure
- Low Profile Visual Position Indicator and Three Flush Mounted LEDs Allow At-a-glance Position Indication
- Manual Override Lever and 8mm Access Shaft at the Bottom of the Actuator Housing
- NEMA 4X/IP67 Compliant
- PG6 EMT Entry Port with Sealed Cable Gland

OPTIONS

- Power Supply Flexibility – 24 VAC/VDC, 120 VAC and 230 VAC
- On / Off or Proportional Control

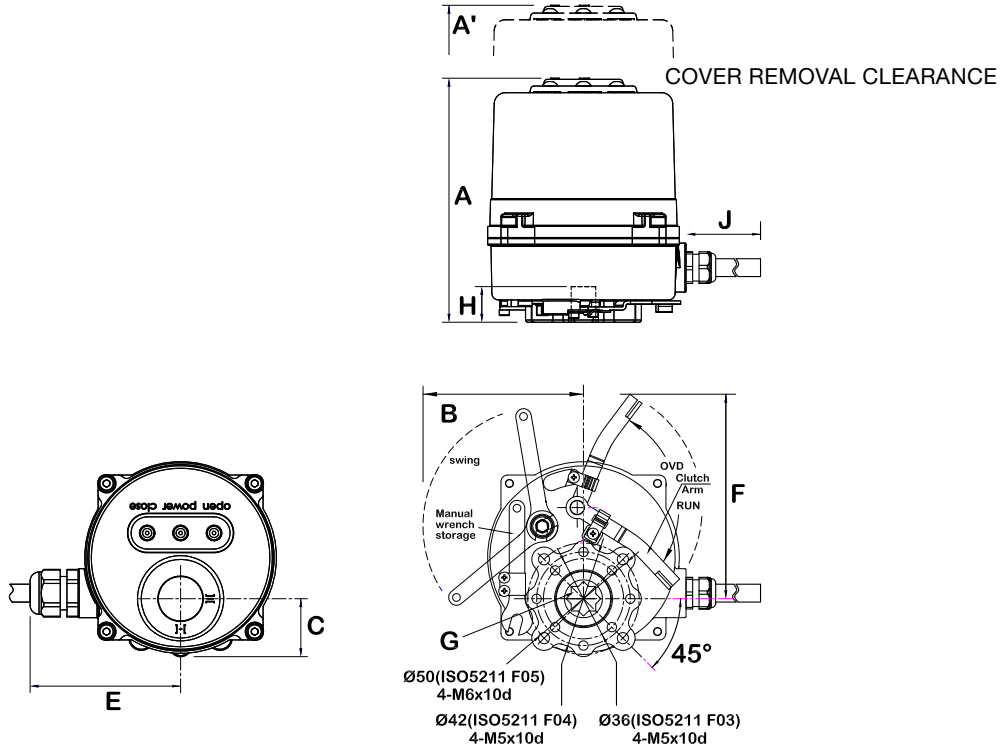
TECHNICAL INFORMATION

ACTUATOR SPECIFICATIONS		HZSN1C
Supply	Torque Output (lbf-in / Nm)	266 / 30
24VAC - 24VDC	Current Draw (Start / Run / LRA)	2.1A / 1.2A / 2.3A
	Speed (90°) DC, seconds	11
	Motor - 24vdc Perm Magnet Brush Type	10W
	Duty Cycle (on/off / mod)	75%
	Motor Starts, per hour, Max	1200
	Motor Class	Class B
120V	Current Draw (Start / Run / LRA)	.39A / .36A / .48A
	Speed (90°) 60Hz / 50Hz, seconds	11
	Motor - 120vac Split-Phase Cap TENV	10W
	Duty Cycle (on/off / mod)	25% / 75%
	Motor Starts, per hour, Max	1200
	Motor Class	Class B
230V	Current Draw (Start / Run / LRA)	.23A / .21A / .28A
	Speed (90°) 60Hz / 50Hz, seconds	11
	Motor - 230vac Split-Phase Cap TENV	10W
	Duty Cycle (on/off / mod)	25% / 75%
	Motor Starts, per hour, Max	1200
	Motor Class	Class B
All	Control	On/Off or Proportional
	Electrical Entry (1)	PG6 Nylon Gland with 39" 10C-24 Cable On/Off or 8C-24 Proportional
	Manual Override	Bottom Mounted 8mm Hex Shaft
	Ambient Operating Range	-22°F to +158°F (-30°C to +70°C)
	Humidity Range	0-95% RH
	Altitude Limit	9850 ft / 3000 m

HZSN1 Series On/Off Proportional Electric Actuators

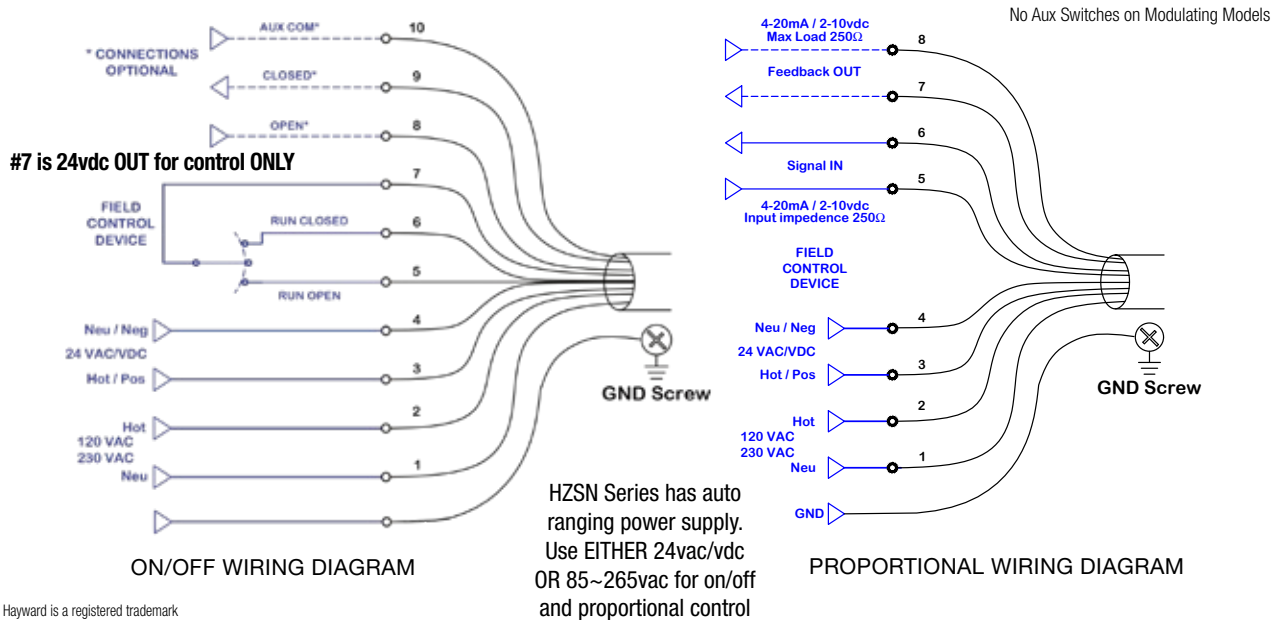
FOR BALL VALVES UP TO 2"

TECHNICAL INFORMATION, CONTINUED



DIMENSIONS

MODEL	A in / mm	A' in / mm	B in / mm	C in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	WEIGHT lbs / kg
HZSN1A,B,C	4.33 / 110	2.95 / 75	2.83 / 72	1.00 / 25	2.75 / 70	3.72 / 95	.433 / 11	.630 / 16	39.4 / 1000	2.2 / 1.0



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HRSN2 Series On/Off Proportional Electric Actuators

FOR BALL UP TO 6" AND
BUTTERFLY VALVES UP TO 4"

KEY FEATURES

- Units are equipped with two (2) volt-free Form A Auxiliary switches
- ISO5211 compliant mounting with a double square female drive socket
- Raised visual position indicator
- NEMA 4X/IP67 compliant
- Two (2) EMT entry ports with sealed cable glands

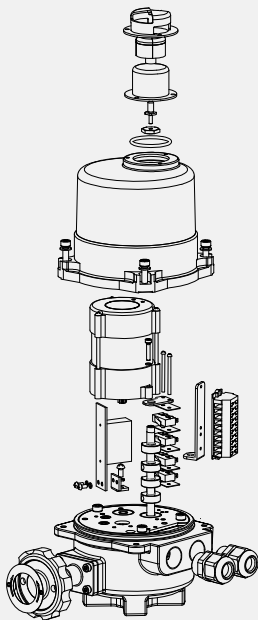
OPTIONS*

- Manual Override Handwheel
- Local Control Stations
- IP68 Submersion
- Battery Backup
- Supercap Backup

* Not Available on All Models

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION	Reversing
CONDUIT SIZE	HRSN2 Two Conduit Fittings 1/2" NPT Each
DUTY CYCLE	HRSN2A~2S AC Versions On/Off = 25%, Ext Dty = 75%, Proportional = 75%, DC Versions On/Off & Proportional = 75%
CYCLE TIMES	8–13 Seconds, Depending on Model
ENCLOSURE	NEMA 4/4X
VOLTAGES	HRSN2A~2S 12VAC/VDC, 24VAC/VDC, 120/230VAC
THERMAL OVERLOAD PROTECTION MECHANICAL	Class B 24V, Class F 120/230V, Extended Duty Class H
OVERRIDE	2A, 2R: 8mm Bottom Mounted Shaft 2B, 2S Side Mounted Handwheel
HOUSING	Aluminum Alloy Dry Powder Coated

HRSN2 Series On/Off Proportional Electric Actuators

FOR BALL UP TO 6" AND BUTTERFLY VALVES UP TO 4"

TECHNICAL INFORMATION, *CONTINUED*

ACTUATOR SPECIFICATIONS

		HRSN2A	HRSN2B	HRSN2R	HRSN2S
		310 / 35	310 / 35	440 / 50	440 / 50
Supply Voltage		12VAC/VDC			
		24VAC/VDC			
		120/230VAC			
Duty Cycle	12VDC	75%			
	24VDC	75%			
	120/230VAC	25% ON/OFF, 75% PROPORTIONAL			
	120/230V Extended Duty	75%			
Thermal Overload		STANDARD			
Cycle Time	90° 12V/24V(sec)	9	9	13	13
	90° 120V/230V(60hz/50hz, sec)	9 / 11	9 / 11	13 / 15	13 / 15
Aux Switch Rating		(2) FORM A - 3A @ 250VAC			
Conduit Entry		(2) 1/2" NPT			
Enclosure Material		NEMA 4 / 4X / ALUMINIUM ALLOY - ELECTROSTATIC POWDER COAT			
Maximum Inrush Current	12VDC	3.45A	3.45A	3.45A	3.45A
	24VDC	2.1A	2.1A	2.1A	2.1A
	120VAC	0.39A	0.39A	0.39A	0.39A
	230VAC	0.23A	0.23A	0.23A	0.23A
Running Current	12VDC	1.95A	1.95A	1.95A	1.95A
	24VDC	1.2A	1.2A	1.2A	1.2A
	120VAC	0.36A	0.36A	0.36A	0.36A
	230VAC	0.21A	0.21A	0.21A	0.21A
WEIGHT (LBS / KG) - ON/OFF (MOD)		3 / 6.6 (5.5 / 12.1)	3.5 / 7.7 (6 / 13.2)	3 / 6.6 (5.5 / 12.1)	3.5 / 7.7 (6 / 13.2)

BALL VALVE SELECTION CHART*

SIZE in / DN	TB / TBH SERIES BALL VALVES	TW/LA SERIES BALL VALVES
1/2 - 2 / 15 - 50	HRSN2A~2S	HRSN2A~2S
2-1/2 - 3 / 65 - 80		
4 - 6 / 100 - 150		

BUTTERFLY VALVE SELECTION CHART*

SIZE in / DN	BYV SERIES BUTTERFLY VALVES
2, 3 / 50, 80	HRSN2A, 2B
4 / 100	HRSN2R, 2S

* Actuator size selections based on clean water at 70°F

* Actuator size selections based on clean water at 70°F

Please Note: All HRS Series Reversing Electric Actuators are considerably heavier than those typically used with plastic ball and butterfly valves, and they must be supported independently of the valves on which they are mounted. The weight must not be borne by the valve or piping. Please consult the factory if you need help with your particular application.



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HRSN3-HRSN7 Series On/Off Proportional Electric Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"



KEY FEATURES

- Units are equipped with two (2) volt-free Form A Auxiliary switches
- ISO5211 compliant mounting with double square female drives and inserts
- Raised visual position indicator
- NEMA 4X/IP67 compliant
- Two (2) EMT entry ports with sealed cable glands

OPTIONS*

- Local Control Stations
- IP68 Submersion
- Battery Backup
- Interchangeable ISO5211 Flange & Drives

PARTS LIST

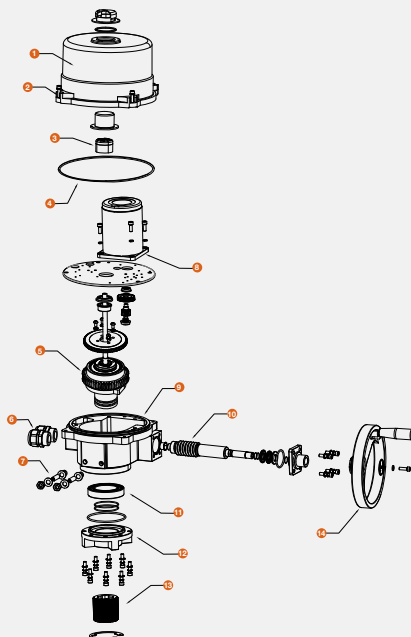
1. Cast Aluminum Cover
2. Captured Cover Screws
3. High Visibility Position Indicator
4. Cover O-Ring Seal
5. Epicyclic Transmission Set
6. EMT Glands
7. External Mechanical Stops
8. Drive Motor
9. Cast Aluminum Housing
10. Worm Override Shaft
11. Heavy Final Drive Bearing
12. ISO5211 Flange
13. Splined Drive Insert
14. Handwheel w/Collapsible Knob[†]

* Not Available on All Models

[†] Collapsible knob HRSN3-4 models

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION	Reversing
CONDUIT SIZE	HRSN3~7 Two Conduit Fittings 3/4" NPT Each
DUTY CYCLE	HRSN3A~4D AC Versions On/Off = 25%, Ext Dty = 75%, Proportional = 75%, DC Versions On/Off & Proportional = 75% 3 Phase On/Off = 25%, Proportional = 75% HRSN4E~6A AC Versions On/Off = 25%, Ext Dty = 50%, Proportional = 50%, 3 Phase On/Off = 25%, Proportional = 50% HRSN7A~7C 3 Phase On/Off = 25%, Proportional = 50%
CYCLE TIMES	8-155 Seconds, Depending on Model
ENCLOSURE	NEMA 4/4X
VOLTAGES	HRSN3A~4D 24VAC/VDC, 120/230VAC HRSN4E~6A 120/230VAC HRSN3A~7C 220/3, 380/3, 440/3, 480/3
THERMAL OVERLOAD PROTECTION	Class B 24V, Class F 120/230V, Extended Duty Class H
MECHANICAL OVERRIDE	Clutchless Manual Hand Wheel
HOUSING	Aluminum Alloy Dry Powder Coated

HRSN3-HRSN7 Series On/Off Proportional Electric Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"

ACTUATOR SPECIFICATIONS		HRSN3A	HRSN3B	HRSN4A	HRSN4B	HRSN4C	HRSN4D	HRSN4E	HRSN4F	HRSN5A	HRSN5B		
		880/100	1770/200	3540/400	5310/600	7080/800	8850/1000	15040/1700	20350/2300	30970/3500	44250/5000		
Supply Voltage		12VAC/VDC						N/A					
		24VAC/VDC						N/A					
		120/230VAC											
		230/3 ~ 480/3 Polyphase											
Duty Cycle		12VDC		75%						N/A			
		24VDC		75%						N/A			
		120/230VAC		25% ON/OFF, 75% PROPORTIONAL						25% ON/OFF, 50% PROPORTIONAL			
		120/230V Extended Duty		75%						50%			
		Polyphase		25% ON/OFF, 75% PROPORTIONAL						25% ON/OFF, 50% PROPORTIONAL			
Thermal Overload		STANDARD											
Cycle Time		90° 12V/24V(sec)		14	28	21	28	34	34	N/A			
		90° 120V/230V(60hz/50hz, sec)		16 / 19	33 / 39	24 / 29	33 / 39	39 / 47	39 / 47	28 / 34	39 / 47	63 / 76	88 / 105
Aux Switch Rating		(2) FORM A - 10A @ 250VAC											
Conduit Entry		(2) 3/4" NPT											
Enclosure Material		NEMA 4 / 4X / ALUMINIUM ALLOY - ELECTROSTATIC POWDER COAT											
Maximum Inrush Current		12VDC	7.2A	7.2A	11.4A	11.4A	11.4A						
		24VDC	4.2A	4.2A	7.0A	7.0A	7.0A	10.5A					
		120VAC	1.16A	1.16A	2.95A	2.95A	2.95A	3.8A	7.2A	7.2A	7.2A	7.2A	
		230VAC	.54A	.54A	1.71A	1.71A	1.71A	2.16A	4.05A	4.05A	4.05A	4.05A	
		480/3	0.24A	0.24A	0.7A	0.7A	0.7A	.089A	1.2A	1.2A	1.2A	1.2A	
Running Current		12VDC	3.2A	3.2A	9.4A	9.4A	9.4A						
		24VDC	3.2A	3.2A	5.8A	5.8A	5.8A	7.8A					
		120VAC	0.93A	.093A	1.8A	1.8A	1.8A	2.3A	4.5A	4.5A	4.5A	4.5A	
		230VAC	0.42A	0.42A	0.91A	0.91A	0.91A	1.1A	2.2A	2.2A	2.2A	2.2A	
		480/3	0.21A	0.21A	0.4A	0.4A	0.4A	0.53A	0.87A	0.87A	0.87A	0.87	
WEIGHT (LBS / KG)		25 / 11	25 / 11	49 / 22	49 / 22	49 / 22	49 / 22	80 / 36	80 / 36	168 / 76	168 / 76		

BALL VALVE SELECTION CHART*

SIZE in / DN	TB / TBH SERIES BALL VALVES	TW/LA SERIES BALL VALVES
1/2 - 2 / 15 - 50	HRSN2A~2S	HRSN2A~2S
2-1/2 - 3 / 65 - 80		
4 - 6 / 100 - 150		

* Actuator size selections based on clean water at 70°F

Please Note: All HRS Series Reversing Electric Actuators are considerably heavier than those typically used with plastic ball and butterfly valves, and they must be supported independently of the valves on which they are mounted. The weight must not be borne by the valve or piping. Please consult the factory if you need help with your particular application.

BUTTERFLY VALVE SELECTION CHART*

SIZE in / DN	BYV SERIES BUTTERFLY VALVES
2, 3 / 50, 80	HRSN2A, 2B
4 / 100	HRSN2R, 2S
6 / 150	HRSN3A
8 / 200	HRSN3B
10 / 250	HRSN4A
12 / 300	HRSN4B
14 / 350	HRSN4D
16 / 400	HRSN4E
18-20 / 450, 500	HRSN4F
24 / 600	HRSN5A



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PMD Series Double Acting Pneumatic Actuators

FOR BALL VALVES UP TO 2"
FOR BUTTERFLY VALVES UP TO 3"

KEY FEATURES

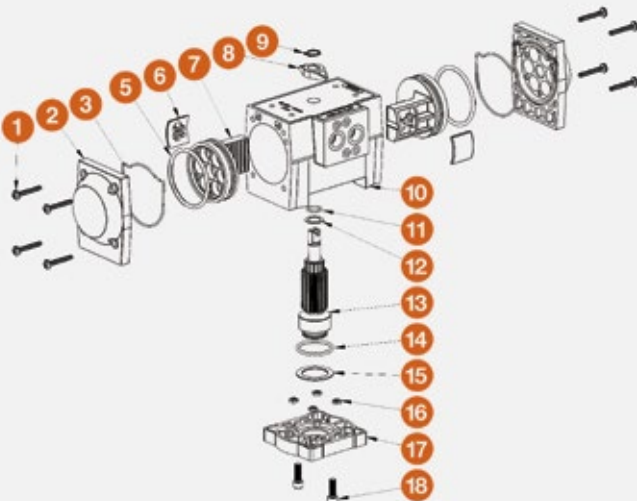
- Double Acting Air-to-Open and Close
- Corrosion-Resistant Thermoplastic Housing
- Permanently Lubricated Gear Train
- Manual Override
- Two-Piston Rack and Pinion Design
- Namur-Style Mounting
- Position Indicator
- Lightweight
- ISO 5211 Mounting Base

OPTIONS

- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Cycle Speed Controls
- Positioners

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	Polyamide
OUTPUT SHAFT	Carbon Steel, Nickel Plated
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
SEALS	Nitrile
CYCLE TIME	Half Second, Typical
AIR PORT CONNECTIONS	1/4" NPT

PMD Series Double Acting Pneumatic Actuators

FOR BALL VALVES UP TO 2"

FOR BUTTERFLY VALVES UP TO 3"

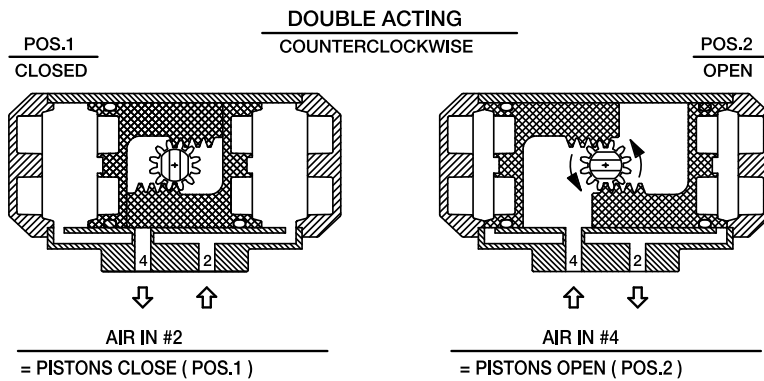
TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	ϕA in / mm	B in / mm	C in / mm	L in / mm	P in / mm	R in / mm
PMD15	.551 / 14 ISO F05	1/4-20 x .512 UNC-ISO F05	$\phi 1.969 / 50$ ISO F05	6.299 / 160	4.370 / 111	3.386 / 86

Dimensions are subject to change without notice – consult factory for installation information

ACTUATOR OPERATING SYSTEMS



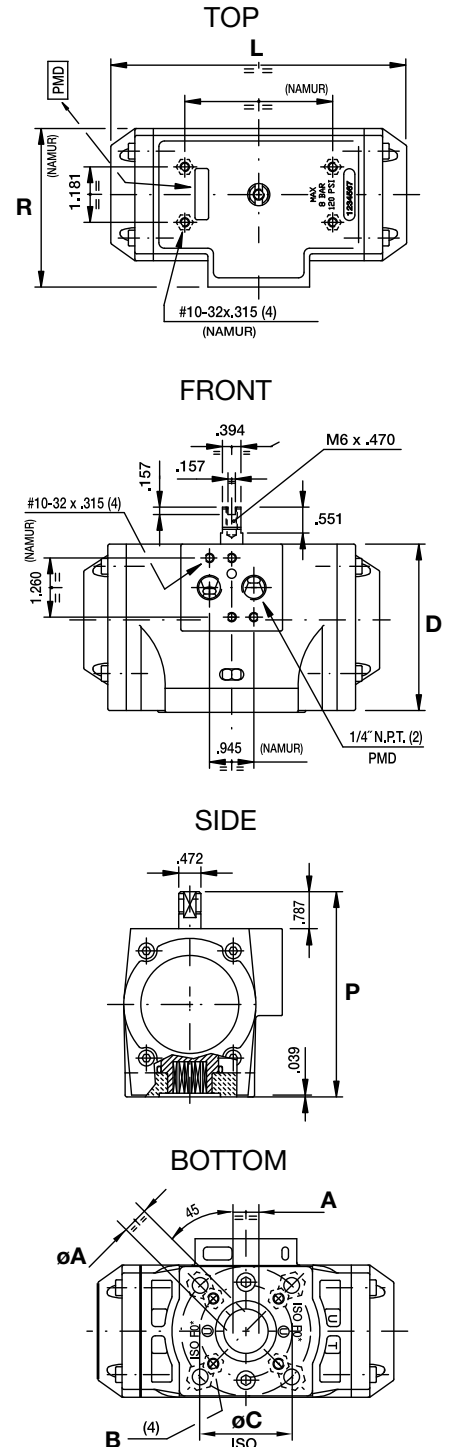
ACTUATOR SPECIFICATIONS

MODEL	PMD15
Torque Output (in-lbs) @ 80 PSI	275
Enclosure Material	Polyamide
Output Shaft	Carbon Steel, Nickel Plated
Air Port Connections	1/4" NPT
Air Consumption (cu. in.)	22.0
Air Transfer	Internal
Stroke Time (seconds)	.5
Cycle Time	1/2 Second
Minimum Air Pressure	80 PSI
Maximum Air Pressure	120 PSI
Operation	Rack and Pinion
Weight (lbs / kg)	2.624 / 1.2

VALVE SELECTION CHART

SIZE* in / DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES	BYV SERIES BUTTERFLY VALVES
1/2 - 2 / 15 - 50	PMD15	PMD15	N/A
2 - 3	-	-	PMD15

* Actuator selection based on clean water @ 70°F



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PMS Series Spring Return Pneumatic Actuators

FOR BALL VALVES UP TO 2"

KEY FEATURES

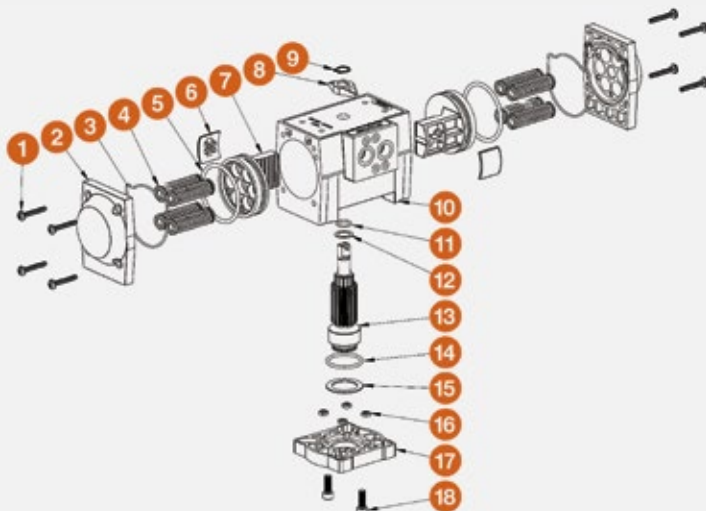
- Air to Spring Fail-Safe Operation
- Corrosion-Resistant Thermoplastic Housing
- Permanently Lubricated Gear Train
- Manual Override
- Two-Piston Rack and Pinion Design
- Namur-Style Mounting
- Position Indicator
- Lightweight
- ISO 5211 Mounting Base

OPTIONS

- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Cycle Speed Controls
- Positioners

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	Polyamide
OUTPUT SHAFT	Carbon Steel, Nickel Plated
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
SEALS	Nitrile
CYCLE TIME	Half Second, Typical
AIR PORT CONNECTIONS	1/4" NPT

PMS Series Spring Return Pneumatic Actuators

FOR BALL VALVES UP TO 2"

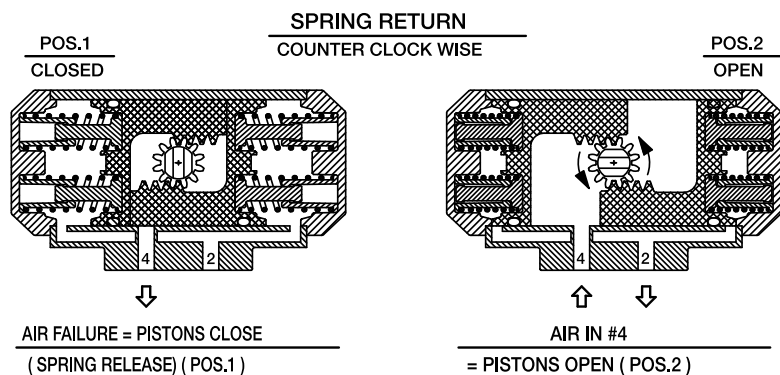
TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	øA in / mm	B in / mm	C in / mm	L in / mm	P in / mm	R in / mm
PMD15	.551 / 14 ISO F05	1/4-20 x .512 UNC-ISO F05	ø1.969 / 50 ISO F05	6.299 / 160	4.370 / 111	3.386 / 86

Dimensions are subject to change without notice – consult factory for installation information

ACTUATOR OPERATING SYSTEMS



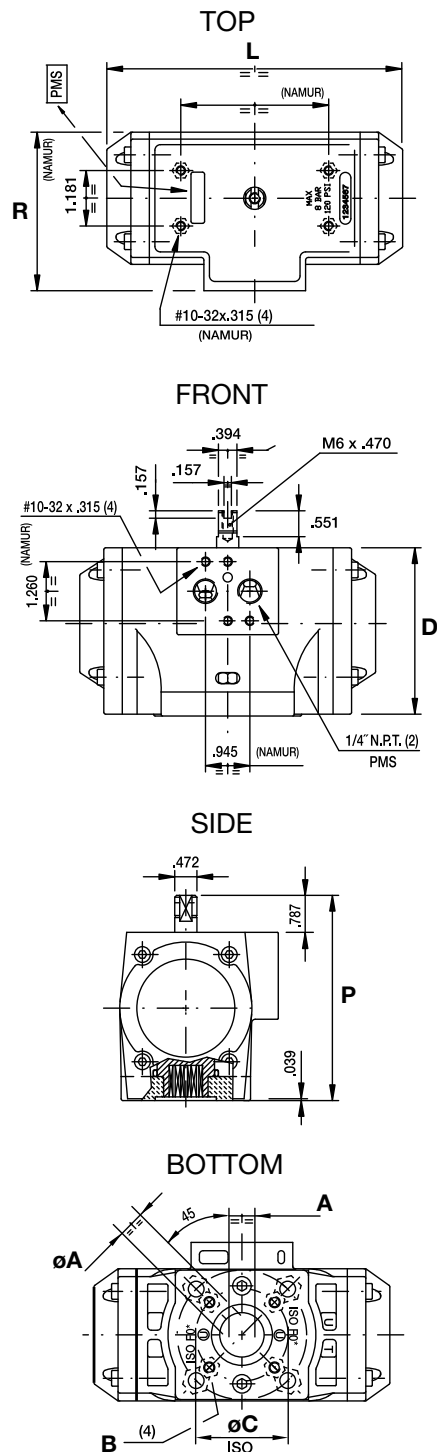
ACTUATOR SPECIFICATIONS

MODEL	PMS15
Torque Output (in-lbs) @ 80 PSI	168 / 125
Spring Stroke (Start/End)	150 / 107
Enclosure Material	Polyamide
Output Shaft	Carbon Steel, Nickel Plated
Air Port Connections	1/4" NPT
Air Consumption (cu. in.)	10.8
Air Transfer	Internal
Stroke Time (seconds)	.5
Cycle Time	1/2 Second
Minimum Air Pressure	80 PSI
Maximum Air Pressure	120 PSI
Operation	Rack and Pinion
Weight (lbs / kg)	3.1 / 1.4

VALVE SELECTION CHART

SIZE* in/DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES
1/2 – 2 / 15 – 50	PMS15	PMS15

* Actuator selection based on clean water @ 70°F



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PMD4 Series Double Acting Pneumatic Actuators

FOR BALL VALVES UP TO 6"
FOR BUTTERFLY VALVES UP TO 6"

KEY FEATURES

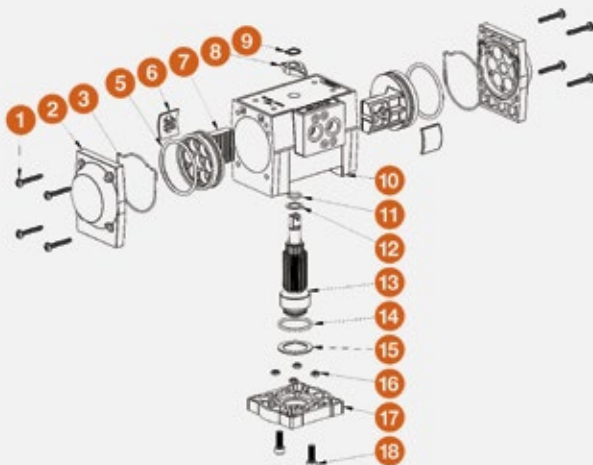
- Double Acting Air-to-Open and Close
- Corrosion-Resistant GFPP Housing
- Ideal for Corrosive Atmosphere and Environments
- Anodized Aluminum Two-Piston Rack and 303 Stainless Steel Pinion
- Manual Override
- Position Indicator
- Permanent Lubrication
- Lightweight – Easy for Installation
- Namur-Style Solenoid Mounting
- ISO 5211 Mounting Base
- Stainless Steel Fasteners
- Alternative Operating Media for 80 PSI to 120 PSI
- All Units are Marked for Traceability
- 100% Factory Tested

OPTIONS

- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Cycle Speed Controls
- Positioners

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	GFPP per ASTM D4101 Cell Class 85580
OUTPUT SHAFT	03 Stainless Steel per ASTM A314
SEALS	Nitrile
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
CYCLE TIME	Half Second, Typical
AIR PORT CONNECTIONS	1/4" NPT
NAMUR MOUNTING	VDI / VDE / 3845
OPERATING TEMPERATURE RANGE	-4°F to 176°F

PMD4 Series Double Acting Pneumatic Actuators

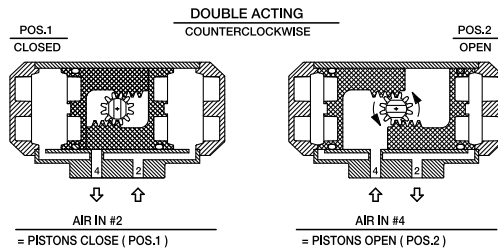
FOR BALL AND BUTTERFLY VALVES UP TO 6"

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	A in / mm	B in / mm	E in / mm	H in / mm	J in / mm	K in / mm	L in / mm	FLANGE STANDARD (dim M)	WEIGHT (lbs)
PMD415	3.54 / 90	4.37 / 111	0.47 / 12	1.30 / 33	3.39 / 86	0.55 / 14	6.30 / 160	F05	2.3
PMD419	4.39 / 112	5.22 / 133	0.47 / 12	1.30 / 33	3.98 / 101	0.67 / 17	6.89 / 175	F07	3.6

ACTUATOR OPERATING SYSTEMS

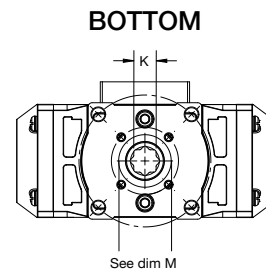
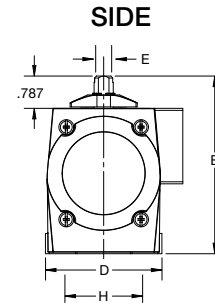
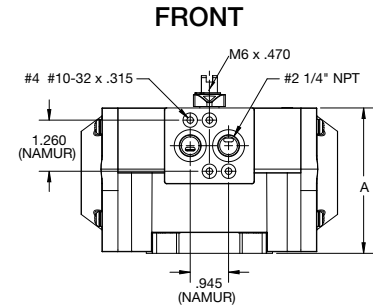
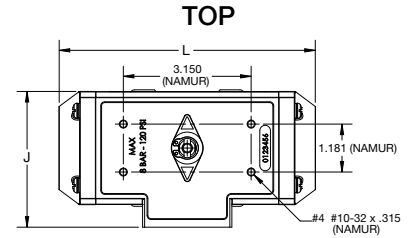


ACTUATOR SPECIFICATIONS

	PMD415	PMD419
Torque Output (in. /lb.) @ 80psi	275	500
Spring Stroke (Start/End)	NA	NA
Enclosure Material	Glass Filled Polypropylene	
Output Shaft	303 Stainless Steel	
Air Port Connections	1/4" NPT	
Air Consumption (cu. in.)	22	40.6
Air Transfer	Internal	
Stroke Time (seconds)	0.5	
Cycle Time	1/2 second	
Minimum Air Pressure	80psi	
Maximum Air Pressure	120psi	
Operation	Rack and Pinion	
Weight (lb / kg)	2.25 / 1.02	3.55 / 1.61

VALVE SELECTION CHART

SIZE* in / DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES	BYV SERIES BUTTERFLY VALVES
1/2 / 15	PMD415	PMD415	N/A
3/4 / 20	PMD415	PMD415	N/A
1 / 25	PMD415	PMD415	N/A
1-1/4 / 32	PMD415	PMD415	N/A
1-1/2 / 40	PMD415	PMD415	N/A
2 / 50	PMD415	PMD415	PMD415 / PMD419
2-1/2 / 65	PMD419	PMD419	PMD415 / PMD419
3 / 80	PMD419	PMD419	PMD415 / PMD419
4 / 100	PMD419	PMD419	PMD419
6 / 150	PMD419	PMD419	N/A



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PMS4 Series Spring Return Pneumatic Actuators

FOR 1/2" TO 4" BALL VALVES /
UP TO 4" BUTTERFLY VALVES

KEY FEATURES

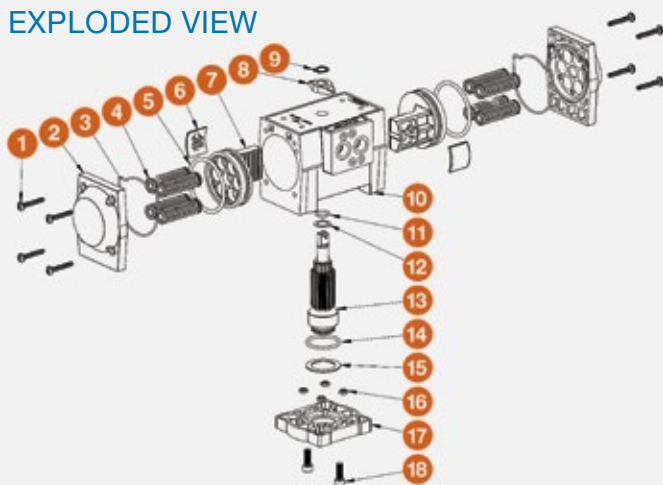
- Air to Spring Fail Safe Operation
- Corrosion-Resistant GFPP Housing
- Ideal for Corrosive Atmosphere and Environments
- Anodized Aluminum Two-Piston Rack and 303 Stainless Steel Pinion
- Position Indicator
- Permanent Lubrication
- Lightweight – Easy for Installation
- Namur-Style Solenoid Mounting
- ISO 5211 Mounting Base
- Stainless Steel Fasteners
- Alternative Operating Media for 40 PSI to 120 PSI
- All Units are Marked for Traceability
- 100% Factory Tested

OPTIONS

- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Cycle Speed Controls
- Positioners

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	GFPP per ASTM D4101 Cell Class 85580
OUTPUT SHAFT	03 Stainless Steel per ASTM A314
SEALS	Nitrile
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
CYCLE TIME	Half Second, Typical
AIR PORT CONNECTIONS	1/4" NPT
NAMUR MOUNTING	VDI/VDE 3845
OPERATING TEMPERATURE RANGE	-4°F to 176°F

PMS4 Series Spring Return Pneumatic Actuators

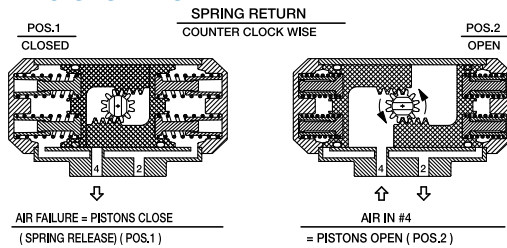
FOR BALL AND BUTTERFLY VALVES UP TO 4"

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	A in / mm	B in / mm	E in / mm	H in / mm	J in / mm	K in / mm	L in / mm	FLANGE STANDARD (dim M)	WEIGHT (lbs)
PMS415	3.54 / 90	4.37 / 111	0.47 / 12	1.30 / 33	3.39 / 86	0.55 / 14	6.30 / 160	F05	3.1
PMS419	4.39 / 112	5.22 / 133	0.47 / 12	1.30 / 33	3.98 / 101	0.67 / 17	6.89 / 175	F07	5.2
PMS420	4.39 / 112	5.22 / 133	0.47 / 12	1.30 / 33	3.98 / 101	0.67 / 17	6.89 / 175	F07	5.2

ACTUATOR OPERATING SYSTEMS

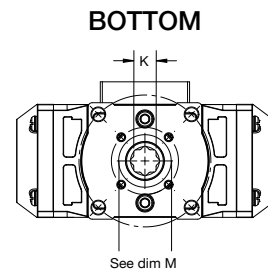
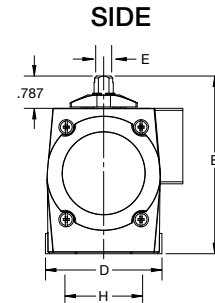
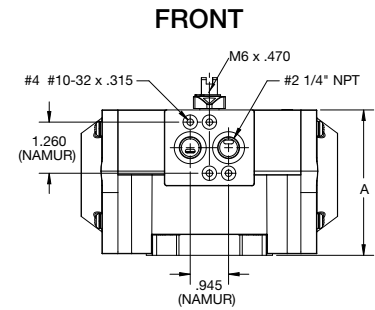
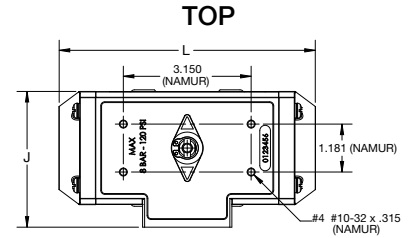


ACTUATOR SPECIFICATIONS

	PMS415	PMS419	PMS420
Torque Output (in. / lb.) @ 80psi	168 / 125	316 / 255	270 / 193
Spring Stroke (Start/End)	150 / 107	245 / 184	307 / 230
Enclosure Material	Glass Filled Polypropylene		
Spring Set	4+4	4+4	5+5
Air Port Connections	1/4" NPT		
Air Consumption (cu. in.)	10.8	17.5	17.5
Air Transfer	Internal		
Stroke Time (seconds)	0.5 second		
Cycle Time	1/2 second		
Minimum Air Pressure	80psi		
Maximum Air Pressure	120psi		
Operation	Rack and Pinion, Spring Return		
Weight (lb / kg)	3.1 / 1.4	5.2 / 2.4	5.2 / 2.4

VALVE SELECTION CHART

SIZE* in / DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES	BYV SERIES BUTTERFLY VALVES
1/2 / 15	PMS415	PMS415	N/A
3/4 / 20	PMS415	PMS415	N/A
1 / 25	PMS415	PMS415	N/A
1-1/4 / 32	PMS415	PMS415	N/A
1-1/2 / 40	PMS415	PMS415	N/A
2 / 50	PMS415	PMS415	PMS420
2-1/2 / 65	PMS419	PMS419	PMS420
3 / 80	PMS419	PMS419	PMS420
4 / 100	PMS420	PMS420	N/A
6 / 150	PMS420	PMS420	N/A



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PCD Series Double Acting Pneumatic Actuators

FOR BALL AND BUTTERFLY
VALVES UP TO 18"

KEY FEATURES

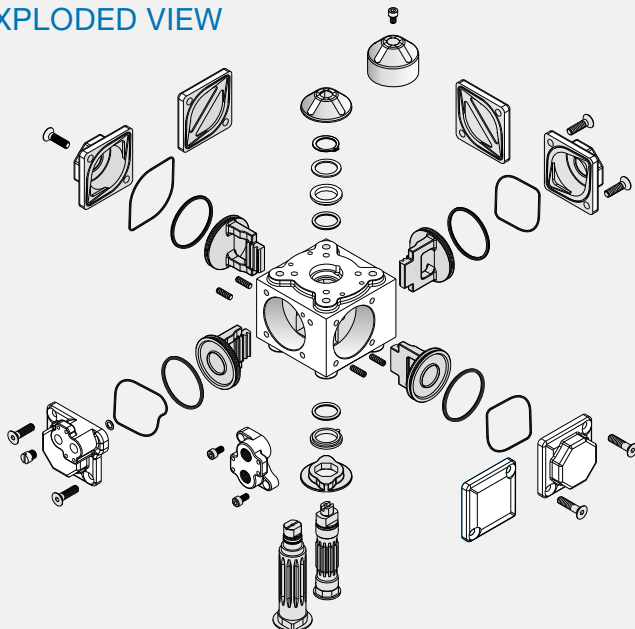
- Double Acting Air-to-Open and Close
- For All Sizes of Ball and Butterfly Valves
- Four-Piston Rack and Pinion Design
- Manual Override
- Compact, Lightweight
- Position Indicator
- Namur-Style Solenoid Mounting (Inlet/Outlet)
- Adjustable Travel Stops
- ISO 5211 Mounting Base

OPTIONS

- Solenoid Valves with Optional Voltages
- Positioners
- Auxiliary Limit Switches
- Cycle Speed Controls

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	Epoxy-Coated Aluminum
OUTPUT SHAFT	Plated Steel
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
CYCLE TIME	Less Than One Second, Typical
AIR PORT CONNECTIONS	1/4" NPT

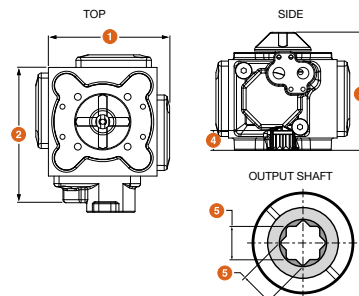
PCD Series Double Acting Pneumatic Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 18"

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm	ISO 5211 MOUNT	AIR CONSUMPTION cu. in.
PCD 15	3.39 / 86	3.85 / 98	3.50 / 89	.53 / 13	.35 / 9	F05 (1.97)	5.5
PCD 20	4.03 / 102	4.60 / 117	3.96 / 101	.59 / 15	.43 / 11	F05 (1.97)	9.2
PCD 25	5.24 / 133	5.79 / 147	4.61 / 117	.77 / 20	.55 / 14	F07 (2.76)	20
PCD 35	7.15 / 182	7.94 / 202	6.10 / 155	1.02 / 26	.87 / 22	F10 (4.02)	49
PCD 45	8.70 / 220	9.65 / 245	7.24 / 184	1.30 / 33	1.06 / 27	F12 (4.92)	81
PCD 60	11.22 / 285	N/A	9.76 / 248	1.69 / 43	1.42 / 36	F14 (5.51)	195
PCD 75	13.46 / 342	N/A	11.81 / 300	1.69 / 43	1.42 / 36	F14 (5.51)	351



Dimensions are subject to change without notice – consult factory for installation information

ACTUATOR SPECIFICATIONS

MODEL	PCD15	PCD20	PCD25	PCD35	PCD45	PCD60	PCD75
Torque Output (in-lbs) @ 80 PSI	172	311	639	1,848	3,622	8,585	15,856
Enclosure Material	Epoxy-Coated Aluminum						
Output Shaft	Plated Steel						
Air Port Connections	1/4" NPT						
Air Consumption (cu. in.)	5.5	9.2	20	49	81	195	351
Air Transfer	Internal						
Stroke Time (seconds)	0.2	0.4	0.7	1.0	1.5	2.5	4.0
Cycle Time	Under 1 Second Typical-Depends on Solenoid						
Minimum Air Pressure	80 PSI						
Maximum Air Pressure	120 PSI						
Operation	Rack and Pinion						
Weight (lbs / kg)	2.1 / 0.9	3.3 / 1.5	6.2 / 2.8	16 / 7.1	24 / 11	57 / 26	112 / 51

VALVE SELECTION CHART

SIZE* in / DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES	BYV/BYB SERIES BUTTERFLY VALVES
1/2 - 1-1/2 / 15 - 40	PCD15	PCD15	N/A
2 / 50	PCD15	PCD15	PCD20
2-1/2 / 65	PCD20	PCD20	PCD20
3 / 80	PCD20	PCD20	PCD20
4 / 100	PCD20	PCD20	PCD25
6 / 150	PCD20	PCD20	PCD25
8 / 200	N/A	N/A	PCD35
10 - 12 / 250 - 300	N/A	N/A	PCD45
14 / 350	N/A	N/A	PCD60
16 - 18 / 400 - 450	N/A	N/A	PCD75

* Actuator size selections based on clean water at 70°F



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PCS Series Spring Return Pneumatic Actuators

FOR BALL AND BUTTERFLY
VALVES UP TO 8"

KEY FEATURES

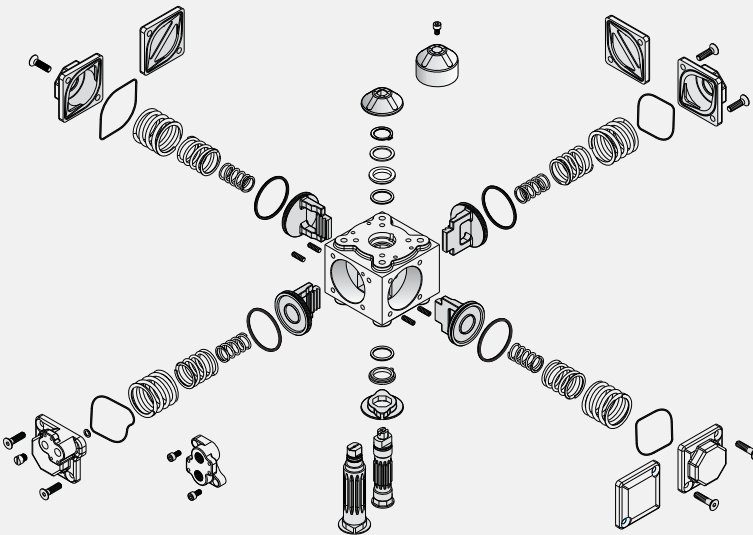
- Spring Return Fail-Safe Operation
- For All Sizes of Ball and Butterfly Valves
- Four-Piston Rack and Pinion Design
- Manual Override
- Compact, Lightweight
- Position Indicator
- Namur-Style Solenoid Mounting (Inlet/Outlet)
- Adjustable Travel Stops
- ISO 5211 Mounting Base

OPTIONS

- Solenoid Valves with Optional Voltages
- Positioners
- Auxiliary Limit Switches
- Cycle Speed Controls

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

HOUSING	Epoxy-Coated Aluminum
OUTPUT SHAFT	Plated Steel
MINIMUM AIR PRESSURE	80 PSI
MAXIMUM AIR PRESSURE	120 PSI
CYCLE TIME	Less Than One Second, Typical
AIR PORT CONNECTIONS	1/4" NPT

PCS Series Spring Return Pneumatic Actuators

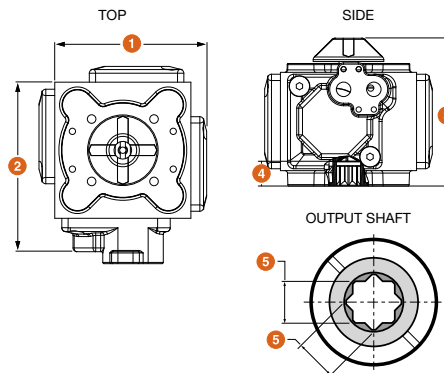
FOR BALL AND BUTTERFLY VALVES UP TO 8"

TECHNICAL INFORMATION, CONTINUED

DIMENSIONS

MODEL	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm	ISO 5211 MOUNT	AIR CONSUMPTION cu. in.
PCS 15	4.31 / 109	4.31 / 109	3.50 / 89	.53 / 13	.35 / 9	F05 (1.97)	5.5
PCS 20	5.17 / 131	5.17 / 131	3.96 / 101	.59 / 15	.43 / 11	F05 (1.97)	9.2
PCS 25	6.34 / 161	6.34 / 161	4.61 / 117	.77 / 20	.55 / 14	F07 (2.76)	20
PCS 30	7.33 / 186	7.33 / 186	5.37 / 136	.87 / 22	.67 / 17	F07 (2.76)	33
PCS 35	8.74 / 222	8.74 / 222	6.10 / 155	1.02 / 26	.87 / 22	F10 (4.02)	49
PCS 45	10.59 / 269	10.59 / 269	7.24 / 184	1.30 / 33	1.06 / 27	F12 (4.92)	81

Dimensions are subject to change without notice – consult factory for installation information



ACTUATOR SPECIFICATIONS

MODEL	PCS15	PCS20	PCS25	PCS30	PCS35	PCS45
Torque Output (in-lbs) @ 80 PSI	61	109	217	345	607	1,218
Enclosure Material	Epoxy-Coated Aluminum					
Output Shaft	Plated Steel					
Air Port Connections	1/4" NPT					
Air Consumption (cu. in.)	5.5	9.2	20	33	49	81
Air Transfer	Internal					
Stroke Time (seconds)	0.2	0.4	0.7	0.8	1.0	1.5
Cycle Time	Under 1 Second Typical-Depends on Solenoid					
Minimum Air Pressure	80 PSI					
Maximum Air Pressure	120 PSI					
Operation	Rack and Pinion					
Weight (lbs / kg)	2 / 1.1	4 / 1.9	8 / 3.5	11 / 5.0	20 / 9.0	33 / 15

VALVE SELECTION CHART

SIZE* in / DN	TB / TBH / CV / CVH SERIES BALL VALVES	TW/LA SERIES BALL VALVES	BYV SERIES BUTTERFLY VALVES
1/2 - 1 / 15 - 25	PCS15	PCS15	N/A
1-1/4 - 1-1/2 / 32 - 40	PCS15 / PCS20	PCS20	N/A
2 / 50	PCS20	PCS20	PCS25
2-1/2 / 65	PCS25	PCS25	PCS25
3 / 80	PCS25	PCS25 / PCS30	PCS25
4 / 100	PCS25	PCS30	PCS30
6 / 150	PCS25	PCS30	PCS35
8 / 200	N/A	N/A	PCS45

* Actuator size selections based on clean water at 70°F



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RV Series Pressure Relief Valves

1/2" TO 2" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Hand Adjustable, No Tools Needed
- Integrally Molded Threaded Gauge Port
- Pressure Relief from 5 PSI to 75 PSI

OPTIONS

- 0 to 30 PSI Pressure Gauge
- 0 to 60 PSI Pressure Gauge
- 0 to 160 PSI Pressure Gauge
- Gauge Guards
- 2 to 20 PSI for 1-1/2" to 2" with Low Pressure Spring
- Flanged Ends

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTION	SEALS	PRESSURE SETTING	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Threaded or Flanged	FPM or EPDM	5 to 75 PSI	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Available with threaded ends to BS21.

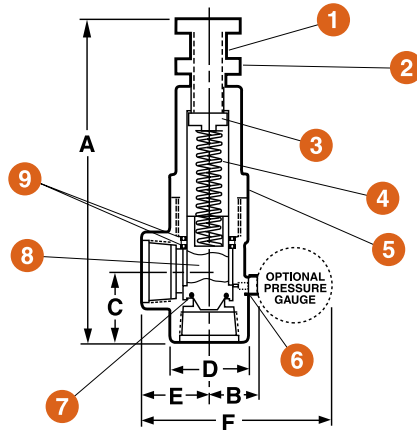
RV Series Pressure Relief Valves

1/2" TO 2" PVC AND CPVC

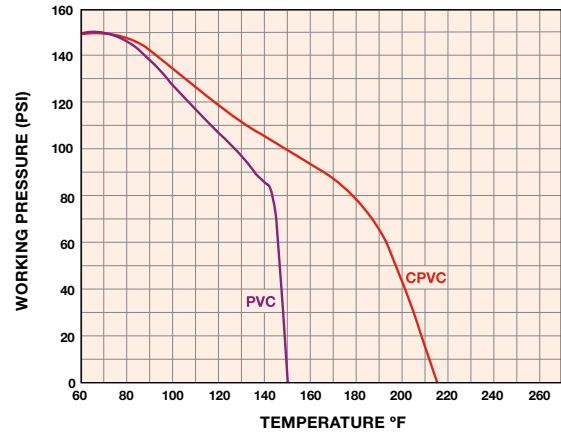
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Stem
2. Locknut
3. Spring Retainer
4. Spring (Plastic Coated)
5. Body
6. Gauge Port
7. O-Ring Seal
8. Piston
9. U-Cup Seal



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	WEIGHT lb / kg
1/2 / 15	6.75 / 171	1.38 / 35	1.50 / 38	1.38 / 35	1.38 / 35	5.19 / 132	.50 / .23
3/4 / 20	6.88 / 175	1.50 / 38	1.75 / 44	1.56 / 40	1.63 / 41	5.44 / 138	.75 / .34
1 / 25	8.75 / 222	1.63 / 41	2.06 / 52	1.88 / 48	1.88 / 48	5.75 / 146	1.00 / .45
1-1/2 / 40	13.25 / 337	1.88 / 48	2.63 / 67	2.63 / 67	2.44 / 62	6.25 / 159	2.50 / 1.13
2 / 50	15.50 / 394	2.13 / 54	3.00 / 76	3.13 / 80	2.88 / 73	6.69 / 170	3.50 / 1.59

Dimensions are subject to change without notice – consult factory for installation information

RELIEF VALVE FLOW CHART

The chart below shows the flow rate out of the relief valve discharge port at a given set pressure and overpressure. For example, a 1" relief valve set to relieve at 30 PSI would have a flow rate of 20 GPM out of the discharge port at 10 PSI of overpressure (system pressure at 40 PSI).

RELIEF VALVE SIZES (NPT)

SET RELIEF PRESSURE (PSI)	1/2"			3/4"			1"			1-1/2"			2"	
	OVERPRESSURE (PSI)			OVERPRESSURE (PSI)			OVERPRESSURE (PSI)			OVERPRESSURE (PSI)			OVERPRESSURE (PSI)	
	+5	+10	+20	+5	+10	+20	+5	+10	+20	+2*	+5*	+10	+20	
	FLOW RATE (GPM)			FLOW RATE (GPM)			FLOW RATE (GPM)			FLOW RATE (GPM)			FLOW RATE (GPM)	
10	.5	2.0	6.0	3.0	4.0	9.0	7.0	11.0	18.0	1.0	15.0	20.0	22.5	110.0
20	1.0	3.0	7.0	4.0	6.0	15.0	8.0	14.0	24.0	1.5	30.0	33.0	40.0	125.0
30	1.0	3.0	8.0	5.5	9.0	17.5	8.0	20.0	27.0	5.0	40.0	45.0	55.0	147.0
40	1.0	3.0	8.0	9.0	13.0	19.0	8.0	27.5	30.0	8.0	47.5	51.0	75.0	160.0
50	N/A	N/A	N/A	9.0	15.0	21.0	8.0	33.0	36.0	10.0	69.0	72.0	83.0	180.0
75	N/A	N/A	N/A	9.0	18.0	20.0	8.0	40.0	48.0	10.0	90.0	96.0	92.0	180.0

* With Optional Low Pressure Spring



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PR Series Pressure Regulator Valves

1/4" TO 1-1/2" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Hand Adjustable, No Tools Needed
- Integrally Molded Threaded Gauge Port
- Regulates from 5 to 75 PSI
- Prevents Downstream Pressure from Exceeding the Set Pressure

OPTIONS

- 0 to 30 PSI Pressure Gauge
- 0 to 60 PSI Pressure Gauge
- 0 to 160 PSI Pressure Gauge
- Gauge Guards
- Flanged Ends

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTION	SEALS	PRESSURE SETTING	PRESSURE RATING
1/4" – 1-1/2" (DN8 – DN40)	PVC or CPVC	Threaded or Flanged	FPM	5 to 75 PSI	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Available with threaded ends to BS21.

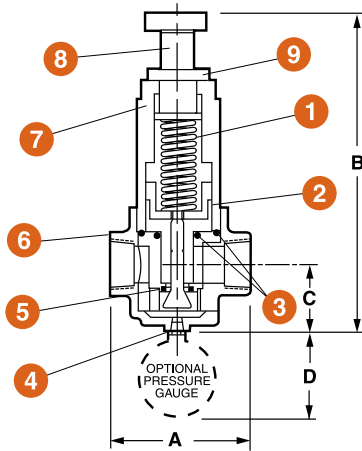
PR Series Pressure Regulator Valves

1/4" TO 1-1/2" PVC AND CPVC

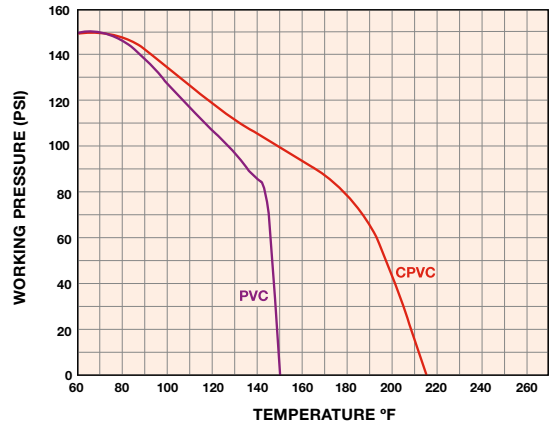
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Spring (Plastic Coated)
2. Diaphragm Assembly
3. O-Ring Seals
4. Gauge Port
5. Square Cut Seal
6. Body
7. Bonnet
8. Stem
9. Locknut



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	WEIGHT lb / kg
1/4 / 8	4.13 / 105	9.25 / 235	2.13 / 54	2.38 / 60	1.38 / .63
1/2 / 15	4.13 / 105	9.25 / 235	2.13 / 54	2.38 / 60	1.38 / .63
3/4 / 20	4.13 / 105	9.25 / 235	2.13 / 54	2.38 / 60	1.38 / .63
1 / 25	5.50 / 140	14.00 / 356	3.00 / 76	2.38 / 60	4.75 / 2.15
1-1/2 / 40	5.50 / 140	14.00 / 356	3.00 / 76	2.38 / 60	4.75 / 2.15

Dimensions are subject to change without notice – consult factory for installation information

HOW TO SIZE A PRESSURE REGULATOR

Pressure regulator selection is based on the desired flow, inlet pressure and the desired outlet pressure.

Example: A system requires a flow rate of 10 GPM at a set pressure of 30 PSI, and the inlet pressure is 50 PSI. From the graph at right, a 1" regulator has a flow coefficient of 5.5 at a 30 PSI set pressure.

$$\Delta P = (Q \div C_v)^2 \quad \Delta P = \text{Pressure Drop}$$

$$\Delta P = (10 \div 5.5)^2 \quad Q = \text{Flow in GPM}$$

$$\Delta P = 3.3 \text{ PSI} \quad C_v = \text{Flow Coefficient}$$

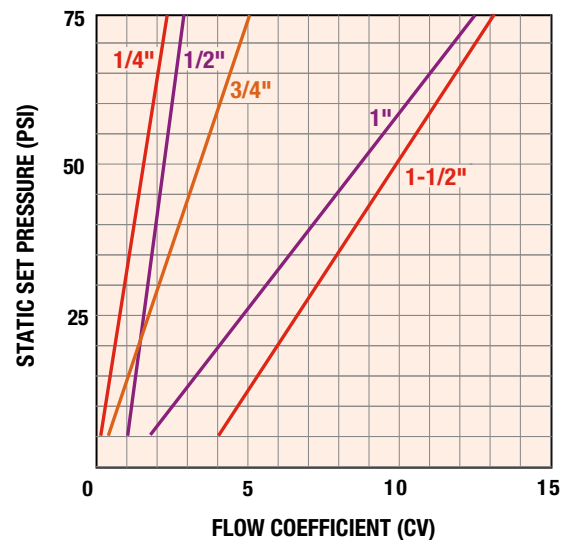
The 1" regulator will meet the requirements because 3.3 PSI is less than the required pressure drop of 20 PSI (50 PSI inlet pressure less 30 PSI set pressure). The maximum flow rate in this example is:

$$Q = C_v \sqrt{\Delta P}$$

$$Q = 5.5 \sqrt{20}$$

$$Q = 24.6 \text{ GPM}$$

FLOW COEFFICIENTS



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PBV Series Back Pressure Valves

1/4" TO 2" PVC, CPVC, PP AND PVDF



HAYWARD
BACK PRESSURE VALVE
SIZE: 1" For use
BODY: PVDF
DIAPHRAGM: PTFE/EPDM
RATING: 10 - 150 psi
Serial # 1175010
Series: PBV
www.haywardflowcontrol.com

NSF

Certified to
NSF/ANSI 61 & 372

KEY FEATURES

- Available in PVC, CPVC, PP or PVDF Body with Noryl™ Molded Dome
- PTFE/EPDM Diaphragm
- Spring: 10 – 150 psi (Spring pre-set: 50 psi)
- 304 Stainless Steel Bolting
- FNPT Threads
- Anti-Siphon Function
- Adjustment Screw with Slot
- PVC, CPVC and PVDF rated to 250 psi @ 70°F / 17.2 Bar at 21°C, PP rated to 150 psi @ 70°F / 10 Bar at 21°C

OPTIONS

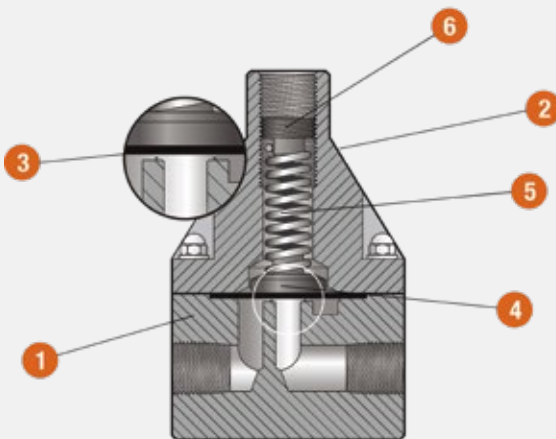
- ANSI or DIN / EN Threaded, Socket, True Union Socket or Flanged End Connections
- 0 - 50 psi and 10 - 250 psi Springs
- PTFE/FPM Diaphragm

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- PVDF

TECHNICAL INFORMATION

DETAILED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" - 2"	PVC, CPVC, PP, PVDF	FNPT, Socket, Flange, TU Socket	PTFE/EPDM	10-150 psi, 0-50, 10-250

PBV Series Back Pressure Valves

1/4" TO 2" PVC, CPVC, PP AND PVDF

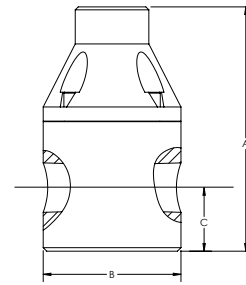
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Valve Body - PVC, CPVC, PP or PVDF
2. Dome - Noryl™
3. Diaphragm - PTFE/EPDM or PTFE/FPM
4. Compressor
5. Spring
6. Adjustment Screw

SPARE PARTS

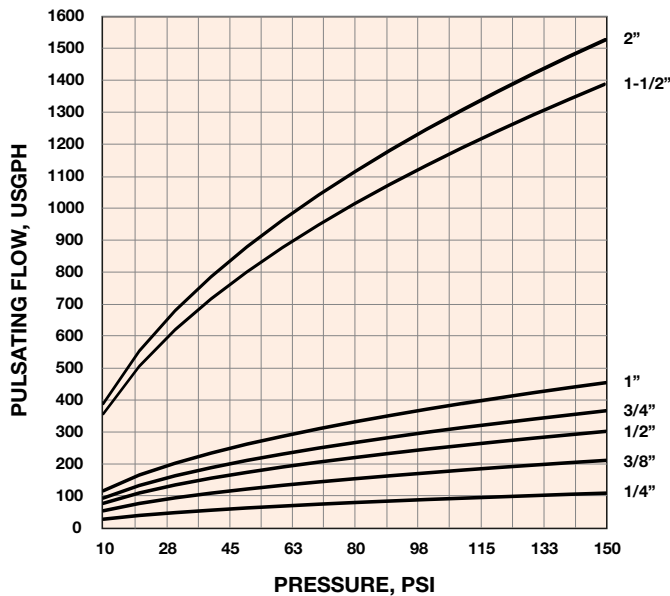
- Diaphragm and Spring
- Rebuild Kit: Diaphragm, Compressor, Adjustment Screw and Spring



DIMENSIONS (INCHES / MILLIMETERS)

VALVE SIZE in / DN	A in / mm	B in / mm	C in / mm
1/4 / 8	3.55 / 90	2.35 / 60	0.75 / 19
3/8 / 10	3.55 / 90	2.35 / 60	0.75 / 19
1/2 / 15	4.25 / 108	2.35 / 60	1.08 / 27
3/4 / 20	5.60 / 142	3.50 / 89	1.10 / 28
1 / 25	5.90 / 150	3.50 / 89	1.25 / 32
1-1/2 / 40	8.50 / 216	4.90 / 124	1.80 / 46
2 / 50	9.00 / 229	4.90 / 124	2.10 / 53

PERFORMANCE CURVE



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RPV Series Pressure Relief Valves

1/4" TO 2" PVC, CPVC PP OR PVDF

KEY FEATURES

- Available in PVC, CPVC, PP or PVDF Body with Noryl™ Molded Dome
- PTFE/EPDM Diaphragm
- Spring: 10 – 150 psi (Spring pre-set: 50 psi)
- 304 Stainless Steel Bolting
- FNPT Threads
- Adjustment Screw with Slot
- PVC, CPVC and PVDF rated to 250 psi @ 70°F / 17.2 Bar at 21°C, PP rated to 150 psi @ 70°F / 10 Bar at 21°C

OPTIONS

- 2-port / 90°
- ANSI or DIN / EN Threaded, Socket, True Union Socket or Flanged End Connections
- 0 - 50 psi and 10 - 250 psi Springs
- PTFE/FPM Diaphragm

MATERIALS

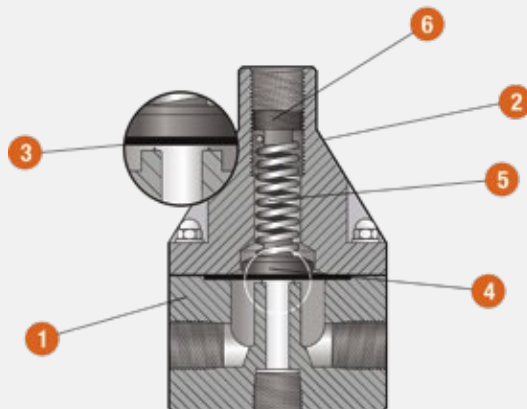
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- PVDF



Certified to
NSF/ANSI 61 & 372

TECHNICAL INFORMATION

DETAILED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2"-2"	PVC, CPVC, PP, PVDF	FNPT, Socket, Flange, TU Socket	PTFE/EPDM, PTFE/FPM	10-150 psi, 0-50, 10-250

RPV Series Pressure Relief Valves

1/4" TO 2" PVC, CPVC PP OR PVDF

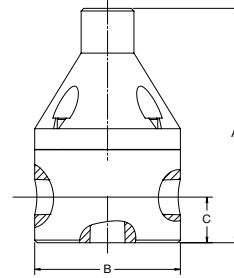
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Valve Body - PVC, CPVC, PP or PVDF
2. Dome - Noryl™
3. Diaphragm - PTFE/EPDM or PTFE/FPM
4. Compressor
5. Spring
6. Adjustment Screw

SPARE PARTS

- Diaphragm and Spring
- Rebuild Kit: Diaphragm, Compressor, Adjustment Screw and Spring

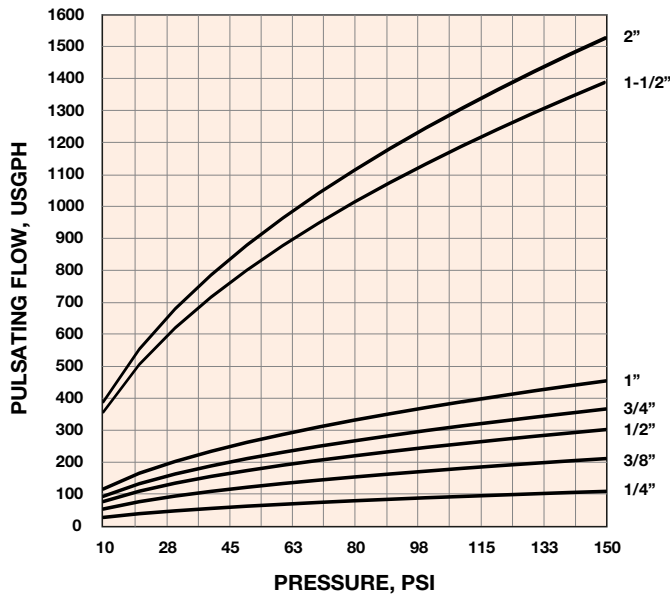


Note: 1/4" - 1" has 3 ports.
1-1/2" - 2" has 2 ports.

DIMENSIONS (INCHES / MILLIMETERS)

VALVE SIZE in / DN	A in / mm	B in / mm	C in / mm
1/4 / 8	3.55 / 90	2.35 / 60	0.75 / 19
3/8 / 10	3.55 / 90	2.35 / 60	0.75 / 19
1/2 / 15	4.25 / 108	2.35 / 60	1.08 / 27
3/4 / 20	4.60 / 142	3.50 / 89	1.10 / 28
1 / 25	5.90 / 150	3.50 / 89	1.25 / 32
1-1/2 / 40	8.50 / 216	4.90 / 124	1.80 / 46
2 / 50	9.00 / 229	4.90 / 124	2.10 / 53

PERFORMANCE CURVE



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CCS Series Calibration Cylinders / Columns

100 - 2000ml

KEY FEATURES

- NPT connections - 1/2" through 1"
- High Contrast Graduation Markings
- Direct GPH and mL readout
- Clear Easy-View Tube
- Sealed Top with Overflow Connection (Vent)
- Pressure rated to 15 psi @ 70°F / 1.03 Bar at 21°C

OPTIONS

- Dust Cover or EZ Clean (glass cylinder only)
- BSPT, Socket, Flange, Flange with Ball Valve or True Union End Connections
- Borosilicate Glass Column Available

MATERIALS

- PVC Cell Class 12454 per ASTM D1784

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	PRESSURE RATING
100 - 2000ml	PVC, Borosilicate glass	15 psig

CCS Series Calibration Cylinders / Columns

1/2" to 2" PVC

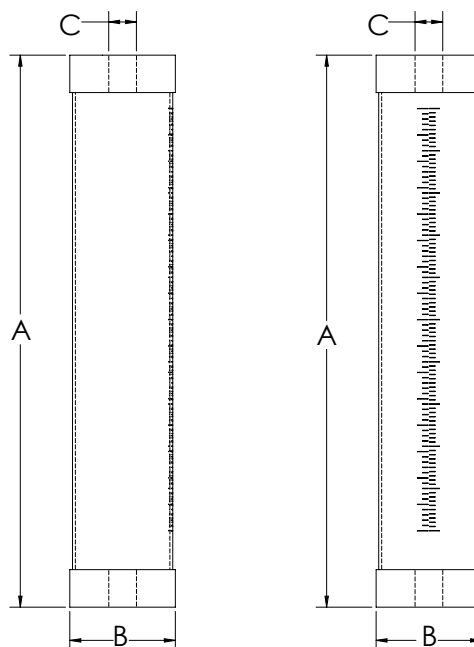
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Cylinder - PVC or Glass
2. Top Cover End - PVC
3. Bottom Cover End - PVC

SPARE PARTS (GLASS CYLINDER ONLY)

- Dust Cover Top Ends
- EZ Clean Top Ends



DIMENSIONS (INCHES / MILLIMETERS)

CAPACITY mL	MAX FLOW gph	SCALE mL / gph	A in / mm	B in / mm	C in / mm
100	3.17	1.00 / 0.10	11.00 / 279	1.50 / 38	0.50 / 13
200	6.34	1.00 / 0.10	19.00 / 483	1.50 / 38	0.50 / 13
300	9.51	5.00 / 0.20	13.00 / 330	2.20 / 56	0.50 / 13
500	15.85	5.00 / 0.20	13.00 / 330	2.50 / 63	0.75 / 19
1,000	31.70	5.00 / 0.20	22.00 / 559	2.50 / 63	0.75 / 19
2,000	63.40	10.00 / 1.00	20.00 / 508	3.70 / 94	1.00 / 25
3,000	95.10	10.00 / 1.00	17.00 / 432	4.90 / 124	1.50 / 38
4,000	126.80	10.00 / 1.00	37.00 / 940	3.70 / 94	1.00 / 25
5,000	158.50	10.00 / 1.00	28.00 / 711	4.90 / 124	1.50 / 38
7,000	221.90	10.00 / 1.00	38.00 / 965	4.90 / 124	1.50 / 38
10,000	317.00	100.00 / 5.00	25.00 / 635	6.95 / 176	2.00 / 51
15,000	475.50	100.00 / 5.00	36.00 / 914	6.95 / 176	2.00 / 51
20,000	634.00	100.00 / 5.00	47.00 / 1,193	6.95 / 176	2.00 / 51



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CS Series Corporation Stops

1/2" TO 1" PVC and CPVC

KEY FEATURES

- True Union Thermoplastic Ball Valve with PTFE Seats
- Thermoplastic Injection Quill with Beveled Tip
- 316SS Chain and Hardware
- Variable and Customer Injector Lengths
- Ball Check Valve with FPM O-Rings
- Standard MNPT and Threaded True Union End Connections
- Pressure rated to 150 psi @ 70°F/10 Bar at 21°C

OPTIONS

- Flat Tip
- Socket True Union, Metric Socket or BSPT Threaded End Connections
- EPDM O-Ring Seals

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM O-Ring Seals



PVC



CPVC

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" – 1" (DN15 – DN20)	PVC or CPVC	MNPT	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Available with threaded ends to BS21.

CS Series Corporation Stops

1/2" TO 1" PVC AND CPVC

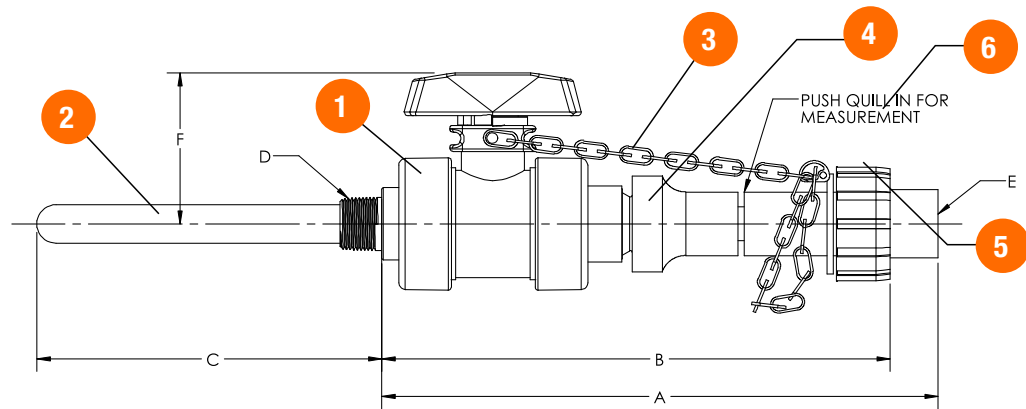
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Ball Valve - PVC or CPVC
2. Quill with Ball Check Valve and Hastelloy C Spring - PVC or CPVC
3. Stainless Steel Chain - 316SS
4. Quill Seal - FPM or EPDM
5. Union O-ring - FPM or EPDM
6. Union Nut

SPARE PARTS

- Valve
- Chain
- Replacement Quill Unit



DIMENSIONS*

VALVE SIZE in / DN	A in / mm	B in / mm	C in / mm	D	E	F in / mm
1/2 / 15	11.00 / 279	10.50 / 267	7.00 / 178	3/4" NPT	1/2" NPT	3.00 / 76
3/4 / 20	12.50 / 318	11.75 / 298	7.00 / 178	1" NPT	3/4" NPT	3.50 / 89
1 / 25	14.00 / 356	13.25 / 337	7.00 / 178	1-1/4" NPT	1" NPT	4.30 / 109

* Dimensions A, B and C with quill pushed into valve.



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IV Series Injection Valves / IQ Series Injection Quills

1/2" TO 1" PVC, CPVC AND PVDF

KEY FEATURES

- Built-in ball check valve with Hastelloy C™ spring, with the IV check being rebuildable
- Threaded MNPT End Connections
- FPM O-Ring Seals
- 45° Bevel on Quill Tip
- Pressure rated to 150 psi @ 70°F

OPTIONS

- Flat Bevel
- Socket End Connections
- EPDM O-Ring Seals

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PVDF
- FPM or EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" - 1" (DN15 - DN20)	PVC, CPVC, PVDF	NPT or Socket	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

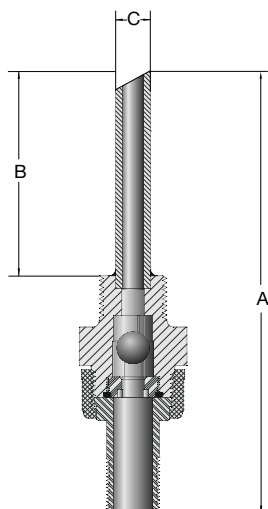
IV Series Injection Valves / IQ Series Injection Quills

1/2" TO 1" PVC, CPVC AND PVDF

TECHNICAL INFORMATION, CONTINUED

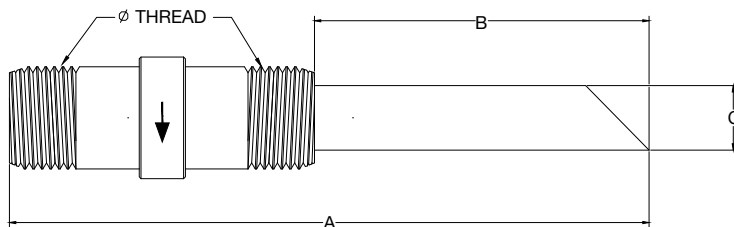
IV SERIES PARTS LIST

1. Check Valve
2. Union Nut
3. Quill



IQ SERIES PARTS LIST

1. Check Valve
2. Quill



VALVE DIMENSIONS (INCHES / MILLIMETERS)

CONNECTION SIZE in / DN	A in / mm	B in / mm	C in / mm
1/2 / 15	8.50 / 216	4.00 / 102	0.54 / 14
3/4 / 20	8.50 / 216	4.00 / 102	0.67 / 17
1 / 25	8.50 / 216	4.00 / 102	0.84 / 21

QUILL DIMENSIONS (INCHES / MILLIMETERS)

CONNECTION SIZE in / DN	A in / mm	B in / mm	C in / mm
1/2 / 15	5.50 / 140	3.00 / 76	0.54 / 14
3/4 / 20	6.10 / 155	3.00 / 76	0.67 / 17
1 / 25	7.90 / 200	4.00 / 102	0.84 / 21



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AV Series Angle Valves

1/4" TO 2" PVC & CPVC MATERIALS

KEY FEATURES

- Available in PVC and CPVC
- Space Saving Angle Design
- Fine Pitch Stem Threads for Precision Adjustment
- Perfect for Throttling and Changing Flow Direction

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 2" (DN8 – DN50)	PVC or CPVC	Threaded or Flanged	FPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Available with threaded ends to BS21.

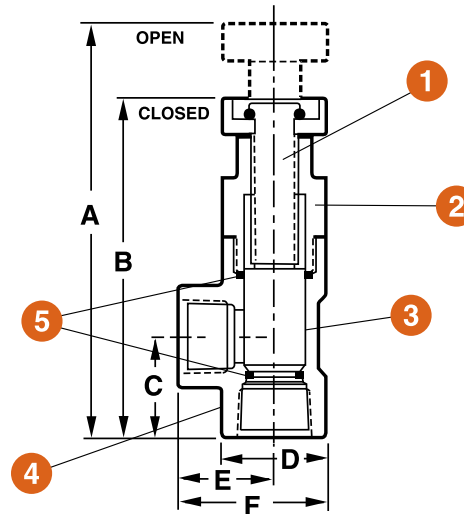
AV Series Angle Valves

1/4" TO 2" PVC & CPVC MATERIALS

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Stem
2. Bonnet
3. Piston
4. Body
5. O-Ring



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	WEIGHT lb / kg
1/4 / 8	3.63 / 92	3.19 / 81	1.06 / 27	1.00 / 25	.88 / 22	1.38 / 35	.13 / .06
1/2 / 15	5.88 / 149	4.94 / 125	1.50 / 38	1.38 / 35	1.44 / 37	2.06 / 52	.38 / .17
3/4 / 20	6.38 / 162	5.19 / 132	1.88 / 48	1.56 / 40	1.63 / 41	2.44 / 62	.50 / .23
1 / 25	7.44 / 189	6.19 / 157	2.06 / 52	1.94 / 49	1.94 / 49	2.75 / 70	.63 / .29
1-1/2 / 40	10.25 / 260	8.31 / 211	2.63 / 67	2.63 / 67	2.44 / 62	3.75 / 95	1.75 / .80
2 / 50	11.81 / 300	9.44 / 240	3.00 / 76	3.13 / 80	2.88 / 73	4.44 / 113	2.63 / 1.19

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

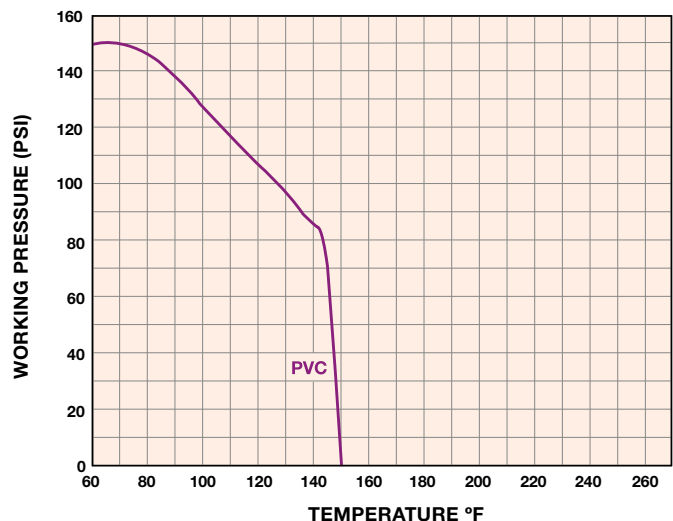
SIZE in / DN	Cv VALUES
1/4 / 8	1.0
1/2 / 15	5.0
3/4 / 20	10.0
1 / 25	16.0
1-1/2 / 40	45.0
2 / 50	70.0

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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NVA Series Needle Valves*

1/4" TO 2" PVC, CPVC, GFPP AND PVDF

KEY FEATURES

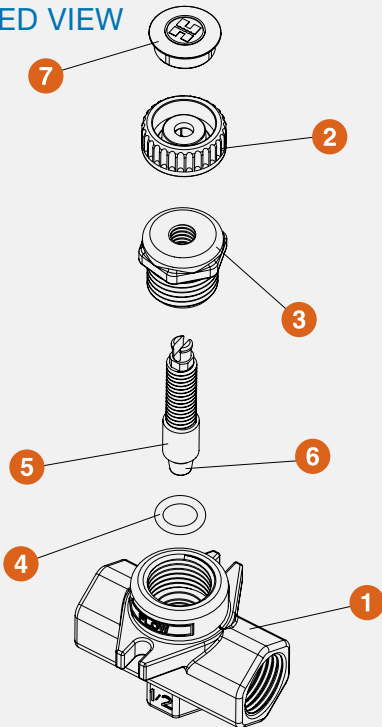
- Available in PVC, CPVC, GFPP and PVDF
- Integrated Stem/PTFE Seat Design
- Flanges for Panel Mounting
- NPT Threaded Ends
- Accurate Flow Control
- Fine Pitch Stem Threads for Precise Adjustment
- Adjust Flow Rates Down to Drops per Minute
- Ideal for Metering Flow

MATERIALS

- Heavy Duty FPM O-Ring Seals
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP per ASTM D4101
- PVDF

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" - 1/2" (DN8 - DN15)	PVC, CPVC, GFPP or PVDF	Threaded	FPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

"Patented" Pat. No.: 9,506,569

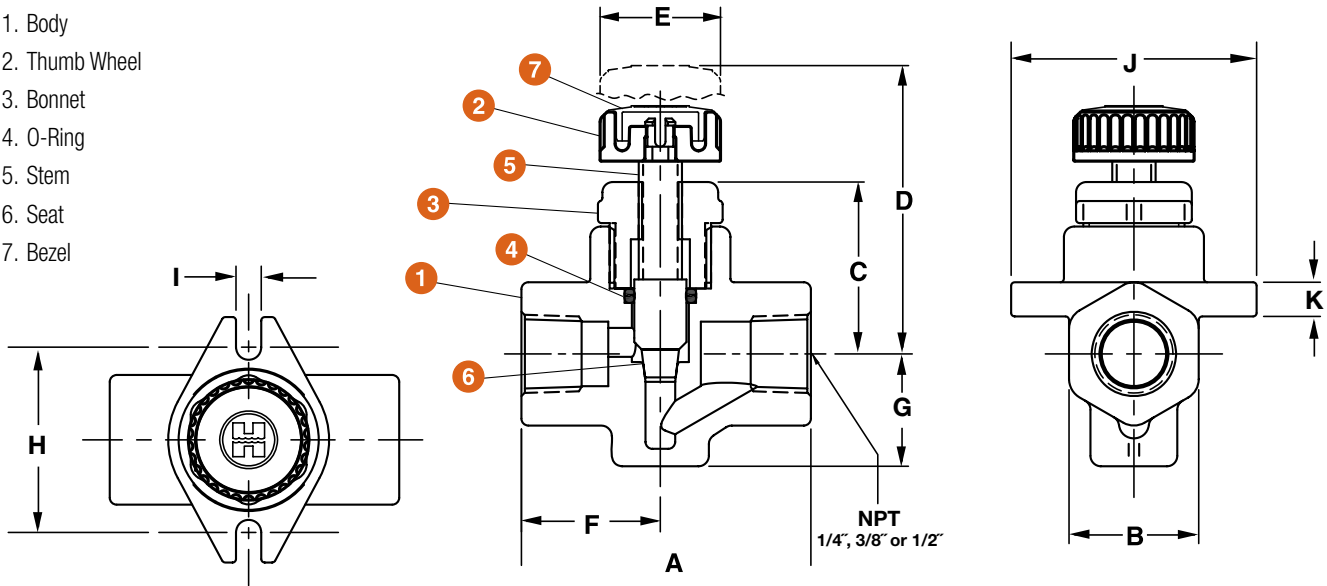
NVA Series Needle Valves

1/4" TO 1/2" PVC, CPVC, GFPP AND PVDF

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Thumb Wheel
3. Bonnet
4. O-Ring
5. Stem
6. Seat
7. Bezel



DIMENSIONS

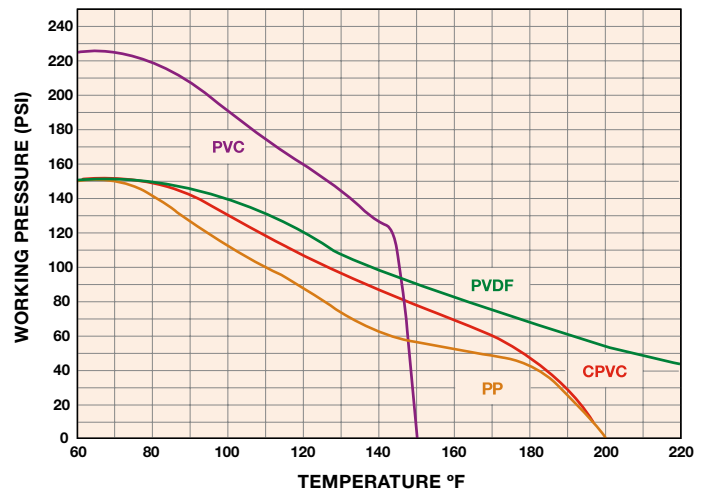
NOM SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	I in / mm	J in / mm	K in / mm	WEIGHT lbs / kg
1/4 / 8	2.50 / 64	1.12 / 28	1.49 / 38	2.49 / 63	1.04 / 26	1.20 / 30	.97 / 25	1.60 / 41	.22 / 6	2.12 / 54	.30 / 8	.22 / .10
3/8 / 10	2.50 / 64	1.12 / 28	1.49 / 38	2.49 / 63	1.04 / 26	1.20 / 30	.97 / 25	1.60 / 41	.22 / 6	2.12 / 54	.30 / 8	.22 / .10
1/2 / 15	2.50 / 64	1.12 / 28	1.49 / 38	2.49 / 63	1.04 / 26	1.20 / 30	.97 / 25	1.60 / 41	.22 / 6	2.12 / 54	.30 / 8	.22 / .10

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES

SIZE in / DN	Cv VALUES	PRESSURE LOSS CALCULATION FORMULA
1/4 / 8	.64	$\Delta P = \left[\frac{Q}{C_v} \right]^2$ ΔP = Pressure Drop Q = Flow in GPM Cv = Flow Coefficient
3/8 / 10	.72	
1/2 / 15	.79	

OPERATING TEMPERATURE/PRESSURE



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LC Series Universal Stopcock™

1/4" PVC

KEY FEATURES

- Available in Industrial Grade PVC
- Six End Connections in One Package
- Ideal for Laboratory Service
- Fine Control of Flow
- Superior Sealing Design
- EPDM Seat and Seals Standard
- Hex Wrench Included for End Connection Installation
- NSF / ANSI 61 and NSF / ANSI 372 Listed

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- EPDM O-Ring Seals



Certified to
NSF/ANSI 61 & 372

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" (DN8)	PVC	FPT x FPT FPT x MPT FPT x Hose MPT x MPT MPT x Hose Hose x Hose	EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

FPT = female pipe thread, MPT = male pipe thread

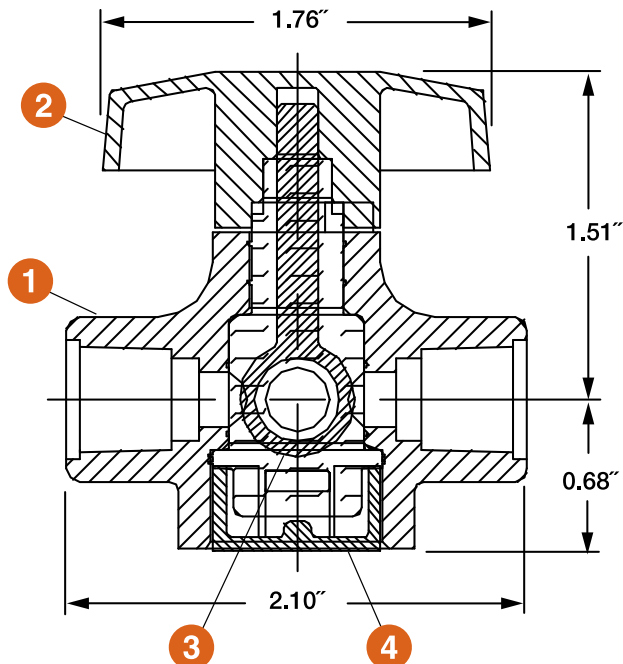
LC Series Universal Stopcock™

1/4" PVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Stopcock Body
2. Handle
3. Plug
4. Retainer Cap

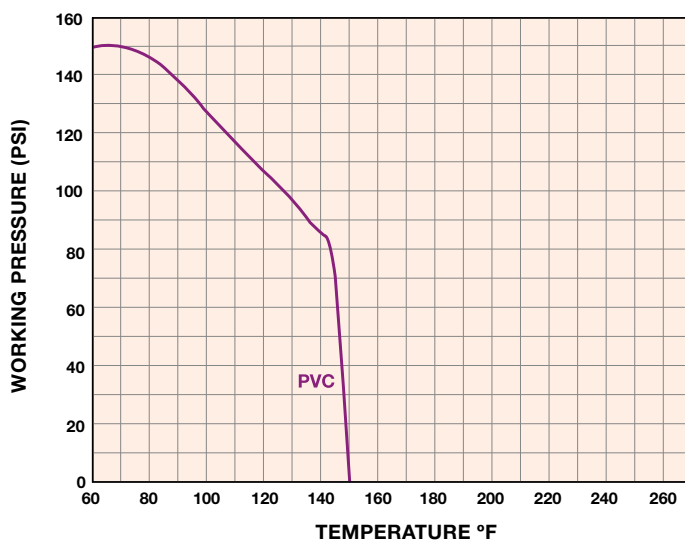


DIMENSIONS

END CONNECTION	LENGTH in / mm
FPT x FPT	2.10 / 53
FPT x MPT	2.82 / 72
FPT x Hose	3.11 / 79
MPT x MPT	3.54 / 90
MPT x Hose	3.83 / 97
Hose x Hose	4.11 / 104

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

C_v = Flow Coefficient



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YS Series Y-Strainers

1/2" - 2" PVC, CLEAR PVC AND CPVC
2-1/2" - 4" PVC AND CPVC

KEY FEATURES

- Available in PVC, CPVC and Clear PVC
- Horizontal or Vertical Installation
- FPM O-Ring Seals
- 2:1 Open Area Ratio
- Hex Cap for Easy Access to Screen
- Standard Screen has 1/32" Perforation

OPTIONS

- Stainless Steel Perforated or Mesh Strainer Screens Available in Various Sizes and Alloy Materials

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- Clear PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SCREEN OPTIONS

PERFORATION SIZES	MESH SIZES	SCREEN MATERIAL
1/32"	20	SSTL, Hastelloy, Monel and Titanium
1/16"	40	
1/8"	60	
5/32"	80	
3/16"	100	
1/4"	200	
3/8"	325	
1/32"	N/A	PVC, CPVC and PP
1/16"		
1/8"		
3/16"		

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" - 1" (DN15 - DN25)	PVC, CPVC or Clear PVC	Socket or Threaded	FPM and EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
1-1/4" (DN32)	PVC and Clear PVC			
1-1/2" (DN40)	PVC, CPVC or Clear PVC			
2" (DN50)	PVC	Socket, Threaded or Flanged		
2-1/2" (DN65)				
3-4" (DN80-DN100)				

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN / EN PN10.

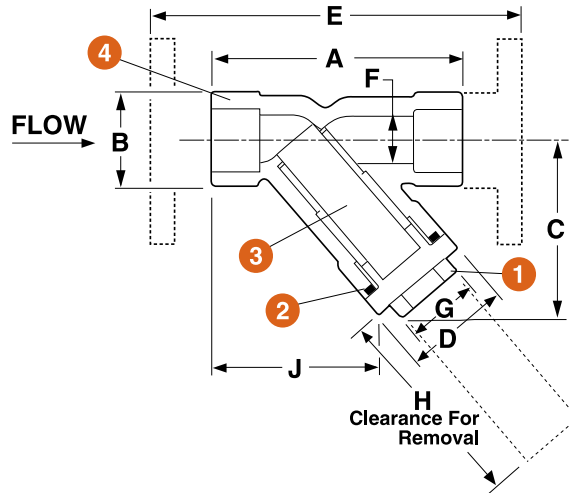
YS Series Y-Strainers

1/2" - 2" PVC, CLEAR PVC AND CPVC
2-1/2" - 4" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Cap
2. O-Ring Seal
3. Screen
4. Body



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	WEIGHT lbs / kg	
										SOC / THD	FLANGED
1/2 / 15	3.38 / 86	1.38 / 35	2.25 / 57	1.50 / 38	N/A	.56 / 14	1.00 / 25	2.13 / 54	2.50 / 64	.25 / .11	N/A
3/4 / 20	4.18 / 106	1.69 / 43	2.88 / 73	2.00 / 51	N/A	.81 / 21	1.25 / 32	2.75 / 70	3.00 / 76	.63 / .29	N/A
1 / 25	5.19 / 132	2.00 / 51	3.63 / 92	2.16 / 55	N/A	1.00 / 25	1.50 / 38	3.30 / 84	3.32 / 84	.88 / .40	N/A
1-1/4 / 32	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	N/A	1.25 / 32	2.00 / 51	4.50 / 114	4.45 / 113	1.75 / .79	N/A
1-1/2 / 40	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	N/A	1.56 / 40	2.00 / 51	4.50 / 114	4.45 / 113	1.63 / .74	N/A
2 / 50	7.63 / 194	3.38 / 86	5.38 / 137	3.75 / 95	11.00 / 279	2.00 / 51	2.38 / 60	5.06 / 129	4.88 / 124	3.00 / 1.36	5.00 / 2.27
2-1/2 / 65	10.31 / 262	4.69 / 119	7.25 / 184	5.25 / 133	N/A	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	7.75 / 3.52	N/A
3 / 80	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	14.37 / 365	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	7.50 / 3.40	12.25 / 5.56
4 / 100	12.81 / 325	5.75 / 146	8.88 / 226	6.18 / 157	17.73 / 450	3.78 / 96	4.25 / 108	8.00 / 203	8.58 / 218	9.50 / 4.30	17.50 / 7.94

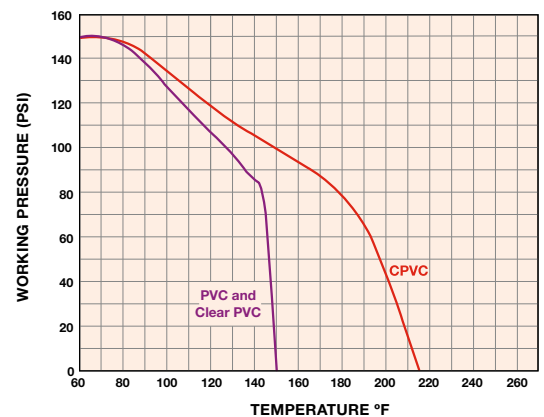
Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES*

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES	PRESSURE LOSS CALCULATION FORMULA
1/2 / 15	4.0	2 / 50	28	
3/4 / 20	6.8	2-1/2 / 65	40	
1 / 25	9.0	3 / 80	65	
1-1/4 / 32	12	4 / 100	100	
1-1/2 / 40	28			

* With 1 / 32" plastic screen

OPERATING TEMPERATURE/PRESSURE



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YS Series True Union Y-Strainers

1/2" - 2" PVC, CLEAR PVC AND CPVC
2-1/2" - 4" PVC AND CPVC

KEY FEATURES

- True Union Connection for Ease of Installation
- Available in PVC, CPVC and Clear PVC
- Horizontal or Vertical Installation
- FPM O-Ring Seals
- 2:1 Open Area Ratio
- Hex Cap for Easy Access to Screen
- Standard Screen has 1/32" Perforation

OPTIONS

- Stainless Steel Perforated or Mesh Strainer
Screens Available in Various Sizes and Alloys

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- Clear PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SCREEN OPTIONS

PERFORATION SIZES	MESH SIZES	SCREEN MATERIAL
1/32"	20	SSTL, Hastelloy, Monel and Titanium
1/16"	40	
1/8"	60	
5/32"	80	
3/16"	100	
1/4"	200	
3/8"	325	
1/32"	N/A	PVC, CPVC and PP
1/16"		
1/8"		
3/16"		

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" - 1" (DN15 - DN25)	PVC, CPVC or Clear PVC	Socket, Threaded or Flanged	FPM and EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
1-1/4" (DN32)	PVC and Clear PVC			
1-1/2" (DN40)	PVC, CPVC or Clear PVC			
2" (DN50)				
2-1/2" (DN65)	PVC			
3-4" (DN80 - DN100)	PVC and CPVC			

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN / EN PN10.

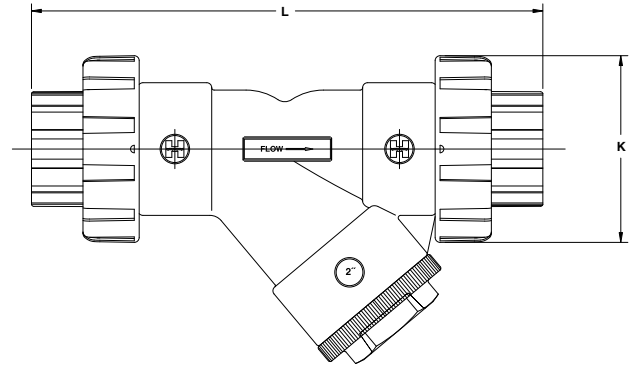
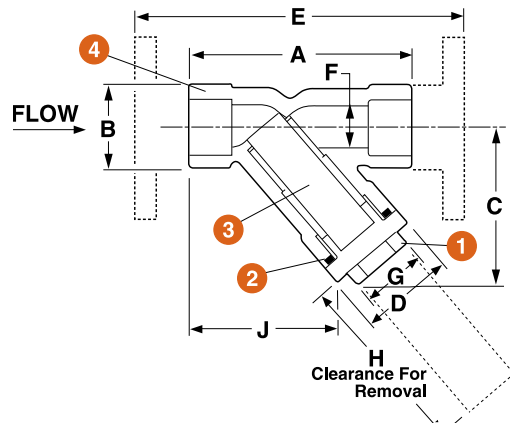
YS Series True Union Y-Strainers

1/2" - 2" PVC, CLEAR PVC AND CPVC
2-1/2" - 4" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Cap
2. O-Ring Seal
3. Screen
4. Body



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	L in / mm	WEIGHT lbs / kg	
												SOC/ THD	FLANGED
1/2 / 15	3.38 / 86	1.38 / 35	2.25 / 57	1.50 / 38	NA	.56 / 14	1.00 / 25	2.13 / 54	2.50 / 64	2.25 / 57	6.64 / 167	25 / .11	NA
3/4 / 20	4.18 / 106	1.69 / 43	2.88 / 73	2.00 / 51	NA	.81 / 21	1.25 / 32	2.75 / 70	3.00 / 76	2.63 / 67	7.42 / 188	63 / .29	NA
1 / 25	5.19 / 132	2.00 / 51	3.63 / 92	2.16 / 55	NA	1.00 / 25	1.50 / 38	3.30 / 84	3.32 / 84	3.00 / 76	8.97 / 228	.88 / .40	NA
1-1/4 / 32	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	NA	1.25 / 32	2.00 / 51	4.50 / 114	4.45 / 113	4.75 / 121	13.01 / 330	1.75 / .79	NA
1-1/2 / 40	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	NA	1.56 / 40	2.00 / 51	4.50 / 114	4.45 / 113	4.75 / 121	12.07 / 307	1.63 / .74	NA
2 / 50	7.63 / 194	3.38 / 86	5.38 / 137	3.75 / 95	11.00 / 279	2.00 / 51	2.38 / 60	5.06 / 129	4.88 / 124	4.75 / 121	13.05 / 331	3.00 / 1.36	5.00 / 2.27
2-1/2 / 65	10.31 / 262	4.69 / 119	7.25 / 184	5.25 / 133	NA	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	6.40 / 163	16.77 / 426	7.75 / 3.52	NA
3 / 80	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	14.37 / 365	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	6.40 / 163	16.77 / 426	7.50 / 3.40	12.25 / 5.56
4 / 100	12.81 / 325	5.75 / 146	8.88 / 226	6.18 / 157	17.73 / 450	3.78 / 96	4.25 / 108	8.00 / 203	8.58 / 218	8.56 / 217	21.23 / 539	9.50 / 4.30	17.50 / 7.94

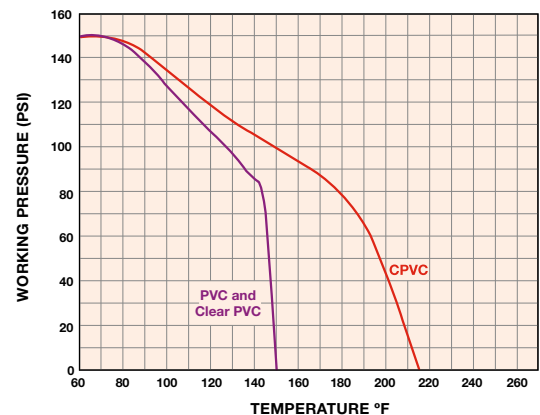
Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES*

SIZE in/DN	Cv VALUES	SIZE in/DN	Cv VALUES	PRESSURE LOSS CALCULATION FORMULA
1/2 / 15	4.0	2 / 50	28	
3/4 / 20	6.8	2-1/2 / 65	40	
1 / 25	9.0	3 / 80	65	
1-1/4 / 32	12	4 / 100	100	
1-1/2 / 40	28			

* With 1/32" plastic screen

OPERATING TEMPERATURE/PRESSURE



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YS Series Y-Strainers

1/2", 3/4" AND 1" PVDF



KEY FEATURES

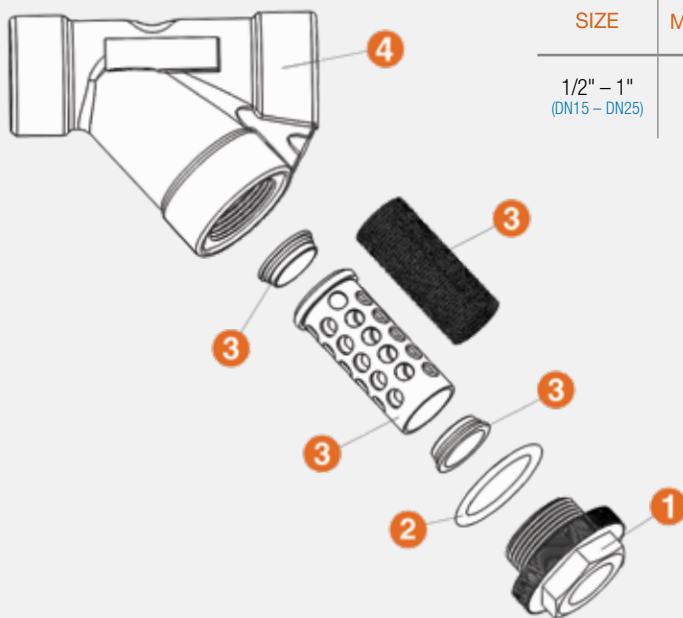
- PVDF 1-pc Construction
- NPT or BSP Threaded Ends
- Socket Fusion Ends for IPS Schedule 40 / 80, or for SDR21 / 33 Piping
- Horizontal or Vertical Installation
- FPM O-Ring Seals
- Hex Cap for Easy Access to Screen
- Standard Screen has 3/32" Perforation

MATERIALS

- Natural PVDF per ASTM D3222 Type 1
- FPM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" - 1" (DN15 - DN25)	PVDF	Socket Fusion or Threaded	FPM	150 PSI @ 70°F Non-Shock

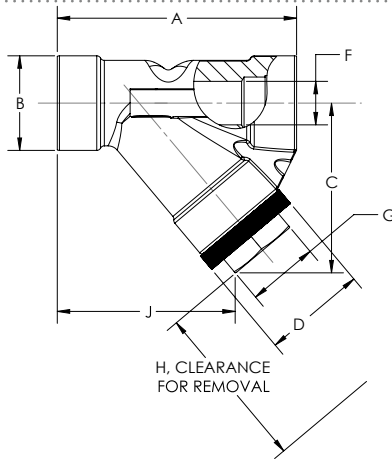
YS Series Y-Strainers

1/2", 3/4" AND 1" PVDF

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Cap
2. O-Ring Seal
3. Cartridge
4. Body



SCREEN OPTIONS

PERFORATION SIZES	BASKET MATERIAL
1/16"	PTFE / PVDF
3/32"	

DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	F in / mm	G in / mm	H in / mm	J in / mm	WEIGHT lbs / kg SOC / THD
1/2 / 15	3.30 / 84	1.50 / 38	2.30 / 58	1.40 / 36	0.50 / 13	1.00 / 25	2.20 / 56	2.80 / 71	0.33 / 0.15
3/4 / 20	4.1 / 104	1.90 / 48	3.00 / 76	1.90 / 49	0.75 / 19	1.25 / 32	2.70 / 69	3.20 / 81	0.82 / 0.37
1 / 25	5.0 / 127	2.00 / 51	3.60 / 91	2.10 / 53	1.00 / 25	1.50 / 38	3.50 / 89	3.90 / 99	1.14 / 0.52

Dimensions are subject to change without notice – consult factory for installation information

Cv VALUES*

SIZE in / DN	Cv VALUES
1/2 / 15	4.0
3/4 / 20	6.8
1 / 25	9.0

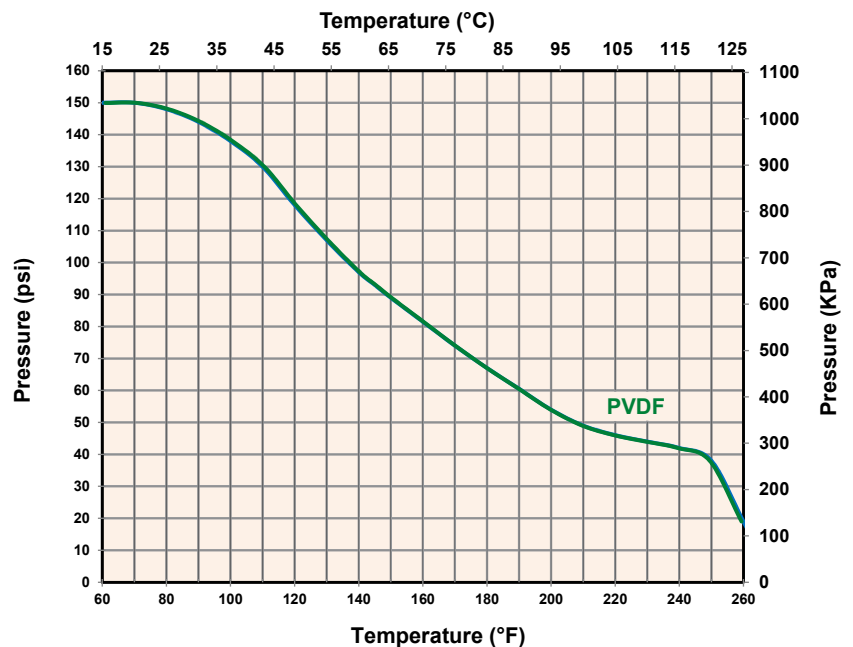
* With standard 3/32" perforation.

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

OPERATING TEMPERATURE/PRESSURE



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Certified to
NSF/ANSI 61 & 372
PVC and CPVC

SB Series Simplex Basket Strainers

1/2" TO 4" PVC, CPVC, GFPP BLACK, GFPP PLATINUM AND EASTAR®

KEY FEATURES

- Available in PVC, CPVC, GFPP and Eastar®
- True Union Design
- Ergonomic Hand-Removable Cover
- In-Line or Loop Connections
- External Cover Threads
- Integral Flat Mounting Bases
- PVC or CPVC Baskets Standard
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

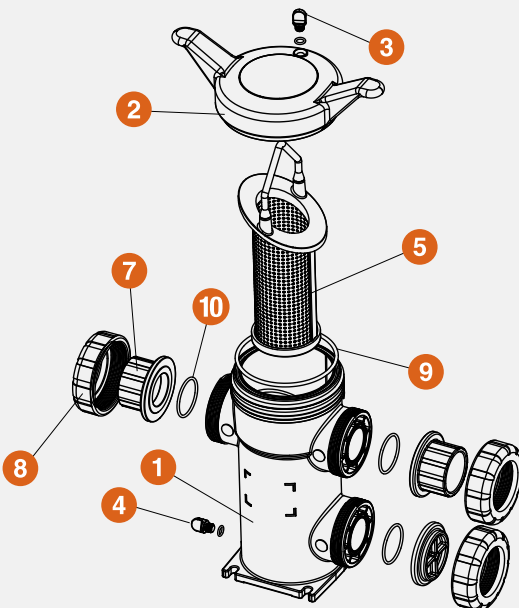
- Stainless Steel, Monel®, Hastelloy® and Titanium Strainer Baskets
- Pressure Differential Gauge and Switch
- Baskets Available with Perforated or Mesh Liners

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- Eastar®
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE*	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
	Eastar®*			100 PSI @ 70°F 7 Bar @ 21°C Non-Shock
	GFPP	Socket Fusion, Threaded or Flanged		150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* End connections and assembly nuts are PVC.
 ** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
 *** PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
 Flanged ends available in DIN / EN PN10.

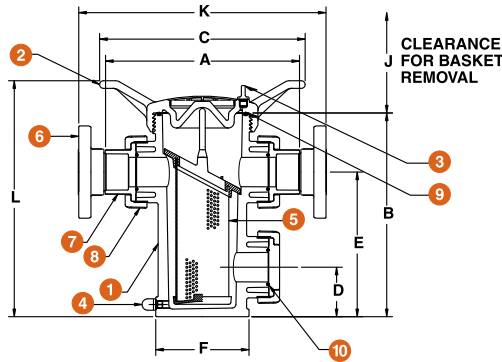
SB Series Simplex Basket Strainers

1/2" TO 4" PVC, CPVC, GFPP AND EASTAR®

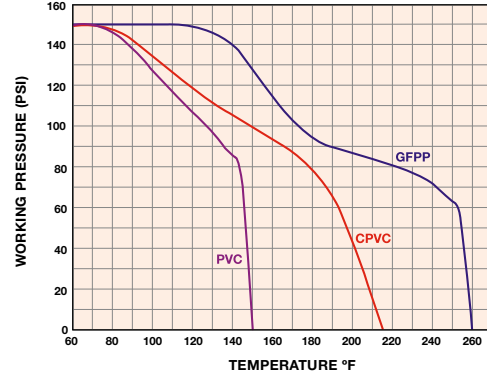
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Cover
3. Vent Plug and O-Ring
4. Drain Plug and O-Ring
5. Basket
6. Flange (Optional)
7. End Connector
8. Nut
9. Cover O-Ring
10. End Connector O-Ring



OPERATING TEMPERATURE/PRESSURE



Consult factory for Eastar Temperature & Pressure ratings

DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	J in / mm	K in / mm	L in / mm	WEIGHT lbs / kg		VOLUME gal / LT
										SOC / THD	FLANGED	
1/2 / 15	8.64 / 219	9.63 / 245	11.00 / 279	2.25 / 57	6.75 / 171	4.31 / 109	8.00 / 203	10.77 / 274	11.70 / 297	8.00 / 3.63	9.00 / 4.08	.20 / .76
3/4 / 20	8.64 / 219	9.63 / 245	11.00 / 279	2.25 / 57	6.75 / 171	4.31 / 109	8.00 / 203	11.02 / 280	11.70 / 297	8.00 / 3.63	9.00 / 4.08	.20 / .76
1 / 25	8.64 / 219	9.63 / 245	11.00 / 279	2.25 / 57	6.75 / 171	4.31 / 109	8.00 / 203	11.64 / 296	11.70 / 297	8.00 / 3.63	9.00 / 4.08	.20 / .76
1-1/4 / 32	12.75 / 324	13.38 / 340	13.50 / 343	3.25 / 83	9.50 / 241	6.13 / 156	12.86 / 327	15.63 / 397	15.50 / 394	14.00 / 6.35	16.50 / 7.48	.70 / 2.65
1-1/2 / 40	12.69 / 322	13.38 / 340	13.50 / 343	3.25 / 83	9.50 / 241	6.13 / 156	12.86 / 327	15.89 / 403	15.50 / 394	14.00 / 6.35	16.50 / 7.48	.70 / 2.65
2 / 50	12.75 / 324	13.38 / 340	13.50 / 343	3.25 / 83	9.50 / 241	6.13 / 156	12.86 / 327	16.29 / 413	15.50 / 394	14.00 / 6.35	16.50 / 7.48	.70 / 2.65
2-1/2 / 65	16.52 / 420	19.83 / 504	16.00 / 406	4.83 / 123	14.83 / 377	7.25 / 184	17.25 / 438	21.02 / 534	22.30 / 566	28.00 / 12.70	33.00 / 14.97	2.80 / 10.60
3 / 80	16.40 / 417	19.83 / 504	16.00 / 406	4.83 / 123	14.83 / 377	7.25 / 184	17.25 / 438	20.36 / 517	22.30 / 566	28.00 / 12.70	33.50 / 15.20	2.80 / 10.60
4 / 100	17.27 / 439	19.83 / 504	16.00 / 406	4.83 / 123	14.83 / 377	7.25 / 184	17.25 / 438	22.13 / 562	22.30 / 566	28.00 / 12.70	37.00 / 16.78	2.80 / 10.60

Dimensions are subject to change without notice – consult factory for installation information

PRESSURE DROP CALCULATIONS

BASKET PERFORATION CORRECTION FACTORS

For 1/2" to 4" Strainers

Plastic		Stainless Steel	
1/32"	1.05	1/32"	.82
1/16"	1.00	1/16"	.74
1/8"	.58	1/8"	.58
3/16"	.46	5/32"	.37
		3/16"	.46
		1/4"	.58
		3/8"	.45
		20 Mesh	.79
		40 Mesh	1.01
		60 Mesh	1.20
		80 Mesh	1.16
		100 Mesh	1.20
		200 Mesh	1.09
		325 Mesh	1.22

PRESSURE LOSS CALCULATION FORMULA

The pressure drop across the strainer, for water or fluids with a similar viscosity, can be calculated using the formula at the right:

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

C_v = Flow Coefficient

Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	15	2 / 50	60
3/4 / 20	18	2-1/2 / 65	290
1 / 25	20	3 / 80	300
1-1/4 / 32	55	4 / 100	350
1-1/2 / 40	58		

The above Cv Values were determined using a 1 / 16" perforated plastic basket in 1/2" through 4" strainers.

To calculate pressure drop through vessels using other than 1 / 16" perforated baskets, first calculate the pressure drop using the listed Cv, and then multiply the result by the correction factor in the Correction Factors chart to the left.



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Certified to
NSF/ANSI 61 & 372
PVC and CPVC

SB Series Simplex Basket Strainers

6" TO 8" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Ergonomic Hand-Removable Cover
- In-Line or Loop Connections
- External Cover Threads
- Integral Flat Mounting Bases
- PVC or CPVC Baskets Standard
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

- Stainless Steel, Monel®, Hastelloy® and Titanium Strainer Baskets
- Pressure Differential Gauge and Switch
- Baskets Available with Perforated or Mesh Liners

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

BASKET OPTIONS

PERFORATION SIZES	MESH SIZES	BASKET MATERIAL
1/32"	20	SSTL, Hastelloy, Monel and Titanium
1/16"	40	
1/8"	60	
5/32"	80	
3/16"	100	
1/4"	200	
3/8"	325	
1/8"	N/A	PVC, CPVC and PP
3/16"		

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
6" – 8" (DN150 – DN200)	PVC or CPVC	Flanged*	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* Flanged Ends available in ANSI/ASME 150 or DIN/ EN PN10

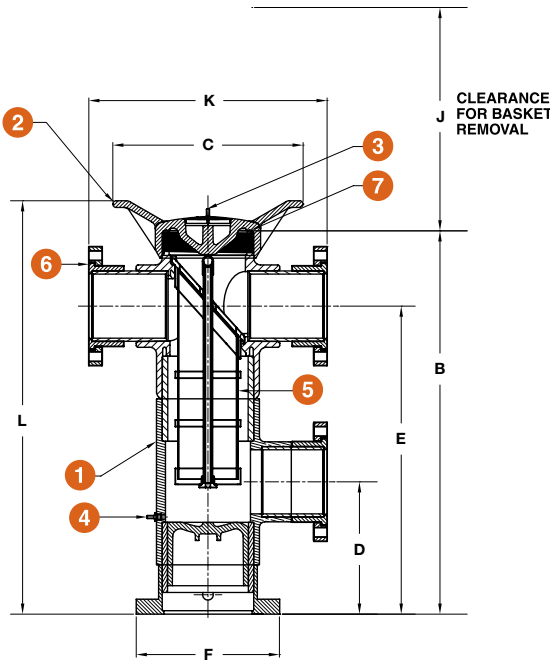
SB Series Simplex Basket Strainers

6" TO 8" PVC AND CPVC

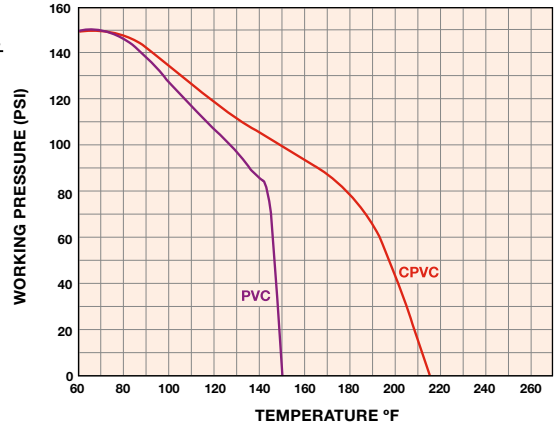
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. Cover
3. Vent Plug and O-Ring
4. Drain Plug and O-Ring
5. Basket
6. Flange (Optional)
7. Cover O-Ring



OPERATING TEMPERATURE/PRESSURE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	J in / mm	K in / mm	L in / mm	WEIGHT lbs / kg		VOLUME gal / LT
										SOC / THD	FLANGED	
6 / 150	N/A	36.07 / 871	18.00 / 457	12.46 / 316	28.99 / 736	13.50 / 298	21.80 / 554	22.42 / 569	39.90 / 1013	N/A	60.00 / 27.21	6.80 / 25.74
8 / 200	N/A	36.07 / 871	18.00 / 457	12.46 / 316	28.99 / 736	13.50 / 298	28.75 / 730	25.44 / 640	39.90 / 1013	N/A	80.00 / 36.28	9.00 / 34.07

Dimensions are subject to change without notice – consult factory for installation information

PRESSURE DROP CALCULATIONS

BASKET PERFORATION CORRECTION FACTORS

For 6" to 8" Strainers

Plastic		Stainless Steel			
1/8"	2.00	1/32"	2.25	20 Mesh	2.16
3/16"	1.50	1/16"	2.03	40 Mesh	2.79
		1/8"	1.58	60 Mesh	3.28
		5/32"	1.00	80 Mesh	3.18
		3/16"	1.26	100 Mesh	3.30
		1/4"	1.58	200 Mesh	2.98
		3/8"	1.24	325 Mesh	3.33

PRESSURE LOSS CALCULATION FORMULA

The pressure drop across the strainer, for water or fluids with a similar viscosity, can be calculated using the formula at the right:

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop
 Q = Flow in GPM
 C_v = Flow Coefficient

Cv VALUES

SIZE in / DN	Cv VALUES
6 / 150	1,000
8 / 200	750

The above Cv Values were determined using a 5 / 32" perforated plastic basket in 6" and 8" strainers.

To calculate pressure drop through vessels using other than 5 / 32" perforated baskets, first calculate the pressure drop using the listed Cv, and then multiply the result by the correction factor in the Correction Factors chart to the left.



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 Visit us at: haywardflowcontrol.com

DB Series Duplex Basket Strainers

1/2" TO 4" PVC, CPVC AND EASTAR®

KEY FEATURES

- Available in PVC, CPVC and Eastar®
- Ergonomic Hand-Removable Cover
- Uninterrupted Flow
- No System Shutdown for Basket Cleaning
- In-Line or Loop Piping
- Integral Flat Mounting Bases
- External Cover Threads
- Hand Removable Vents on Covers
- Hand Removable Drains on Bodies
- Liquid Displacing Covers

OPTIONS

- Stainless Steel, Monel®, Hastelloy® and Titanium Strainer Baskets
- Pressure Differential Gauge and Switch
- Pneumatic or Electric Valve Automation
- Baskets Available with Perforated or Mesh Liners

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- Eastar®
- FPM and EPDM O-Ring Seals



TECHNICAL INFORMATION

BASKET OPTIONS

PERFORATION SIZES	MESH SIZES	BASKET MATERIAL
1/32"	20	SSTL, Hastelloy, Monel and Titanium
1/16"	40	
1/8"	60	
5/32"	80	
3/16"	100	
1/4"	200	
3/8"	325	
<hr/>		
1/32"	N/A	PVC, CPVC and PP
1/16"		
1/8"		
3/16"		

SELECTION CHART

SIZE**	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
	Eastar*			100 PSI @ 70°F 7 Bar @ 21°C Non-Shock

* End connections and assembly nuts are PVC.
 ** PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
 *** Flanged ends available in DIN / EN PN10.

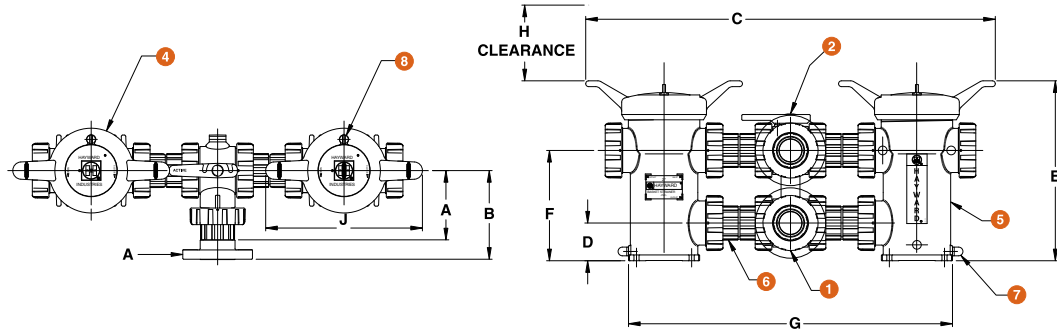
DB Series Duplex Basket Strainers

1/2" TO 4" PVC, CPVC AND EASTAR®

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Single Stem Lateral
2. Double Stem Lateral
3. Inlet Flange
4. Cover
5. Strainer Body
6. Spool
7. Drain Plug and O-Ring
8. Vent Plug and O-Ring



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	WEIGHT lbs / kg	
										SOC / THD	FLANGED
1/2 / 15	4.14 / 105	5.21 / 132	27.20 / 691	2.25 / 57	11.70 / 297	6.75 / 171	20.50 / 521	5.00 / 127	11.00 / 279	20.00 / 9.07	21.00 / 9.53
3/4 / 20	4.14 / 105	5.33 / 135	27.20 / 691	2.25 / 57	11.70 / 297	6.75 / 171	20.50 / 521	5.00 / 127	11.00 / 279	20.00 / 9.07	21.00 / 9.53
1 / 25	4.14 / 105	5.64 / 143	27.20 / 691	2.25 / 57	11.70 / 297	6.75 / 171	20.50 / 521	5.00 / 127	11.00 / 279	20.00 / 9.07	21.00 / 9.53
1-1/4 / 32	6.00 / 152	7.44 / 189	35.30 / 897	3.25 / 83	15.50 / 394	9.50 / 241	28.00 / 711	10.80 / 274	13.50 / 343	39.50 / 17.92	42.00 / 19.05
1-1/2 / 40	6.00 / 152	7.60 / 193	35.30 / 897	3.25 / 83	15.50 / 394	9.50 / 241	28.00 / 711	10.80 / 274	13.50 / 343	39.50 / 17.92	42.00 / 19.05
2 / 50	6.00 / 152	7.77 / 197	35.30 / 897	3.25 / 83	15.50 / 394	9.50 / 241	28.00 / 711	10.80 / 274	13.50 / 343	39.50 / 17.92	42.00 / 19.05
2-1/2 / 65	7.60 / 193	9.85 / 250	44.40 / 1128	4.83 / 123	22.30 / 566	14.83 / 377	35.60 / 904	14.80 / 376	16.00 / 406	83.00 / 37.65	88.00 / 39.92
3 / 80	7.60 / 193	9.85 / 250	44.40 / 1128	4.83 / 123	22.30 / 566	14.83 / 377	35.60 / 904	14.80 / 376	16.00 / 406	83.00 / 37.65	88.50 / 40.14
4 / 100	9.33 / 237	11.76 / 299	47.50 / 1207	4.83 / 123	22.30 / 566	14.83 / 377	38.70 / 983	14.80 / 376	16.00 / 406	100.00 / 45.36	105.00 / 47.63

Dimensions are subject to change without notice – consult factory for installation information

PRESSURE DROP CALCULATIONS

BASKET PERFORATION CORRECTION FACTORS

For 1/2" to 4" Strainers

Plastic		Stainless Steel	
1/32"	1.05	1/32"	.82
1/16"	1.00	1/16"	.74
1/8"	.58	1/8"	.58
3/16"	.46	5/32"	.37
		3/16"	.46
		1/4"	.58
		3/8"	.45
		20 Mesh	.79
		40 Mesh	1.01
		60 Mesh	1.20
		80 Mesh	1.16
		100 Mesh	1.20
		200 Mesh	1.09
		325 Mesh	1.22

PRESSURE LOSS CALCULATION FORMULA

The pressure drop across the strainer, for water or fluids with a similar viscosity, can be calculated using the formula at the right:

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

C_v = Flow Coefficient

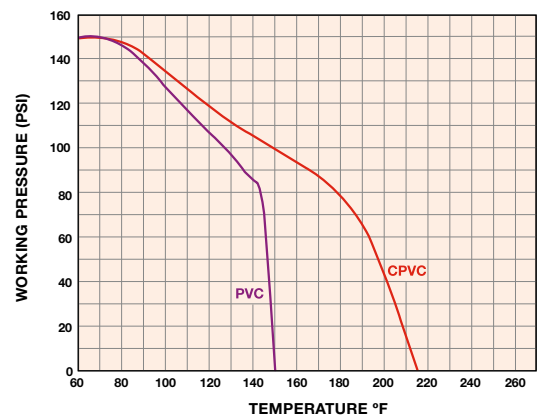
Cv VALUES

SIZE in / DN	Cv VALUES	SIZE in / DN	Cv VALUES
1/2 / 15	12.5	1-1/2 / 40	45
3/4 / 20	13	2 / 50	48
1 / 25	14	3 / 80	200
1-1/4 / 32	40	4 / 100	280

The Cv Values were determined using a 1/16" perforated plastic basket in 1/2" through 4" strainers.

To calculate pressure drop through vessels using other than 1/16" perforated baskets, first calculate the pressure drop using the listed Cv, and then multiply the result by the correction factor in the Correction Factors chart to the left.

OPERATING TEMPERATURE/PRESSURE



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DB Series Duplex Basket Strainers

6" TO 8" PVC AND CPVC

KEY FEATURES

- Available in PVC and CPVC
- Ergonomic Hand-Removable Cover
- Uninterrupted Flow
- No System Shutdown for Basket Cleaning
- In-Line or Loop Piping
- Integral Flat Mounting Bases
- External Cover Threads
- Hand Removable Vents on Covers
- Hand Removable Drains on Bodies
- Liquid Displacing Covers

OPTIONS

- Stainless Steel, Monel®, Hastelloy® and Titanium Strainer Baskets
- Pressure Differential Gauge and Switch
- Pneumatic or Electric Valve Automation
- Baskets Available with Perforated or Mesh Liners

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

BASKET OPTIONS

PERFORATION SIZES	MESH SIZES	BASKET MATERIAL
1/32"	20	SSTL, Hastelloy, Monel and Titanium
1/16"	40	
1/8"	60	
5/32"	80	
3/16"	100	
1/4"	200	
3/8"	325	
1/8"	N/A	PVC, CPVC and PP
3/16"		

SELECTION CHART

SIZE*	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
6" – 8" (DN150 – DN200)	PVC or CPVC	Flanged*	FPM or EPDM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

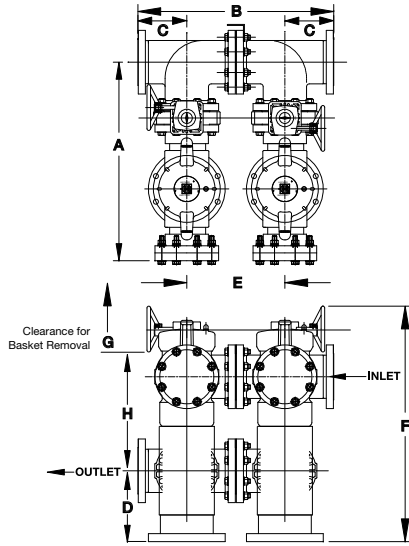
* Flanged Ends available in ANSI/ASME 150 or DIN/ EN PN10

DB Series Duplex Basket Strainers

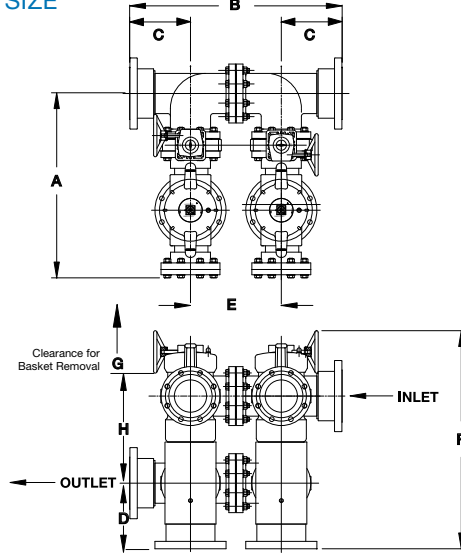
6" AND 8" PVC AND CPVC

TECHNICAL INFORMATION, CONTINUED

6" SIZE



8" SIZE



DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	WEIGHT lbs / kg
6 / 150	34.91 / 887	34.42 / 874	8.59 / 218	12.45 / 316	17.24 / 438	41.40 / 1052	21.80 / 554	16.53 / 420	180.00 / 81.65
8 / 200	42.70 / 1085	53.15 / 1350	13.27 / 337	12.45 / 316	26.62 / 676	42.52 / 1080	28.75 / 730	16.53 / 420	250.00 / 113.40

Dimensions are subject to change without notice – consult factory for installation information

PRESSURE DROP CALCULATIONS

BASKET PERFORATION CORRECTION FACTORS

For 6" to 8" Strainers

Plastic		Stainless Steel			
1/8"	2.00	1/32"	2.25	20 Mesh	2.16
3/16"	1.50	1/16"	2.03	40 Mesh	2.79
		1/8"	1.58	60 Mesh	3.28
		5/32"	1.00	80 Mesh	3.18
		3/16"	1.26	100 Mesh	3.30
		1/4"	1.58	200 Mesh	2.98
		3/8"	1.24	325 Mesh	3.33

PRESSURE LOSS CALCULATION FORMULA

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

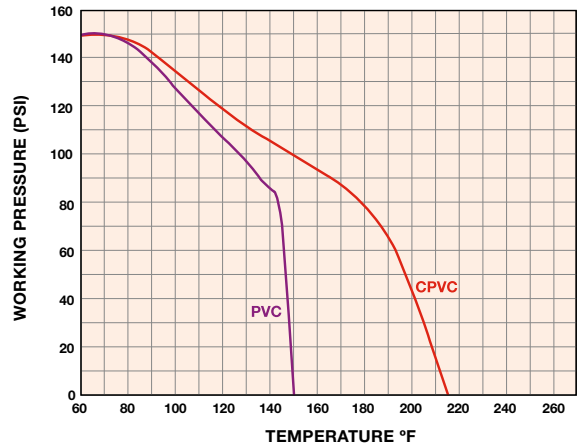
ΔP = Pressure Drop

Q = Flow in GPM

C_v = Flow Coefficient

The pressure drop across the strainer, for water or fluids with a similar viscosity, can be calculated using the formula at the right:

OPERATING TEMPERATURE/PRESSURE



Cv VALUES

SIZE in / DN	Cv VALUES GPM
6 / 150	1,000
8 / 200	750

The Cv Values were determined using a 5/32" perforated plastic basket in 6" and 8" strainers.

To calculate pressure drop through vessels using other than 5/32" perforated baskets, first calculate the pressure drop using the listed Cv, and then multiply the result by the correction factor in the Correction Factors chart to the left.



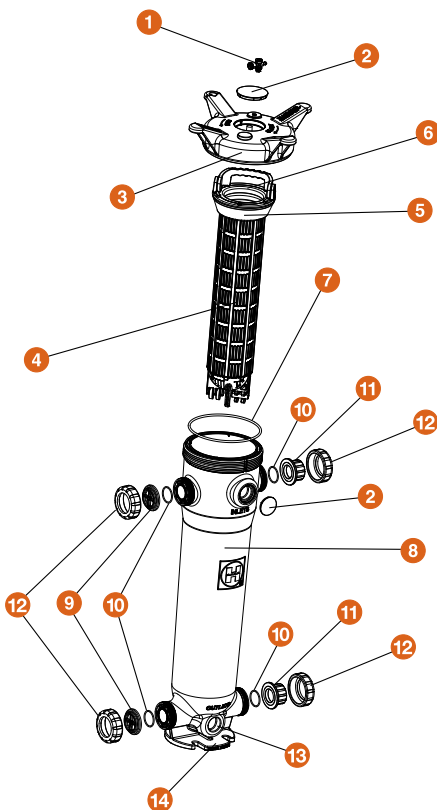
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EXPLODED VIEW



FLV Series Simplex Bag Filters

SINGLE LENGTH – 16" GFPP
1-1/4" TO 2" PIPE SIZES

KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included On Cover
- Rated up to 100 GPM
- True Union Socket, Threaded or Flanged End Connections
- In-Line or Loop Flow Configurations
- Solid Basket
- Drain Port at Bottom
- Integral Mounting Base
- Easier Installations Due to True Union Connectivity
- Vertical Flow Flutes in Basket, No Bag Snag and More Flow Area

OPTIONS

- Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Cartridge Adapters
- Hinged Basket
- 316 Stainless Steel Basket

MATERIALS

- GFPP per ASTM D4101, Cell Class 85580
- FPM Standard O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16"	GFPP	GFPP (Threaded and Flanged), PVC/CPVC (Socket and PP Socket Fusion)	1-1/4" – 2" (DN32 – DN50)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
					150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

FLV Series Simplex Bag Filters

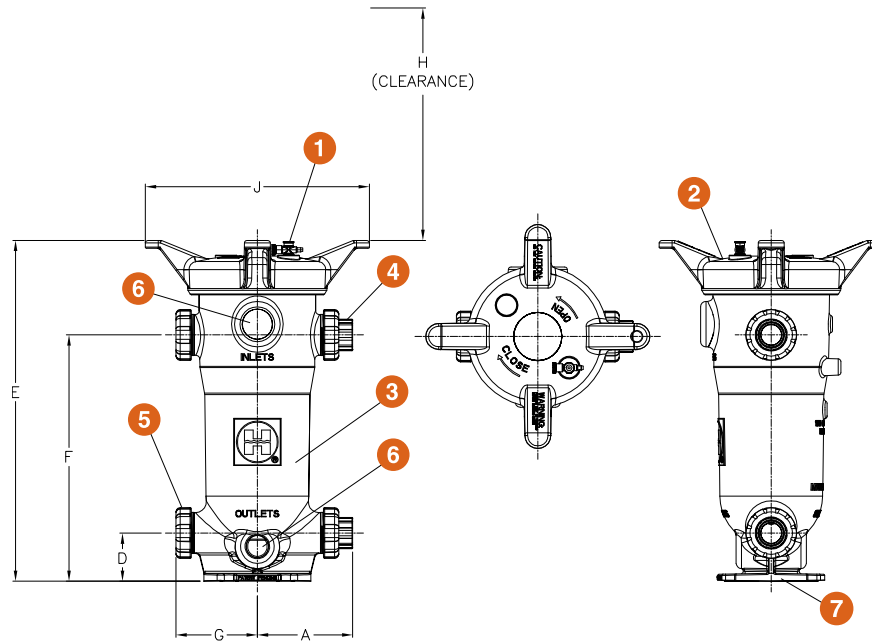
SINGLE LENGTH – 16" GFPP
1-1/4" TO 2" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connector
5. Assembly Nut
6. Alternate 2" NPT Ports
7. Integrally Molded Mounting Pad

* See page 8 for a complete Parts List



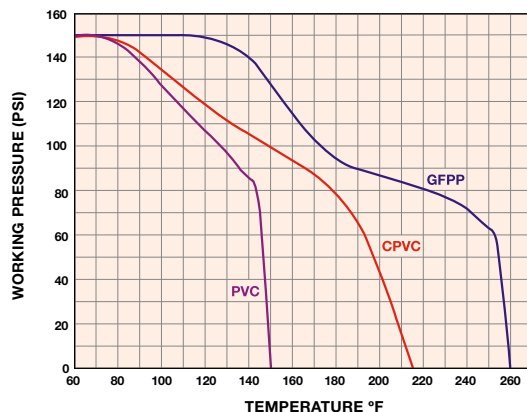
DIMENSIONS

FILTER SIZE in / DN	A in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm
1-1/4" / 32	8.86 / 225	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532
1-1/2" / 40	8.86 / 225	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532
2" / 50	8.91 / 226	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

OPERATING TEMPERATURE / PRESSURE



Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

SPECIFICATIONS

- Material of Construction:** GFPP
- Inlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Outlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Bag Size:** Bag Size #1: 7" x 16"
- Pressure Rating:** 150 PSI @ 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Flow Rate:** 100 GPM (*May be Limited by Pipe Size or Bag Choice*)
- Weight:** 47.8 lbs.

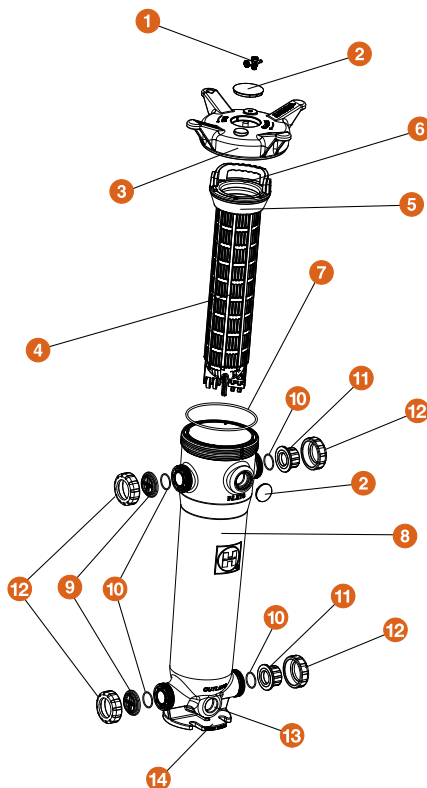


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EXPLODED VIEW



FLV Series Simplex Bag Filters

DOUBLE LENGTH – 32" GFPP
1-1/4" TO 2" PIPE SIZES

KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 100 GPM
- True Union Socket, Threaded or Flanged End Connections
- In-Line or Loop Flow Configurations
- Solid Basket
- Drain Port at Bottom
- Integral Mounting Base
- Easier Installations Due to True Union Connectivity
- Vertical Flow Flutes in Basket, No Bag Snag and More Flow Area

OPTIONS

- Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Cartridge Adapters
- Hinged Basket
- 316 Stainless Steel Basket

MATERIALS

- GFPP per ASTM D4101, Cell Class 85580
- FPM Standard O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Double Length 7" x 32"	GFPP	GFPP (Threaded and Flanged), PVC/CPVC (Socket and PP Socket Fusion)	1-1/4" – 2" (DN32–DN50)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
					150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

FLV Series Simplex Bag Filters

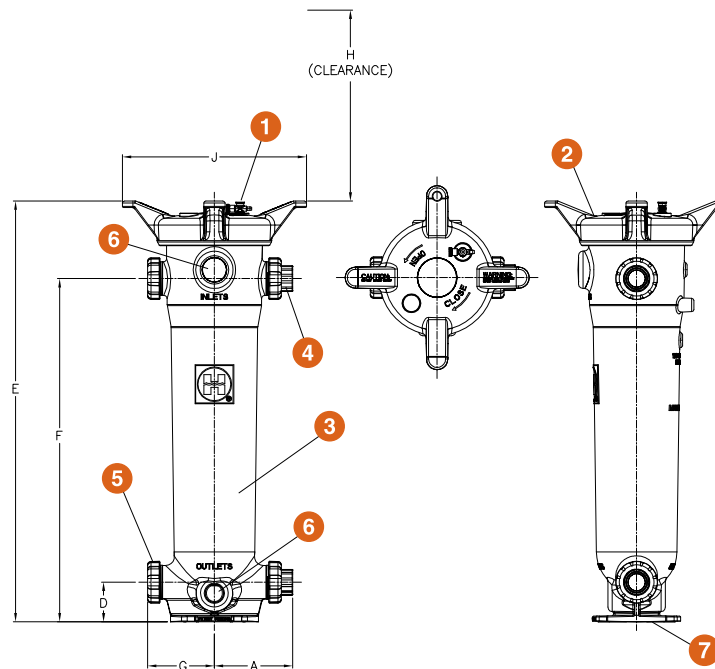
DOUBLE LENGTH – 32" GFPP
1-1/4" TO 2" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connector
5. Assembly Nut
6. Alternate 2" NPT Ports
7. Integrally Molded Mounting Pad

* See page 8 for a complete Parts List



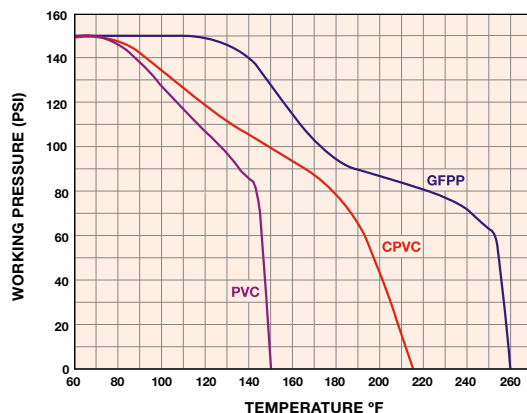
DIMENSIONS

FILTER SIZE in / DN	A in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm
1-1/4" / 32	8.86 / 225	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532
1-1/2" / 40	8.86 / 225	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532
2" / 50	8.91 / 226	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

OPERATING TEMPERATURE / PRESSURE



Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

SPECIFICATIONS

- Material of Construction:** GFPP
- Inlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Outlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Bag Size:** Bag Size #2: 7" x 32"
- Pressure Rating:** 150 PSI @ 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Flow Rate:** 100 GPM (May be Limited by Pipe Size or Bag Choice)
- Weight:** 64.1 lbs.

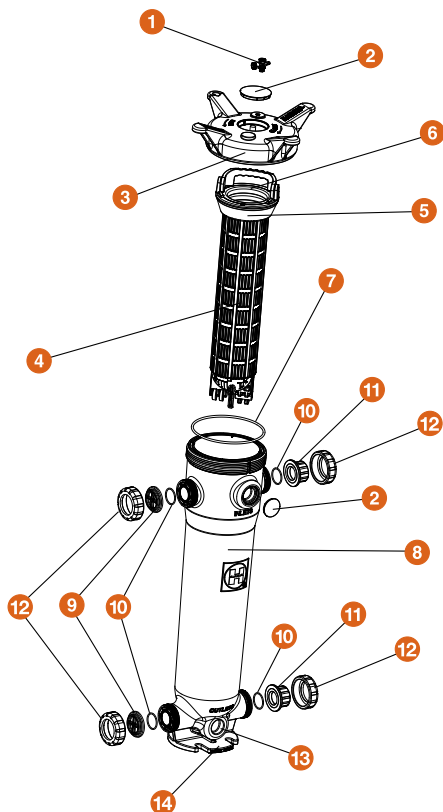


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EXPLODED VIEW



FLV Series Simplex Bag Filters

DOUBLE LENGTH – 32" GFPP
2-1/2" TO 4" PIPE SIZES

KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 150 GPM
- True Union Socket, Threaded or Flanged End Connections
- In-Line or Loop Flow Configurations
- Solid Basket
- Drain Port at Bottom
- Integral Mounting Base
- Easier Installations Due to True Union Connectivity
- Vertical Flow Flutes in Basket, No Bag Snag and More Flow Area

OPTIONS

- Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Cartridge Adapters
- Hinged Basket
- 316 Stainless Steel Basket

MATERIALS

- GFPP per ASTM D4101, Cell Class 85580
- FPM Standard O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Double Length 7" x 32"	GFPP	GFPP (Threaded and Flanged), PVC/CPVC (Socket and PP Socket Fusion)	2-1/2" – 4" (DN65–DN100)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
					150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

FLV Series Simplex Bag Filters

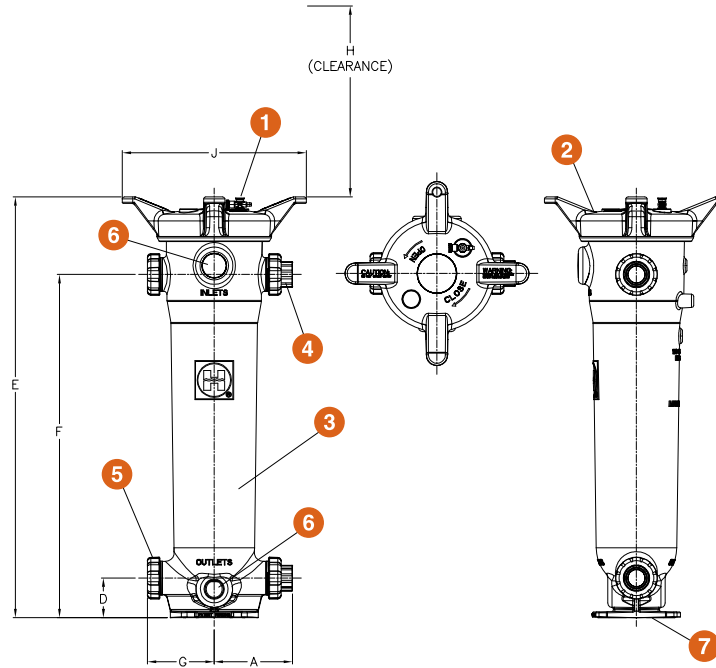
DOUBLE LENGTH – 32" GFPP
2-1/2" TO 4" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connector
5. Assembly Nut
6. Alternate 2" NPT Ports
7. Integrally Molded Mounting Pad

* See page 8 for a complete Parts List



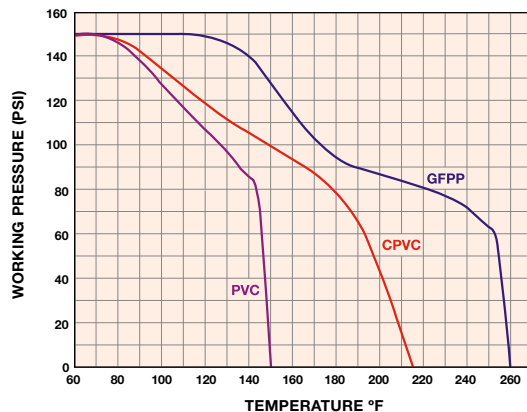
DIMENSIONS

FILTER SIZE in / DN	A in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm
2-1/2" / 65	9.79 / 249	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532
3" / 80	9.73 / 247	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532
4" / 100	10.17 / 258	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

OPERATING TEMPERATURE / PRESSURE



Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

SPECIFICATIONS

- Material of Construction:** GFPP
- Inlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Outlet Connections:** GFPP (Threaded and Flanged)
PVC (Socket)
CPVC (Socket)
- Bag Size:** Bag Size #2: 7" x 32"
- Pressure Rating:** 150 PSI @ 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Flow Rate:** 150 GPM (*May be Limited by Pipe Size or Bag Choice*)
- Weight:** 69.1 lbs.



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FLV Series Duplex Bag Filters

SINGLE LENGTH – 16" GFPP
2" PIPE SIZE

KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 100 GPM
- True Union Socket, Threaded or Flanged End Connections
- In-Line or Loop Flow Configurations
- Solid Basket
- Drain Port at Bottom
- Integral Mounting Base
- Easier Installations Due to True Union Connectivity
- Vertical Flow Flutes in Basket, No Bag Snag and More Flow Area

OPTIONS

- Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Cartridge Adapters
- Hinged Basket
- 316 Stainless Steel Basket

MATERIALS

- CPVC per ASTM D1784, Cell Class 23447
- GFPP per ASTM D4101, Cell Class 85580
- FPM Standard O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16"	GFPP	CPVC (Socket, Threaded or Flanged)	2" (DN50)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
					150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

FLV Series Duplex Bag Filters

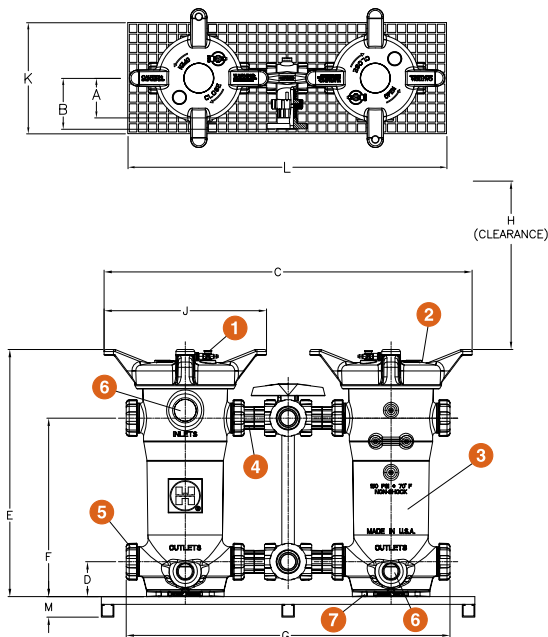
SINGLE LENGTH – 16" GFPP
2" PIPE SIZE

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

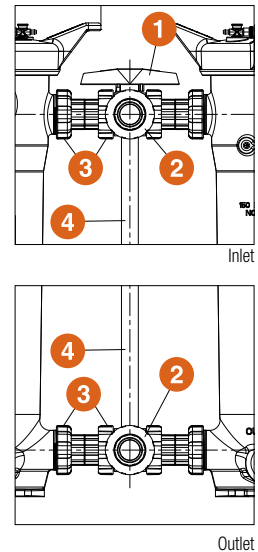
1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connector
5. Assembly Nut
6. Alternate 2" NPT Ports
7. Integrally Molded Mounting Pad

* See page 8 for a complete Parts List



PIPING PARTS LIST

1. Handle
2. Hayward® LA Series Three-Way Lateral Valve
3. Spool Assembly (Each Side)
4. Stem Extension Pipe



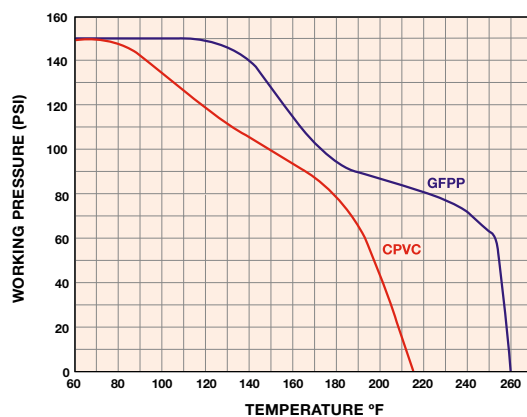
DIMENSIONS

FILTER SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm	K in / mm	L in / mm	M in / mm
2" / 50	6.00 / 152	7.77 / 197	47.44 / 1205	4.50 / 114	31.83 / 808	23.00 / 584	41.70 / 1059	15.25 / 387	20.93 / 532	16.75 / 425	48.00 / 1219	2.62 / 67

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

OPERATING TEMPERATURE / PRESSURE



Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

SPECIFICATIONS

- Material of Construction:** GFPP
- Inlet Connections:** GFPP (Threaded or Flanged)
CPVC (Socket, Threaded and Flanged)
- Outlet Connections:** GFPP (Threaded and Flanged)
CPVC (Socket, Threaded or Flanged)
- Bag Size:** Bag Size #1: 7" x 16"
- Pressure Rating:** 150 PSI @ 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Maximum Flow Rate:** 100 GPM (*May be Limited by Pipe Size or Bag Choice*)
- Mounting Base:** Fiberglass
- Hardware:** Stainless Steel
- Weight:** 100.0 lbs.



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FLV Series Duplex Bag Filters

DOUBLE LENGTH – 32" GFPP
2" TO 4" PIPE SIZES

KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 100 GPM – 2"
- Rated up to 150 GPM – 3" to 4"
- True Union Socket, Threaded or Flanged End Connections
- In-Line or Loop Flow Configurations
- Solid Basket
- Drain Port at Bottom
- Integral Mounting Base
- Easier Installations Due to True Union Connectivity
- Vertical Flow Flutes in Basket, No Bag Snag and More Flow Area

OPTIONS

- Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Cartridge Adapters
- Hinged Basket
- 316 Stainless Steel Basket

MATERIALS

- CPVC per ASTM D1784, Cell Class 23447
- GFPP per ASTM D4101, Cell Class 85580
- FPM Standard O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Double Length 7" x 32"	GFPP	CPVC (Socket, Threaded or Flanged)	2-1/2" – 4" (DN50, DN80 and DN100)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
					150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

FLV Series Duplex Bag Filters

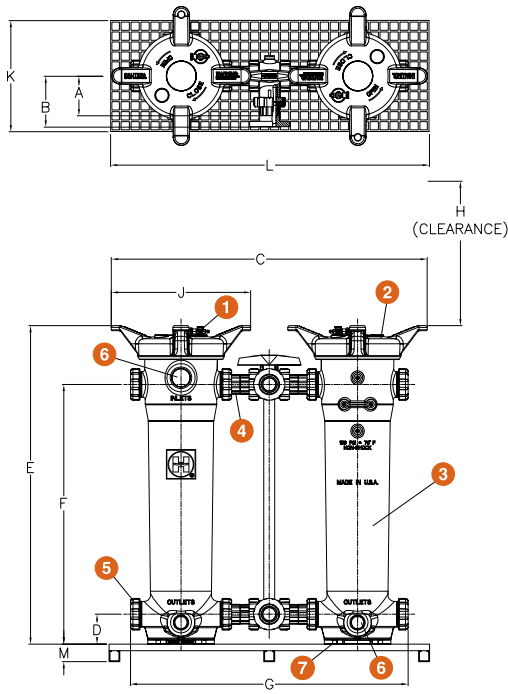
DOUBLE LENGTH – 32" GFPP
2" TO 4" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST*

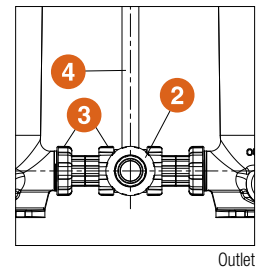
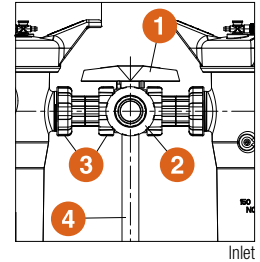
1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connector
5. Assembly Nut
6. Alternate 2" NPT Ports
7. Integrally Molded Mounting Pad

* See page 8 for a complete Parts List



PIPING PARTS LIST

1. Handle
2. Hayward® LA Series Three-Way Lateral Valve
3. Spool Assembly (Each Side)
4. Stem Extension Pipe



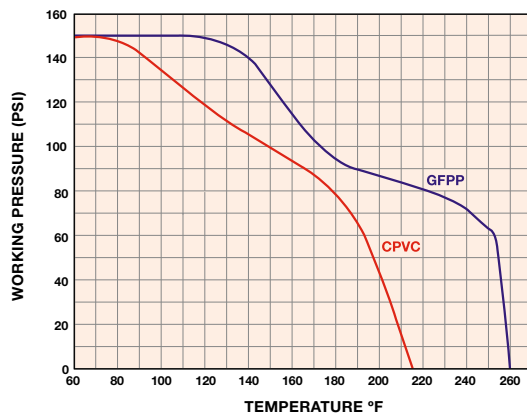
DIMENSIONS

FILTER SIZE	A	B	C	D	E	F	G	H*	J	K	L	M
in / DN	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
2" / 50	6.00 / 152	7.77 / 197	47.44 / 1205	4.50 / 114	47.83 / 1215	39.00 / 991	41.70 / 1059	31.25 / 794	20.93 / 532	16.75 / 425	48.00 / 1219	2.62 / 67
3" / 80	7.60 / 193	9.85 / 205	55.17 / 1401	4.50 / 114	47.83 / 1215	39.00 / 991	50.99 / 1295	31.25 / 794	20.93 / 532	16.75 / 425	48.00 / 1219	2.62 / 67
4" / 100	9.33 / 237	11.76 / 299	55.17 / 1401	4.50 / 114	47.83 / 1215	39.00 / 991	50.99 / 1295	31.25 / 794	20.93 / 532	16.75 / 425	48.00 / 1219	2.62 / 67

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

OPERATING TEMPERATURE / PRESSURE



Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

SPECIFICATIONS

- Material of Construction:** GFPP
- Inlet Connections:** GFPP (Threaded and Flanged)
CPVC (Socket, Threaded or Flanged)
- Outlet Connections:** GFPP (Threaded and Flanged)
CPVC (Socket, Threaded or Flanged)
- Bag Size:** Bag Size #2: 7" x 32"
- Pressure Rating:** 150 PSI @ 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Maximum Flow Rates:** 100 GPM – 2"
(May be Limited by Pipe Size or Bag Choice)
150 GPM – 3" to 4"
(May be Limited by Pipe Size or Bag Choice)
- Mounting Base:** Fiberglass
- Hardware:** Stainless Steel
- Weight:** up to 2" – 132.0 lbs. / 3" to 4" – 145.0 lbs.

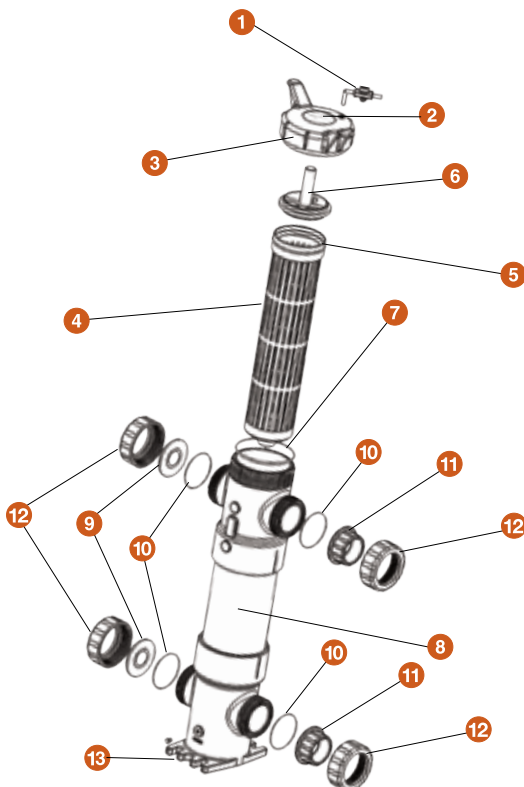


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EXPLODED VIEW



FLV Series PVC & CPVC Bag Filters

SINGLE LENGTH – 16"

1-1/4" TO 2" PIPE SIZES

KEY FEATURES

- Available in PVC or CPVC Materials
- True Union End Connections - Socket, Threaded or Flanged
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 100 GPM Flow Rates
- In-Line or Loop Flow Configurations
- Solid 1-Piece Basket
- Drain Port at Bottom
- Integral Mounting Base

OPTIONS

- Pressure Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Duplex Configurations

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16"	PVC or CPVC	Socket, Threaded or Flanged	1-1/4" - 2" (DN32 - DN50)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21. Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

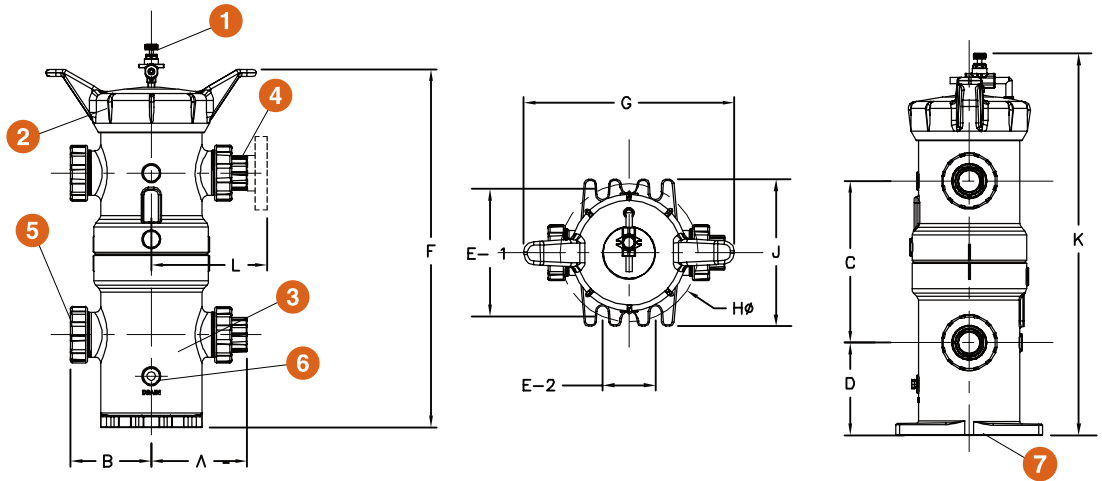
FLV Series PVC & CPVC Bag Filters

SINGLE LENGTH – 16" 1-1/4" TO 2" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Vent Valve (Included)
2. Cover
3. Filter Body
4. End Connectors
5. Assembly Nut
6. Drain Port & Plug with O-Ring
7. Integrally Molded Mounting Pad



DIMENSIONS – INCHES / MILLIMETERS

FILTER SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E1 in / mm	E2 in / mm	F in / mm	G in / mm	H Ø B / C in / mm	K in / mm	L in / mm
1-1/4"	8.16 / 207	6.88 / 175	13.75 / 349	7.87 / 200	10.86 / 276	4.50 / 114	30.50 / 775	17.90 / 455	11.75 / 298	32.0 / 813	9.58 / 243
1-1/2"	8.07 / 205	6.88 / 175	13.75 / 349	7.87 / 200	10.86 / 276	4.50 / 114	30.50 / 775	17.90 / 455	11.75 / 298	32.0 / 813	9.66 / 245
2"	8.16 / 207	6.88 / 175	13.75 / 349	7.87 / 200	10.86 / 276	4.50 / 114	30.50 / 775	17.90 / 455	11.75 / 298	32.0 / 813	9.90 / 251

Dimensions are subject to change without notice – consult factory for installation information.

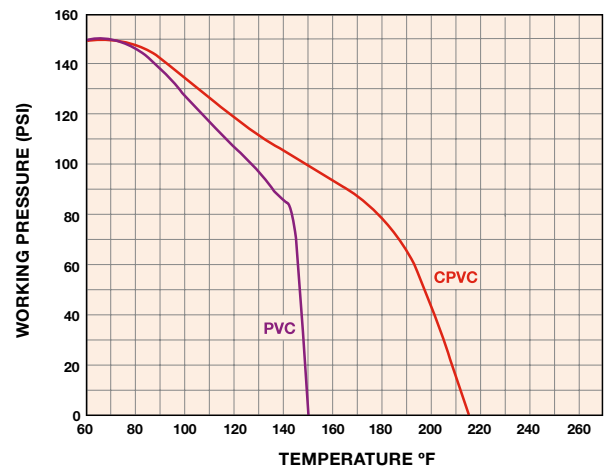
* Clearance from top for basket removal

SPECIFICATIONS

- Material of Construction:** PVC or CPVC
- Inlet Connections:** PVC (Socket, Threaded or Flanged)
CPVC (Socket, Threaded or Flanged)
- Outlet Connections:** PVC (Socket, Threaded or Flanged)
CPVC (Socket, Threaded or Flanged)
- Bag Size:** Bag Size #1: 7" x 16"
- Pressure Rating:** 150 PSI at 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Flow Rate:** 100 GPM (May be Limited by Pipe Size or Bag Choice)
- Weight:** 50 lbs.

Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

OPERATING TEMPERATURE/PRESSURE

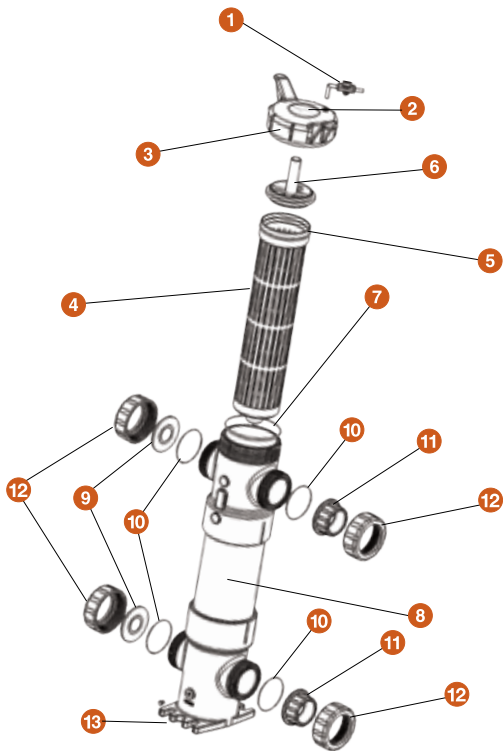


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EXPLODED VIEW



FLV Series PVC & CPVC Bag Filters

DOUBLE LENGTH 32"
1-1/4" TO 4" PIPE SIZES

KEY FEATURES

- Available in PVC or CPVC Materials
- True Union End Connections - Socket, Threaded or Flanged
- Hand Removable, Ergonomic Cover with Liquid Displacing Dome
- Vent Valve Included on Cover
- Rated up to 100 GPM Flow Rates
- In-Line or Loop Flow Configurations
- Solid 1-Piece Basket
- Drain Port at Bottom
- Integral Mounting Base

OPTIONS

- Pressure Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Duplex Configuration

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	PIPING CONNECTION	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Double Length 7"x 32"	PVC or CPVC	Socket, Threaded or Flanged	1-1/4" - 4" (DN32 - DN100)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
Flanged ends available in DIN/EN PN10.

"Patented" Pat. No.: 9,630,127

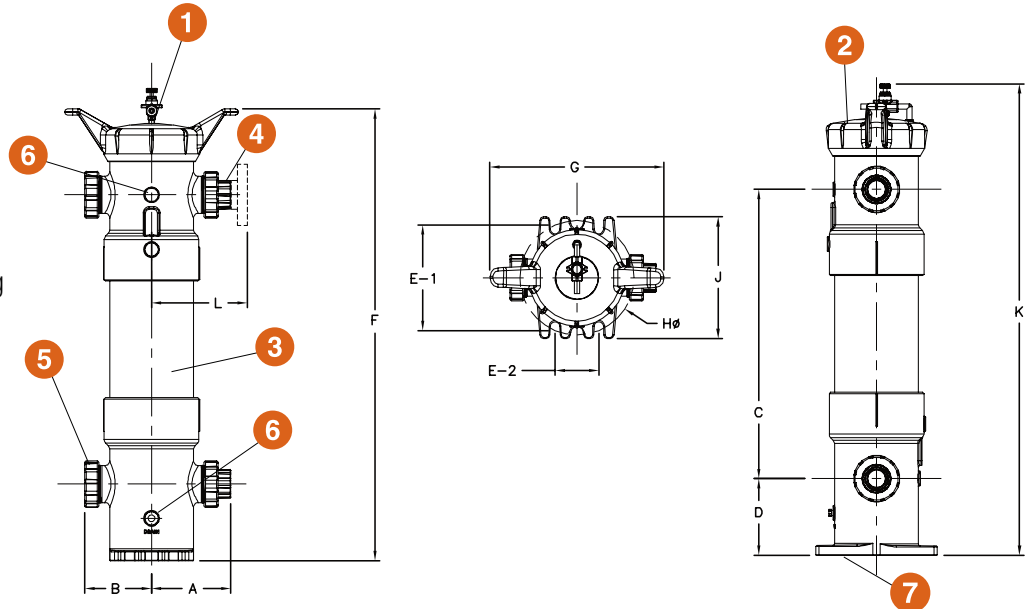
FLV Series PVC & CPVC Bag Filters

DOUBLE LENGTH 32" 1-1/4" TO 4" PIPE SIZES

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Vent Valve (Included)
2. Cover
3. Filter Vessel Body
4. End Connector
5. Assembly Nut
6. Drain Port & Plug with O-Ring
7. Integrally Molded Mounting Pad



DIMENSIONS – INCHES / MILLIMETERS

FILTER SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E1 in / mm	E2 in / mm	F in / mm	G in / mm	H in / mm	B / C in / mm	J in / mm	K in / mm	L in / mm
1-1/4" / 32	8.16 / 207	6.88 / 175	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	9.58 / 243	
1-1/2" / 40	8.07 / 205	6.88 / 175	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	9.66 / 245	
2" / 50	8.16 / 207	6.88 / 175	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	9.90 / 251	
2-1/2" / 65	8.92 / 227	7.50 / 191	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	10.96 / 278	
3" / 80	8.83 / 224	7.50 / 191	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	10.85 / 276	
4" / 100	9.24 / 235	7.50 / 191	29.75 / 756	7.87 / 200	10.86 / 276	4.50 / 114	46.50 / 1181	17.90 / 455	11.75 / 298	12.50 / 318	48.0 / 1219	11.70 / 297	

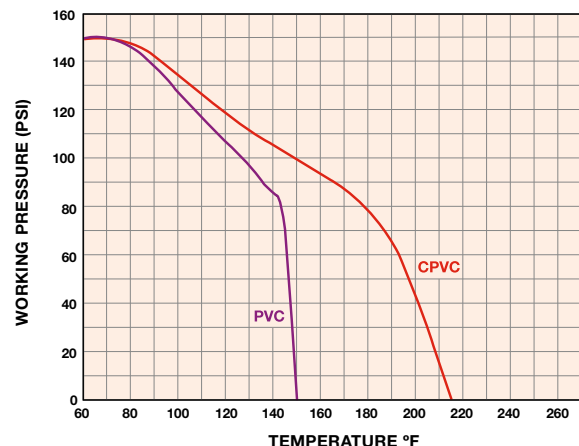
Dimensions are subject to change without notice – consult factory for installation information.

SPECIFICATIONS

- Material of Construction:** PVC or CPVC
- Inlet Connections:** PVC (Socket, Threaded and Flanged)
CPVC (Socket, Threaded and Flanged)
- Outlet Connections:** PVC (Socket, Threaded and Flanged)
CPVC (Socket, Threaded and Flanged)
- Bag Size:** Bag Size #2: 7" x 32"
- Pressure Rating:** 150 PSI at 70°F Non-Shock
- O-Ring Seals:** FPM or EPDM
- Bag Ratings:** 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 Microns
- Flow Rate:** 100 GPM (May be Limited by Pipe Size or Bag Choice)
- Weight:** 71 lbs.

Hayward recommends that you monitor your pressure differential with a differential gauge or pressure gauges

OPERATING TEMPERATURE/PRESSURE



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CFLV Series Cartridge Filters

SINGLE AND DOUBLE LENGTH

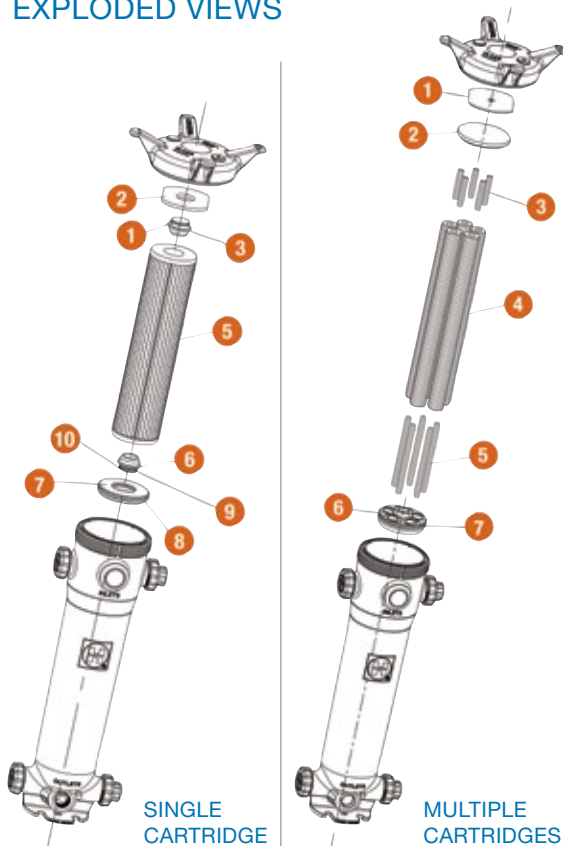
KEY FEATURES

- Platinum Glass Filled Polypropylene
- One-Piece Injection Molded Construction
- Allows for Single 7" or Multiple (5) 2-1/2" Cartridges
- Ideal for Pleated, Meltblown or Spin Wounded Cartridges
- True Union Design with Multiple End Connection Options
- Hand Removable Ergonomic Cover with Liquid Displacing Dome
- Vent Valve on Cover
- In-Line or Loop Configuration
- Drain Port at Bottom
- Integral Mounting Base

OPTIONS

- Duplex or Other Manifold Systems
- Vent Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- EPDM Seals
- Multiple Cartridge Adapters Options

EXPLODED VIEWS



TECHNICAL INFORMATION

SELECTION CHART

SIZE*	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16"	GFPP	GFPP (Threaded and Flanged), PVC/CPVC (Socket and PP Socket Fusion)	1-1/4" – 2" (DN32 – DN50)	FPM or EPDM	100 GPM	150 PSI @ 70°F 10 Bar @ 21°C Non-Shock
Double Length 7" x 32"			2-1/2" – 4" (DN65 – DN100)		150 GPM	

* PVC and CPVC socket ends available to ISO 727-1 and threaded ends to BS21.
PP socket fusion ends per ASTM F2389 and threaded ends per BS21.
Flanged ends available in DINEN PN10.

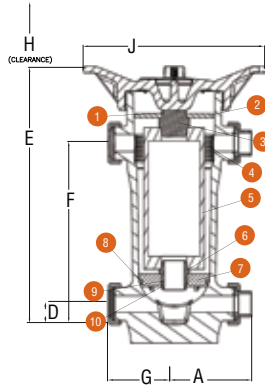
CFLV Series Cartridge Filters

SINGLE AND DOUBLE LENGTH

TECHNICAL INFORMATION, CONTINUED

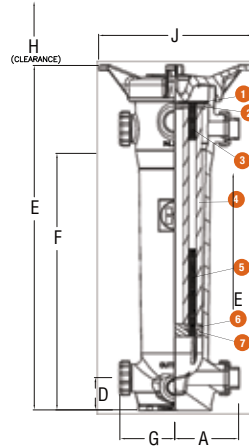
SINGLE CARTRIDGE PARTS LIST

1. Cartridge Connector Retaining O-Ring
2. Upper Plate
3. Cartridge Connector (Upper)
4. Flow Diffuser
5. Cartridge (not included in kit)
6. Cartridge Connector (Lower)
7. Lower Plate
8. Lower Plate Seal
9. Cartridge Connector Sealing O-Ring
10. Cartridge Connector Retaining O-Ring



MULTIPLE CARTRIDGE PARTS LIST

1. Anti-Rotation Ring
2. Upper Plate
3. Perforated Tube (Short)
4. Cartridge (not included in kit)
5. Perforated Tube (Long)
6. Lower Plate Seal
7. Lower Plate



DIMENSIONS – SINGLE LENGTH

FILTER SIZE in / DN	A in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm
1-1/4" / 32	8.86 / 225	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532
1-1/2" / 40	8.86 / 225	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532
2" / 50	8.91 / 226	4.50 / 114	31.83 / 808	23.00 / 584	7.60 / 193	15.25 / 387	20.93 / 532

Dimensions are subject to change without notice – consult factory for installation information

* Clearance from top for basket removal

DIMENSIONS – DOUBLE LENGTH

FILTER SIZE in / DN	A in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H* in / mm	J in / mm
1-1/4" / 32	8.86 / 225	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532
1-1/2" / 40	8.86 / 225	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532
2" / 50	8.91 / 226	4.50 / 114	47.83 / 1215	39.00 / 991	7.60 / 193	31.25 / 794	20.93 / 532
2-1/2" / 65	9.79 / 249	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532
3" / 80	9.73 / 247	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532
4" / 100	10.17 / 258	4.50 / 114	47.83 / 1215	39.00 / 991	8.38 / 213	31.25 / 794	20.93 / 532

Dimensions are subject to change without notice – consult factory for installation information

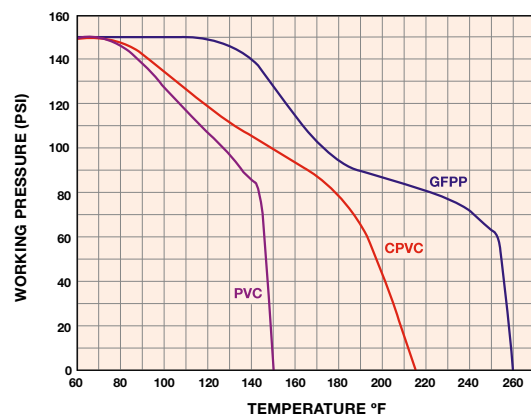
* Clearance from top for basket removal

CARTRIDGE ADAPTER SELECTION CHART

CARTRIDGE TYPE	AVAILABLE YES / NO	
	CFLV SINGLE LENGTH	CFLV DOUBLE LENGTH
2-1/2" – 2-3/4" DOE/222XCAP	Yes	Yes
4-1/2" DOE/222XCAP	Yes	Yes
Hayward 7"x16" DOE	Yes	No
Hayward 7"x16" DOE (Double Stacked)	No	Yes
Hayward 7"x30"	No	Yes
7-3/4" DOE	Yes	Yes

Consult Hayward for Available Cartridges.

OPERATING TEMPERATURE / PRESSURE



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LS Series Aquatic Sand Filter

AQUATIC FILTERS

KEY FEATURES

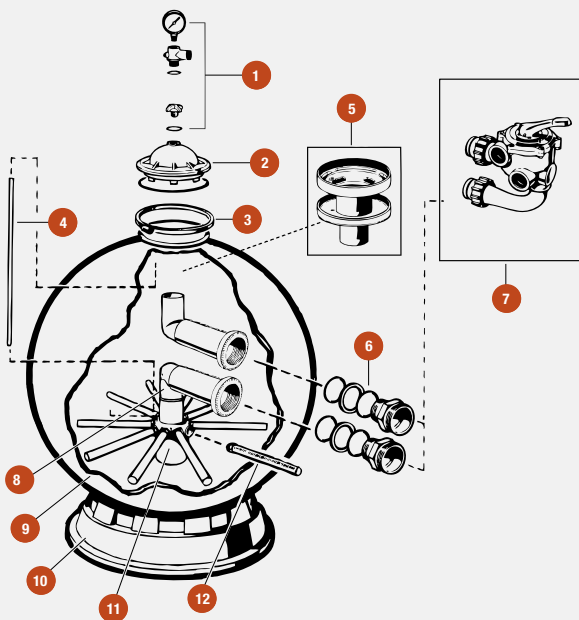
- Ideal for Sensitive Aquatic Environments or Salt Water Systems
- All Wetted Hardware Manufactured from 316 Stainless Steel
- Corrosion Resistant Thermoplastic Housing and Base
- Durable Flanged Inspection Cover
- Integral Top Diffuser
- Efficient, Multilateral Underdrain Assembly
- Integral Molded Drain Plug

OPTIONS

- LS Aquatic 6-Way Multiport Valve

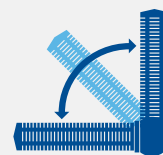
TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTIONS	PIPING SIZES	SEALS	FLOW RATE	PRESSURE RATING
31"	HDPE	NPT	2" (DN50)	EPDM	99GPM	50PSI @ 70F Non-Shock
36"					130GPM	



PATENTED SERVICE-EASE DESIGN

Unique folding ball joint design allows lateral assembly to be easily accessed for simple servicing.

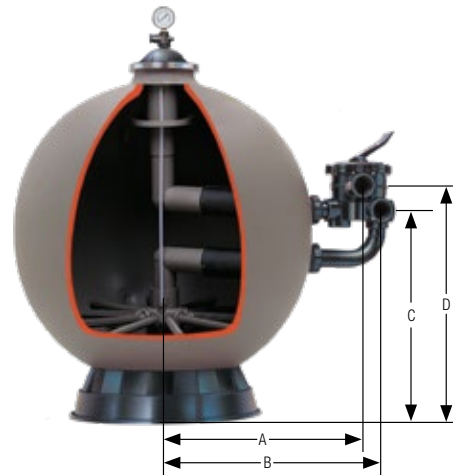
LS Series Aquatic Sand Filters

AQUATIC FILTER

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|--|------------------------------|
| 1. Relief Valve/Gauge Adapter Assembly | 9. Filter Tank |
| 2. Top Closure Dome | 10. Filter Support Stand |
| 3. Flange Clamp | 11. Folding Lateral Assembly |
| 4. Air Tube | 12. Lateral |
| 5. Top Diffuser Assembly | |
| 6. Bulkhead Fitting Assembly | |
| 7. Vari-Flow Valve Assembly | |
| 8. Elbow Assembly | |



DIMENSIONS

PART NUMBER	HEIGHT in / mm	WIDTH in / mm	A in / mm	B in / mm	C in / mm	D in / mm
LS311SX	39 / 990	31 / 787	21.03 / 534	23.59 / 599	21.62 / 549	24.62 / 625
LS360SX	46 / 1169	36 / 914	23.80 / 604	26.36 / 669	25.45 / 646	28.45 / 723

Dimensions are approximate. Please check dimensions before installing.

FILTER PERFORMANCE DATA

PART NUMBER	EFFECTIVE FILTRATION RATE ft / m	DESIGN FLOW RATE gpm / lpm	MAXIMUM WORKING PRESSURE psi / bar	TURNOVER RATE gph / kl	TURNOVER		SAND REQUIRED lbs / kg
					8 HOURS gal / kl	10 HOURS gal / kl	
LS311SX	4.95 / 0.46	99 / 375	50 / 3.45	5,940 / 23	47,520 / 180	59,400 / 225	350 / 159
LS360SX	6.50 / 0.60	130 / 492	50 / 6.45	7,800 / 29	62,000 / 236	78,000 / 295	700 / 318

Based upon 20 GPM per ft.² (815 LPM per m²).

FILTER SPECIFICATIONS

PART	SPECIFICATION
Filter Type	High-rate sand: No. 2 silica sand (0.45 mm - 0.55 mm)
Filter Tank	Spherical, Molded High Density Polyethylene
Underdrain	360° self-cleaning slotted laterals, precision installed in ball-joint assembly
Control Valve	LS Aquatic 6-Way Multiport Valve
Support Base	Injection-Molded ABS
Performance Range	99 to 130 GPM (375 to 492 LPM)
Port Size	2" NPT
Pressure Rating	50 PSI @ 70°F Non-Shock
Dimensions	LS311SX - 31" W x 38 5 / 8" H (787 mm x 981 mm) LS360SX - 36" W x 46" H (914 mm x 1168 mm)



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Heavy-Duty Filter Bags

HEAVY-DUTY POLYPROPYLENE,
POLYESTER AND NYLON FILTER BAGS

KEY FEATURES

- All Bag Materials Silicone-Free
- Size 1 – Single Length 7" x 16"
- Size 2 – Double Length 7" x 32"
- Sewn or Welded Construction
- Size 1 – Maximum Flow Rate 90 GPM
- Size 2 – Maximum Flow Rate 180 GPM
- Sewn Bags Have Sewn-In Cloth Handles
- Flanged Bags Have Molded-In Handles
- Easy Change-Out Reduces Down Time
- Compact, for Easy Disposal
- Versatile Micron Ratings Will Accommodate Most Applications

MICRON RATINGS

- 1 Micron (*Material – Polypropylene and Polyester Needled Felt*)
- 5 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 10 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 25 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 50 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 100 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 150 Microns (*Material – Polypropylene and Nylon Monofilament Mesh*)
- 200 Microns (*Material – Polypropylene and Polyester Needled Felt*)
- 400 Microns (*Material – Polypropylene and Nylon Monofilament Mesh*)
- 600 Microns (*Material – Polypropylene and Nylon Monofilament Mesh*)
- 800 Microns (*Material – Polypropylene and Nylon Monofilament Mesh*)

MATERIALS

- Glazed Polypropylene Needled Felt - Rated up to 200°F
- Singed Polyester Needled Felt - Rated up to 300°F
- Polypropylene Monofilament Mesh - Rated up to 200°F
- Nylon Monofilament Mesh - Rated up to 325°F



Heavy-Duty Filter Bags

PP NEEDLE FELT, POLYESTER NEEDLE FELT, PP MESH OR NYLON MESH 1 TO 800 MICRON RATINGS

How to Select Filter Bags

HOW TO SELECT A PART NUMBER

MATERIAL		MICRON RATING		FINISH		BAG SIZE		BAG STYLE*		OPTIONS	
Glazed Polypropylene Needled Felt	PO	1 Micron	001	Glazed Needled Felt	G	16"	1	PP Ring	PR	Sewn with Handle	SH
Polypropylene Monofilament Mesh	PMO	5 Microns	005	Singed Needled Felt	S	32"	2	PP Flange	PF	Welded with Flange	WF
Singed Polyester Needled Felt	PE	10 Microns	010	Monofilament Mesh	M						
Nylon Monofilament Mesh	NMO	25 Microns	025								
		50 Microns	050								
		100 Microns	100								
		150 Microns	150								
		200 Microns	200								
		400 Microns	400								
600 Microns	600										
800 Microns	800										
To find your part number, please select your Material, Micron Rating, Finish, etc., and place the corresponding identifier (PO, 001, G, etc.) in the boxes below.											
EXAMPLE	PO	100		G		1		PR		SH	

* Carbon Steel and Stainless Steel rings are available upon request – consult factory for information

STANDARD FIBER AND MICRON RATINGS

FIBER CONSTRUCTION	MATERIAL	AVAILABLE MICRON RATINGS										
		1	5	10	25	50	100	150	200	400	600	800
Needled Felts	Polypropylene	●	●	●	●	●	●		●			
	Polyester	●	●	●	●	●	●		●			
Monofilament Meshes	Polypropylene							●		●	●	●
	Nylon							●		●	●	●

COMPATIBILITY AND TEMPERATURE LIMITS

FIBER	COMPATIBLE WITH								Temperature Limits (Max °F)
	Organic Solvent	Animal, Vegetable and Petro Oils	Microorganisms	Alkalies	Organic Agents	Oxidizing Agents	Mineral Acids		
Polyester	A	A	A	B	B	B	B	300	
Polypropylene	A	A	A	A	A	C	C	200	
Nylon	A	A	A	B	C	D	D	325	

A Excellent B Good C Fair D Poor



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Pleated Filter Cartridges

HIGH CAPACITY / EFFICIENCY

KEY FEATURES

- Multiple Micron Ratings for High Efficiency Filtration
- For use with Single (7" diameter) and Multiple (2-1/2" diameter) Cartridge CFLVs (Single and Double Length)
- High Surface Area Design Provides Excellent Flow Rates and Comprehensive Service Life
- Thermally Bonded DOE End-Caps, Core and Filter Media
- Low Pressure Drop
- Multiple Layered Media Construction Guarantees Dependable Performance

MATERIALS

- PP Media
- Cellulose Media
- Plastisol PVC
- PP Core
- ABS Core

OPERATING CHARACTERISTICS

- Max. ΔP: 60 PSI at maximum recommended temperature of 140°F
- Change-out recommended at 30 PSID



TECHNICAL INFORMATION

COMPATIBILITY AND TEMPERATURE LIMITS

FILTER LENGTH	CARTRIDGE SIZE, RATING AND MATERIAL			
	Single Cartridge	Multiple Cartridge	Micron	Material
SINGLE (SIZE 1)	7 x 16	2-1/2 x 10	5	Cellulose
		2-1/2 x 20	1,5, 10 or 30	PP
DOUBLE (SIZE 2)	7 x 30	2-1/2 x 30	1,5, 10 or 30	PP

Pleated Filter Cartridges

HIGH CAPACITY/EFFICIENCY



PLEATED FILTER CARTRIDGES SINGLE (1 PER VESSEL), FOUR IN CARTON/HAYWARD - PROPRIETARY

NOMINAL MICRON RATING	DESCRIPTION	FILTRATION AREA PER CARTRIDGE SQ FT	USE WITH CFLV SERIES ADAPTER KIT
1, 5, 10 and 30	7" x 16" (DOE)* PP Cartridge** For Single Length Series Cartridge Filter	45	CFLVKIT716
1, 5, 10 and 30	7" x 16" (DOE)* PP Double Stacked Cartridge** For Double Length Series Cartridge Filter	45 x 2	CFLVKIT732
1, 5, 10 and 30	7" x 30" (DOE)* PP Cartridge For Double Length Series Cartridge Filter	85	CFLVKIT730



SINGLE (1 PER VESSEL), FOUR IN CARTON/HAYWARD - PROPRIETARY

5	7" x 16" (DOE)* Polyester Cellulose Cartridge** For Single Length Series Cartridge Filter	45	CFLVKIT716
5	7" x 16" (DOE)* Polyester Cellulose Double Stacked Cartridge** For Double Length Series Cartridge Filter	45 x 2	CFLVKIT732



MULTIPLE (5 PER VESSEL), 25 IN CARTON

1, 5, 10 and 30	2-1/2" x 10" (DOE)* PP Cartridge** For Single Length Series Cartridge Filter	4.5	MFLVKIT210
1, 5, 10 and 30	2-1/2" x 20" (DOE)* PP Cartridge** For FLT120 or FLT220	9	N/A
1, 5, 10 and 30	2-1/2" x 30" (DOE)* PP Cartridge** For Double Length Series Cartridge Filter	13.5	MFLVKIT230

NOTES:

* All end caps are Plastisol PVC.

** For chemical compatibility, refer to the Hayward Engineering Product Guide (EPG113) or consult factory.
For other media and micron ratings, please consult factory.



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Single Phase/
Three Phase -
ODP MOTOR



Three Phase -
TEFC MOTOR

A Series LifeStar® Aquatic Pump

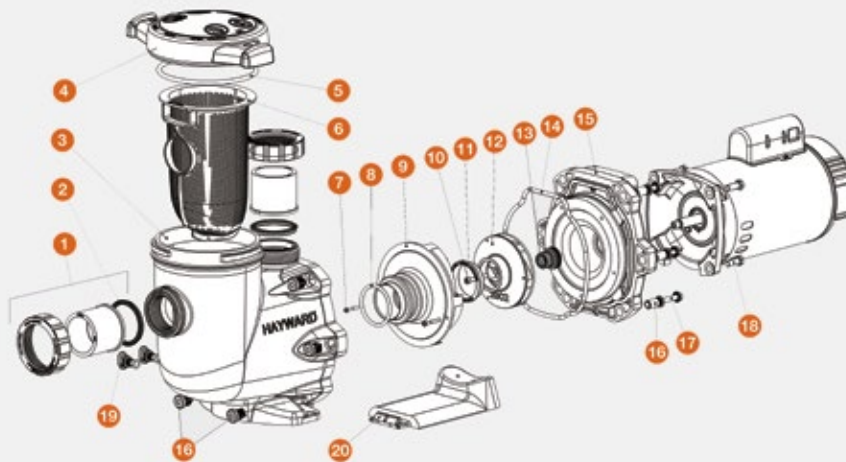
1/2, 3/4, 1, 1-1/2, 2, 3, 5 HP

KEY FEATURES

- Ideal for Sensitive Aquatic Environments or Salt Water Systems
- All Wetted Hardware Manufactured from 316 Stainless Steel
- Silicon Carbide Shaft Seal Suitable for Fresh and Salt Water Use
- Corrosion Resistant Housing
- Self-Priming Pump
- Suitable For High Volume Pumping
- Clear High Capacity Basket Strainer Lid for Visual Inspection
- Elevated Base Ensures Better Ventilation and Protection from Flooding
- Perforated HDPE Basket

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP HOUSING	Glass Filled Polypropylene	MAIN HOUSING GASKET	EPDM
CONNECTIONS	T2" True Union Socket	MOTOR BOLTS	316 SS
MOTOR SHAFT	303 SS (Non-Wetted)	HOUSING BOLTS	316 SS
SHAFT FACE SEAL	Silicon Carbide/Silicon Carbide	MOTORS	Single Phase - Open Drip Proof (ODP) Three Phase Totally Enclosed Fan Cooled (TEFC)
SHAFT SECONDARY SEAL	EPDM	HP RATINGS	1/2, 3/4, 1, 1-1/2, 2, 3, 5
ALL WETTED HARDWARE	316 SS (Impeller Insert, Impeller Screw and 2 Diffuser Screws)	STRAINER BASKET	HDPE

A Series LifeStar® Aquatic Pump

1/2, 3/4, 1, 1-1/2, 2, 3, 5 HP

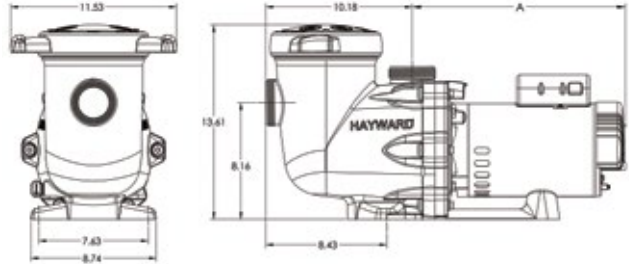
TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|--|--------------------------------------|
| 1. True Union Connection and Nut with O-Ring | 13. Shaft Seal Assembly |
| 2. Union Gasket | 14. Housing O-Ring |
| 3. Pump Strainer Housing | 15. Seal Plate |
| 4. Strainer Cover | 16. Housing Insert/Seal Plate Spacer |
| 5. Strainer Cover O-Ring | 17. Housing Bolt |
| 6. Strainer Basket | 18. Motor Bolt |
| 7. Diffuser Screw | 19. Drain Plug with O-Ring |
| 8. Diffuser O-Ring | 20. Bracket, Motor Support |
| 9. Diffuser | |
| 10. Impeller Screw | |
| 11. Impeller Ring | |
| 12. Impellers with Impeller Screws | |

AVAILABLE SPARE PARTS

- | | |
|--------------------------|-----------------------------|
| • True Union Connections | • Seals |
| • Hardware | • Strainer Cover and Basket |
| • Shaft Seal | • Seal Plate |
| • Impellers | • Base Risers |



DIMENSIONS

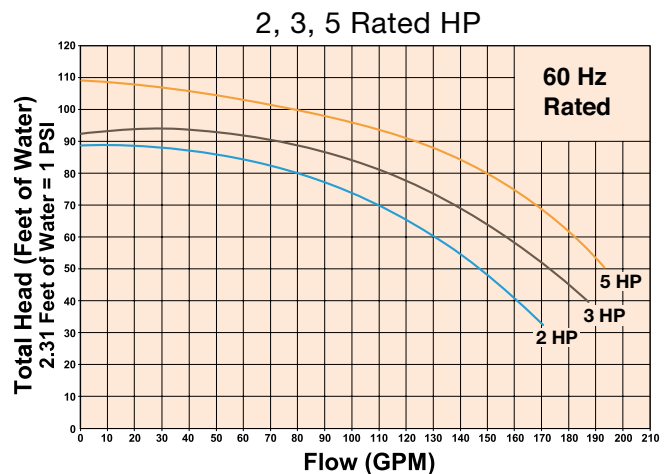
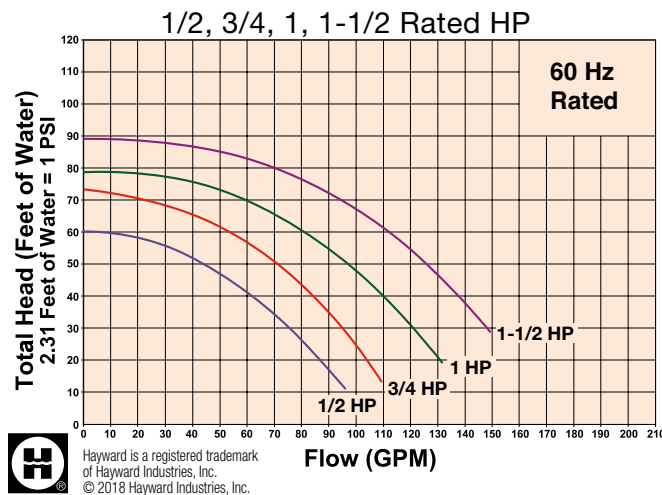
RATED HP	DIM A		
	1 PHASE - ODP in / mm	3 PHASE - ODP in / mm	3 PHASE - TEFC in / mm
1/2	13-5/8 / 346	-	13-13/16 / 351
3/4	13-7/8 / 352	-	14-3/16 / 360
1	14-3/8 / 365	-	14-11/16 / 373
1-1/2	14-7/8 / 378	-	15-5/16 / 389
2	14-7/8 / 378	-	15-5/8 / 397
3	17-1/8 / 435	-	-
5	17-1/8 / 435	17-1/8 / 435	-

TECHNICAL SPECS AND PERFORMANCE DATA

DESCRIPTION	RATED HP	TRUE UNION SOCKET CONNECTORS	SERVICE FACTOR	VOLTAGE SUPPLY	PHASE	MOTOR FRAME
1/2 HP Aquatic Pump	1/2	2"	1.99	115 / 208-230	1	ODP
				208-230 / 460	3	TEFC
3/4 HP Aquatic Pump	3/4	2"	1.85	115 / 208-230	1	ODP
				208-230 / 460	3	TEFC
1 HP Aquatic Pump	1	2"	1.85	115 / 208-230	1	ODP
				208-230 / 460	3	TEFC
1-1/2 HP Aquatic Pump	1-1/2	2"	1.60	115 / 208-230	1	ODP
				230 / 460	3	TEFC
2 HP Aquatic Pump	2	2"	1.35	208-230	1	ODP
				230 / 460	3	TEFC
3 HP Aquatic Pump	3	2"	1.20	208-230	1	ODP
				230 / 460	3	TEFC
5 HP Aquatic Pump	5	2"	1.00	208-230	1	ODP
				230 / 460	3	ODP

Dimensions are subject to change without notice - consult factory for installation information.

PUMP PERFORMANCE CURVES



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A Series LifeStar® VS Aquatic Pump

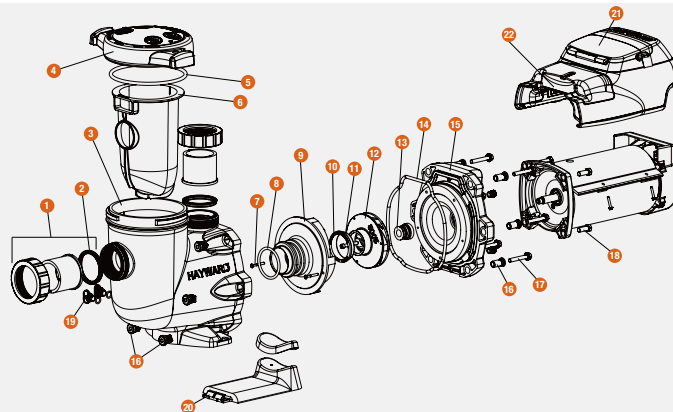
VARIABLE SPEED 600 - 3450 RPM,
2 HP, SINGLE PHASE 230V, TEFC

KEY FEATURES

- Ideal for Sensitive Aquatic Environments or Salt Water Systems
- Multi-Position or Detachable / Wall Mount Digital Control Interface with Password Protection
- All Wetted Hardware Manufactured from 316 Stainless Steel
- Silicon Carbide/Silicon Carbide Shaft Seal Suitable for Fresh and Salt Water Use
- Corrosion Resistant Housing
- Self-Priming Pump
- Suitable For High Volume Pumping
- Clear High Capacity Basket Strainer Lid for Visual Inspection
- Elevated Base Ensures Better Ventilation and Protection from Flooding
- Perforated HDPE Basket

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP HOUSING	Glass Filled Polypropylene	MOTOR BOLTS	316 SS
CONNECTIONS	2" True Union Socket	HOUSING BOLTS	316 SS
MOTOR SHAFT	303 SS (Non-Wetted)	MOTORS	Single Phase - Totally Enclosed Fan Cooled (TEFC)
SHAFT FACE SEAL	Silicon Carbide/Silicon Carbide	HP RATINGS	2
SHAFT SECONDARY SEAL	EPDM	STRAINER BASKET	HDPE, 1/8" Perf
ALL WETTED HARDWARE	316 SS (Impeller Insert, Impeller Screw and 2 Diffuser Screws)	SERVICE FACTOR	1.35
MAIN HOUSING GASKET	EPDM	VOLTAGE SUPPLY	230V, 60 Hz

A Series LifeStar® VS Aquatic Pump

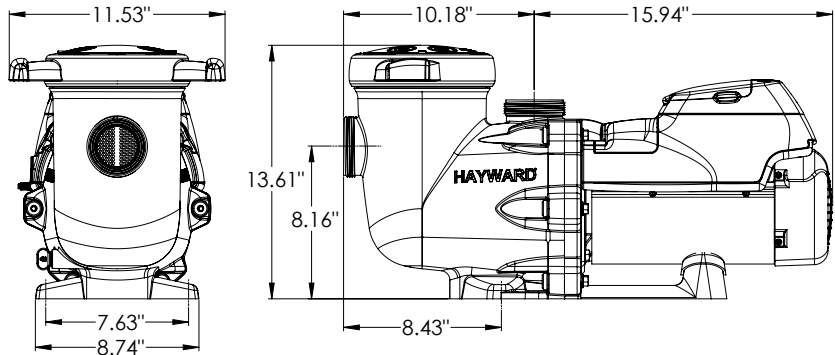
VARIABLE SPEED 600 - 3450 RPM,
2 HP, SINGLE PHASE 230V, TEFC

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|--|--|
| 1. True Union Connection and Nut with O-Ring | 12. Impellers with Impeller Screws |
| 2. Union Gasket | 13. Shaft Seal Assembly |
| 3. Pump Strainer Housing | 14. Housing O-Ring |
| 4. Strainer Cover | 15. Seal Plate |
| 5. Strainer Cover O-Ring | 16. Housing Insert/Seal Plate Spacer |
| 6. Strainer Basket | 17. Housing Bolt |
| 7. Diffuser Screw | 18. Motor Bolt |
| 8. Diffuser O-Ring | 19. Drain Plug with O-Ring |
| 9. Diffuser | 20. Bracket, Motor Support |
| 10. Impeller Screw | 21. Motor Drive Display Cover |
| 11. Impeller Ring | 22. Digital Control Interface Assembly |

DIAGRAM

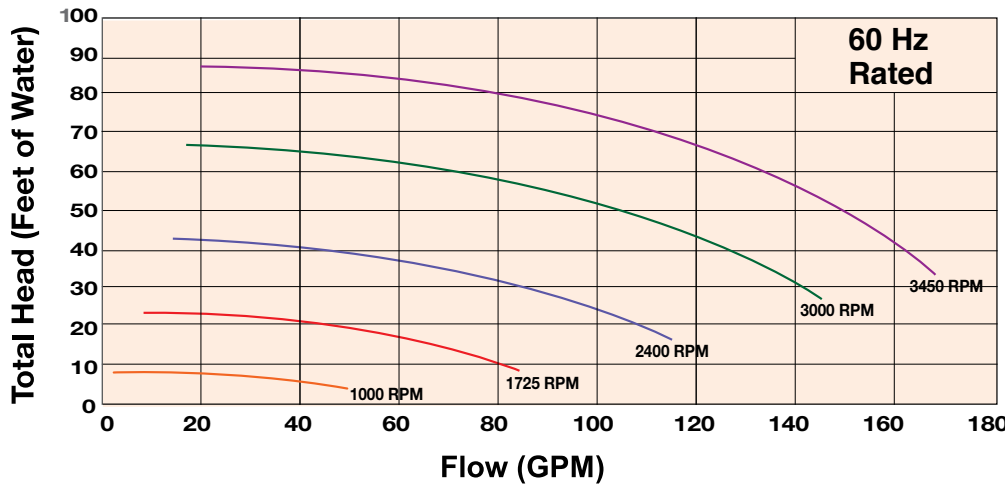


Dimensions are subject to change without notice - consult factory for installation information.

AVAILABLE SPARE PARTS

- | | |
|---------------------------|---------------|
| 1. True Union Connections | 3. Shaft Seal |
| 2. Hardware | 4. Impellers |

PUMP PERFORMANCE CURVE



DIGITAL CONTROL INTERFACE



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Totally enclosed fan-cooled (TEFC) motor in all models.

LifeStar® MV Medium Head Aquatic Pump

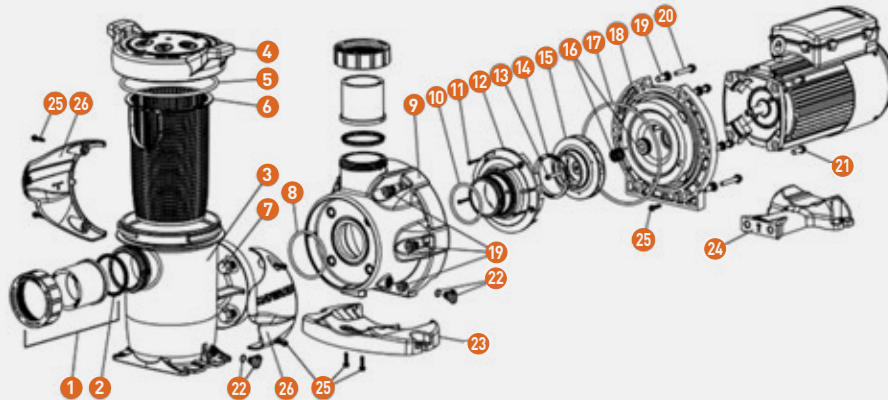
2, 3, 5, AND 7 HP

KEY FEATURES

- Ideal for Sensitive Aquatic Environments, Fresh or Salt Water Systems
- Corrosion Resistant GFPP Housing for Long Term Performance
- True Union 2-1/2" x 3" Socket End Connections
- Modular Strainer Basket Design – Can Be Mounted Remotely
- Oversized Strainer Basket with HDPE 1/8th Perf Basket
- 3" ANSI Class 150 Flange Connection from Pump to Basket
- Silicon Carbide/Silicon Carbide Shaft Seal
- All Wetted Hardware Manufactured from 316 Stainless Steel
- FPM Seals Standard
- Available In 1-phase and 3-phase Models
- Industrial Grade TEFC Motors Standard with 220-240, 190/380-415, 190/380-415, 50Hz and 208-230, 208-230/460, 575, 60Hz Voltage
- High Efficiency Enclosed Impeller
- Self-Priming Pump – Up to 10 feet
- For Indoor and Outdoor Use
- UL778 Listing

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP HOUSING	Glass Filled Polypropylene
CONNECTIONS	2-1/2" x 3" True Union CPVC Socket Schedule 80
MOTOR SHAFT	303 SS (Non-Wetted)
SHAFT FACE SEAL	Silicon Carbide/Silicon Carbide
SHAFT SECONDARY SEAL	FPM
ALL WETTED HARDWARE	316 SS (Impeller Insert, Impeller Screw and 2 Diffuser Screws)
MAIN HOUSING GASKET	FPM

MOTOR BOLTS	316 SS
HOUSING BOLTS	316 SS
MOTORS	Single and Three Phase - Totally Enclosed Fan Cooled (TEFC)
HP RATINGS	2, 3, 5, 7
STRAINER BASKET	HDPE, 1/8" Perf
VOLTAGES	220-240, 190/380-415, 190/380-415, 50Hz 208-230, 208-230/460, 575, 60Hz

LifeStar® MV Medium Head Aquatic Pump

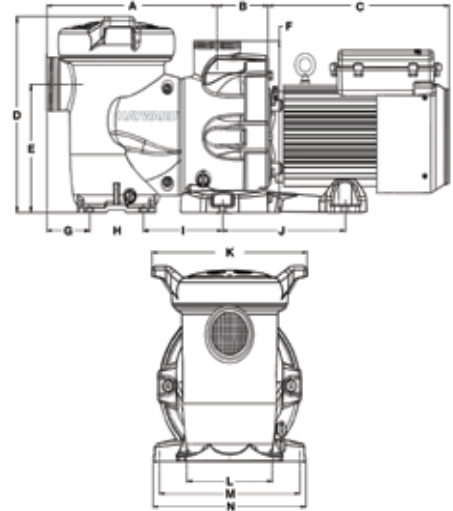
2, 3, 5, AND 7 HP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

- | | |
|---|--|
| 1. Union Connector Kit (Includes Union Nut, Union Connector, Union Gasket - 2 each) | 14. Impeller Ring, 2-7 HP |
| 2. Union Gasket | 15. Impeller with Impeller Screw, 2-7 HP |
| 3. Strainer Housing with Drain Plug | 16. Shaft Seal Assembly |
| 4. Strainer Cover Kit (Includes Strainer Cover, Lock Ring, O-Ring) | 17. Pump Housing O-Ring |
| 5. Strainer Cover O-Ring | 18. Seal Plate |
| 6. Strainer Basket | 19. Housing Insert/Seal Plate Spacer |
| 7. Strainer Housing Flange Bolt/Washer - 4 each | 20. Housing Bolt |
| 8. Strainer Housing Flange O-Ring | 21. Motor Bolt (4 Pack) |
| 9. Pump Housing with Drain Plug | 22. Drain Plug with O-Ring |
| 10. Diffuser O-Ring | 23. Pump Housing Base |
| 11. Diffuser Screws (4 Pack) | 24. Motor Support Base |
| 12. Diffuser, 2-7 HP | 25. Base Screws (7 Pack) |
| 13. Impeller Screw | 26. Right and Left Side Plate Set |

DIAGRAM

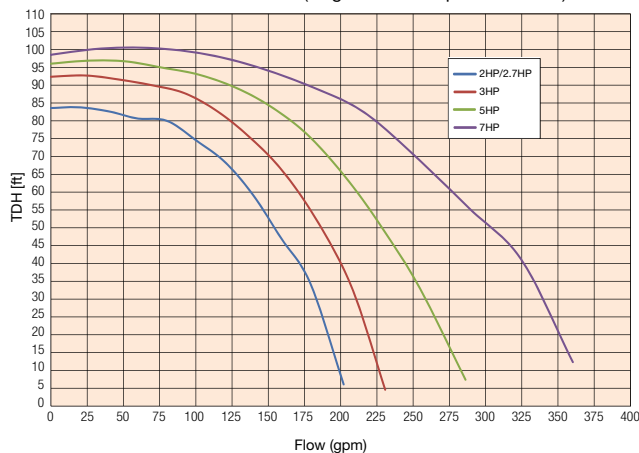


DIMENSIONS

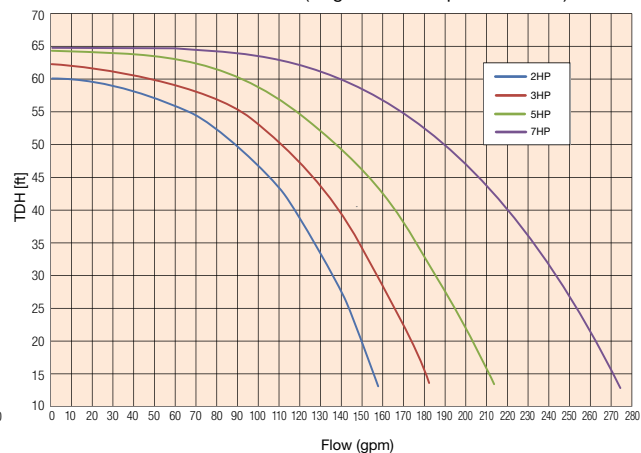
A	B	C	D	E	F	G	H	I	J	K	L	M	N
in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm
14.07 / 357	4.23 / 107	14.94 / 379	13.95 / 354	9.13 / 232	12.23 / 311	3.54 / 90	4.44 / 113	6.53 / 166	10.14 / 258	12.76 / 324	7.00 / 178	11.55 / 293	12.50 / 317

PUMP PERFORMANCE CURVES

LIFESTAR® MV Curves 60Hz (single and three phase models)



LIFESTAR® MV Curves 50Hz (single and three phase models)



ADDITIONAL FEATURES



3" ANSI standard flanged connection allows strainer basket to be removed and mounted remotely.



LifeStar® MV-VS with variable speed pump featuring digital control interface that can be rotated on the pump or detached and wall mounted, allowing convenient access and viewing.



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T Series Vertical Seal-Less Immersible Pumps

1/3, 1/2, 3/4, 1 AND 1-1/2 HP

KEY FEATURES

- Available in CPVC, GFPP and PVDF
- Single, Non-Coupled Motor Shaft 303 SS
- Proprietary, Patent Pending PTFE Shaft Seal
- Extended Shaft Sleeve
- Solid, Stable One-Piece Shaft
- Seal Point Away from Weep Hole
- Less Vibration
- Runs True

OPTIONS

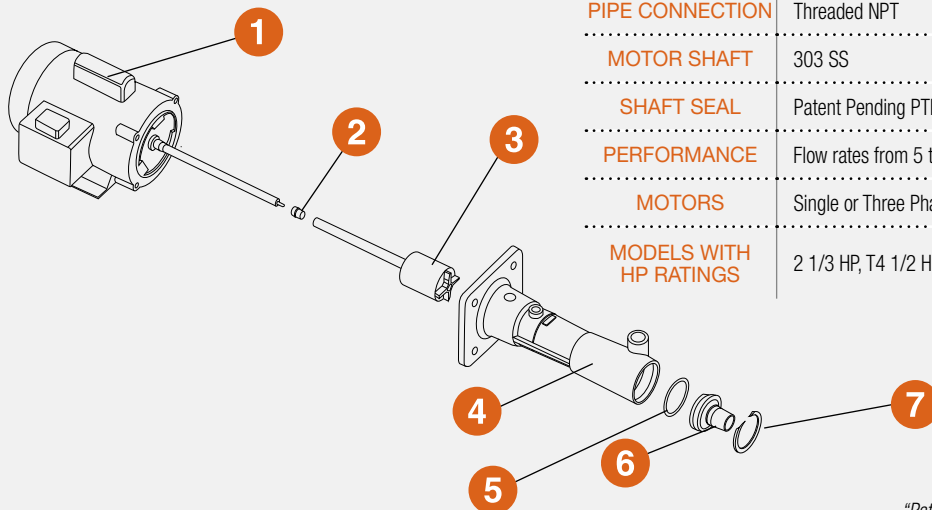
- Optional Inlet Screen
- In-Tank Filtration
- Impeller Trim Variations
- Explosion-Proof Motors
- Wash-Down Motors
- 575V Motors

MATERIALS

- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- PVDF

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP HEAD	CPVC, GFPP or PVDF Construction
PIPE CONNECTION	Threaded NPT
MOTOR SHAFT	303 SS
SHAFT SEAL	Patent Pending PTFE Shaft Seal
PERFORMANCE	Flow rates from 5 to 80 GPM with TDH's up to 45 feet
MOTORS	Single or Three Phase Motors
MODELS WITH HP RATINGS	2 1/3 HP, T4 1/2 HP, T5 3/4 HP, T6 1 HP, T7 1 HP and T8 1-1/2 HP

"Patented & Other Patents Pending" Pat. N.: 9,695,947

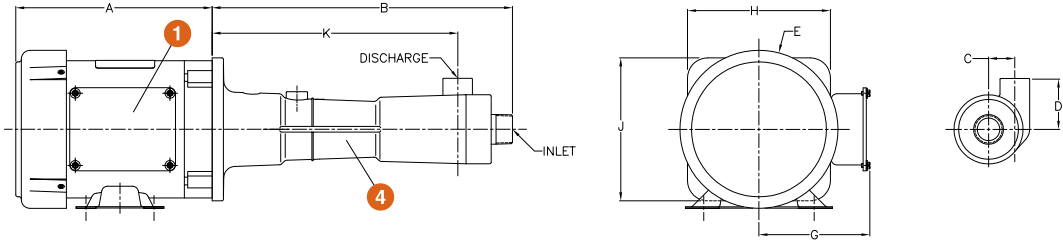
T Series Vertical Seal-Less Immersible Pumps

1/3, 1/2, 3/4, 1 AND 1-1/2 HP

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Motor and Shaft
2. Impeller Seal (PTFE)
3. Impeller
4. Body
5. End Cap O-Ring
6. End Cap
7. Retainer Clip



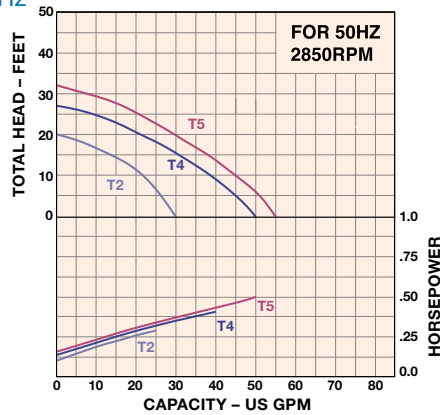
DIMENSIONS

	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	G in / mm	H in / mm	J in / mm	K in / mm	INLET	DISCHARGE	HP
T2	8.68 / 220	13.28 / 337	1.16 / 29	2.25 / 57	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	10.86 / 276	1" MNPT	1/2" FNPT	1 / 3
T4	9.19 / 233	12.90 / 328	1.38 / 35	2.88 / 70	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	9.77 / 248	1-1/4" MNPT	1" FNPT	1/2
T5	9.69 / 246	12.90 / 328	1.38 / 35	2.88 / 73	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	9.77 / 248	1-1/4" MNPT	1" FNPT	3/4
T6	9.69 / 246	11.40 / 290	1.69 / 43	3.21 / 82	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT	1
T7	9.94 / 252	11.40 / 290	1.69 / 43	3.21 / 82	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT	1
T8	10.44 / 265	11.40 / 290	1.69 / 43	3.21 / 82	6.98 / 177	4.90 / 124	6.32 / 161	6.32 / 161	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT	1-1/2

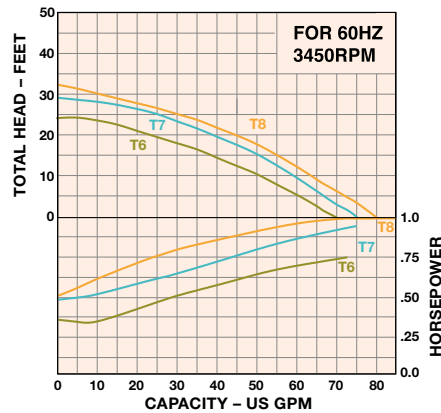
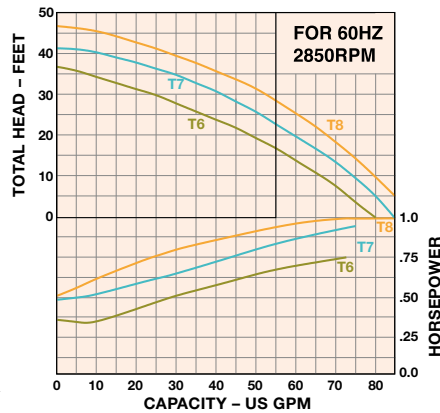
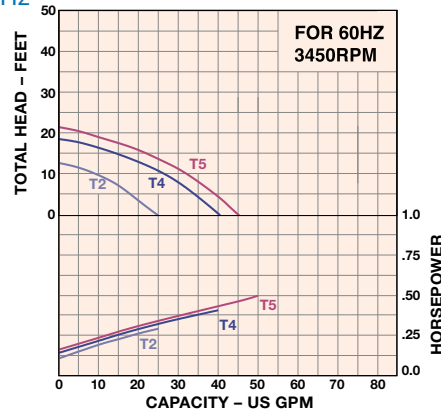
Dimensions are subject to change without notice – consult factory for installation information.

PERFORMANCE CURVES

60 Hz



50 Hz



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S Series Vertical Seal-Less Immersible Pumps

1/3, 1/2, 3/4, 1, 1-1/2, 3 AND 5 HP

KEY FEATURES

- Heavy Duty Design for Continuous Duty Service
- Available in CPVC, GFPP and PVDF
- FPM Elastomers
- Seal-Less Design

OPTIONS

- Optional Inlet Screen and Extended Shaft
- In-Tank Filtration
- CPVC Inlet Screens
- Extended Shafts
- Impeller Trim Variations
- Explosion Proof Motors
- Washdown Motors
- 575V Motors
- EPDM Elastomers
- S-J Type Electrical Cord

MATERIALS

- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- PVDF

TECHNICAL INFORMATION

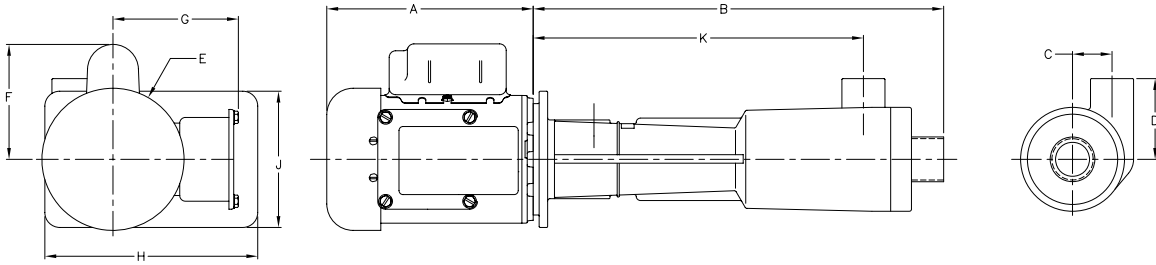
SPECIFICATIONS

PUMP HEAD	CPVC (1/15– 5 HP), Natural PP (1/15 HP Only), GFPP (1/3 – 1-1/2 HP), PVDF (1/15 – 1-1/2 HP)
PIPE CONNECTION	Threaded NPT
FUME BARRIER	PTFE, Protects Motor and Bearings from Corrosion Damage
O-RINGS	FPM
PERFORMANCE	Flow Rates from 5 to 130 GPM with TDHs of up to 115 Feet. S-Series Motors and Pumps are Matched for Non-Overloading, Continuous Duty Performance Throughout the Entire Pump Performance Range.
MOTORS	Matched for Non-Overloading, Continuous Duty Performance Throughout the Entire Pump Performance Range. or 208-230 / 460 VAC and are Heavy Duty TEFC, Epoxy Painted and Rated for Continuous Service. Also Available with Wash Down and Explosion Proof Motors.
MODELS WITH HP RATING	S1 1/15 HP, S2 1/3 HP, S4 1/2 HP, S5 3/4 HP, S6 3/4 HP, S7 1 HP, S8 1-1/2 HP, S8 1-1/2 HP, S12 3 HP and S16 5 HP

S Series Vertical Seal-Less Immersible Pumps

1/3, 1/2, 3/4, 1, 1-1/2, 3 AND 5 HP

TECHNICAL INFORMATION, CONTINUED



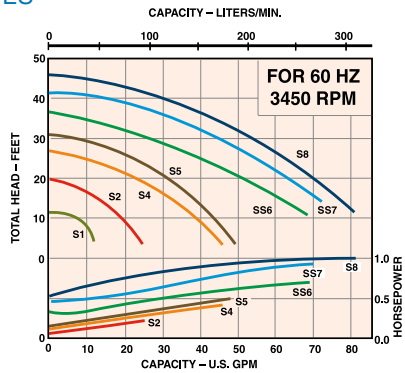
DIMENSIONS

	A	B	C	D	E	F	G	H	J	K	INLET	DISCHARGE
	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm		
S1	5.30 / 135	10.89 / 277	.84 / 21	2.13 / 54	3.91 / 99	N/A	N/A	6.25 / 159	4.00 / 102	8.49 / 216	3/4" MNPT	1/2" FNPT
S2	8.68 / 220	13.28 / 337	1.16 / 29	2.25 / 57	6.58 / 167	5.55 / 141	N/A	6.31 / 160	6.31 / 160	10.86 / 276	1" MNPT	3/4" FNPT
S4	10.28 / 261	12.90 / 328	1.38 / 35	2.88 / 73	6.96 / 177	5.75 / 146	4.87 / 124	6.31 / 160	6.31 / 160	9.77 / 248	1-1/4" MNPT	1" FNPT
S5	9.52 / 242	12.90 / 328	1.38 / 35	2.88 / 73	6.96 / 177	5.75 / 146	4.87 / 124	6.31 / 160	6.31 / 160	9.77 / 248	1-1/4" MNPT	1" FNPT
SS6	9.52 / 242	11.40 / 290	1.69 / 43	3.21 / 82	6.96 / 177	5.75 / 146	5.40 / 137	6.31 / 160	6.31 / 160	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT
SS7	12.60 / 320	11.40 / 290	1.69 / 43	3.21 / 82	6.96 / 177	5.75 / 146	5.40 / 137	6.31 / 160	6.31 / 160	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT
S8	13.40 / 340	11.40 / 290	1.69 / 43	3.21 / 82	6.96 / 177	5.75 / 146	5.94 / 151	6.31 / 160	6.31 / 160	7.97 / 202	1-1/2" MNPT	1-1/4" FNPT
S8 / S16	13.67 / 347	14.83 / 377	2.68 / 68	7.07 / 180	9.46 / 240	N/A	7.67 / 195	N/A	N/A	9.73 / 247	3" SLIP	2" FNPT
S0 / S12	13.12 / 333	15.66 / 398	2.00 / 51	6.91 / 176	7.16 / 182	N/A	5.94 / 151	N/A	N/A	11.35 / 288	3" SLIP	1-1/2" FNPT

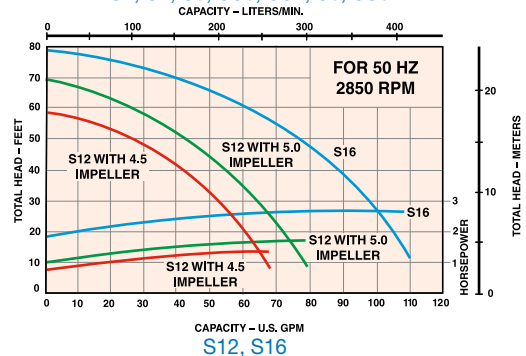
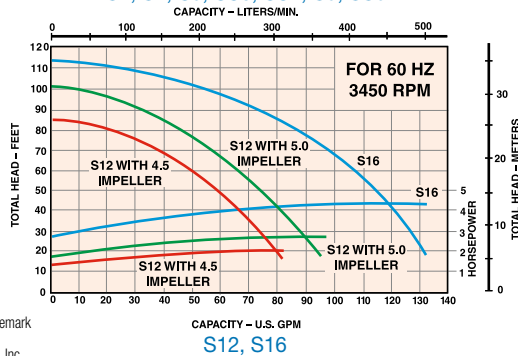
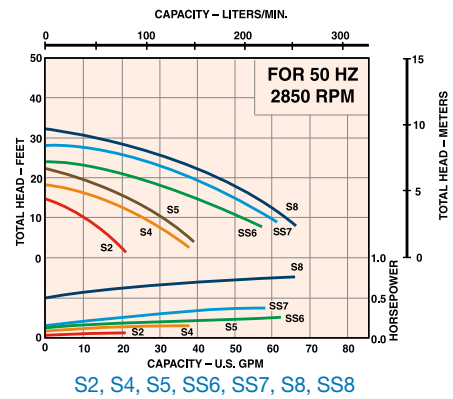
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PERFORMANCE CURVES

60 Hz



50 Hz



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D Series Vertical Seal-Less Immersible Pumps

1/8 HP

KEY FEATURES

- Available in CPVC, Natural PP and PVDF
- No Seals to Leak or Replace
- PTFE Fume Barrier
- FPM Elastomer
- Optional Inlet Screens

OPTIONS

- In-Tank Filtration
- Inlet Screens
- EPDM Elastomer
- Impeller Trim Variations
- Explosion Proof Motors
- Washdown Motors
- 575V Motors
- S-J Type Electrical Cord

MATERIALS

- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- GFPP Cell Class 85580 per ASTM D4101
- PVDF

TECHNICAL INFORMATION

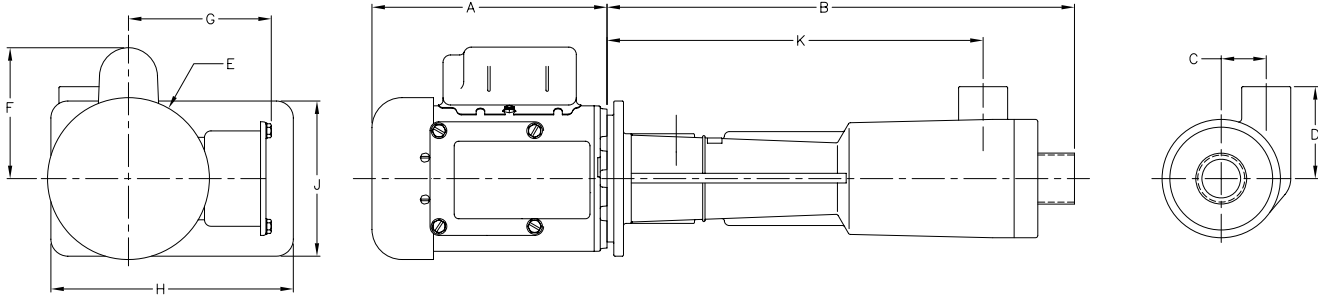
SPECIFICATIONS

PUMP HEAD	CPVC, PP or PVDF Construction
PIPE CONNECTION	Threaded Connections
SHAFT	Stainless Steel Shaft with Non-Metallic Sleeve
SEAL	PTFE Fume Barrier Protects Motor and Bearings, FPM O-Rings
PERFORMANCE	Flow Rates from 2 to 17 GPM with TDHs up to 18 Feet
MOTORS	Single Phase Motor with 1/8 HP, 115 / 230 VAC has Heavy Duty TEFC, Epoxy Painted Construction and is Rated for Continuous Duty Service. The Motor Features a 1/2" Diameter Extended Stainless Steel Shaft and Sealed Ball Bearings with "Slinger" Lip Seal.
PUMP MODELS	1/8 HP

D Series Vertical Seal-Less Immersible Pumps

1/8 HP

TECHNICAL INFORMATION, CONTINUED



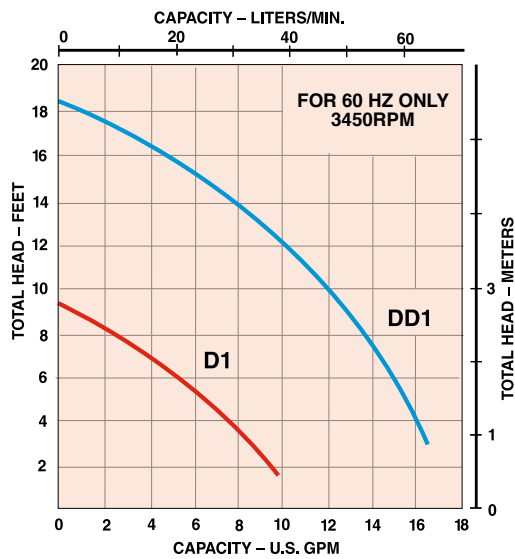
DIMENSIONS

	A	B	C	D	E	F	G	H	J	K	INLET	DISCHARGE
	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm	in / mm		
D1	6.06 / 154	12.05 / 306	1.16 / 29	2.37 / 60	4.17 / 106	3.37 / 86	3.68 / 93	6.25 / 159	4.00 / 102	9.67 / 246	1" MNPT	1/2" FNPT
DD1	6.06 / 154	12.05 / 306	1.16 / 29	2.37 / 60	4.17 / 106	3.37 / 86	3.68 / 93	6.25 / 159	4.00 / 102	9.67 / 246	1" MNPT	1/2" FNPT

Dimensions are subject to change without notice – consult factory for installation information

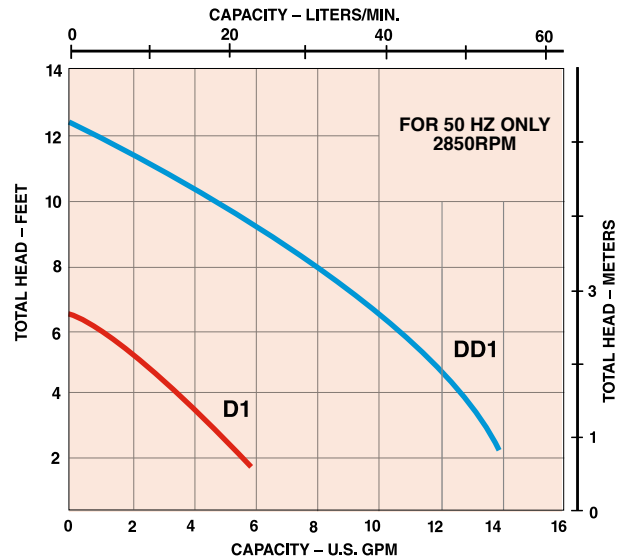
PERFORMANCE CURVES

60Hz



D1, DD1

50Hz



D1, DD1



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R Series Magnetic Drive Pumps

1/3, 1/2, 3/4, 1, 1-1/2, 2, 3 AND 5 HP

KEY FEATURES

- Available in GFPP and Carbon Reinforced ETFE
- Seal-Less Design
- Low Friction Operation
- Easy Maintenance, No Special Tools

OPTIONS

- Carbon Bushings
- Ceramic Bushings
- EPDM Elastomers
- 575V Motors
- Explosion Proof Motors
- Washdown Motors

MATERIALS

- GFPP Cell Class 85580 per ASTM D4101
- ETFE

TECHNICAL INFORMATION

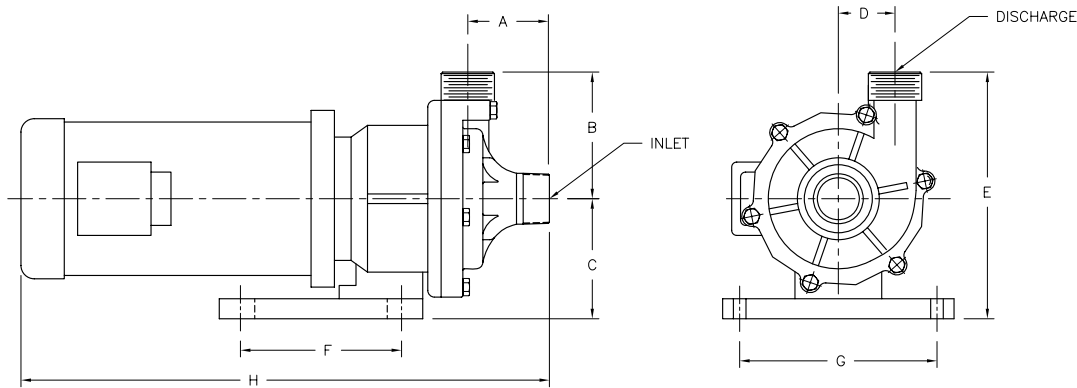
SPECIFICATIONS

PUMP HEAD	Glass reinforced, thick wall, polypropylene construction. Also in ETFE.
PIPE CONNECTION	Threaded NPT
SHAFT	Ceramic with PTFE Bushing
SEALS	FPM
PERFORMANCE	Models for flow rates from 5 to 140 GPM with TDHs of up to 141 feet. R-Series pumps and motors are matched for non-overloading, continuous duty performance throughout the entire pump performance range.
MOTORS	Single or three phase motors available with horsepower ratings of 1/3, 1/2, 3/4, 1, 1-1/2, 2, 3 or 5 HP, 115 / 230 VAC or 208-230 / 460 VAC. Motors are heavy-duty TEFC and epoxy painted.
PUMP MODELS	RC03 1/3 HP, RX05 1/2 HP, RX07 3/4 HP, RX10, 1 HP, RX15 1-1/2 HP, RX20 2 HP, RX30 3HP, RX50 5HP.

R Series Magnetic Drive Pumps

1/3, 1/2, 3/4, 1, 1-1/2, 2, 3 AND 5 HP

TECHNICAL INFORMATION, CONTINUED

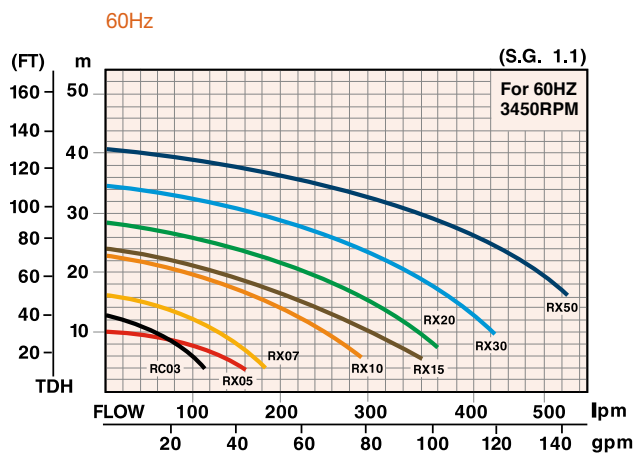


DIMENSIONS

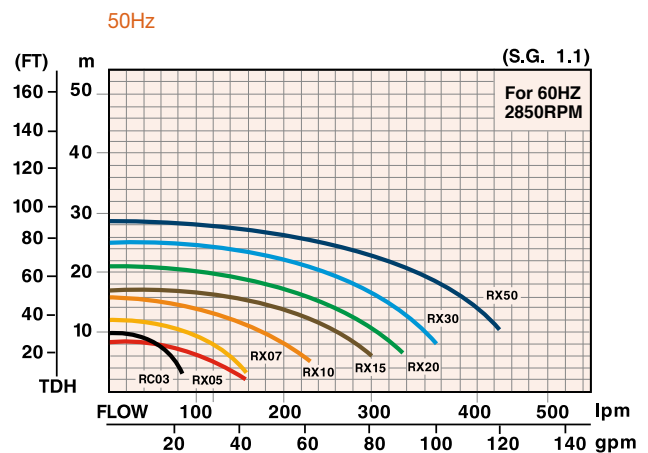
	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	INLET	DISCHARGE
RC03	2.52 / 64	3.94 / 100	2.95 / 75	1.73 / 44	6.89 / 175	4.33 / 110	2.76 / 70	13.82 / 351	1" MNPT	1" MNPT
RC05	3.15 / 80	4.49 / 114	4.53 / 115	2.00 / 51	9.02 / 229	5.12 / 130	5.21 / 132	20.47 / 520	1-1/2" MNPT	1-1/2" MNPT
RC07	3.15 / 80	4.49 / 114	4.53 / 115	2.00 / 51	9.02 / 229	5.12 / 130	5.21 / 132	20.47 / 520	1-1/2" MNPT	1-1/2" MNPT
RC10	3.78 / 96	5.20 / 132	4.53 / 115	2.27 / 58	9.73 / 247	5.12 / 130	5.21 / 132	20.47 / 520	1-1/2" MNPT	1-1/2" MNPT
RC15	3.15 / 80	5.44 / 138	4.53 / 115	2.56 / 65	9.97 / 253	7.88 / 200	8.20 / 208	23.50 / 597	2" MNPT	1-1/2" MNPT
RC20	3.15 / 80	5.44 / 138	4.53 / 115	2.56 / 65	9.97 / 253	7.88 / 200	8.20 / 208	23.50 / 597	2" MNPT	1-1/2" MNPT
RC30	3.15 / 80	5.44 / 138	4.53 / 115	2.56 / 65	9.97 / 253	7.88 / 200	8.20 / 208	23.50 / 597	2" MNPT	1-1/2" MNPT
RC50	3.15 / 80	5.44 / 138	5.32 / 135	2.56 / 65	10.76 / 273	10.28 / 261	9.06 / 230	24.15 / 613	2" MNPT	1-1/2" MNPT

Dimensions are subject to change without notice – consult factory for installation information

PERFORMANCE CURVES



RC03, RX05, RX07, RX10, RX15, RX20, RX30, RX50



RC03, RX05, RX07, RX10, RX15, RX20, RX30, RX50



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C Series Centrifugal Pumps

1/3, 1 AND 1-1/2 HP

KEY FEATURES

- Available in CPVC, GFPP and PVDF
- Rugged Design for Demanding Continuous Duty Service
- No Metal in Contact with Process Fluid
- Carbon/Ceramic Seals
- FPM Elastomers

OPTIONS

- Impeller Trim Variations
- PTFE/Ceramic Seals
- PTFE/Carpenter 20 Seals
- EPDM Elastomers
- Waterflushed Seals
- 575V Motors
- Washdown Motors

MATERIALS

- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101
- PVDF



TECHNICAL INFORMATION

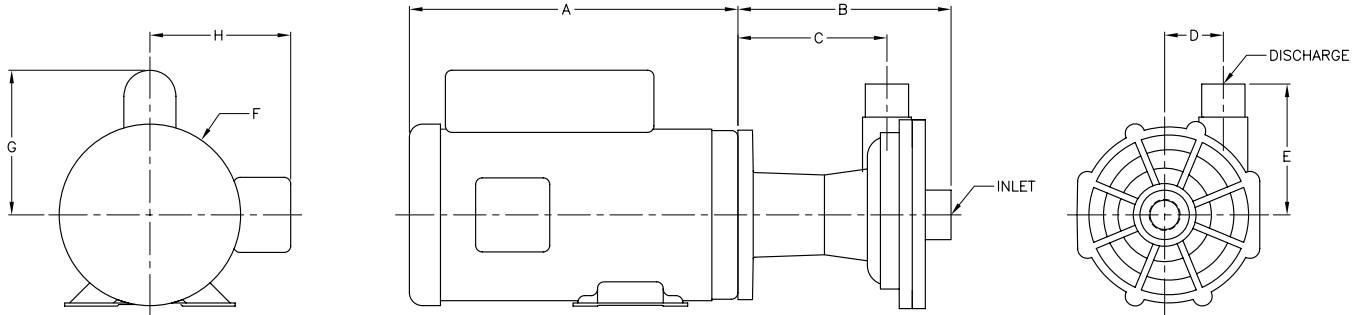
SPECIFICATIONS

PUMP HEAD	CPVC, GFPP or PVDF Construction
PIPE CONNECTION	Threaded Connections
SHAFT	Stainless Steel Shaft with Non-Metallic Sleeve
SEAL	John Crane external Type 21 or equal carbon/ceramic seal faces with stainless steel hardware and FPM elastomers
PERFORMANCE	Flow rates from 5 to 83 GPM with TDH's up to 70 feet. Series C motors and pumps are matched for non-overloading, continuous duty performance throughout the entire pump performance range
MOTORS	Single or Three Phase Motors are available with 1/3, 1, 1-1/2 HP ratings, 115/230 VAC or 208-230/460 VAC, and are heavy-duty TEFC, epoxy painted and rated for continuous duty service. Wash down and explosion proof motors available.
PUMP MODELS	C5 1/3, C7 1 and C8 1-1/2 HP

C Series Centrifugal Pumps

1/3, 1 AND 1-1/2 HP

TECHNICAL INFORMATION, CONTINUED



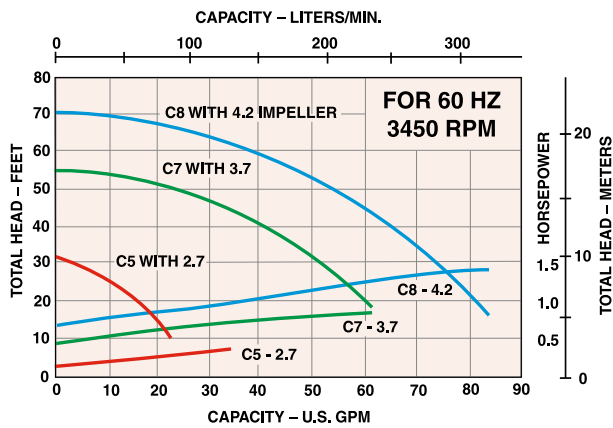
DIMENSIONS

	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	INLET	DISCHARGE
C5	8.63 / 219	8.17 / 208	5.72 / 145	2.25 / 57	5.03 / 128	6.58 / 167	5.55 / 141	N/A	3/4" FNPT	1/2" FNPT
C7	12.60 / 320	8.18 / 208	5.72 / 145	2.25 / 57	5.03 / 128	6.96 / 177	5.55 / 141	5.40 / 137	1" FNPT	3/4" FNPT
C8	13.41 / 341	8.17 / 208	5.72 / 145	2.25 / 57	2.03 / 52	6.96 / 177	5.73 / 146	5.94 / 151	1-1/4" FNPT	1" FNPT

Dimensions are subject to change without notice – consult factory for installation information

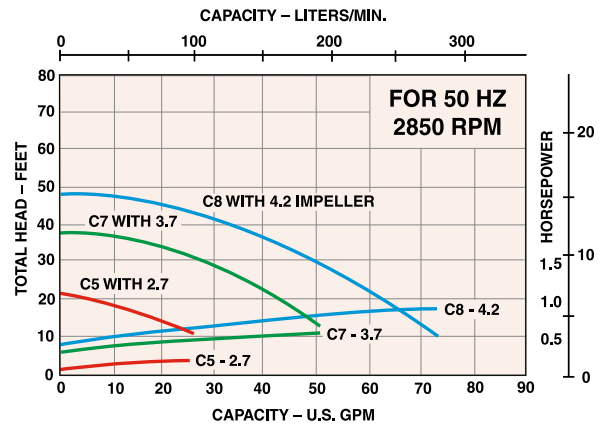
PERFORMANCE CURVES

60Hz



C5, C7, C8

50Hz



C5, C7, C8



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PVDF Multifunction Valve Optional

Z Series Solenoid Diaphragm Metering Pumps

ANALOG OPERATION

KEY FEATURES

- Three Pump Sizes Cover <1 To 29 GPH, with Discharge Pressures up to 232 psi
- Standard One Piece Molded PVDF Pump Head
- PTFE Diaphragm Provides Superior Chemical Handling
- Degassing Valve Included on 100 and 200 Size Models
- Glass Reinforced Polypropylene Housing
- FPM Body O-Ring Seal
- Removable Bracket Allows For Panel Mounting
- Inputs: 4-20mA, Pulse, etc. (varies by model)
- Manual Priming Valve on 500 Size
- NEMA 4X/IP65 Rated
- Electrical Connections Are Configured With "Quick-Connectors", Capped When Not In Use
- Automatic Power Supply - 100-240 VAC 50-60 Hz
- CE Mark
- Complete Standard Installation Kit Includes:
 - PVDF Foot Filter & Injection Valve
 - PVC Suction Tube
 - PE Delivery Tube

OPTIONS

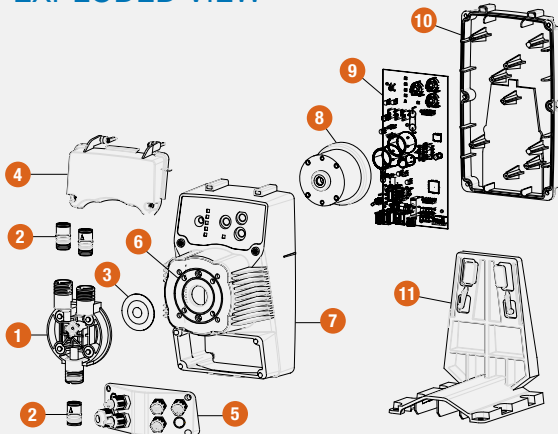
- Multifunction Valve Optional
- EPDM Seals Optional
- Level Switch
- Flow Switch

MATERIALS

- GFPP Cell Class 85580 Per ASTM D4101
- PVDF Per ASTM D3222 II
- PTFE Diaphragm
- FPM Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP SIZE	FLOW RATE (GPH)	LINE PRESSURE (PSI)	STROKE CAPACITY (CC/STROKE)	Ø CONNECTIONS IN / OUT (INCHES)	FREQUENCY MAX (STROKE/MIN)	CONSUMPTION (W)
100	1.06	175	0.42	0.17" x 1/4"	160	12.2
	1.32	145	0.52			
	1.58	116	0.63			
	2.11	29	0.83			
200	1.85	232	0.38	0.17" x 1/4"	300	23.9
	2.64	145	0.55			
	3.96	72	0.83			
	4.75	14	1.00			
500	7.90	73	1.11	5/16" x 7/16"	300	22.2
	10.50	58	1.39			
	12.00	29	2.22			
	29.00	0	3.00			

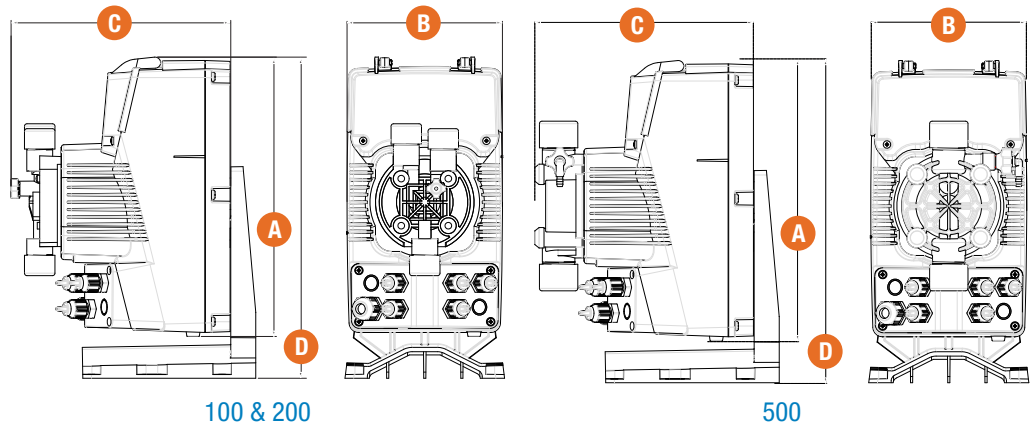
Z Series Solenoid Diaphragm Metering Pumps

ANALOG OPERATION

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Pump Head - PVDF
2. Ceramic Check Valve Assemblies - PVDF / FPM/SC
3. Diaphragm - PTFE
4. Front Panel Lid
5. Wiring Terminal Block - GFPP
6. O-Ring Seal - FPM
7. Housing - GFPP
8. Solenoid
9. Circuit Board
10. Back Plate - GFPP
11. Mounting Stand - GFPP



DIMENSIONS

PUMP SIZE	A in / mm	B in / mm	C in / mm	D in / mm	WEIGHT lbs / kg
100 & 200	9.1 / 231	4.7 / 119	7.81 / 198	10 / 254	6.9 / 3.1
500	9.1 / 231	4.7 / 119	7.77 / 197	10 / 254	9.5 / 4.3

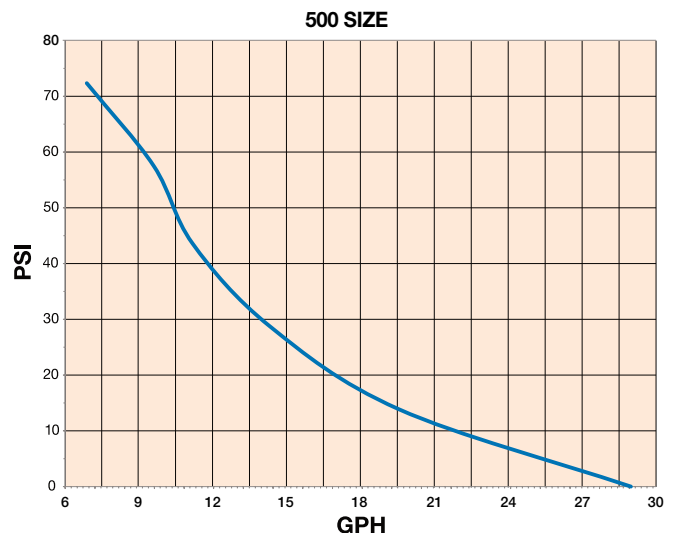
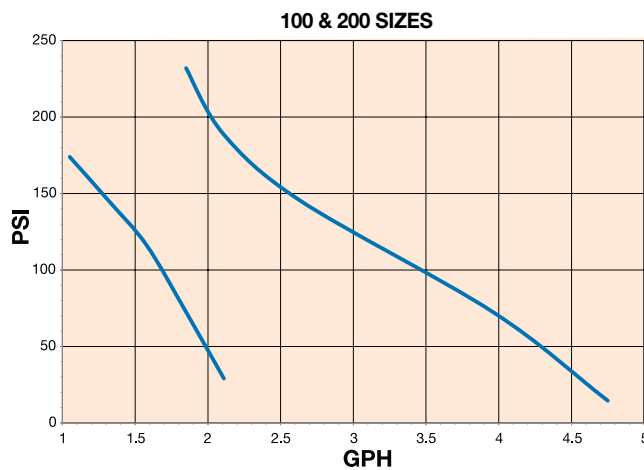
MULTIFUNCTION VALVE DETAILS

- Separately Adjustable Back-Pressure and Over-Pressure Controls
- PVDF Wetted Components
- Mounts on Pump Discharge
- Kit includes Back-pressure Tubing

OPERATION FEATURES BY MODEL

MODEL	FREQUENCY	DOSING	4-20MA	PULSE INPUT	PULSE MUL/ DIVISION	LEVEL/FLOW SWITCH IN	REMOTE ON/OFF	ALARM RELAY	100 / 200 / 500 MODELS
ZMA	Manual, Dual Range	Constant	No	No	No	Select	Yes	Yes	Yes
ZPA	Manual or Remote	Proportional	Input	Yes	Yes	Select	Yes	Yes	Yes
ZTA	Manual	Timed or Constant	No	Yes	No	Select	No	Yes	Yes

PERFORMANCE CURVES



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PVDF Multifunction Valve Optional

Z Series Solenoid Diaphragm Metering Pumps

DIGITAL OPERATION

KEY FEATURES

- Three Pump Sizes Cover <1 To 29 GPH, with Discharge Pressures up to 232 psi
- Standard One Piece Molded PVDF Pump Head
- PTFE Diaphragm Provides Superior Chemical Handling
- Degassing Valve Included on 100 and 200 Size Models
- Glass Reinforced Polypropylene Housing
- FPM Body O-Ring Seal, EPDM Optional
- Removable Bracket Allows For Panel Mounting
- Inputs: 4-20mA, Pulse, etc. (varies by model)
- Manual Priming Valve on 500 Size
- NEMA 4X/IP65 Rated
- Electrical Connections Are Configured With "Quick-Connectors", Capped When Not In Use
- Automatic Power Supply - 100-240 VAC 50-60 Hz
- CE Mark
- Complete Standard Installation Kit Includes:
 - PVDF Foot Filter & Injection Valve
 - PVC Suction Tube
 - PE Delivery Tube

OPTIONS

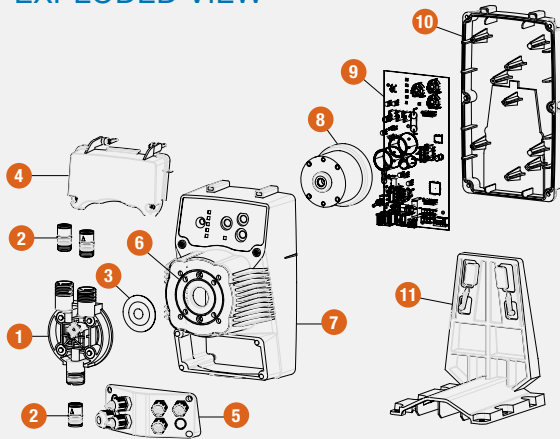
- Multifunction Valve Optional
- EPDM Seals Optional
- Level Switch
- Flow Switch

MATERIALS

- GFPP Cell Class 85580 Per ASTM D4101
- PVDF Per ASTM D3222 II
- PTFE Diaphragm
- FPM Seals

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

PUMP SIZE	FLOW RATE (GPH)	LINE PRESSURE (PSI)	STROKE CAPACITY (CC/STROKE)	Ø CONNECTIONS IN / OUT (INCHES)	FREQUENCY MAX (STROKE/MIN)	CONSUMPTION (W)
100	1.06	175	0.42	0.17" x 1/4"	160	12.2
	1.32	145	0.52			
	1.58	116	0.63			
	2.11	29	0.83			
200	1.85	232	0.38	0.17" x 1/4"	300	23.9
	2.64	145	0.55			
	3.96	72	0.83			
	4.75	14	1.00			
500	7.90	73	1.11	5/16" x 7/16"	300	22.2
	10.50	58	1.39			
	12.00	29	2.22			
	29.00	0	3.00			

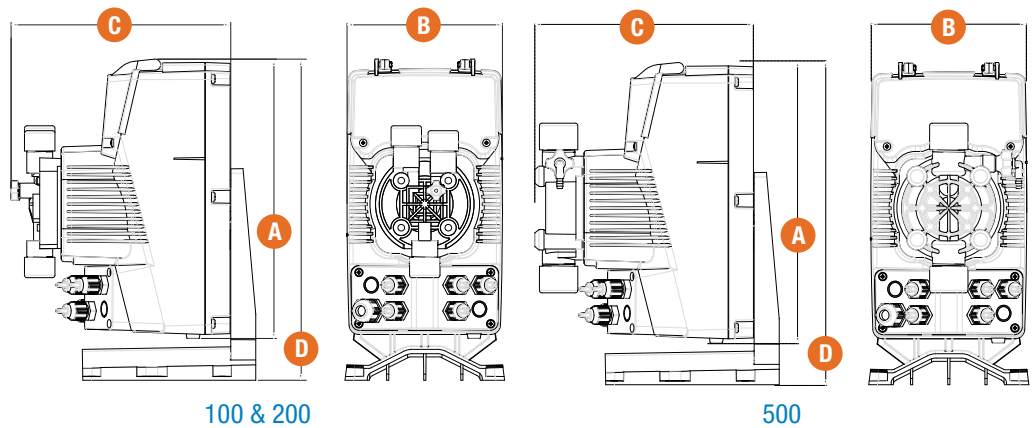
Z Series Solenoid Diaphragm Metering Pumps

DIGITAL OPERATION

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Pump Head - PVDF
2. Ceramic Check Valve Assemblies - PVDF / FPM/SC
3. Diaphragm - PTFE
4. Front Panel Lid
5. Wiring Terminal Block - GFPP
6. O-Ring Seal - FPM
7. Housing - GFPP
8. Solenoid
9. Circuit Board
10. Back Plate - GFPP
11. Mounting Stand - GFPP



DIMENSIONS

PUMP SIZE	A in / mm	B in / mm	C in / mm	D in / mm	WEIGHT lbs / kg
100 & 200	9.1 / 231	4.7 / 119	7.81 / 198	10 / 254	6.9 / 3.1
500	9.1 / 231	4.7 / 119	7.77 / 197	10 / 254	9.5 / 4.3

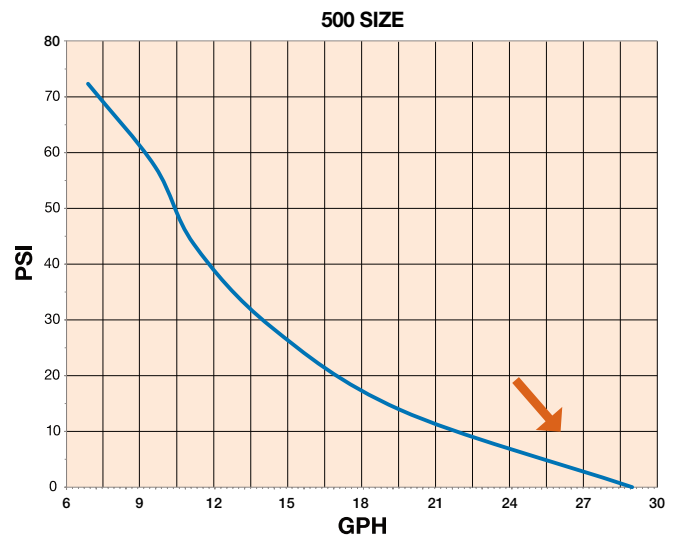
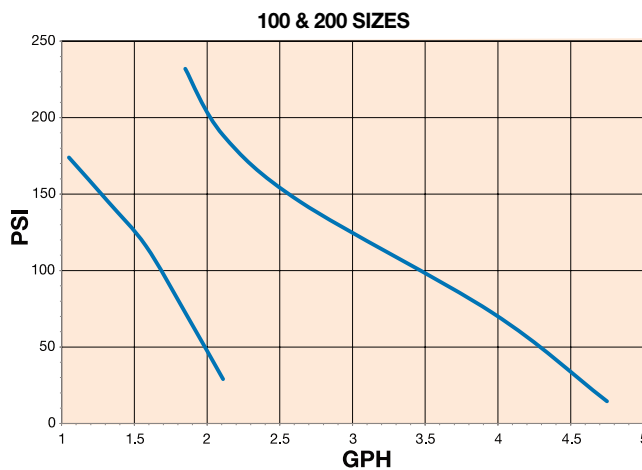
MULTIFUNCTION VALVE DETAILS

- Separately Adjustable Back-Pressure and Over-Pressure Controls
- PVDF Wetted Components
- Mounts on Pump Discharge
- Kit includes Back-pressure Tubing

OPERATION FEATURES BY MODEL

MODEL	FREQUENCY	DOSING	4-20MA	PULSE INPUT	PULSE MUL/DIVISION	LEVEL/FLOW SWITCH IN	REMOTE ON/OFF	ALARM RELAY	100 / 200 / 500 MODELS
ZPD	Manual	Proportional	Input	Yes	Yes	Both	Yes	Yes	Yes
ZRD	Auto or Manual	pH/ORP Setpoint	Output	No	No	Both	Yes	Yes	Yes
ZKD	Manual	Timed or Constant	No	Yes	No	Both	Yes	Yes	100 / 500

PERFORMANCE CURVES



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NEW



HLS SERIES

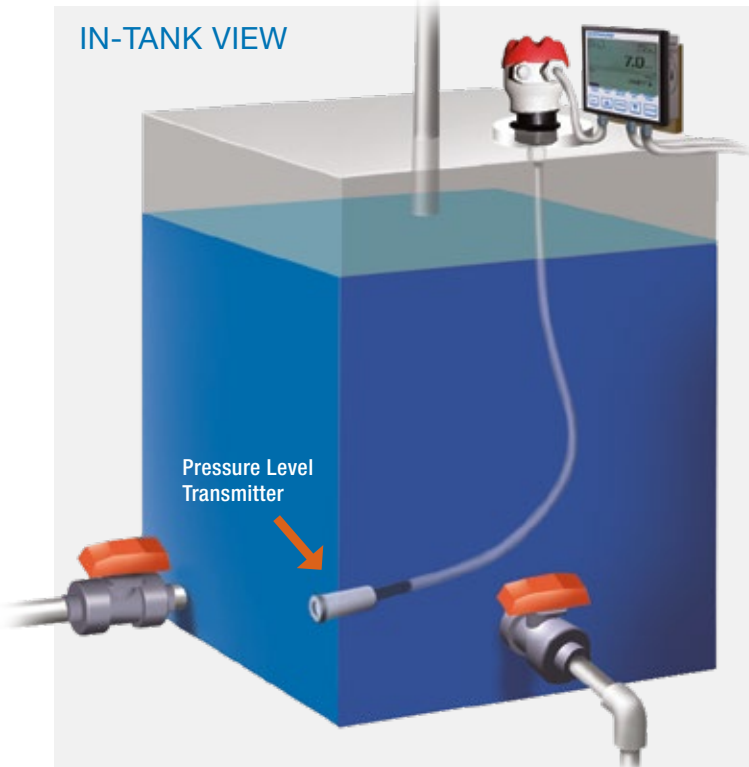
ADVANCED SUBMERSIBLE
PRESSURE LEVEL TRANSMITTER

KEY FEATURES

- Unaffected by Surface Foaming, Waves or Headspace Vapors
- All CPVC Housing
- Al₂O₃ (Alumina) Diaphragm
- Triple Sealed Cable Entry into Body
- Available with FPM or EPDM Seals
- Available with 0-15 Ft or 0-33 Ft of Level Range
- 30 and 50 ft FEP Coated Cable Standard (Lengths to 1000 Feet Available)
- 10-35 VDC Powered
- Direct Analog 4-20mA Output Signal
- 0.25% Accuracy Full Scale
- Laser Printed Sensor Details on Body
- Full Range of Accessories Available

TECHNICAL INFORMATION

IN-TANK VIEW



SPECIFICATIONS

DIMENSIONS LxDIA.	5.8 in long x 1.25 in dia. (14.7 cm long x 3.1 cm dia.)
RANGE	0-15 ft (6.5 psi) and 0-33 ft (14.3 psi) of water column
STANDARD CABLE LENGTH	30 ft with the 0-15 ft level sensor; 50 ft with the 0-33 ft level sensor
CABLE	Vented, 4 conductor, FEP cover
TEMPERATURE	30°F (non-freezing) to 140°F
TEMPERATURE EFFECTS	+/- 1.5% TEB (Total Error Band = linearity+hysteresis+ repeatability+zero and span settings+temperature effects)
POWER EQUIPMENT	10-35 VDC
OUTPUT SIGNAL	4-20 mA, scaled for full sensor range
BODY	CPVC per ASTM D1784, cell classification 23447

HLS Series

ADVANCED SUBMERSIBLE PRESSURE LEVEL TRANSMITTER

SENSOR OUTPUT VS LIQUID HEIGHT

0-15 FOOT SENSORS, 1.0 S.G. LIQUID

Liquid Height ft / m	0	2.3 / 0.7	10 / 3	15 / 4.6
Pressure at sensor PSI / kPa	0	1.0 / 6.9	4.3 / 29.7	6.5 / 44.8
Output mA	4	6.45	14.7	20

0-33 FOOT SENSORS, 1.0 S.G. LIQUID

Liquid Height ft / m	0	10 / 3	20 / 6.1	33 / 10.1
Pressure at sensor PSI / kPa	0	4.3 / 29.6	8.7 / 60	14.3 / 98
Output mA	4	8.8	14.7	20

WIRING

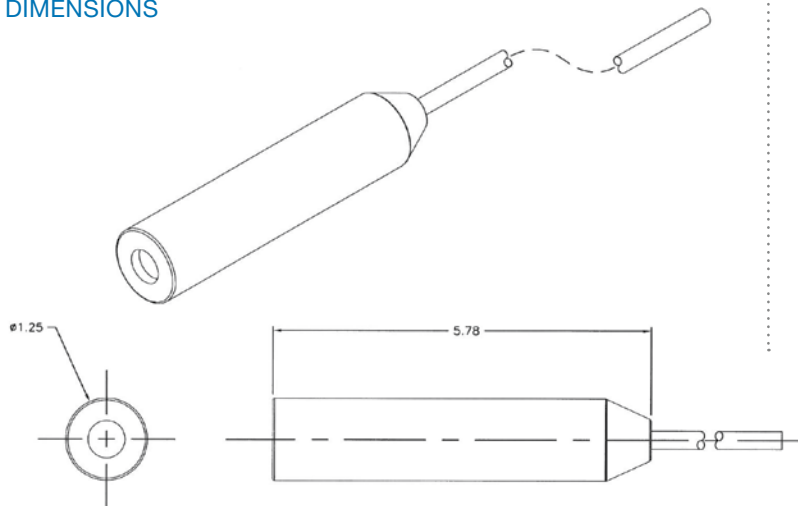
The FEP-coated cable provides four elements and a breather capillary. The Capillary must be protected from entry of moisture or debris, so an **HLSMP11 Moisture Protection Reference Volume** or equal device should be attached to the top of the capillary.

RED = 10-35 VDC +, 4-20mA +
 BLACK = 10-35 VDC -, 4-20mA -
 GREEN = Ground
 SILVER = Shield

ACCESSORIES

- HLSMP11 Moisture Protection Dessicant Pack
- Ceramic Sink Weights for High Specific Gravity Fluids
- HLST200 Indicating Level Transmitter, Configurable Display, Separate Temperature Channel

DIMENSIONS

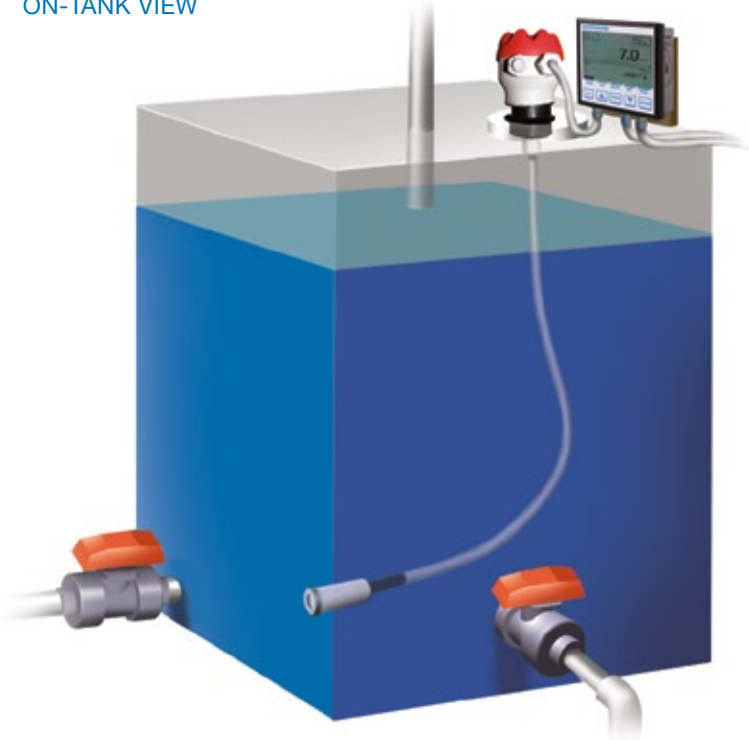


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ON-TANK VIEW



HMC SERIES

INDICATING TRANSMITTER

The HMC Series Indicating Transmitters offer advanced reading display and transmission. The multicolor, configurable LCD graphical display provides easy viewing of process variables. Built-in relays, open collectors, analog outputs and serial output allow a wide range of communications and control options.

KEY FEATURES & BENEFITS

- pH/ORP, conductivity/resistivity and multi-parameter models
- Temperature indication and transmission included
- Highly accurate, +/- 0.2%
- Rugged industrial design
- Dual Inputs: Measured parameter or analog input and RTD (Resistance Temperature Detector)
- Configurable LCD graphical display, changes colors to indicate alarm conditions
- 1/4 DIN size
- NEMA 4X/IP65 front panel protection
- AC and DC power options
- Rugged, removable terminal strips
- Powered 4-20mA input loop
- Dual, assignable 4-20mA outputs
- Dual 5A, 250 V programmable relays
- Dual programmable open collector outputs
- Mounting hardware included
- Hayward 2-year warranty

OPTIONS

- RS485 MODBUS option
- Combine with Hayward analytical sensors for complete system
- NEMA 4X/IP65 pre-wired enclosures available
- Industrial-grade pH/ORP, conductivity/resistivity electrodes available

HMC Series

INDICATING TRANSMITTER

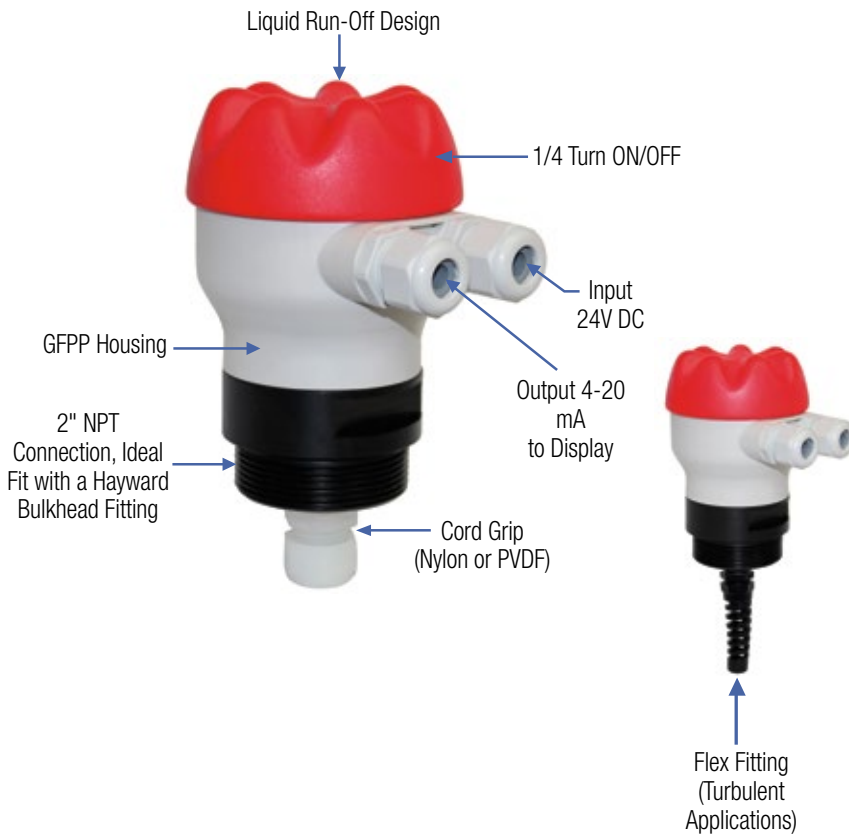
SPECIFICATIONS

ACCURACY	+/- 0.2%
INPUT 1	Analog: 0-20mA or 4-20 mA, two or three wire
INPUT 2	PT100 or PT1000 RTD, automatic detection
TEMPERATURE MEASUREMENT RANGE	-58 to 302°F (-50 to 150°C)
TEMPERATURE RESOLUTION	0.1°F or C
TEMPERATURE ACCURACY	PT100: +/- 0.9 °F (+/- 0.5°C) PT1000: +/- 0.4°F (+/- 0.2°C)
OUTPUT	Analog: 2 x 4-20mA, assignable to either channel, 800Ω, 3.6 to 22 mA Range
RELAY	Two 5A, SPDT 250 V, programmable with delays, PWM
OPEN COLLECTORS	Two, programmable
DISPLAY	128 x 128 pixel LCD display, multiple display options, three colors to indicate alarm conditions
CHASSIS	¼ DIN, ABS housing, includes cam-loks to secure into enclosure
POWER REQUIREMENT	100-240 / 50-60 VAC or 12-32 VDC, selected at time of order
POWER CONSUMPTION	<5W for 100-240 VAC, <3.5W for 12-32 VDC
ELECTRICAL CONNECTIONS	Rear panel, removable terminals, marked for service
USB	Rear panel connection for software updates
DISPLAY MODES	VIEW MEASURE, CALIBRATION MENU, SETUP MENU, ADVANCED MENU, VIEW MENU
DIMENSIONS	Chassis: 92 x 92 x 57.3mm
DIMENSIONS	Front bezel: 96 x 96mm
WEIGHT	0.9 lbs / 0.4 Kg
FRONT PANEL	UV-resistant polycarbonate
PROTECTION	IP65 front, IP20 chassis
RELATIVE HUMIDITY	0-100% condensing
STORAGE TEMPERATURE	-13 to 149°F (-25 to 65°C)
OPERATING TEMPERATURE	4 to 122°F (-10 to 50°C)
POWER SUPPLY FUSE	500 mA



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TLF SERIES

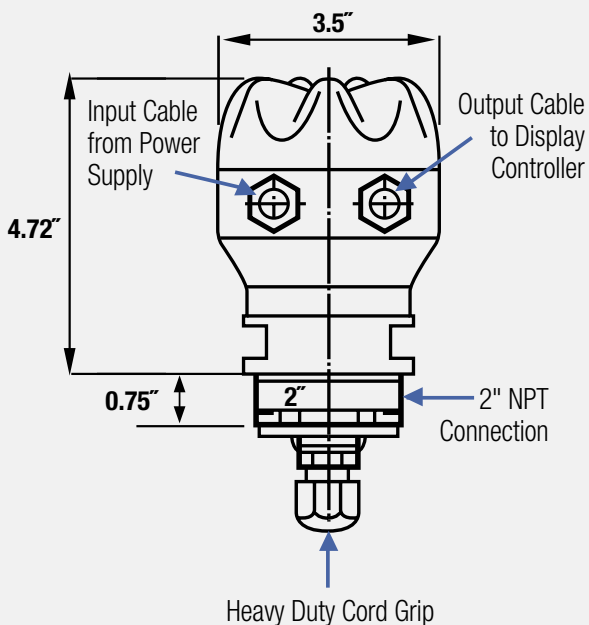
LEVEL SENSOR JUNCTION BOX

KEY FEATURES

- Suitable for HLS Series Sensors
- Glass Reinforced Polypropylene Housing for High Impact Resistance
- NEMA 4X Enclosure
- Threaded Polyethylene 2" Connection
- 2X Cord Grips: Cable-In, Cable-Out
- Excellent Chemical Resistance
- Weather Resistant
- Easy Installation with Hayward Bulkhead Fittings

TECHNICAL INFORMATION

DIMENSIONS AND ADDITIONAL FEATURES



OPTIONAL CORD GRIPS*



** For fuming chemicals please ensure cord grip is sealed to prevent internal corrosion.*

GG Series Gauge Guards

1/4" x 1/4" PVC, CPVC AND PP
 1/4" x 1/2" PVC, CPVC AND PVDF

KEY FEATURES

- Available in PVC, CPVC, PP and PVDF
- Threaded NPT Connections
- FPM Membrane
- All Thermoplastic, No Rust or Corrosion
- No Metal Fasteners
- Rugged, Low Profile, Compact Design
- Work in any Position
- Dual Face Scale

OPTIONS

- 0 to 30 PSI Gauge
- 0 to 60 PSI Gauge
- 0 to 160 PSI Gauge
- 0 to 160 PSI SS Liquid Filled Gauge and Liquid Damped



TECHNICAL INFORMATION

SPECIFICATIONS

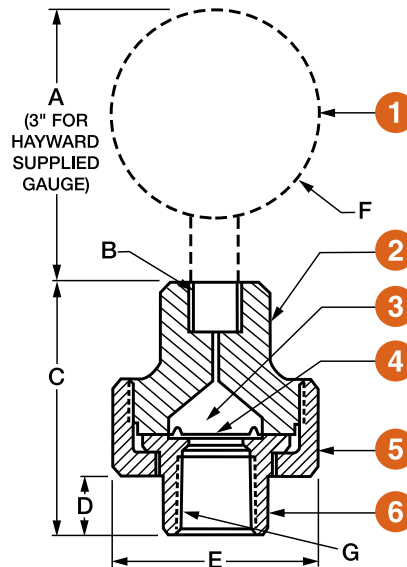
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" x 1/4" (DN8 - DN8)	PVC, CPVC or PP	NPT	FPM	150 PSI @ 70°F Non-Shock
1/4" x 1/2" (DN8 - DN15)	PVC, CPVC or PVDF			

GG Series Gauge Guards

1/4" x 1/4" PVC, CPVC AND PP
1/4" x 1/2" PVC, CPVC AND PVDF

PARTS LIST

1. Gauge/Instrument
2. Body
3. Oil-Filled Upper Chamber with Installed Gauge
4. FPM Membrane
5. Union Nut
6. End Connector

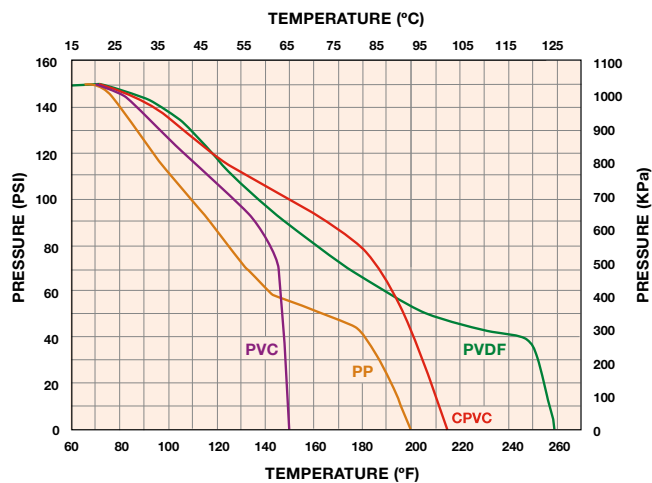


DIMENSIONS

SIZE in / DN	MATERIAL	A	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G
1/4 x 1/4 / 8 x 8	PVC, CPVC and PP	3.0 / 76	1/4" NPT	2.69 / 68	.61 / 15	2.25 / 57	2.3 / 58	1/4" NPT
1/4 x 1/2 / 8 x 15	PVC and CPVC	3.0 / 76	1/4" NPT	2.69 / 68	.61 / 15	2.25 / 57	2.3 / 58	1/2" NPT
1/4 x 1/2 / 8 x 15	PVDF	3.0 / 76	1/4" NPT	2.25 / 57	.35 / 9	2.0 / 51	2.0 / 51	1/2" NPT

Dimensions are subject to change without notice – consult factory for installation information

OPERATING PRESSURE/TEMPERATURE



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PP VERSION



PVDF VERSION

GA Series

PRESSURE GAUGE & ISOLATOR

KEY FEATURES

- All Thermoplastic Combo Gauge & Isolator
- One-Piece Molded Design (No Assembly)
- Heavy Duty Design; Simple to Install
- Completely Corrosion Resistant
- Available with PP body with FPM diaphragm or PVDF Body with PTFE diaphragm
- High Accuracy
- Factory Pre-Filled Glycerin / Vacuum Sealed
- No Filling Required
- Suitable for Corrosive Media + Slurries
- Simple Installation
- Calibration Certified

TECHNICAL INFORMATION

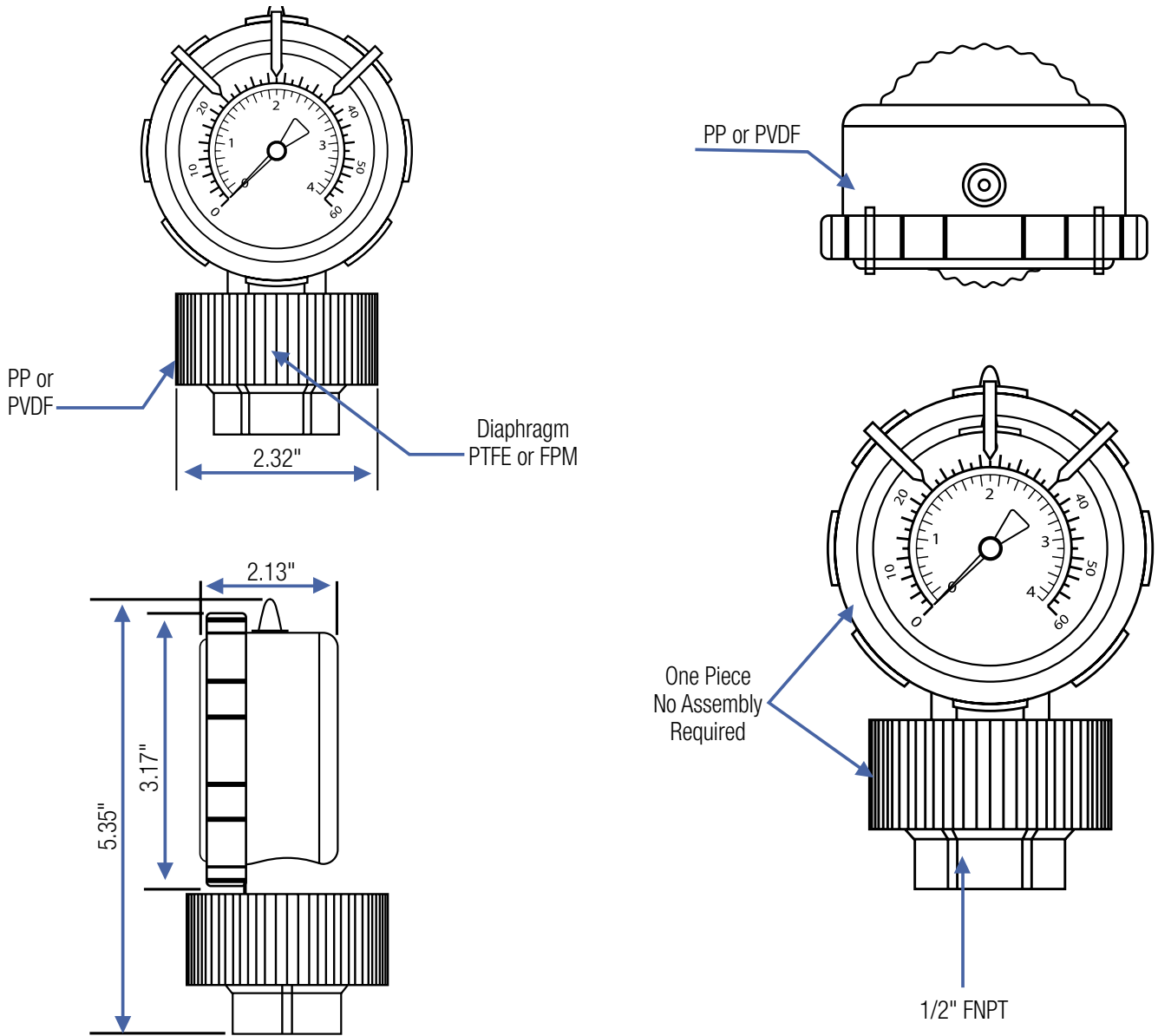
SPECIFICATIONS

DIAL DIAMETER	Large 2-1/2" Face (Big Numbers-Clear Markers)
MOUNTING	Direct Mount, Bottom Connection FNPT 1/2"
HOUSING	PVDF or Polypropylene with FPM or PTFE Diaphragm
LENS	Safety Glass
DIAL	Red & Black Scale White Background, dial arc 270°
MEASURING PRINCIPLE	Bourdon Tube-SS316 (Non Wetted) Diaphragm (Wetted Part) - FPM (Standard)
MOVEMENT	SS316 (Non Wetted)
GAUGE	Red, Yellow, Green Moveable Plastic Markers- Pressure Range Pointers Fitted on the Bezel
CONNECTION	1/2" FNPT
FILLING	Options: Glycerin or Silicone Filled
ACCURACY	±1.5% F.S.
OPERATING TEMPERATURE	Max. Working Temp. PVDF-195°F, PP-170°F
PRESSURE RANGE	Standard Range 0-60 / 0-100 / 0-160 PSI (Second Scale: Bar) Other units available, e.g., bar, MPa, etc.

GA Series

PRESSURE GAUGE & ISOLATOR

DIMENSIONS AND MATERIALS



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PP VERSION



PVDF VERSION

GDS SERIES

DOUBLE SIDED LIQUID FILLED PRESSURE GAUGE & ISOLATOR

KEY FEATURES

- All Thermoplastic Double Sided Gauge
- Heavy Duty Rugged Design; Simple to Install
- Completely Corrosion Resistant
- For use as a Visual Pressure Alert for Change-Out or BAG Replacement
- PP body with FPM Diaphragm or PVDF body with PTFE diaphragm
- High Accuracy of 1.5%
- Factory Pre-Filled Glycerin / Vacuum
- No Filling Required
- One-Piece Molded Design (No Assembly)
- Suitable for Corrosive Media + Slurries

TECHNICAL INFORMATION

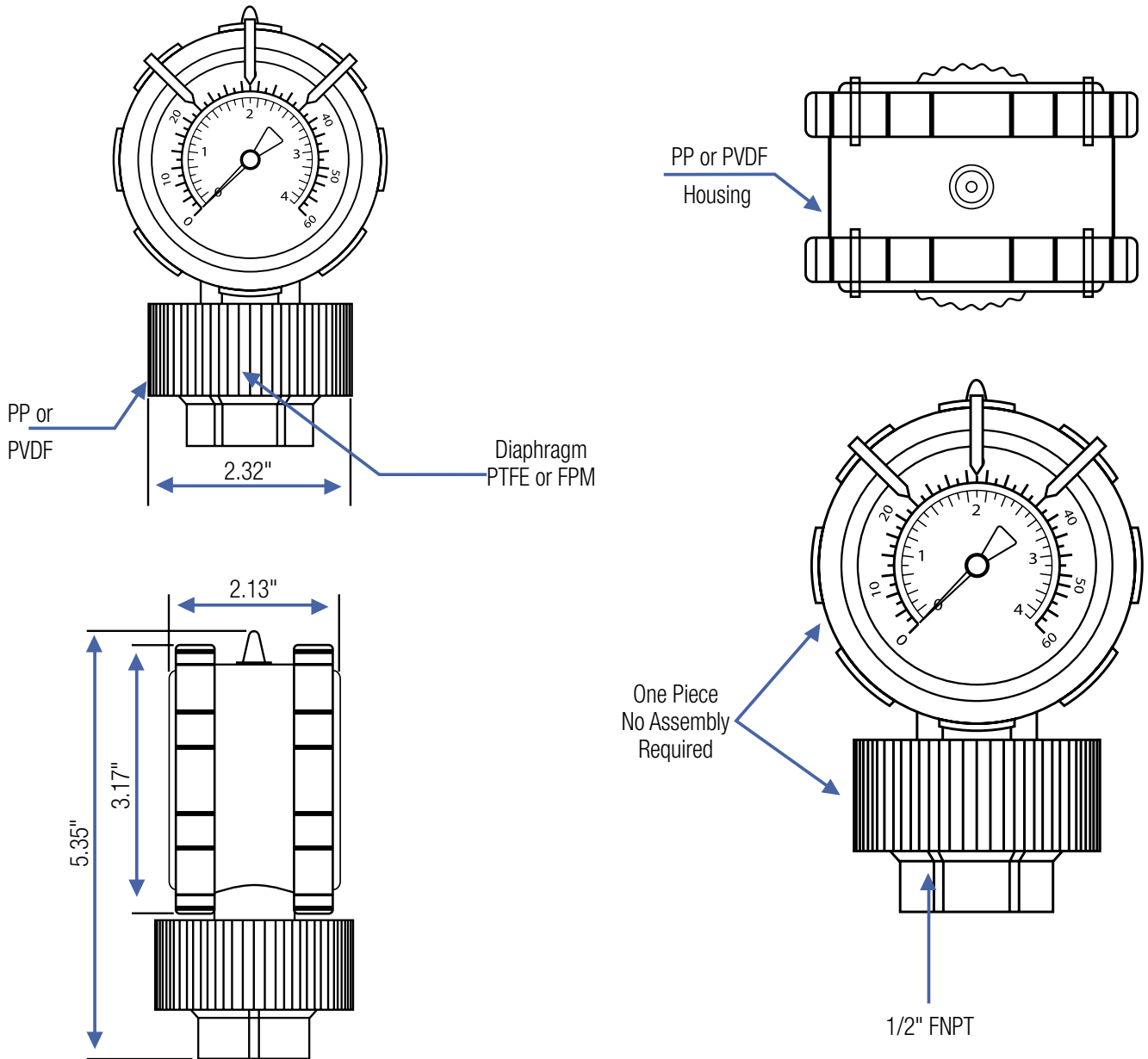
SPECIFICATIONS

DIAL DIAMETER	Large 2-1/2" Face (Big Numbers-Clear Markers)
MOUNTING	Direct Mount, Bottom Connection FNPT 1/2"
HOUSING	PVDF or Polypropylene with FPM or PTFE Diaphragm-One Piece Molded Design (No Assembly or Filling Required)
LENS	Safety Glass
DIAL	Red & Black Scale White Background, dial arc 270°
MEASURING PRINCIPLE	Bourdon Tube-SS316 (Non Wetted) Diaphragm (Wetted Part) - FPM (Standard)
MOVEMENT	SS316 (Non Wetted)
GAUGE	3 Adjustable Plastic Markers-Pressure Range Pointers fitted on the Bezel (Green, Yellow, Red)
CONNECTION	1/2" FNPT
FILLING	Glycerin Filled
ACCURACY	±1.5% F.S.
OPERATING TEMPERATURE	Max. Working Temp. PVDF-195°F / 90°C, PP-170°F / 76°C
PRESSURE RANGE	Standard range 0-60 / 0-100 / 0-160 PSI (Second Scale: Bar) Other units available, e.g., MPa, etc.

GDS Series

DOUBLE SIDED LIQUID FILLED
PRESSURE GAUGE & ISOLATOR

DIMENSIONS & FEATURES



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GD SERIES

DIGITAL LED PRESSURE ALARM

KEY FEATURES

- Display Changes from Green to Red (Alarm Status)
- Highly Accurate $\pm 0.25\%$ of Full Scale
- Ceramic Diaphragm 316 SS $\frac{1}{2}$ " NPT Process Port
- 316 SS $\frac{1}{2}$ " NPT Process Port
- Display Pressure Units PSI, Bar, Kg/Cm², KPA, MPA, In Hg
- Two(2) 3 Amp Relay Alarm Functions
- 4-20 mA Analog Output Function (Remote Display)
- Digital RS-485 Interface Function (optional)
- NEMA 4X/IP66 Rated^o
- Adjustable Range
- Adjust ΔP Set Points
- Lockable Software Security

TECHNICAL INFORMATION

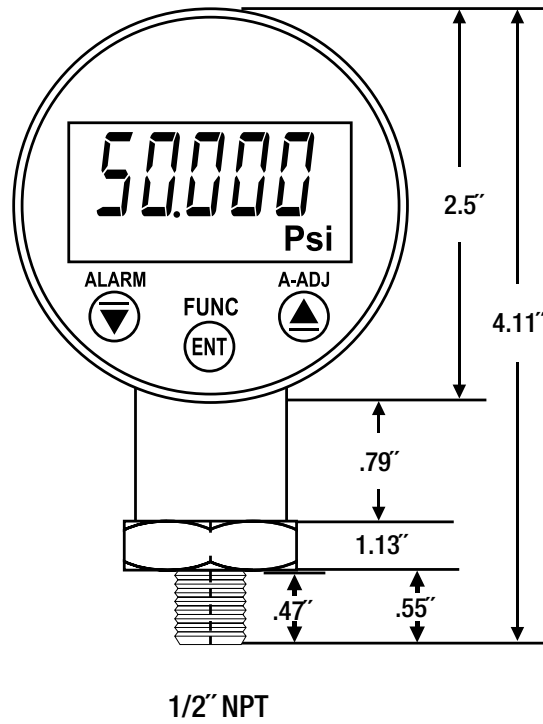
SPECIFICATIONS

SUPPLY VOLTAGE	DC 14 to 30 V
MEASURING ACCURACY	0.25% Full Scale
DISPLAY RANGE	-19999 ~ 99999
RELAY CONTACT OUTPUT	DC 30V-3A
ANALOG OUTPUT	4-20 mA
DISPLAY	Bright Red/Green LED high (0.4")
PARAMETER SETTING	Push Button
MEMORY MODE	Non-Volatile E2 PROM Memory
DIAPHRAGM MATERIALS	Ceramic Al ₂ O ₃
PRESSURE PORT MATERIALS	316 SS
DISPLAY MATERIALS	Polyamide 66+ 15% Glass Filled
OPERATING TEMPERATURE RANGE	-4°F to 176°F (-20°C to 80°C)
STORAGE TEMPERATURE RANGE	-22°F to 176°F (-35°C to 80°C)
PRESSURE RANGE	0 to 400 psi

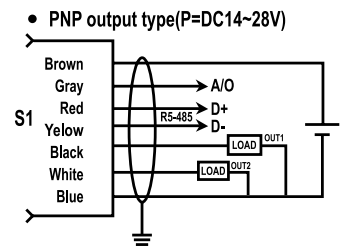
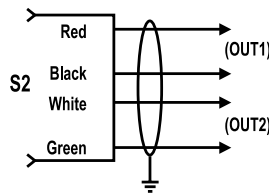
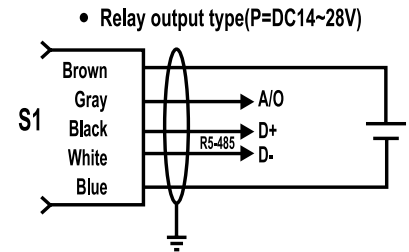
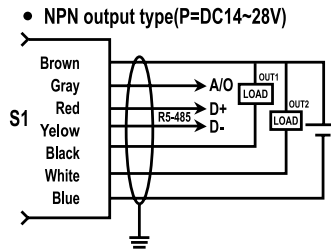
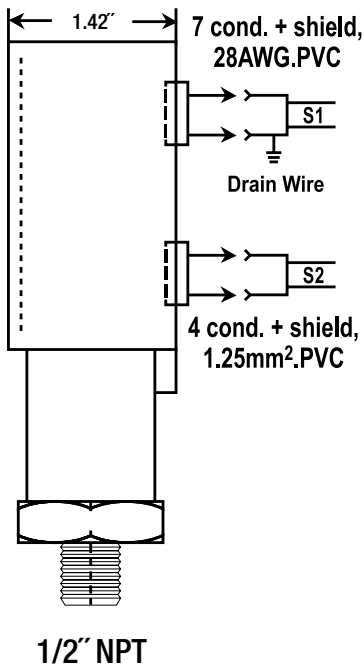
GD Series

DIGITAL LED PRESSURE ALARM

DIMENSIONS (UNIT : INCH)



CONNECTION DIAGRAM



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GLD Series

PRESSURE GAUGE & ISOLATORS

KEY FEATURES

- All Thermoplastic Construction (Gauge + Isolator)
- Heavy Duty One-Piece Molded Design (No Assembly Required)
- No Filling Required
- Corrosion Resistant
- Designed to Act as Visual Pressure Alert for Bag/Filter Change-Out
- Extra Large LED Display
- Reduces Small Pressure Surges caused by Water Hammer or Metering Pump Pulsations
- PTFE Diaphragm Standard
- High Accuracy $\pm 1.0\%$
- Suitable for Corrosive Media & Slurries
- 15 ft. of Cable
- 10-30 VDC Powered
- Simple Installation

TECHNICAL INFORMATION

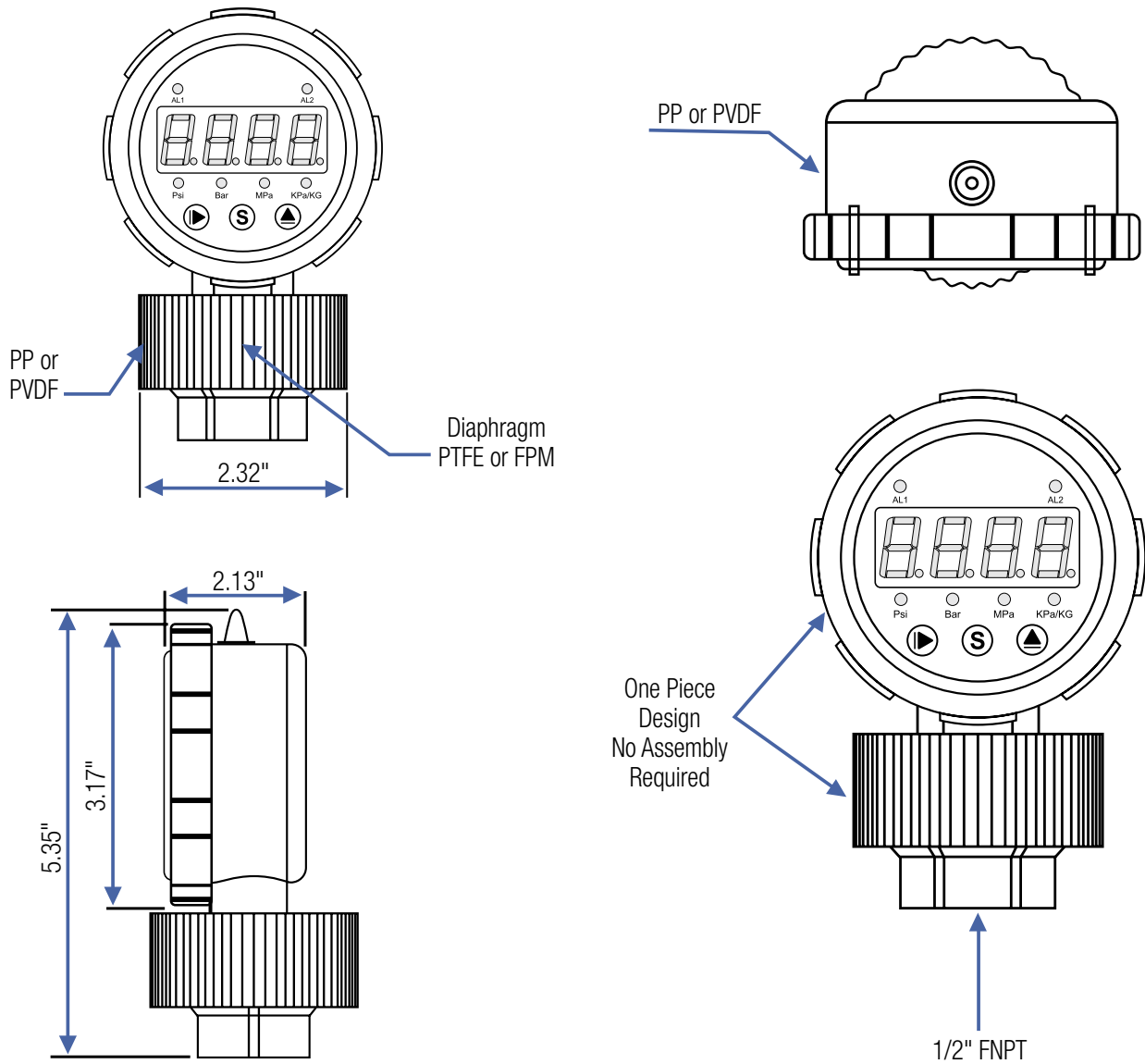
SPECIFICATIONS

DIAL DIAMETER	2-1/2"
MOUNTING	Direct Mount, Bottom Connection
HOUSING	PVDF or Polypropylene with PTFE Diaphragm NEMA 4X
LENS	Polycarbonate
DIAL	LED Display
CONNECTION	1/2" FNPT
ACCURACY	$\pm 1.0\%$
OPERATING TEMPERATURE	Max. Working Temp. PVDF 195°F (90°C), PP 170°F (76°C)
PRESSURE RANGE	0-150 PSI (Ambient Temp)
OUTPUT	4-20 mA + 2 (NPN or PNP)
POWER REQUIREMENT	10-30V DC GLD

GLD Series

PRESSURE GAUGE & ISOLATORS

DIMENSIONS AND MATERIALS (UNITS IN INCHES)



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Certified to
NSF/ANSI 61 & 372
1/2" - 3"
PVC/EPDM

BFAS Series Bulkhead Fittings Standard Flange

1/2" TO 4" PVC, CPVC, PP AND GFPP

KEY FEATURES

- Available in PVC, CPVC, PP and GFPP
- FPM or EPDM Gasket Seal
- Left-Hand Threads
- Buttress Threads Protect Against Blowout
- Hex Body for One-Person Installation
- Rated at 150 PSI
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

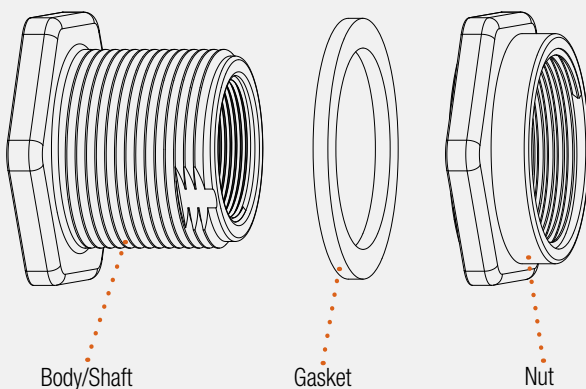
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™ Compression Fitting

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- GFPP Cell Class 85580 per ASTM D4101
- Heavy-Duty FPM and EPDM Gaskets

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	GASKETS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC	Socket x Thread Thread x Thread	FPM or EPDM	150 PSI @ 70°F Non-Shock
	CPVC	Socket x Thread		
	PP	Thread x Thread		
	GFPP			

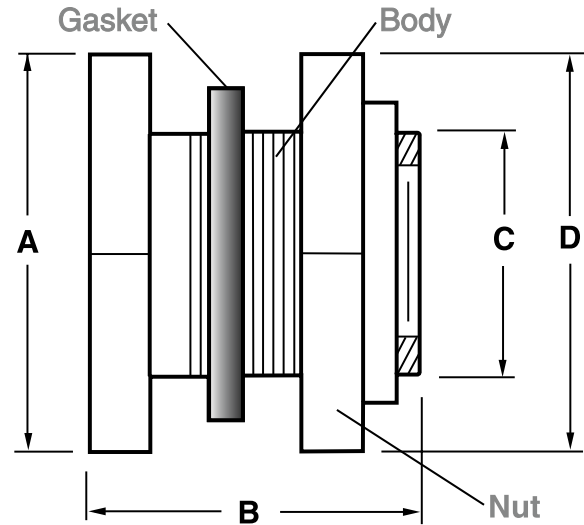
BFAS Series Bulkhead Fittings – Standard Flange

1/2" TO 4" PVC, CPVC, PP AND GFPP

TECHNICAL INFORMATION, CONTINUED

MINIMUM INSIDE RADII OF TANKS FOR BULKHEAD FITTING INSTALLATION

SIZE in / DN	Min. Rigid Tank Radius	Min. Flexible Tank Radius	Max. Wall Thickness
1/2 / 15	7.25"	6.50"	1.08"
3/4 / 20	10.00"	9.25"	1.08"
1 / 25	11.75"	10.70"	1.08"
1-1/4 / 32	16.25"	12.19"	1.00"
1-1/2 / 40	16.25"	12.19"	1.00"
2 / 50	25.75"	19.38"	1.00"
3 / 80	30.00"	25.25"	1.02"
4 / 100	60.00"	55.00"	2.45"



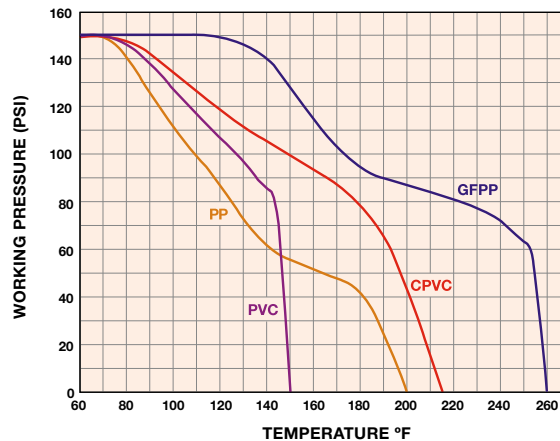
DIMENSIONS

SIZE in / DN	A in / mm ACROSS FLATS	B in / mm	C in / mm INSTALLATION HOLE SIZE	D in / mm ACROSS FLATS	E in / mm GASKET THICKNESS
1/2 / 15	2.00 / 51	2.75 / 70	1.38 / 35	2.00 / 51	.19 / 5
3/4 / 20	2.38 / 60	2.88 / 73	1.63 / 41	2.38 / 60	.19 / 5
1 / 25	2.56 / 65	2.88 / 73	1.88 / 48	2.56 / 65	.19 / 5
1-1/4 / 32	3.25 / 83	3.00 / 76	2.63 / 67	3.25 / 83	.19 / 5
1-1/2 / 40	3.25 / 83	3.00 / 76	2.63 / 67	3.25 / 83	.19 / 5
2 / 50	4.38 / 111	3.25 / 83	3.25 / 83	4.38 / 111	.25 / 6
3 / 80	6.00 / 152	3.63 / 92	4.50 / 114	6.00 / 152	.25 / 6
4 / 100	8.75 / 222	4.75 / 121	5.75 / 146	8.75 / 222	.25 / 6

Dimensions are subject to change without notice – consult factory for installation information

Dimensions A and D are Across Flats. 1/2" to 2" Hexagon Flats, 3" and 4" Octagon Flats

OPERATING TEMPERATURE/PRESSURE



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Certified to
NSF/ANSI 61 & 372
PVC/EPDM

BFA Series Bulkhead Fittings Standard Flange

1/2" TO 6" PVC, CPVC AND PP – LONG PATTERN

KEY FEATURES

- Available in PVC, CPVC and PP
- Extra Long Design for Thick Tank Walls
- Left-Hand Threads
- Rated at 150 PSI
- FPM or EPDM Gasket Seal
- Hex Body for One-Person Installation
- Full Buttress Threads
- NSF / ANSI 61 and NSF / ANSI 372 Listed

OPTIONS

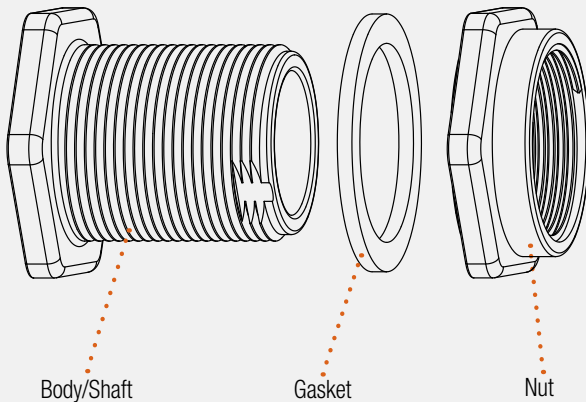
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- FPM and EPDM Gaskets

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	GASKETS	PRESSURE RATING
1/2" – 6" (DN15 – DN150)	PVC	Socket x Socket Socket x Thread	FPM or EPDM	150 PSI @ 70°F Non-Shock
	CPVC	Thread x Thread		
	PP	Thread x Thread		

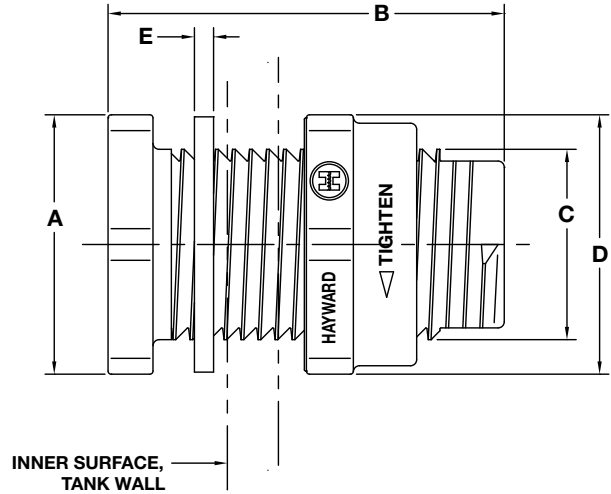
BFA Series Bulkhead Fittings – Standard Flange

1/2" TO 6" PVC, CPVC AND PP – LONG PATTERN

TECHNICAL INFORMATION, CONTINUED

MINIMUM INSIDE RADII OF TANKS FOR BULKHEAD FITTING INSTALLATION

SIZE in / DN	Min. Rigid Tank Radius	Min. Flexible Tank Radius	Max. Wall Thickness
1/2 / 15	7.25"	6.50"	2.08"
3/4 / 20	10.00"	9.25"	2.08"
1 / 25	11.75"	10.70"	2.08"
1-1/4 / 32	16.25"	12.19"	2.00"
1-1/2 / 40	16.25"	12.19"	2.00"
2 / 50	25.75"	19.38"	2.00"
3 / 80	30.00"	25.25"	2.12"
4 / 100	60.00"	55.00"	2.45"
6 / 150	114.00"	97.00"	3.25"

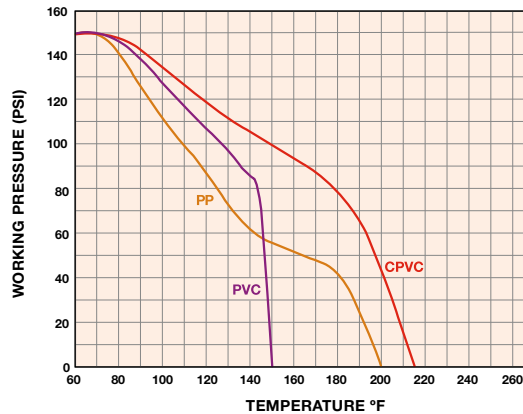


DIMENSIONS

SIZE in / DN	A in / mm ACROSS FLATS	B in / mm	C in / mm INSTALLATION HOLE SIZE	D in / mm ACROSS FLATS	E in / mm GASKET THICKNESS
1/2 / 15	2.00 / 51	3.75 / 95	1.38 / 35	2.00 / 51	.19 / 5
3/4 / 20	2.38 / 60	3.88 / 99	1.63 / 41	2.38 / 60	.19 / 5
1 / 25	2.56 / 65	3.88 / 99	1.88 / 48	2.56 / 65	.19 / 5
1-1/4 / 32	3.25 / 83	4.00 / 102	2.65 / 67	3.25 / 83	.19 / 5
1-1/2 / 40	3.25 / 83	4.00 / 102	2.65 / 67	3.25 / 83	.19 / 5
2 / 50	4.38 / 111	4.25 / 108	3.25 / 83	4.38 / 111	.25 / 6
3 / 80	6.00 / 152	4.65 / 118	4.50 / 114	6.00 / 152	.25 / 6
4 / 100	8.75 / 222	5.75 / 146	5.75 / 146	8.75 / 222	.25 / 6
6 / 150	12.00 / 305	8.00 / 203	8.06 / 205	12.00 / 305	.31 / 8

Dimensions are subject to change without notice – consult factory for installation information
 Dimensions A and D are Across Flats. 1/2" to 2" Hexagon Flats, 3", 4" and 6" Octagon Flats

OPERATING TEMPERATURE/PRESSURE



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BFA Series Bulkhead Fittings Oversized Flange

1/2" TO 1" PVC, CPVC AND PP

KEY FEATURES

- Available in PVC, CPVC and PP
- Oversized Flange Base
- Extra Long Design for Thick Tank Walls
- Left-Hand Threads
- Rated at 150 PSI
- FPM or EPDM Gasket Seal
- Hex Body for One-Person Installation
- Full Buttress Threads

OPTIONS

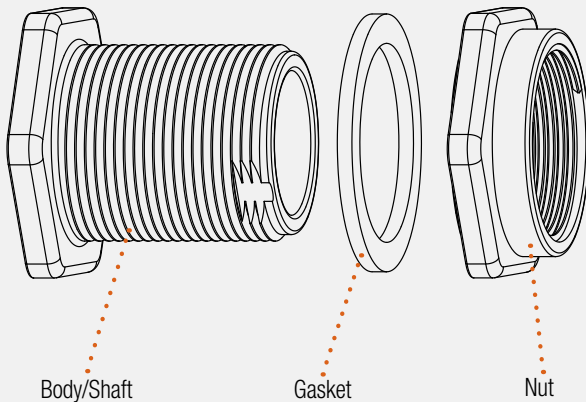
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- FPM and EPDM Gaskets

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	GASKETS	PRESSURE RATING
1/2" – 1" (DN15 – DN25)	PVC	Socket x Socket Socket x Thread	FPM or EPDM	150 PSI @ 70°F Non-Shock
	CPVC	Thread x Thread		
	PP	Thread x Thread		

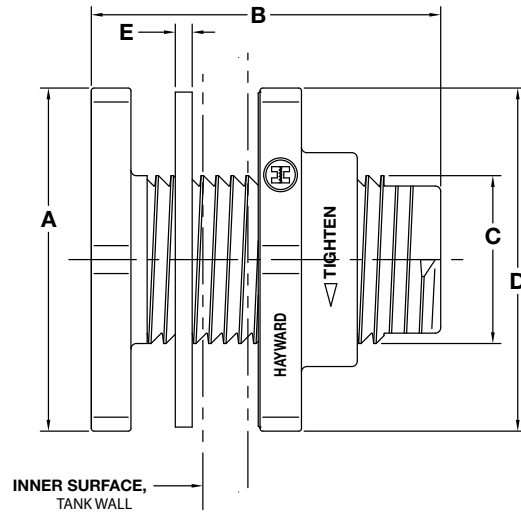
BFA Series Bulkhead Fittings – Oversized Flange

1/2" TO 1" PVC, CPVC AND PP

TECHNICAL INFORMATION, CONTINUED

MINIMUM INSIDE DIAMETERS OF TANKS FOR BULKHEAD FITTING INSTALLATION

SIZE in / DN	ID Rigid Wall	ID Flexible Wall	Max. Wall Thickness
1/2 / 15	7.25"	6.50"	2.08"
3/4 / 20	10.00"	9.25"	2.08"
1 / 25	11.75"	10.70"	2.08"

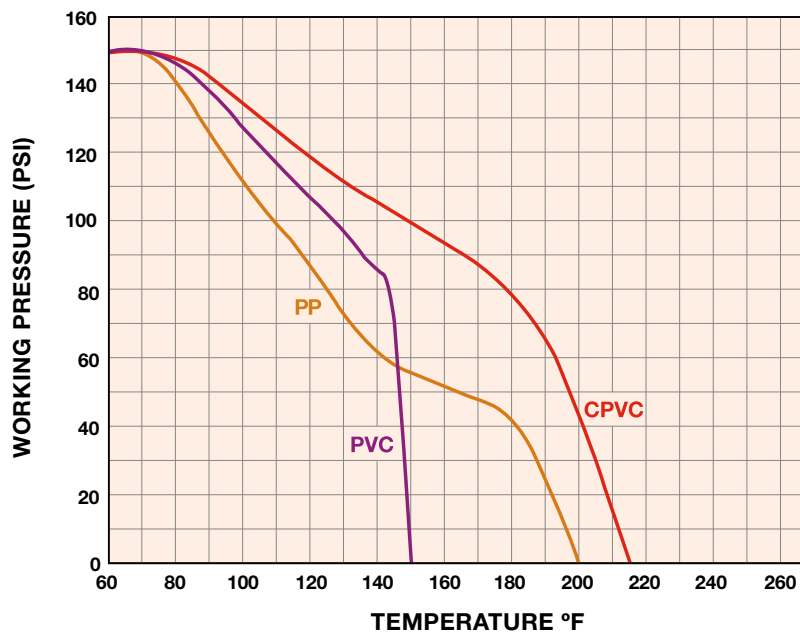


DIMENSIONS

SIZE in / DN	A in / mm ACROSS FLATS	B in / mm	C in / mm INSTALLATION HOLE SIZE	D in / mm ACROSS FLATS	E in / mm GASKET THICKNESS
1/2 / 15	2.00 / 51	3.75 / 95	1.38 / 35	2.00 / 51	.19 / 5
3/4 / 20	2.38 / 60	3.88 / 99	1.63 / 41	2.38 / 60	.19 / 5
1 / 25	2.56 / 65	3.88 / 99	1.88 / 48	2.56 / 65	.19 / 5

Dimensions are subject to change without notice – consult factory for installation information
Dimensions A and D are Across Flats. 1/2" to 1" Hexagon Flats

OPERATING TEMPERATURE/PRESSURE



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*Bulkhead Fitting Not Included

TANK TITE™

CCP Series Tank-Tite™* Compression Ring

1/2" TO 3" PVC

The Tank-Tite is a revolutionary patented compression ring that eliminates the need to retighten gasketed bulkhead fittings! The Tank-Tite provides a constant load on the gasket of the bulkhead fitting to overcome, and compensate for, tank wall expansion/contraction in thickness due to changes in temperature and/or pressure within the tank. The Tank-Tite also imparts at the same time a constant load on the bulkhead fitting nut that reduces the possibility of loosening of the nut due to vibration within the system.

KEY FEATURES

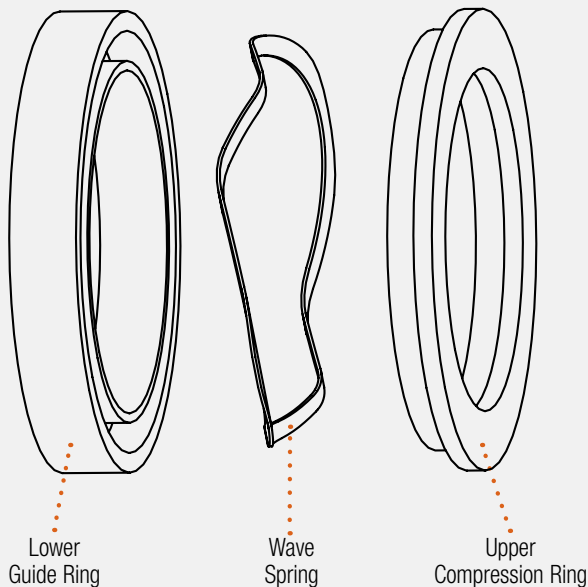
- Robust PVC Upper and Lower Body Construction
- 17.7 PH Stainless Steel Wave Spring
- Rated to 150 PSI
- Fits with Hayward® BFAS / BFA Series Bulkhead Fittings
- Can be Used with All Bulkhead Fitting Materials

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- 17.7 PH Stainless Steel

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

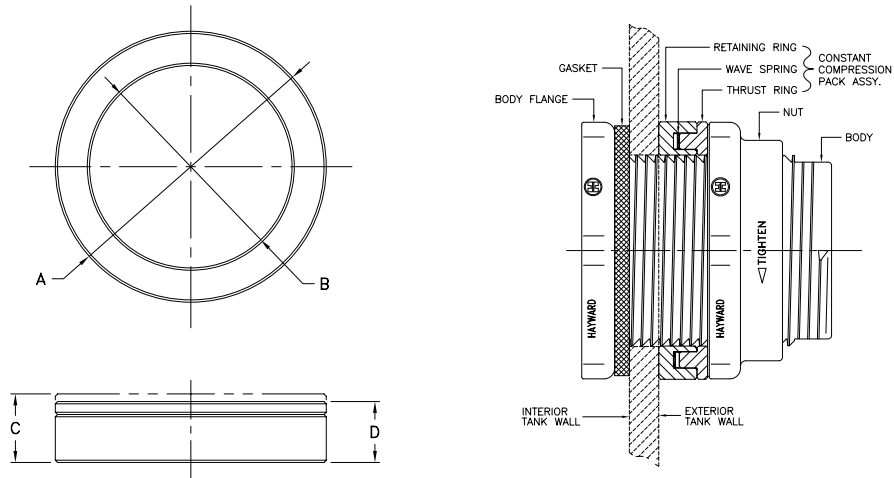
SIZE	MATERIAL	SPRING	PRESSURE RATING
1/2" – 3" (DN15 – DN80)	PVC	17.7 PH SSSL	150 PSI @ 70°F Non-Shock

"Patented" Pat. No.: 8,328,240

CCP Series Tank-Tite™ Compression Ring

1/2" TO 3" PVC

TECHNICAL INFORMATION, CONTINUED

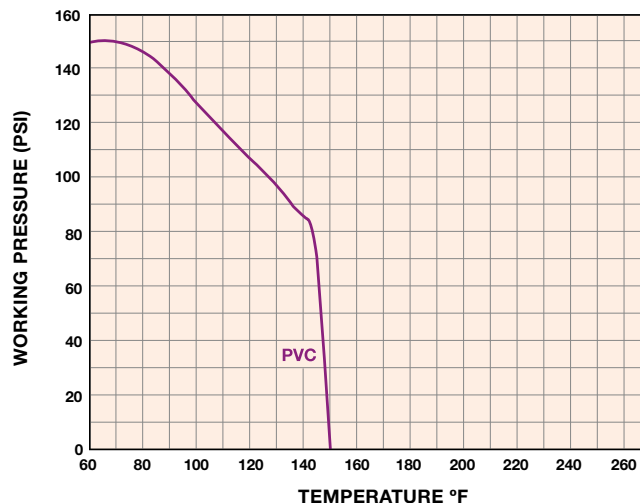


DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm FREE HEIGHT	D in / mm WORKING HEIGHT
1/2 / 15	2.40 / 61	1.40 / 36	.80 / 20	.69 / 18
3/4 / 20	2.40 / 61	1.65 / 42	.80 / 20	.69 / 18
1 / 25	2.72 / 69	1.90 / 48	.84 / 21	.72 / 18
1-1/4 / 32	3.56 / 90	2.66 / 68	.90 / 23	.80 / 20
1-1/2 / 40	3.56 / 90	2.66 / 68	.90 / 23	.80 / 20
2 / 50	4.38 / 111	3.25 / 82	.93 / 24	.83 / 21
3 / 80	6.12 / 155	4.52 / 115	1.07 / 27	.91 / 23

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



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SF Series Self-Aligning Bulkhead Fittings

1", 2" AND 3" PVC

KEY FEATURES

- Available in PVC
- Enables Easy Piping Connections to Domed Tanks
- Swivel Ball Connection Corrects for Curved Tanks
- Enables Straight Pipe Connections up to 27° of Offset Angle
- PTFE Ball Seat
- FPM or EPDM Gasket

TECHNICAL INFORMATION

ALTERNATE VIEW



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	GASKETS	PRESSURE RATING
1" 2" and 3" (DN25, DN50 and DN80)	PVC	Thread x Thread	FPM or EPDM	75 PSI @ 70°F Non-Shock

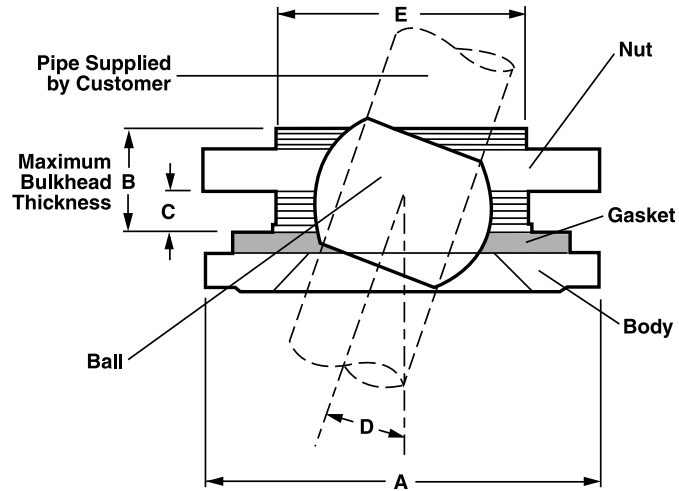
SF Series Self-Aligning Bulkhead Fittings

1", 2" AND 3" PVC

TECHNICAL INFORMATION, CONTINUED

MINIMUM INSIDE DIAMETERS OF TANKS FOR BULKHEAD FITTING INSTALLATION

SIZE in / DN	Min. Rigid Tank ID	Min. Flexible Tank ID
1 / 25	25.75"	19.38"
2 / 50	42.50"	36.25"
3 / 80	90.00"	76.81"

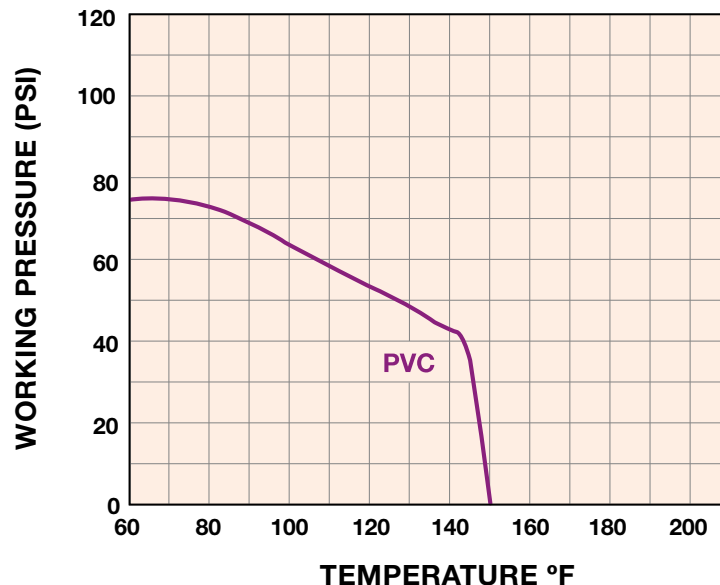


DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D angle	E in / mm	WEIGHT lbs / kg
1 / 25	4.38 / 111	2.00 / 51	1.25 / 32	27°	3.25 / 83	1.90 / .86
2 / 50	6.00 / 152	2.00 / 51	1.06 / 27	25°	4.50 / 114	4.80 / 2.18
3 / 80	8.75 / 222	2.50 / 64	1.25 / 32	20°	5.75 / 146	11.10 / 5.03

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



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AR Series Air Release Valves

3/4" PVC OR CPVC BODY WITH PP BALL



KEY FEATURES

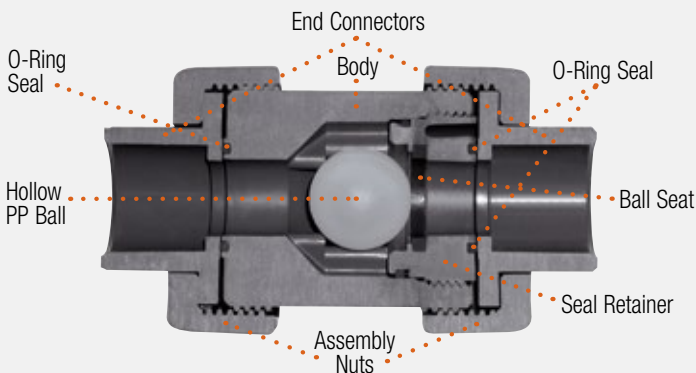
- PVC or CPVC Body with PP Ball
- Reliable Tank Air Venting
- Prevents Tank Overflow
- Hollow, Floating Ball Design
- Closes at 0 PSI
- FPM or EPDM Seals
- Standard Screen

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101

TECHNICAL INFORMATION

CUTAWAY OF AIR RELEASE VALVE



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
3/4" (DN20)	PVC/CPVC Body PP Ball	Socket and Threaded	FPM or EPDM	150 PSI @ 70°F Non-Shock

VENTING SPECIFICATIONS

One Air Release Valve will vent a tank with flows of up to 150 GPM (either in or out). For higher flow rates, use additional Air Release Valves.

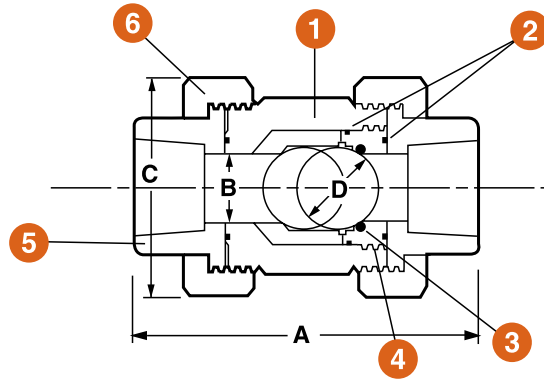
AR Series Air Release Valves

3/4" PVC BODY WITH PP BALL

TECHNICAL INFORMATION, CONTINUED

PARTS LIST

1. Body
2. O-Ring Seals
3. Square Cut O-Ring Seat
4. Seal Retainer
5. End Connector
6. Union Nut



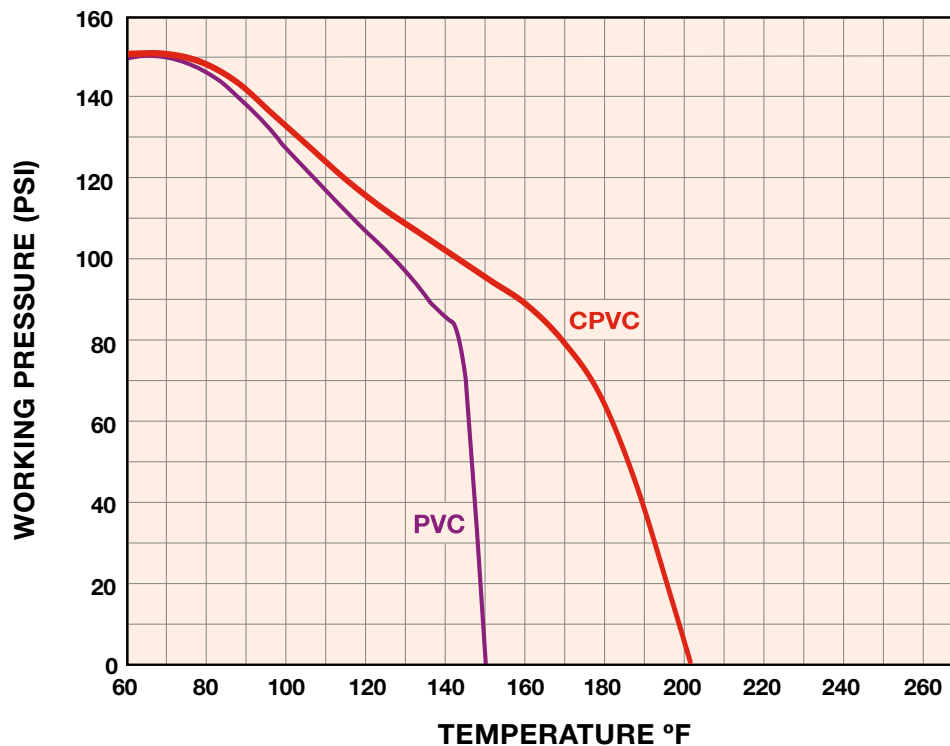
Screen installed

DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	F in / mm	G in / mm	WEIGHT lbs / kg SOC / THD
3/4 / 20	4.75 / 121	0.75 / 19	2.63 / 67	1.00 / 25	5.0 / 127	2.60 / 66	.75 / .34

Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE/PRESSURE



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VB Series Vacuum Breakers

3/4" PVC

KEY FEATURES

- PVC Body
- Reliable Venting of Tanks and Piping Systems
- Advanced Design for Fast Draining
- Easy Installation
- Compact
- No Metal Parts to Stick or Jam
- FPM Membrane
- Use with BFAS / BFA Series Bulkhead Fitting to Vent Tanks (Fits 1-1/2" Only)
- Can be Mounted in 3/4" Schedule 80 Pipe

MATERIALS

- PVC Cell Class 12454 per ASTM D1784

TECHNICAL INFORMATION

SELECTION CHART

SIZE	MATERIAL	SEALS	PRESSURE RATING
3/4" * (DN20)	PVC	FPM	150 PSI @ 70°F Non-Shock

* NPT Connection

EASY TO INSTALL ONTO TANKS

Just solvent-weld the vacuum breaker into the socket connection of a standard Hayward 1-1/2" bulkhead fitting. Then install the bulkhead fitting onto the tank. No extra piping is needed.

VB Series Vacuum Breakers

3/4" PVC

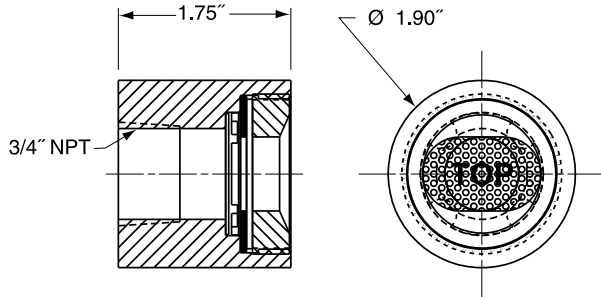
TECHNICAL INFORMATION, CONTINUED

SPECIFICATIONS

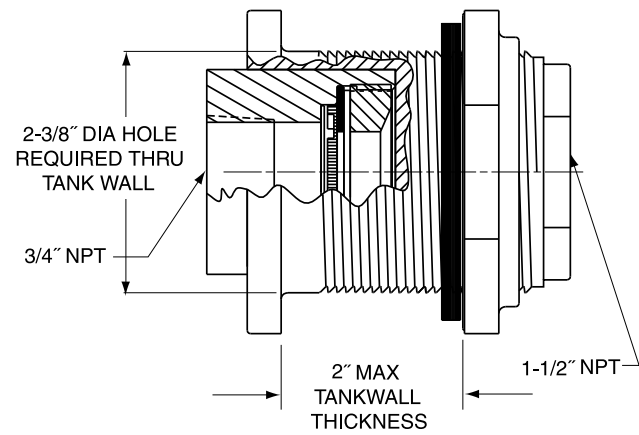
- Body Material:** PVC
- Membrane:** FPM
- Piping Connection:** 3/4" NPT
- Tank Connection:** Uses Bulkhead Fitting
- Maximum Pressure:** 150 PSI @ 70°F
- Operation:** Normally closed. Automatically opens when subjected to a vacuum and closes at positive pressures.
- Maximum Drain Rate:** 300 GPM



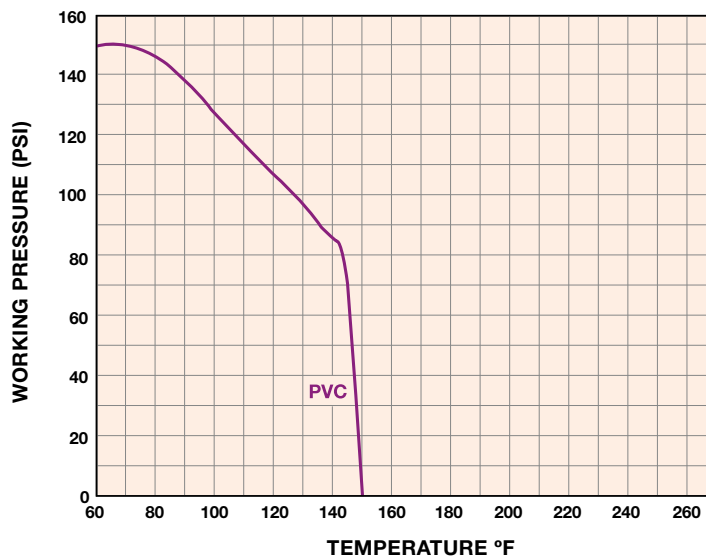
DIMENSIONS



VACUUM BREAKER INSTALLED IN BULKHEAD



OPERATING TEMPERATURE/PRESSURE



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BVX Series Ready Flanges

1" TO 4" PVC, CPVC AND GFPP

KEY FEATURES

- Ideal for conversion from socket to flange end
- Available in PVC, CPVC and GFPP
- One-Piece Construction
- Integral Molded Spigot End
- Eliminates the Need for an Extra Fabricated Joint – Preventing a Possible Leak Path
- Easily Converts Socket Valves to Flanged
- ANSI / AMSE Class 150 Bolt Pattern / 2" are ANSI / ASME 150 and PN10 Compatible

OPTIONS

- Threaded to Flanged

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- GFPP Cell Class 85580 per ASTM D4101

TECHNICAL INFORMATION

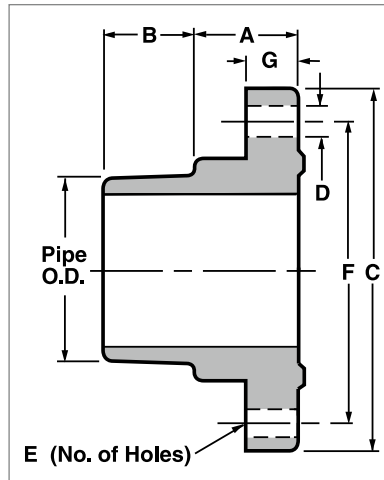
SELECTION CHART

SIZE	MATERIAL	END CONNECTION	PRESSURE RATING
1" – 4" (DN25 – DN100)	PVC and CPVC	Spigot x Flanged	150 PSI @ 70°F Non-Shock
	GFPP	Threaded x Flanged	

BVX Series Ready Flanges

1" TO 4" PVC, CPVC AND GFPP

TECHNICAL INFORMATION, CONTINUED

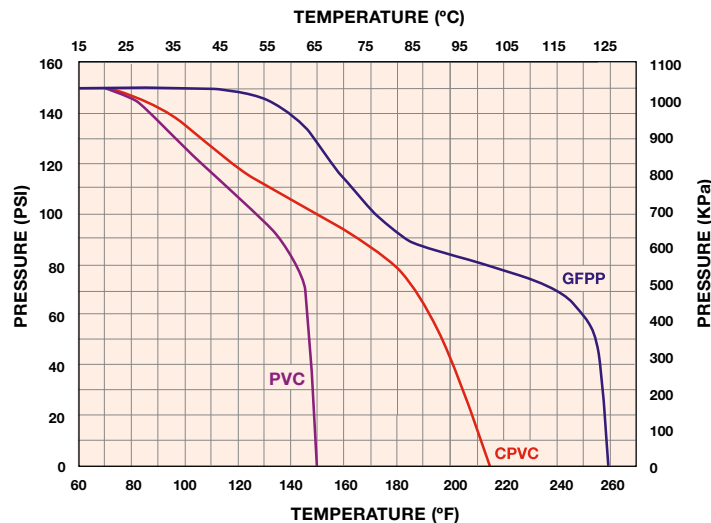


DIMENSIONS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	WEIGHT lbs / kg
1 / 25	1.25 / 32	1.19 / 30	4.50 / 114	.56 / 14	4.00 / 102	3.13 / 80	.56 / 14	.50 / .23
1-1/2 / 40	1.50 / 38	1.44 / 37	5.00 / 127	.56 / 14	4.00 / 102	3.88 / 99	.75 / 19	.75 / .34
2 / 50	1.65 / 42	1.54 / 39	6.00 / 152	.75 / 19	4.00 / 102	4.75 / 121	.75 / 19	1.25 / .57
3 / 80	1.98 / 50	1.84 / 47	7.50 / 191	.75 / 19	4.00 / 102	6.00 / 152	1.00 / 25	2.75 / 1.25
4 / 100	2.36 / 60	2.31 / 59	9.00 / 229	.75 / 19	8.00 / 203	7.50 / 191	1.13 / 29	4.50 / 2.04

Dimensions are subject to change without notice – consult factory for installation information

OPERATING PRESSURE/TEMPERATURE



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 Visit us at: haywardflowcontrol.com

Material Description

PVC (POLYVINYL CHLORIDE)

Type 1, Grade 1 PVC is the most frequently specified of all plastic valve materials. It has been successfully used for over 40 years in such areas as chemical processing, industrial plating, chilled water, deionized water lines, chemical drainage, DWV piping and irrigation systems. PVC is generally inert to most mineral acids, bases, salts and paraffinic hydrocarbon solutions. PVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters or ketones. PVC possesses excellent fire performance properties. In particular, it will not burn once the source of heat or flame is removed. PVC has excellent weatherability. The PVC used in Hayward products conforms to ASTM D1784 Cell Classification 12454. The maximum recommended working temperature of PVC is 140°F. PVC products can be installed using solvent cement, threaded or flanged end connections.

CPVC (CHLORINATED POLYVINYL CHLORIDE)

CPVC is generally inert to most mineral acids, bases, salts and paraffinic hydrocarbon solutions. CPVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters or ketones. The CPVC used in Hayward products conforms to ASTM D1784 Cell Classification 23447. The maximum working temperature for Hayward products made of CPVC is 190°F. It has been proven an excellent material for hot corrosive liquids and hot and cold water distribution. CPVC products can be installed using solvent cement, threaded or flanged end connections.

GFPP (GLASS FILLED POLYPROPYLENE)

GFPP is a material with generally high resistance to chemical attack. It has the highest long-term temperature resistance of any material furnished by Hayward. It has been used successfully for years in such areas as chemical processing, industrial plating, chilled water, deionized water lines and chemical drainage. GFPP is generally inert to most mineral acids, bases, salts and hydrocarbon solutions. The GFPP material used in Hayward products conforms to ASTM D4101. The maximum recommended working temperature of GFPP is 240°F. GFPP products can be installed using threaded or flanged end connections.

PP (POLYPROPYLENE)

PP is a member of the polyolefin family of pure hydrocarbon plastics. PP is superior for concentrated acetic acid or hydroxides. It is also very suitable for milder solutions of most acids, alkalis, salts and many organic chemicals, including solvents. However, PP is not compatible with strong oxidizers, such as the hypochlorites and higher concentrations of sulfuric, nitric and hydrofluoric acids. The PP used in Hayward products conforms to ASTM D4101. The maximum recommended working temperature of PP is 180°F. PP products can be installed using fusion weld, threaded or flanged joinery.

EASTAR®

Eastar is a clear polyester thermoplastic compound having excellent impact strength and high clarity. It is used in a variety of applications such as chemical processing process water applications.

PVDF (POLYVINYLIDENE FLUORIDE)

PVDF is a thermoplastic polymer with excellent corrosion, chemical and abrasion resistance. It has a good mechanical and thermal stability with a maximum operating temperature of 300°F. The material has a high impact resistance and excellent UV resistance. It is used in applications of high purity and chemical processing.

EPDM (ETHYLENE PROPYLENE DIENE MONOMER)

EPDM rubber is an elastomer prepared from ethylene and propylene compounds. It has been used continuously to a temperature of 300°F. The material is recommended for water, steam, dilute acids, dilute alkalis and alcohols. EPDM is not recommended for petroleum oils or diester lubricants.

FPM OR FKM (FLUOROCARBON RUBBER)

The fluorocarbon elastomers have a maximum service temperature of 400°F. Fluorocarbon materials are recommended for petroleum oils, diester base lubricants, silicate fluids and greases, halogenated hydrocarbons, acids and vacuum environments. Fluorocarbon materials are not recommended for ketones, amines, anhydrous ammonia, hot hydrofluoric or chlorosulfonic acids.

NITRILE OR BUNA-N

Nitrile, chemically, is a copolymer of butadiene and acrylonitrile. Nitrile maximum service temperature is 275°F. The material is recommended for petroleum oils and fluids, cold water, silicone greases and oils, diester base lubricants and ethylene glycol base fluids. Nitrile is not recommended for halogenated hydrocarbons, nitro hydrocarbons, phosphate ester hydraulic fluids, ketones, strong acids, ozone and automotive brake fluid.

PTFE (POLYTETRAFLUOROETHYLENE)

PTFE is chemically stable and virtually unaffected by chemicals, acids, bases and solvents. It has a maximum service temperature of 500°F. PTFE is used as a seat material in several lines of Hayward valves due to its low coefficient of friction and chemical stability.

ETFE (ETHYLENE TETRAFLUOROETHYLENE)

ETFE is a fluorocarbon based polymer. It has a very good resistance to solvents and chemicals as well as outdoor weathering. The material has a maximum service temperature of 300°F. It is widely used in the electronics, chemical processing and laboratory testing equipment industries.

Abbreviations

ANSI	American National Standards Institute	IAPMO	International Association of Plumbing and Mechanical Officials
ASME	American Society of Mechanical Engineers	I/P	Instrument Signal to Pressure
ASTM	American Society for Testing and Materials	ISO	International Standards Organization
AWWA	American Water Works Association	LED	Light Emitting Diode
BS	British Standards	NEMA	National Electrical Manufacturers Association
CPVC	Chlorinated Polyvinyl Chloride	NPT	American National Standard Taper Pipe Thread
CRN	Canadian Registration Number	NSF	National Sanitation Foundation
CSA	Canadian Standards Association	PP	Polypropylene
DIN	Deutsches Institute für Normung (German Institute for Standards)	PSI	Pounds per Square Inch
DPDT	Double Pole, Double Throw	PSIG	Pounds per Square Inch Gauge Pressure
EN	European Standards	PTFE	Polytetrafluoroethylene
EPDM	Ethylene Propylene Diene Monomer	PVC	Polyvinyl Chloride
ETFE	Ethylene Tetrafluoroethylene	PVDF	Polyvinylidene Fluoride
FM	Factory Mutual	SPDT	Single Pole, Double Throw
FPM	Fluoro Polymer	SPST	Single Pole Single Throw
GPM	Gallons per Minute	UL	Underwriters Laboratories, Inc.
GFPP	Glass Filled Polypropylene		



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Flow Coefficient Cv

Extensive experimentation has shown that, in general, for a given flow passage and completely turbulent flow, the relationship between fluid flow rate and pressure drop follows a power law.

$$\begin{aligned}\text{Variable: } \Delta P &= \text{Pressure drop across flow passage (PSI)} \\ Q &= \text{Volume flow rate of fluid through passage (GPM)} \\ C_v &= \text{Flow coefficient [GPM/PSI}^{1/2}\text{]}\end{aligned}$$

The flow coefficient C_v is the necessary proportionality constant, and it is typically determined experimentally. Usually, flow coefficient is expressed as the flow rate in GPM for a pressure drop of 1 PSI across a flow passage. By definition:

$$C_v = \sqrt{\frac{1}{\Delta P}}$$

A standardized test procedure for finding C_v factors is presented in ISA S75.02. A form of the equation is:

$$\Delta P = \left[\frac{Q}{C_v} \right]^2$$

EXAMPLES

EXAMPLE ONE

A Hayward® 1/2" True Union Ball Valve has an experimentally-determined C_v rating of 8 for water. It is required to flow 20 GPM of water through this valve. The anticipated pressure drop across this valve may be calculated as follows:

$$\Delta P = \left[\frac{20}{8} \right]^2 = 6.3 \text{ PSI}$$

EXAMPLE TWO

If a 0.5 PSI pressure drop has been allotted for a Hayward 4" True Union Ball Valve, the associated flow rate may be calculated by:

$$Q = C_v \sqrt{\Delta P}$$

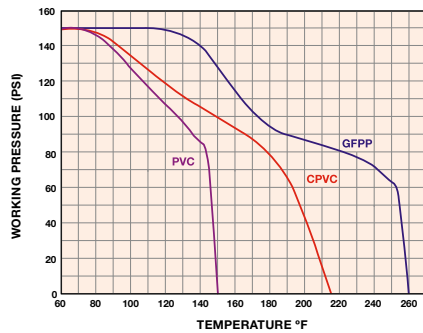
A Hayward 4" True Union Ball Valve has an experimentally-determined C_v rating of 600 for water. The approximate flow rate at a 0.5 PSI pressure drop is calculated by:

$$Q = 600 \sqrt{0.5} = 420 \text{ GPM}$$

How to Select a Bag Filter

1. CHECK THE TEMPERATURE AND PRESSURE RATING OF A VESSEL

To make sure that the temperature/pressure of the application falls within the OK range, see the chart below.



2. DETERMINE THE FLOW RATE

In GPM, of the system into which the bag filter is to be installed. Hayward® single and double length bag filters work with flows of up to 150 GPM. If the system's flow rate is greater, consider using two or more filters manifolded together in parallel. For example, if the system flow rate is 150 GPM or higher, using two manifolded filters would reduce the flow to a manageable 75 GPM through each. Constantly running the flow through the vessels at their maximum rating limit is not recommended.

3. SELECT THE BAG

Hayward bags are available from 1 to 800 microns. The bags are made from several types of materials and are either of a sewn or welded construction. All bags are sold in Carton Quantities. A single length bag has a surface area of 2.0 sq ft and a double length of 4.1 sq ft.

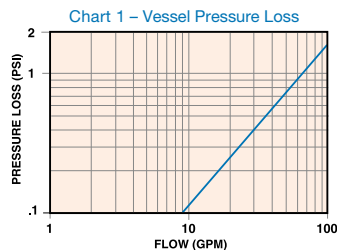
4. CONSIDER STARTUP PRESSURE LOSS

Bag filters are typically sized so that there is a 2 PSI or less pressure loss across them with a clean bag installed. Keep in mind that this is just a guide. The time between bag change outs for a double length filter is more than twice that of a single length filter in the same application.

5. CALCULATE STARTUP PRESSURE LOSS

To figure the total pressure loss across the filter with a clean bag requires making two pressure loss calculations and adding them together: The loss across the filter vessel without a bag and the bag loss.

First: Use the system flow rate and Chart 1 to determine the loss across the filter without a bag (single and double length filter vessels have virtually the same pressure loss without a bag).

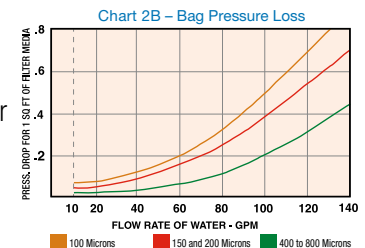
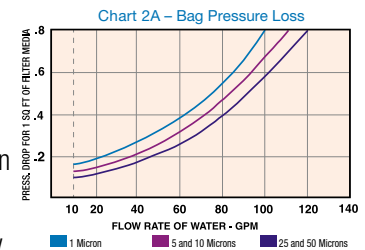


Example: A flow rate of 30 GPM results in a 0.4 PSI pressure loss. If the process media is water or has a viscosity less than 200 CPS, that's it. If the viscosity is greater, select the correction factor that matches the process media viscosity in CPS units from Table

Table 1 - Vessel Viscosity Correction

VISCOSITY IN CPS	200	400	600	800
CORRECTION FACTOR	1.10	1.20	1.40	1.50

Number One. Multiply the pressure drop by this factor. **Second:** Single and double length filter bags have different pressure losses. Use Chart 2A and 2B to determine the pressure loss per square foot of bag surface. Example: with a system flow rate of 30 GPM, a 5 or 10 micron bag would have a 0.2 PSI loss per square foot. This loss is divided by 2.0 for a single length bag or 4.1 for a double length bag. These factors are the respective surface areas of the bags in square feet. The loss for a single bag would be 0.1 PSI ($0.2 \div 2.0$) and 0.05 for a double length bag ($0.2 \div 4.1$). For fluids with viscosities other than water, select the correction factor from Table 2 and multiply the pressure drop by it. Example: If the fluid viscosity were 800 CPS, the pressure loss for a single length bag would be 5.0 (0.1×50.0).



Last: Add the pressure loss of the vessel and the bag together to get the pressure loss across the filter with the bag installed.

Table 2 - Bag Viscosity Correction

VISCOSITY IN CPS	Water 1	50	100	200	400	600	800
CORRECTION FACTOR	1.00	4.50	8.50	16.60	27.70	38.90	50.00

Pressure Drop Correction Factors for Various Size Basket Screens

PLASTIC		STAINLESS STEEL		STAINLESS STEEL	
PERFORATION	CORRECTION FACTOR	PERFORATION	CORRECTION FACTOR	MESH	CORRECTION FACTOR
1/32"	1.05	1/32"	0.82	20	0.79
1/16"	1.00	3/64"	0.63	40	1.01
1/8"	0.58	1/16"	0.74	60	1.20
3/16"	0.46	5/64"	0.50	80	1.16
		7/64"	0.51	100	1.20
		1/8"	0.58	200	1.09
		5/32"	0.37	325	1.22
		3/16"	0.46		
		1/4"	0.58		
		3/8"	0.45		
		1/2"	0.48		



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How to Select a Basket Strainer

SELECTION CRITERIA

The first consideration when selecting a Hayward basket strainer is the amount of free open area. This is the ratio of the open area through the strainer basket to the cross sectional area of the pipe. A well-designed basket strainer should have an open area ratio of at least 4 to 1. Anything less may cause excessive pressure drop. The area is calculated with a clean basket – and as the basket begins to clog, the ratio will drop. Unless there is a wide safety margin, the area through the basket may quickly become smaller than the pipe area. This will reduce flow through the strainer and necessitate very frequent cleaning. A small open area ratio also means the holding capacity of the basket is small (an important consideration if there is a lot of solid material to be removed.)

Second, is ease of basket removal. Since a basket strainer is used where cleaning may occur often, it stands to reason that the basket should be able to be removed and replaced as simply as possible. Hayward Simplex and Duplex strainers feature hand removable, threaded covers which can be quickly loosened or tightened by hand without the use of tools.

Another item to look for in selecting a strainer is compactness of design. Is the strainer unnecessarily bulky or tall? In many industrial areas, space is at a premium and the less room a strainer takes the better.

Lastly, a wide variety of basket perforation sizes should be available. This is necessary to cope with the great range of particle sizes which the strainer may be called upon to remove.

SELECTION AND SIZING

Selecting the proper size basket strainer for a particular application is extremely important for optimum performance of the strainer. Factors such as viscosity, specific gravity and mesh lining size all influence pressure drop of flow through the strainer. As a general rule of thumb, a pressure of greater than 2 PSI through a clean strainer usually indicates the strainer selected is too small for the intended application.

In some cases, the strainer size may not always be the same size as the pipe diameter. For example, the pressure drop of highly viscous liquids passing through a mesh basket can cut flow considerably making it necessary to use a strainer several times larger than pipeline to ensure adequate flow. Likewise, if an unusually large amount of material needs to be taken out of the process flows, a larger strainer or multiple strainer should be specified. By using two strainers in series, the first with large openings designed to catch larger particles and the second with a fine mesh lining to trap smaller material, the load is spread over two strainers and time between maintenance for cleaning is also extended.

PROPER BASKET SELECTION

The question of which perforation or mesh lining size to use comes up regularly. Here again, the basic rule is to use the coarsest size which will strain out the product to be removed. Using a finer mesh than needed will only result in premature clogging. When in doubt about which of two basket screens to use, it is best to choose the larger. As a rule of thumb, size the baskets for one half the particle size to be removed.

BASKET SIZES OFFERED FOR HAYWARD SIMPLEX AND DUPLEX PLASTIC BASKET STRAINERS

Comparitive Paricle Size

PERF	INCHES	MILLIMETERS	MICRONS	MESH	INCHES	MILLIMETERS	MICRONS
1/32	0.033	0.838	838	400	0.0015	0.0381	38
3/64	0.045	1.143	1143	300	0.0018	0.0457	45
1/16	0.070	1.778	1776	250	0.0024	0.0609	60
3/32	0.094	2.387	2387	200	0.0027	0.0686	68
1/8	0.125	3.175	3175	150	0.0041	0.1041	104
5/32	0.150	3.810	3810	100	0.0065	0.1651	165
3/16	0.1875	4.762	4762	80	0.007	0.1778	177
1/4	0.250	6.350	6350	60	0.009	0.2286	228
3/8	0.375	9.525	9525	40	0.015	0.3813	380
1/2	0.500	12.700	12700	20	0.034	0.8636	862

Note: To calculate pressure drop through vessels using other than 1/16" perforated baskets, first calculate the pressure drop using the listed Cv, and then multiply the result by the correction factor in the Correction Factors chart above. See page 102 for the applicable pressure drop calculation.

Flow of Water Through Schedule 80 Plastic Pipe

DISCHARGE		VELOCITY IN SCHEDULE 80 PLASTIC PIPE FOR WATER @ 60°F							
GALLONS / MINUTE	CUBIC FEET/SECOND	FEET/SECOND	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"
0.2	0.000446	—	0.824	—	—	—	—	—	—
0.3	0.000668	—	1.237	0.651	0.392	—	—	—	—
0.4	0.000891	—	1.646	0.867	0.529	—	—	—	—
0.5	0.00111	—	2.061	1.083	0.653	0.359	—	—	—
0.6	0.00134	—	2.476	1.303	0.782	0.431	—	—	—
0.8	0.00178	—	3.295	1.728	1.043	0.574	—	—	—
1	0.00223	—	4.122	2.167	1.311	0.718	0.435	—	—
2	0.00446	—	8.245	4.335	2.609	1.432	0.871	0.525	—
3	0.00668	—	12.381	6.502	3.919	2.161	1.306	0.788	0.538
4	0.00891	2"	16.502	8.671	5.218	2.876	1.747	1.051	0.717
5	0.01114	—	—	10.837	6.528	3.592	2.181	1.313	0.896
6	0.01337	0.65	2-1/2"	13.005	7.827	4.308	2.614	1.579	1.076
8	0.01782	0.86	—	—	10.448	5.741	3.482	2.105	1.434
10	0.02228	1.08	0.752	3"	13.057	7.185	4.351	2.632	1.798
15	0.03342	1.61	1.134	—	—	10.778	6.531	3.941	2.697
20	0.04456	2.15	1.505	0.986	—	—	8.712	5.252	3.596
25	0.0557	2.69	1.886	1.238	—	—	4"	10.881	6.574
30	0.06684	3.23	2.256	1.476	—	—	—	13.062	7.884
35	0.07798	3.78	2.638	1.726	—	0.973	15.232	9.193	6.282
40	0.08912	4.32	3.009	1.976	—	1.114	17.413	10.515	7.171
45	0.1003	4.84	3.391	2.215	—	1.247	—	11.838	8.069
50	0.1114	5.39	3.761	2.465	—	1.391	—	13.147	8.969
60	0.1337	6.47	4.513	2.953	—	1.665	—	15.779	10.778
70	0.156	7.55	5.266	3.453	—	1.942	—	—	12.577
80	0.1782	8.62	6.018	3.942	—	2.228	—	6"	14.36
90	0.2005	9.69	6.771	4.442	—	2.504	—	—	16.162
100	0.2228	10.77	7.523	4.931	—	2.781	—	1.225	17.96
125	0.2785	13.48	9.409	6.168	—	3.475	—	1.534	22.445
150	0.3342	16.18	11.284	7.395	—	4.171	—	1.893	—
175	0.3899	18.87	13.171	8.633	—	4.865	—	2.141	8"
200	0.4456	21.56	15.068	9.861	—	5.561	—	2.451	—
225	0.5013	—	16.943	11.098	—	6.255	—	2.759	1.577
250	0.557	—	—	12.325	—	6.951	—	3.069	1.752
275	0.6127	—	—	13.563	—	7.645	—	3.367	1.927
300	0.6684	—	—	14.768	—	8.341	—	3.675	2.102
325	0.7241	—	—	16.041	—	9.035	—	3.985	2.277
350	0.7798	—	—	—	—	9.731	—	4.294	2.453
375	0.8355	—	—	—	—	10.425	—	4.592	2.628
400	0.8912	—	—	—	—	11.121	—	4.901	2.803
425	0.9469	10"	—	—	—	11.815	—	5.211	2.989
450	1.003	—	—	—	—	12.511	—	5.519	3.164
475	1.059	2.199	—	—	—	13.205	—	5.817	3.329
500	1.114	2.229	—	—	—	13.901	—	6.126	3.515
550	1.225	2.459	—	—	—	15.279	—	6.744	3.865
600	1.337	2.679	12"	—	—	16.681	—	7.352	4.215
650	1.225	2.899	—	—	—	—	—	7.971	4.566
700	1.56	3.129	2.205	—	—	—	—	8.588	4.916
750	1.671	3.349	2.359	—	—	—	—	9.195	5.267
800	1.56	3.569	2.513	—	—	—	—	9.802	5.617
850	1.782	3.799	2.677	—	—	—	—	10.421	5.968
900	2.005	4.019	2.831	—	—	—	—	11.028	6.318
950	2.117	4.239	2.984	—	—	—	—	11.646	6.668
1000	2.228	4.469	3.149	—	—	—	—	12.253	7.019
1100	2.451	4.919	3.458	—	—	—	—	13.489	7.719
1200	2.674	5.359	3.775	—	—	—	—	14.715	8.431
1300	2.896	5.809	4.093	—	—	—	—	15.929	9.121
1400	3.119	6.259	4.401	—	—	—	—	17.165	9.833
1500	3.342	6.698	4.718	—	—	—	—	18.391	10.534
1600	3.565	7.148	5.037	—	—	—	—	19.611	11.235
1800	4.01	8.038	5.662	—	—	—	—	22.067	12.636
2000	4.456	8.938	6.228	—	—	—	—	24.517	14.038
2500	5.57	11.168	7.868	—	—	—	—	—	17.552
3000	6.684	13.396	9.437	—	—	—	—	—	21.068
3500	7.798	15.637	11.006	—	—	—	—	—	24.572
4000	8.912	17.866	12.587	—	—	—	—	—	28.08
4500	10.13	20.106	14.156	—	—	—	—	—	31.613
5000	11.14	—	—	—	—	—	—	—	—
6000	13.37	—	—	—	—	—	—	—	—
7000	15.6	—	—	—	—	—	—	—	—
8000	17.82	—	—	—	—	—	—	—	—
9000	20.05	—	—	—	—	—	—	—	—
10000	22.28	—	—	—	—	—	—	—	—
12000	26.74	—	—	—	—	—	—	—	—

The following wave surge constants may be used to quickly calculate pressure rise due to water hammer where: "C" = the wave surge constant from the table below multiplied by "V" the line velocity in feet per second. The resultant number is then added to the line pressure to determine the resulting wave surge (Water Hammer Effect).

Pipe Size	1/4"	1/2"	3/4"	1"	1-1/2"	2"	3"	4"	6"	8"	10"	12"
Constant	40	35	32	31	27	25	23	23	21	20	19	19

Maximum recommended fluid velocity is 8 feet per second (solenoid valves 5 feet per second)

Chemical Resistance Guide

The data in the following tables was compiled from public information. The information is based primarily on the immersion of unstressed strips of tested material in the chemicals at 70F / 23C. The user should be aware that actual service conditions will affect the chemical resistance. It should be noted in the following charts that the "A" rating does not mean or imply that material will perform. The chemical resistance table should be used for reference only. It is the ultimate responsibility of the end user to determine the compatibility of a selected product with the chemical being used in his or her particular application. Testing of products by the user in actual application conditions is recommended. Contact Hayward for information on Eastar® products.

CHEMICALS	CPVC	Pp	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Ultem® (GF 40%)	EPDM	FPM	Nitrile (Buena N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium
Acetal Benzene			A				A	X	X							
Acetal Oxide			A				B	X	C							
Acetaldehyde	X	B	A	X	X	C	B	X	X				A	A	A	
Acetaldehyde, Aq.	X	A	A	X	X	X	A	A	B	A	A	A	A	A	A	A
Acetamide		A	A				A	A	C	A	A		A	A		
Acetate Solv., Crude	X	X		X	X	A				A		A	A	B		
Acetate Solv., Pure	X	X	A	X	X	A	C	X	X	A		A	A	A		
Acetic Acid 10%	A	A	A	A	A	A	A	B	X	B			A	A	B	
Acetic Acid 20%	B	A	A	A	A	A	A	B	C	B			A	B	A	
Acetic Acid 30%	B		A	A	A		A	A	C	B						
Acetic Acid 5%	A		A	A			A	A	A	B						
Acetic Acid 50%	B	A	A	A	A	A	A	B	C	A			A	C		
Acetic Acid 60%	B	B	A	A	A	A	A	C	C				A	X		
Acetic Acid 80%	B	C	A	B	C	A	A	B	C	C			A	X		
Acetic Acid, Glacial	X	B	A	X	C	B	C	B	X	X			A	X	B	
Acetic Aldehyde			A				A	X	X							
Acetic Anhydride	C	B	A	X	X	B	C	X	C	A		AB	A	X	B	
Acetic Ester			A				B	X	X							
Acetic Ether			A				B	X	X							
Acetol			A													
Acetone	X	B	A	X	X	X	C	A	X	C	A		A	A	AB	A
Acetonitrile		B	A	X	X	A	C	A	C	C			A	A	AB	
Acetophenone	X	A	A	X		A	A	X	C			A	A	X		
Acetyl Acetone	X		A	X	X	X	A	X	X			A		AB		
Acetyl Bromide			A		A											
Acetyl Chloride	X	A	A	X	X	A	X	C	C			BC	AC	AB		
Acetyl Propane			A				B	X	X							
Acetylene Dichl.			A				A						X			
Acetylene Tetrachl.			A				X	A	X	A			A	A	A	
Acetylene	C	A	A	C	C	A	A	A	A	A			A	A	A	
Acid Mine Water	A	B	A	A	A	A		A								
Acrylic Acid	X		A	X	X	A							A			

CHEMICALS	CPVC	Pp	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Ultem® (GF 40%)	EPDM	FPM	Nitrile (Buena N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium
Acrylic Emulsions		X														
Acrylonitrile	X	B	A	X	X	A	X	X	C	AB	A	A	A	A	A	A
Adipic Acid, Aq.	A	A	A	A	A	A	A	A	A	A	AB	A	A	A	A	A
Air	A	A	A	A	A	A	A	A	A							
Alcohol	C		A				A	B	A	A	A	A	A	AC	AB	
Aldehyde			A				A	X	X							
Alkanes			A				X	A	A							
Alkazene			A				X	B	X							
Allyl Alcohol	X	A	A	X	C	A	A	B	A	A	A	A	A	A	A	
Allyl Aldehyde			A					A	B							
Allyl Bromide			A					B	X							
Allyl Chloride	X		B	X	X	A	X	B	X	A			AB		A	
Allyl Trichloride			A					A	X							
Alum	A	A	A	A	A	A	A	A	A	A	AB	AC	AB	X	A	
Aluminum Acetate	A		A				A	C	B	A	AC	A	AB	AC	A	
Aluminum Bromide			A				A	A	A							
Aluminum Chloride	A	A	A	A	A	A	A	A	A	A		X	X	X	AB	
Aluminum Fluoride	A		A	C	A		A	A	A	AB	A	X	C	X	A	
Aluminum Formate			A				X	X								
Aluminum Salts		A	A	A	A	A	A	A	A				X	X		
Aluminum Sulfate	A	A	A	A	A	A	A	A	A				B	X	A	
Amber Acid	A	A	A	A	A	A	A	A								
Amines	X		A	C	C	B		X	X	AB	A	A	A	A	AB	
Ammon. Metaphosph.	A	A	A	A	A	A	A	A	A							
Ammonia 10%	X	A	A	A	A		A	X					A	A	A	
Ammonia, Anhydrous	X	A	A	X	X	B	A	X	C	A	AB		A	A	AB	
Ammonia, Aq. 25%	A	A		A	A	A								B		
Ammonia, Dry Gas	A	A	A	A	A		A	X	A				A	A	A	
Ammonia, Liquid	X	A	A	X	X	A	C	A	X	B	A	A	AB	A	A	AB
Ammonia, Nitrate	B	A		B	C	A		A	A	B				A	A	
Ammonium Acetate	A	A	A	A	A		A	A	A	A	A		A			X
Ammonium Alum	X	A	A	X	C	A		A	A	B	A	BC	A	A	A	

A = Excellent, no effect • B = Good, minor effect • C = Fair, data not conclusive, testing recommended • X = Not recommended.
 Ratings are based on testing at an ambient temperature of 70°F. The chemical resistance table is for reference only. End users should test to determine application suitability.
 Butterfly valves, Solenoid valves, Diaphragm valves and all other valves with elastomers fully exposed to process media should derate elastomer scores by one level (i.e. "B" becomes "C", "C" becomes "X").

Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ulitren® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Ammonium Bichrom.			A				A		A							
Ammonium Bifluoride	A	A	A	A	A		A	A	B	A	B	X	X			X
Ammonium Bisulfide				A	A	A										
Ammonium Carbonate	A	A	A	A	A		A	A	C	AB	AB	AB	AB	B		A
Ammonium Casenite														A		
Ammonium Chloride	A	A	A	A	A		A	A	B	AB	A	X	AB	X		A
Ammonium Dichromate	A		A	A	A		A		A							
Ammonium Fluoride 20%	A	A	A	A	C	A		A								
Ammonium Fluoride	A		A	A					B	A			X			BC
Ammonium Hydroxide	X	A	A	A	A	X	A	B	B	A	X	AC	A	A		A
Ammonium Nitrate	B	A		B	A	A	A	A	AB	C	A	A	A	B		A
Ammonium Oxalate									A	A	A	A	A	A		
Ammonium Persulfate	A	C	A	A	A	A	B	C	C	B	X	AC	A	AC		A
Ammonium Ph. Di Basic	A	A	A	A	A		A	A	A	AB	AB	BC	A	AC		A
Ammonium Ph. Mono	A	A	A	A	A		A	A	A	B	C	A	A	A		A
Ammonium Ph.Tri.	A	A	A	A	A		A	A	A	AB	AB	A	AB	A		A
Ammonium Phosphate	A	A	A	A	A	A	A	A	A					A		
Ammonium Salts		A	A	A	A	A	A	C	A				X			
Ammonium Sulfate	A	A	A	A	A	A	A	C	B	A	AB	AB	A	B		A
Ammonium Sulfide	A	A	A	A	A	A	A	C	A	A		BC	A	C		
Ammonium Thiocyanate	A	A	A	A	A		A	A	A	A			A			
Ammonium Thiosulfate			A				A	A	A		AB	A	C			A
Ammonium, Fluoride 10%	A	A	A	A	C	A	A	A								
Ammonium, Fluoride 25%	A	A		X	X	A										
Amyl Acetate	X	X	A	X	X	C	A	X	C	A	A	AB	A	AB		A
Amyl Alcohol	B	A	A	C	C	A	A	A	A	A	AB	A	A	AB		
Amyl Borate			A		A		X	A	A							
Amyl Bromide			A				X	B	X							
Amyl Chloride	X	X	A	X	X	A	X	A	X	A	AB	A	AC	X		
Aniline Chlorohydrate				X	X											
Aniline Hydrochloride	X	A	A	X	X	A	B	B	C					X		
Aniline	X	A	A	X	X	C	B	B	X	A	B	AB	A	B		AC
Anthraquinone Sulf. Ac.	A	A		A	A	A		A								
Antichlor			A				A	A	A							
Anti-Freeze		A	A	A	A		C	A	A	A	A			A		
Antimony Chloride		A	A		A			A	X							
Antimony Pentachloride			A						X							
Antimony Trichloride	A	A	A	A	A		A	A	A	A	AB	X	A	X		AB
Aqua Regia	X	X	A	X		A	C	C	C	X	X	X	X	X		A

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ulitren® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Argon	X		A	X				A	A	C		A	A	A		
Arochlor													A	X	A	A
Aromatic Hydrocarbons	X			X	X			X	A	X				A		
Arsenic Acid	A	A	A	A	A	A		A	A	B	AB	A	AB	AB	B	AB
Arsenous Acid																
Aryl Sulfonic Acid	X	X		X	X											
Asphalt	X	A	A	X	X	A		X	A	B	A	A	A	A	AB	A
Aviation Fuel			A										A	A	A	A
Aviation Turbine Fuel			A										A	A	A	A
Baking Soda			A					A	A	A					A	
Barium Carbonate	A	A	A	A	A	A		A	A	A	B	AB	AB	B	AB	A
Barium Chloride	A	A	A	A	A	A		A	A	A	A	AB	A	AB	BC	A
Barium Cyanide									A	C	A		A	A	C	
Barium Hydrate			A					A	A	A	A	A	A	A	A	
Barium Hydroxide	A	A	A	A	A	A		A	A	A	B	A	AB	AB	AB	A
Barium Nitrate	A	A	A	A	A			A	A		X	AB	B	B	A	
Barium Salts		A	A	A	A	A		A	A	A				A		
Barium Sulfate	A	A	A	A	A	A		A	A	A	A	AB	AB	AB	C	AB
Barium Sulfide	A	A	A	A	A	A		A	A	A		A	A	AB	A	A
Beer	A	A	A	A	A	A		A	A	C	A	A	A	A	A	A
Beet Sugar Liquid	A	A	A	A	A			A	A	A				A	A	
Beet Sugar Liquor	A	A	A	A	A	A		A	A	A	A	A	A	A	B	A
Benzaldehyde	X	C		X	X	C		C	C	X	A	B	A	A	C	A
Benzalkonium Chl.				A												
Benzene Sulf Ac .	X	X	A	X	X	B		X	A	C	B	B	A	AB		AB
Benzene Sulf. Ac. 10%	X	X	A	X	X	B		A								
Benzene	X	C	A	X	X	B	C	X	B	C	AB	A	A	AB	A	A
Benzoic Acid	A	A	A	A	A	A		B	A	X				B	B	A
Benzyl Alcohol	X	A	A	X	X	A	X	C	A	X		A	C	AB	A	A
Benzyl Benzoate			A					C	A	X				C	AB	C
Benzyl Chloride	X	A	A					X	A	X	B			C	AB	C
Bismuth Carbonate	A	A	A	A	A	A		A	A	A						
Black Liquor	A	A	A	A	A	A		B	A	A	AC			A	A	AC
Borax	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A
Boric Acid	A	A	A	A	A	A		A	A	B	A	AC	B	B	BC	A
Brake Fluid			A				C	A	X	C	A	A	A	A	A	
Brewery Slop									A	A				A		
Brine Acid	A	A	A	A	A	A		A	A	A						
Brine	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A



CHEMICALS	CPVC	Pp	PITE	PVC	PVC-GF (Fiberc®)	PIVDF	Ultram® (GF 40%)	EPDM	FPM	Nitrile (Buena N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium
Bromic Acid	A	X	A	A	A	A	B	A		A			X			
Bromine Gas		X	A	C	C	A	X	A	X	A	X	X	X	X		A
Bromine Dry			A				X	A	X	A	A	X	X	X	AB	
Bromine Liquid, Br	X	X	A	X	X	A	X	A	X	A	A	X	X	X	X	
Bromine Water	C	C	A	X	X	A	X	A	C	A	X	X	X	X		A
Bromobenzene	X		A	X	X		X	A	C							
Bromotoluene	X	X		X	X											
Butadiene Gas	A	A	A	B	C	A	X	A	X	AC	A	A	A	A		
Butane	A	A	A	A	A	A	X	A	A	A	A	A	A	A		A
Butanediol	B			A	A	A	X	A								
Butter			A					A	A				A	A		
Buttermilk			A					A	A				A	A		
Butyl Acetate	X	C	A	X	X	B	C	B	X	C	A	A	A	A	A	A
Butyl Acrylate Pure	X	X	A	X	X	A		A	X							
Butyl Acrylate Satur.								A	X							
Butyl Alcohol (Butanol)	A	A	A	C	C	A		A	A	A	A	A	A	A	A	A
Butyl Amine	X	X	A	X	X	B		X	X	C	AB		A	A	AB	
Butyl Benzoate			A					A	A	X						
Butyl Bromide			A		A			B	X							
Butyl Butyrate			A					B	C	X						
Butyl Carbitol	X		A					A	A	C						
Butyl Cellosolve	X		A	A	A	A		B	X	C	A	A	C	A	AC	AB
Butyl Chloride			A		A			A	X	A	A	A	A	A		A
Butyl Diol	A	A	A	B	C	A		A	A							
Butyl Ether	X	X	A	X	X	A		X	X	B		A	A	A		
Butyl Formate			A						X							
Butyl Hydrate			A					B	A	A						
Butyl Hydride			A					X	A	A						
Butyl Hydroxide			A					B	A	A						
Butyl Mercaptan			A	X	X	A										
Butyl Phenol	A	A		C	C	A				A			A	A		
Butyl Phthalate	X	A	A	X	X	A		B	C	X	AB	AB	AB	AB	A	A
Butyl Stearate			A		A			B	A	B		C	A	AC		
Butylbenzene			A					A	X							
Butylene	A	X	A	A	A	A		X	A	B	A	A	A	A	A	A
Butyraldehyde			A					B	X	X	A					
Butyric Acid	B	A	A	X		A		B	B	X	A	A	AC	AB	X	A
Cadmium Cyanide	A			A	A			A								

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Cadmium Salts	A	A			A			A								
Caffeine Citrate			A	A	A											
Calamine			A									A	B			
Calcium Acetate	A	A	A	A	A	A		A	X	B		AB	C	AB	C	
Calcium Bisulfate	A	A	A	A	A	A		X	A	A			C	X	X	
Calcium Bisulfide	A	A	A	A	A	A		X	A	A	A			AB		A
Calcium Carbonate	A	A	A	A	A	A		A	A	A	B	AB	A	AB	A	AB
Calcium Chlorate	A	A	A	A	A	A		A	A	A	AB	AC	A	B	C	A
Calcium Chloride	A	A	A	A	A	A		A	A	A	A	AC	X	B	X	A
Calcium Cyanide			A					A	A							
Calcium Hydroxide	A	A	A	A	A	A	A	A	A	A	A	A	AB	AB	A	A
Calcium Hypochlorite			A					A	A	X						
Calcium Hypochlorite	A	B	A	A	A	A	A	A	A	B	A	X	X	AB	X	A
Calcium Nitrate	A	A	A	A	A	A		A	A	B	AB	A		AB		AB
Calcium Oxide	A	A	A	A	A	A		A	A	A	A	A	A	A		A
Calcium Phosphate			A					A	A	A	AB		C	AB	C	AB
Calcium Sulfate	A	A	A	A	A	A		A	A	A	AB	A		A	AB	A
Calcium Sulfide	A	A	A	A	A	A		A	A	A		AB	A	AB	BC	
Calcium Thiosulfate			A					A	A	B						
Calgon		C	A			A			A	A			A	A	A	
Cane Sugar Liquors	A	A	A	A	A	A		A	A	A		A	A	A	B	
Caprylic Acid			A			A					C					
Carbinol			A					A	X	A						
Carbolic Acid	A	A									C	A	B	A	A	AB
Carbon Bisulfide	X	X	A	X	X	A			A	X				C		
Carbon Dioxide	A	A	A	A	A	A		B	A	A	A	A	A	A	A	A
Carbon Disulfide	X	X	A	X	X	A		X	A	C	A	B	A	A	AC	AB
Carbon Monoxide	A	A	A	A	A	A		A	A	A	A	A	A	A		A
Carbon Tetrachloride	X	X	A	X	X	A	A	X	B	C	A	A	AB	AB	A	A
Carbonic Acid	A	A	A	A	A	A		A	A	B	A	A	AB	A	AC	AB
Casein			A			A		A	A	A						
Castor Oil	C	A	A	A	A	A		B	A	A	A	A	A	A	A	A
Catsup	A	A		A	A				A	A	A			A	A	
Caustic Lime																(See Calcium Hydroxide)
Caustic Potash																(See Potassium Hydroxide)
Caustic Soda																(See Sodium Hydroxide)
Cellosolve	X	A	A	B		A	C	B	C	C	A	A	C	C	AC	AB
Chloral Hydrate	A	A		A	A	A			A	C						

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 Ratings are based on testing at an ambient temperature of 70°F. The chemical resistance table is for reference only. End users should test to determine application suitability.
 Butterfly valves, Solenoid valves, Diaphragm valves and all other valves with elastomers fully exposed to process media should derate elastomer scores by one level (i.e. "B" becomes "C", "C" becomes "X").

Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Ultem® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastello® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Chloric Acid 20%	A	X		A	A	A										
Chloric Acid	A		A	A	A				X	AB	X	X	X	X		
Chlorinated Glue							B	A	C				A			
Chlorine Dioxide	A	C	A	A	A	A	X	A		A	X	X	X	X	AB	
Chlorine Gas, Dry	X	X	A	X	X	A	A	X	B	C	A	AB	B	BC	X	
Chlorine Gas, Wet	X	X	A	X	X	A	C	X	C	C	A	C	X	X	X	A
Chlorine Water	A	C	A	A	A	A	B	A	C	A	C	X	X	X	A	
Chlorine, Dry	X		A				B	C	X				A	X		
Chlorine, Liquid	X	X	C	X	X	A			C							
Chloroacetic Acid		X	A	A			B	X	X	A	B	X	X	X	A	
Chlorohydr. Alum			A													
Chlorosulfonic Acid	X	X	A	X	X	C	X	X	X	A	AC	X	X	X	A	
Chocolate Syrup		A						A	A	AB	AB	A	A	A		
Chresylic Acid 50%				A	B			A	X				A			
Chrome Alum	A	A		A	A			A	A							
Chrome Alum	A	A		A	A	A		A	A							
Chromic Acid 10%	A	B	A	A	A	A	A	B	A	X					A	
Chromic Acid 20%	A	X	A	B	C	A		B	B	C						A
Chromic Acid 30%	A	X	A	B	C	A			A	X						A
Chromic Acid 5%	A	X		A	A		A	A	A	X				A		A
Chromic Acid 50%	X	X	A	X	X	A	C	B	A	X				X		A
Chromium Alum	A	A	A	A	A	A		A	A							
Citric Acid	A	A	A	A	A	A	A	A	B	A	AB	AB	B	BC	A	
Citric Oils	X	A	A				B	A	A	A				A		
Cobalt Chloride			A				A	A	A							
Coconut Oil	A	A	A	A	A	A	B	A	A	A	BC		A	AC		
Cod Liver Oil			A				A	A	B	A	A	A	A	A		
Coffee	A	A					A	A	A	A	AC	A	A	A		A
Coke Oven Gas	A	A	A	X	X	A		A	A	X			A	A	A	
Cola Concentrates		A														
Copper Acetate	A	A	A	A	A	A	A	X	B	A	X	A	A	AB		
Copper Borofluoride	A	A	A	A	A	A		A	A							
Copper Carbonate	A	A	A	A	A	A		A	A	X	A	X	A	A	BC	A
Copper Chloride	A	A	A	A	A	A		A	A	A	X	X	X	BC	A	
Copper Cyanide	A	A	A	A	A	A		A	A	B	A	X	A	B	AB	A
Copper Fluoborate			A	A	A			A	B	B	C		X			
Copper Fluoride	A	A	A	A	A	A		A	A		C		A			
Copper Nitrate	A	A	A	A	A	A		A	A	A	X	AB	A	B	A	
Copper Salts	A	A	A	A	A	A		A	A	A						
Copper Sulfate 5%	A	A	A	A	A			A	A				A	B	A	
Copper Sulfate	A	A	A	A	A	A										
Corn Oil	A	A	A	A	A											
Corn Syrup	A	A	A	A	A	A		B	A	A				A		
Cottonseed Oil	A	A	A	A	A	A		B	A	B	A	A	AB	A	A	A
Cream	A	A						A	A					A		
Creosol	X	C	A	X	X	C		X	A	X			A	A		
Creosote	X		A	X	X		X	A	B	A	A	A	A	A	AB	A
Cresols	X	C	A	X	X	A		X	A	X	AB			A	A	AB
Cresylic Acid	C	A	A	C		A		X	A	X	A	A	A	A	A	A
Croton Aldehyde	X	A	A	X	X	C		B	A							
Crude Oil	A	A	A	A	A	A		X	A	X	A	AB	A	A	A	A
Cryolite	B	A	A	B		A		A	A	B						
Cupric Fluoride	A	A	A	A	A	A		A	A							
Cupric Nitrate			A					A	A	A						
Cupric Salts		A	A	A	A	A		A	A					X		
Cupric Sulfate	A	A	A	A	A	A		A	A	A						
Cutting Oil			A					X	A	A			A	A	A	
Cyanic Acid			A					A	A		B		A			
Cyclohexane	X	X	A	X	X	A	A	X	A	C	AB	A	AC	A	AC	A
Cyclohexanol	X	A	A	X	X	C		B	A	B	A		C	A	AC	
Cyclohexanone	X	B	A	X	X	C		C	X	C	A	BC	C	A	BC	
Decalin	X	A	A	X	X	A		X	A	X						
Decanal			A					X	X							
Decane			A			A		X	A	B						
Detergents	B	B	A	A	A	A		A	A	A	AB	A		A	A	A
Detergents, Heavy Duty	A	A		A	A	A										
Developers			A						A	A	AB	A	A	A	A	A
Dextrin	A	A	A	A	A	A		A	A				A	A		
Dextrose	A	A	A	A	A	A		A	A	A	A	A		A	A	A
Diacetone Alcohol	X	C	A	X	X	B		A	X	C	A	A	A	A	A	A
Diallyl Phthalate																
Diazo Salts	A	A		A	A	A										
Dibenzyl Ether			A			A		C					A	A	A	
Dibutyl Amine			A			A		X	C	C						
Dibutyl Ether			A			A		C	C	C			A	A	A	
Dibutyl Phthalate	X	B	A	X	X	A		A	B	X	AB			AB	A	
Dibutyl Sebacate			A	B		A		B	C							
Dichlorobenzene	X		A	X	X	A	X	X	B	X	A		A	A	A	
Dichloroethane			A	X	X		X	C			A	A	A	A	A	AB
Dichloroethylene	X	X	A	X	X	A		X	A	X	AB	A		BC		



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CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibergor™)	PVDF	Ultram® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium	CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibergor™)	PVDF	Ultram® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Dichloroisopropyl Ether					A												Epichlorohydrin	X	A	A	X	A		X	X		A	A	A	A			
Dichloromethane			A			X	X	B	X								Epsom Salt		A	A	A	A	A		A	A	A	A	A	A	AB	AB	A
Diemethyl Phthalate											A	AB	A				Esters	X	C	A	X	X	A										
Diesel Fuel	A	B	A	A	A	A	X	A	A	A	A	A	A	A	A		Ethane			A				X	A	A			A	A	A	A	
Diethanolamine											A	A	A	A	A		Ethanol	B	A	A	A	A	A	A	A	B	A			A	B	A	
Diethyl Cellosolve					A		X									Ethanolamine	X	X	A	X	X	X		A	X	B	AB	A	A	A	A	A	
Diethyl Ether	X	B	A	X	X	A	C	C	X	A	B	AB	A	AB	A	Ether Alcohol			A					A	B	C							
Diethyl Ketone			A				B	X	X							Ethers	X	C	A	X	X			C	C	X	A	A	A	A	A	A	
Diethyl Oxide			A				X	X	B							Ethyl Acetate	X	C	A	X	X	A	C	B	X	X	A	A	AB	A	A	A	
Diethylamine	X	A	A	X	X	C	B	X	B		BC	A	A	A	X	Ethyl Acetoacetate	X		A	X	X	A		A	X	X							
Diethylbenzene			A				X	A	X							Ethyl Acrylate	X	X	A	X	X	A	C	B	X	X	A	A	A	A	A	BC	
Diethylene Glycol	A	A	A			A		A	A	B	AB	A	A	A	A	Ethyl Alcohol	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	
Diethylenetriamine			A		A				B							Ethyl Benzene	X		A			A	X	A	X	A	A	A	A	A	A	A	
Diglycolic Acid	A	A	A	A	A		A	A								Ethyl Bromide		X										A	A	A			
Diisobutyl Ketone					A		X	X								Ethyl Chloride	X	X	A	X	X	A		A	A	B	B	AB	A	A	A	A	
Diisobutylene			A		A		X	A					A			Ethyl Ether	X	B	A	X	X	A	A	X	C	X	A	B	AB	AB	AB	A	
Diisooctyl Phthalate			A			A	B	B								Ethyl Formate			A					B	B	X		A	A	A			
Diisopropyl Ketone			A		B		B	X			C	A	A	A		Ethyl Hexanol			A			A	A	A	B								
Dimethyl Amine	X	A	A	X	X	B	C	X	B							Ethyl Sulfate			A					X	C	A	A	C	X	A			
Dimethyl Benzene			A				X	A	X							Ethylene Bromide	X	C	A	X	X	A		C	B	X	AB		AB	B	BC		
Dimethyl Ether			A				B	B	B	C	C	C	C	C	A	Ethylene Chloride	X	C	A	X	X	A		C	A	X	A	AB	A	A	A	AB	
Dimethyl Formamide	X	A	A	X	X	A	X	B	C	B	A	A		A		Ethylene Chlorohydrin	X	A	A	X	X	A		A	A	X	B		AB		BC		
Dimethyl Ketone			A				A	X	X							Ethylene Diamine	X	A	A	X	X	C	X	A	X	A	AC		A	A	A	A	
Dimethyl Phthalate			A			B	B	B	X	A			A			Ethylene Dichloride	X	C	A	X	X	A		X	A	X	A	AB	A	A	A	AB	
Dimethylamine	X	A		X	X	X	X	X								Ethylene Glycol	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Diocetyl Phthalate	X	X	A	X	X	A	B	A	X	A		A	A	A		Ethylene Oxide	X	X	A	X	X	A		X	X	X	A	A	A	AB	A		
Dioxane	X	B	A	X	X	X	X	B	X	X	X	A	A	AB		Extrin	A	A	A	A		A		A	A								
Dioxolane					X		X	X								Fatty Acids	B	A	A	A	A	A		X	A	B	A	A	A	A	B	A	
Diphenyl Ether											A			A		Ferric Acetate			A	B	B			X	X								
Diphenyl Oxide							X	A	X							Ferric Chl. Anhydrous	A	A	A	A	A	A		A	A	B			X	X	A		
Diphenyl			A				X	A	X	B	AB	B	B	A	A	Ferric Hydroxide	A	A	A	A	A			A	C								
Dipropylene Glycol			A					A	A							Ferric Nitrate	A	A	A	A	A	A		A	A	A	AB	X	A	B	B	A	
Disodium Phosphate	A	A	A	A	A	A	A		A	A			A			Ferric Sulfate	A	A		A	A	A		A	A	B	A	B	A	B	B	A	
Distilled Water	A	A		A	A	A										Ferrous Chloride	A	A	A	A	A	A		A	A	B	AB	X	X	X	X	A	
Divinylbenzene	X	X		X	X	X										Ferrous Nitrate	A	A	A	A	A	A		B	A	A							
Dolomite			A				B	A	A							Ferrous Sulfate	A	A	A	A	A	A		A	A	A	A	AB	A	C	B	A	
Dowtherm										A	A	A	A	A	A	Fish Solubles	A	B		A	A												
Dry Cleaning Solvents			A		X		X	A	A			A	A	A		Fluoboric Acid	A	A		A	A	A	B	A	A	B	A	A		B		X	

A = Excellent, no effect • B = Good, minor effect • C = Fair, data not conclusive, testing recommended • X = Not recommended.
 Ratings are based on testing at an ambient temperature of 70°F. The chemical resistance table is for reference only. End users should test to determine application suitability.
 Butterfly valves, Solenoid valves, Diaphragm valves and all other valves with elastomers fully exposed to process media should derate elastomer scores by one level (i.e. "B" becomes "C", "C" becomes "X").

Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Uitem® (GF-40%)	EPDM	FPM	Nitrile (Buena N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium	CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Uitem® (GF-40%)	EPDM	FPM	Nitrile (Buena N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium		
Fluorine Gas (Wet)	A	B	A	A	C	A	A	A	X	A	A						Green Liquor	A	A	A	A	A	A	A	A	B	A								
Fluorine Liquid		X	B	C	X	A	C	B	X				X		X		Helium			A					A	A	A			A					
Fluosilicic Acid 25%	A	A	A	A	A	A	A	A	A	B	A	X	B	C	X		Heptane	A	B	A	A	A	A	X	A	A	A	A	A	A					
Formaldehyde 35%	A	A	A	A	A	A	A	A							B		Hexane	A	B	A	X	X	A	A	X	A	A	A	A	A					
Formaldehyde 50%	A	A	A	A	A	A	X	B									Hexene			A				X	A	A									
Formaldehyde	A	A	A	X	B	A	A	B	B	B	B	A	A	B	A		Hexyl Alcohol	A	A	A	A	A	A	B	A	A	A	A	A	A					A
Formic Acid	A	A	A	A	A	A	B	A	X	C	A	AB	B	B	C		Honey	A	A	A	A	A	A		A	A	A			A					
Freon 11	A	A	A	X	X	A	X	B	B	A	A	A	A	A			Hydraulic Oil (Synth.)	X				C			A	C	A	A	A	A					
Freon 113	B	X	A	B	C	A	X	B	A	A	A	A	A	A			Hydraulic Oil			A			A	X	A	A	A	A	A						
Freon 114			A	A	A	A	C	A	A			A					Hydrazine	X	X	A	X	X	X	A	X	C			A	A					
Freon 12 (Wet)		A	A	B	C		B	A	A				X	A			Hydrobromic Acid 20%	A	A	A	A	A	A	A	A	X				X	X	A			
Freon 12	A	A	A	C	C	A	A	B	B	A	AB	A	A	A			Hydrobromic Acid 50%	A	B	A	A	A	A	A	A	X				X	C	X	X		
Freon 22	X	A	A	X	X	A	B	X	X			A	A	A			Hydrobromic Acid	A	B	A	A	A	A	A	A	X	A	X	X	X	X	A			
Freon TF	(See Freon 113)																Hydrochloric Acid 10%	A	A	A	A	A	A	A	A	A	B			X	X	C			
Fructose	A	A	A	A	A	A	A	A	A	A	A	A	A				Hydrochloric Acid 20%	A	A	A	A	A	A	A	A	A	B			X	X	X	C		
Fruit Juice	A	A	A	A	A	A		A	A	A	A	A	A				Hydrochloric Acid 25%	A	A	A	A	A	A	A	A	A	C			X		X			
Fruit Pulp	A	A		A	A	A		A									Hydrochloric Acid 37%	A	A	A	A	A	A	A	C	A	C			X	X	X	C		
Fuel Oil		B	A	B	C	A	X	A	A	A	A	A	A		A		Hydrochloric Acid	A		A	A		A	A			B	X	X	A					
Fumaric Acid			A					A	A			A					Hydrocyanic Acid 10%	A	A	A	A	A	A	A	A	A	B			X	X				
Furan			A				X	X		B							Hydrocyanic Acid	A	A	A	A	A	A	A	A	B	A	AB	A	A	B	A			
Furfural (Ant Oil)	X	C	A	X	X	B	B	X	X	AB	B	AB	A	A			Hydrofluoric Acid 10%	A	A	A	A	C	A	A	A	B			X	X					
Furfuryl Alcohol			A				C	X				A					Hydrofluoric Acid 20%	A	A	A	A	C		A	A	X			X	X	X	X			
Galic Acid	A	A	A	A	A	A	A	A	A	B	B	A	A	B			Hydrofluoric Acid 30%	A	A	A	A	C	A	A	A				X	X					
Gas, Natural	A	A		A	A	A	X	A	A	A	A						Hydrofluoric Acid 40%	C	A	A	B	C	A	A	A				X	X					
Gasoline, Leaded	X	X	A	A	A	A	X	B	A	A	A	A	A	A	X		Hydrofluoric Acid 50%	C	A	A	X	X	B	A	A	C			X	X	X				
Gasoline, Sour	B	X	A	A	A	A	X	A	A	A	X	A	A	A	X		Hydrofluoric Acid 65%	C		A				B	A	X			X	X					
Gasoline, Unleaded	X	X	A	C	C	A	A	X	B	A	A	A	A	A	X		Hydrofluoric Acid 75%	C	A	A	X	X	A	X	A	X	A	A	X	X	X				
Gelatin	A	A	A	A	A	A	A	A	A	A	A	A	A	A			Hydrofluosilicic Acid	A	A	A	A	A	A	A	A	A	B	A	X	X	X	A			
Gin	A	A	A	A	A	A	A	A									Hydrofluosilicic Acid 20%	A	A	A	A	A		A	A	B			X	X	X				
Glucose	A	A	A	A	A	A	A	A	A	A	A	A	A	A			Hydrogen Chl. Gas Dry	A				A					A	A	A	X					
Glue	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A		Hydrogen Cyanide	A	A	A	A	A	A	A	A	B	A	B	A		C				
Glycerine	A	A	A	A	A	A	A	A	A	A	A	A	A	A			Hydrogen Fluoride	X	A		X	X	A				B	AB	AB		C				
Glycerol	A	A	A	A	A	A	A	A	A				A				Hydrogen Peroxide 10%	A	A	A	A	A	A			A				C	B	C			
Glycolic Acid	A	A	A	A	A	A	A	A	A	A							Hydrogen Peroxide 30%	A	C	A	A	A	A	A	B	A	X			B	B	B			
Glycols	A	A	A	A	A	A	A	A	A		AB						Hydrogen Peroxide 5%	A	A	A	A	A	A	A	A					B					
Glyoxal								A									Hydrogen Peroxide 50%	A	A	A	B	C	A	C	A	X				C					
Gold Monocyanide								A	A				A				Hydrogen Peroxide 90%	X	X	A	X	C	A	C	B	X				X					
Grape Juice	A			A	A			A	A				A				Hydrogen Peroxide		A	A	A	A	A	B	A	C	A	AB	AB	B	B	B			
Grape Sugar	A	A	A	A	A	A	A	A	A								Hydrogen Phosphide	A	A		X	C	A			C									
Grease		A	A	A	A	A	X	A	B	A	A	A	A				Hydrogen Sulf. (Aq. Sol.)	A	A	A	A	A		A	C	C				A	C	A			

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ultram® (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium	CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ultram® (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium			
Hydrogen Sulfide (Dry)	A	A	A	A	A	A	A	A	A	A	B	C	A	C			Lime																			
Hydrogen Sulfide	A	A	A	A	A	A	A	A	A	A	BC	AB		C			(See Calcium Oxide)																			
Hydrogen	A	A	A	A	A	A	A	A	A	A	A	A	A	A			Linoleic Acid	A	A	A	B	C	A		X	B	B	A	A	A		A				
Hydroquinone	A	A	A	A	A	A	A	A	X	B	A	C					Linseed Oil	A	A	A	A	A	A		B	A	A	A	A	A		A				
Hydroxide Alum	A	A	A	A	C	A	A	C	A				A	A	A		Lithium Bromide			A	A	A	A			A	A	AB	AB							
Hydroxyacetic Acid 70%	A		A	A			A	A	A								Lithium Chloride	A				A					AB	A	A		X					
Hydroxyacetic Acid	A						A	A									LPG			A							A	A	A							
Hydroxylamine Sulfate	A	A		A	A	A	A										Lubricants		A	A	A	A				A	A					A	A	A		
Hypochlorous Acid	A	A	A	A	A	A	B	B	X	A		X	X				Lubricating Oil	A	A	A	A	A	A			A		A	A	A		A				
Ink		A			A				A	A	AC	A	A				Lye Solution											A	A	A						
Iodine Solution	A	C	A	X	X	A	A	A	C	A	A	B	X	X	A		Machine Oil	A	A	A	A	A	A			A										
Isobutyl Alcohol			A		A	A	A	A	B	A	A		A				Magnesium Acetate			A					X	X										
Isooctane	A	A	A	A	A	A	X	A	A	A	A	A					Magnesium Carbonate	A	A	A	A	A	A		B	A	A	AB	A	AB	A	A				
Isophorone	X		X	X		X	X		A								Magnesium Chloride	A	A	A	A	A	A		A	A	A	A	X	B	B	A				
Isopropyl Acetate			A				B	X	X	B	AB		B				Magnesium Citrate	A	A	A	A	A	A		A	A										
Isopropyl Alcohol	A	A	A	A	A	B	A	A	B	A	AB	AB	A		A		Magnesium Hydroxide	A	A	A	A	A	A		A	A		A	A	A						
Isopropyl Ether	X	C	A	X	X	A	X	X	B	A	A		A				Magnesium Nitrate	A	A	A	A	A	A		B	A	A	A	B	AB	A	A	A			
Jet Fuel JP-3		A	A				X	A	A	A	A	A	A				Magnesium Oxide	A		A					A	A	A	A	AB		A	B				
Jet Fuel JP-4	A	C	A	A	A	A	X	A	B	A	A	A	A	A			Magnesium Sulfate (Epsom Salts)	A	A	A	A	A	A		C	A	A	A	A	A	A	A	A	A		
Jet Fuel JP-5	A	C	A	A	A	A	X	A	A	A	A	A	A	A			Maleic Acid	A	A	A	A	A	A		C	A	X	A	AC	B	A	A	A			
Kerosene	A	A	A	A	A	A	X	A	A	A	A	A	A	A			Maleic Anhydride									A	X	A								
Ketones	X	A	A	X	X	A	C	X	X	A	A	A	A				Malic Acid	A	A	A	A	A	A		X	A	A	A	A	A	A	A	B	A		
Kraft Liquor	A	A		A	A	A											Manganese Sulfate	A	A	A	A	A			A	A	A	A	A							
Lacquer Thinner		B	A	C	C		A		X	A	A	A	A				Mash										A	A	A		A					
Lacquer		A	A				X	X	X	A	A	A	A				Mayonnaise		A	A						A	A	A	AC	A	A					
Lactic Acid	A	A	A	A	A	A	B	B	B	A	AB	A	A	C	B		Melamine									C				X						
Lard Oil	A	A	A	A	A	A	C	A									Mercuric Chloride	A	A	A	A	A	A		A	A	A	AB	X	X	X	X	A			
Lard	A	A	A	A	A	A	C	A	A	A	AC	A	A				Mercuric Cyanide	A	A	A	A	A	A		B	A	A	A	X	A	A	X	A			
Latex		A	A				B	A	B	A			A	A			Mercuric Nitrate	A		A					A	A	A				A					
Lauric Acid	A	A	A	A	A	A											Mercuric Sulfate	A	A	A	A	A	A		A	A	A									
Lauryl Chloride	A	A	A	A	A	A											Mercurous Nitrate	A	A	A	A	A	A		A	A				X	A					
Lead Acetate	A	A	A	A	A	A	A	C	B	AB	A	B	B	B	A		Mercury	A	A	A	A	A	A		A	A	A	A	B	A	A	A	B			
Lead Chloride	A	A	A	A	A	A	A	A									Methacrylic Ac. Glacial				X															
Lead Nitrate	A	A	A	A	A		A	A	A	B	B	C		B			Methane Sulfonic Ac.			A		A														
Lead Sulfate	A	A	A	A	A	A	A	A	A								Methane	A	A	A	A	A	A		C	A	A	A	A	A		A				
Lemon Oil	A	X	X	A	A	A					A						Methanol (Methyl Alcohol)	X	A	A	A	A	A		A	X	A	A	A	AB	A		A			
Ligroin	X	C		X	X	A	C	A	A	A	A	A	A				Methoxyethyl Oleate				A	A														
Lime - Sulfur Solution	A	A		A	A	A			X								Methyl Cellosolve	X	A		X	X	A		B	X	X	A	A	AC						
																	Methyl Acetate	X	B	A	X	X	A		B	X	X		AB	A	A					

A = Excellent, no effect • B = Good, minor effect • C = Fair, data not conclusive, testing recommended • X = Not recommended.
 Ratings are based on testing at an ambient temperature of 70°F. The chemical resistance table is for reference only. End users should test to determine application suitability.
 Butterfly valves, Solenoid valves, Diaphragm valves and all other valves with elastomers fully exposed to process media should derate elastomer scores by one level (i.e. "B" becomes "C", "C" becomes "X").

Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibercloc™)	PVDF	Ultram™ (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium
Methyl Acetone			A					X	X	AB	A	A				
Methyl Acrylate			A		A		B	X	X	AB	A	A				
Methyl Alcohol	X	A	A	A	A		A	X	A				A		A	
Methyl Benzene																
(See Toluene)																
Methyl Bromide	X	X	A	X	X	A	C	A	X	AB		A				
Methyl Butanol			A					B	A							
Methyl Butyl Ketone			A				B	X	X				A			
Methyl Chloride	X	X	A	X	X	A	C	C	C	A	A	A	A	B	A	
Methyl Chloroform	X	C	A	X	X	A	X	B		A	C					
Methyl Ether			A				C	C	B	C	C	C				
Methyl Ethyl Ketone	X	C	A	X	X	X	C	A	X	X	A	A	A	A		A
Methyl Formate	X						A	X		AB		A				
Methyl Isobutyl Alcohol									X							
Methyl Isopropyl Ketone	X	B	A	X	X	A	C	X	X			A	A			
Methyl Isobutyl Carbinol			A				A	A								
Methyl Isobutyl Ketone	X	C	A	X	X	A	B	X	X				A		A	
Methyl Methacrylate	X		A	A			C	X	X	X		C				
Methyl Propanol			A				B	A	A							
Methyl Salicylate	A	A		A	A	A										
Methyl Sulfate	A	A		B	C	A										
Methylamine	X	X	A	X	X	C	A		B				A			
Methylene Bromide				X	X	X										
Methylene Chloride	X	X	A	X	X	C	X	B	X	A	A	AC	A	B	A	
Methylene Iodine			A	X	X	C		A								
Methylhexane			A				X	A	A							
Methylisobutyl Carb.	A	A		A	A	A	A	A								
Methylmethacrylate			A		A		X	X								
Methylsulfuric Acid	A	A	A	A	A	A										
Milk	A	A	A	A	A	A	B	A	A	A	A	BC	A	A	A	
Mineral Oil	A	A	A	B	A	A	A	X	A	A	A	A	A	A		
Molasses	A	A	A	A	A		C	A	A	A	A	A	A	A		
Monochlorobenzene		B	A		A		X	A		A	A	AB				
Monochloroctic Acid	A	B	A	A	A	A	C	B		A	B			X		
Monoethanolamine	X		A	X	X	X	A	A	A	AB	A	A		A		
Morpholine			A							A				A		
Motor Oil	A	C	A	A	A	A	A	X	A	A	A	A				
Mustard	A	A		A	A			A	B	A	BC	A	A			
Naphtha	A	A	A	A	A	A	A	X	A	B	A	A	A	A	A	
Naphthalene	X	B	A	X	X	A	X	B	X	A	A	B	B	A	A	
Natural Gas	A	A		A	A	A	X	A	A	A	A	A				

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibercloc™)	PVDF	Ultram™ (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel® C	18-8 SS	316 SS	416 SS	Titanium
Neon			A					A	A	A		A				
Nickel Acetate	A	A	A	A	A	A	A	X	B		A	C				
Nickel Chloride	A	A	A	A	A	A	A	A	B	A	AB	AC	B	X	A	
Nickel Cyanide	A			A	A											
Nickel Nitrate	A	A	A	A	A	A	B	A	A	B	B	A		B		
Nickel Sulfate	A	A	A	A	A	A	A	A	A	AB	AB	A	C	B		
Nickel	A	A	A	A	A		A	A	A							
Nicotine Acid	A	A	A	A	A	A	A									
Nicotine	A	X	A	A	A	C										
Nitrate Alum	A	A	A	A	A	A	A	B	A							A
Nitric Acid 10%	A	A	A	A	A	A	A	B	A	X	B	X	A	A	B	A
Nitric Acid 20%	A	A	A	A	A	A	A	X	A	X	B	X	A		B	
Nitric Acid 30%	A	A	A	A	A	B	A	B	A	X	B	X	A		B	
Nitric Acid 40%	A	C		A	A	B	A	X	A	X	B	X	A		C	
Nitric Acid 50%	A	C		A	A	B	X	A	X	B	X	A		X		
Nitric Acid 70%	A	X		A	X	X	X	A	X	C	X	B	X	A		X
Nitric Acid Concentr.	A	X		A	X	X	X	X	C	X	B	X	A		C	
Nitric Acid Fuming	X	X		X	X	X										C
Nitrobenzene	X	C		A	X	X	A	C	C	C	C	A	AB	B	B	A
Nitroethane				A			A	X					A			
Nitrogen Dioxide				A			A									
Nitrogen				A				A	A	A	A	A	A		A	
Nitroglycerine				X				A			A	A	A			
Nitromethane				A			A	B			A	A				
Nitrous Oxide	A	A		A	A	A	A	A	A	A	A	X	C			
Ocenol	A	X		A	A	A										
Octane				A			A	X	A							
Octyl Acid				A			A				C					
Octyl Alcohol								A	B	A		A	A		A	
Octylamine				A				X	C							
Oils, Crude Sour	X															C
Oils	X	A		A	A	A										
Oils, Aniline		A	A	X	X		B	A	X				A		A	
Oils, Anise																A
Oils, Bay									A							A
Oils, Bone									A	A						A
Oils, Castor				A			B	A	A							A
Oils, Cinnamon				A					A							A
Oils, Citric		A							A	A						A
Oils, Clove		B								A						A



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CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ultem® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
	CPVC	PP	PTFE	PVC	PVC-GF (Fiberglass)	PVDF	Ultem® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Oils, Coconut	A						A	A	A				A			
Oils, Cod Liver	A						A	A	A				A			
Oils, Corn	X	A					C	A	A				A			
Oils, Cotton Seed	X	A	A	A			C	A	A				A			
Oils, Creosote	X			X			X	A	B				A			
Oils, Diesel Fuel	A			A			X	A	A				A			
Oils, Fuel		A	A	A			X	A	B				A		A	
Oils, Linseed	X	A		A	A		X	A	A				A			
Oils, Mineral	A		A	A			X	A	A	A	A	A	A	A		
Oils, Olive	X	A	A	A			B	A	A	A	A	A	A	A		
Oils, Pine	X	A	A	A			X	A	C	A	A	A	A			
Oils, Silicone	A			A			A	A					A			
Oils, Vegetable	X	A		A	A	A		A	A	A	A	A	A		A	
Oleic Acid	B	A	A	A	A	A	C	B	B	A	A	A	A	B		
Oleum	X	X	A	X	X	X	X	X	X				A			
Orange Extract		A	A		A											
Oxalic Acid	A	A	A	A	A	A	A	A	B	A	B	A	B	C	C	
Oxychloride Alum	A	A		A	A	A		X								
Oxygen Gas	A	A	A	A	A	A	A	A	C	A	A	A				
Ozone	B	C		B	B	A		A	A	X	A	A	A			
Palmitic Acid 10%	A	A	A	A	A	A	B	A	A							
Palmitic Acid 70%	A	A	A	X			B	A	A							
Paraffin	A	A	A	A	A	A	X	B	A	A	A	A	A	A		
Pentane			A				X	A	A	A	A	A	C			
Peracetic Acid 40%	X	X	A	X	X	A	B	A								
Perchloric Acid 10%	A	A	A	A	A	A	B	A	X					B		
Perchloric Acid 70%	X	A	A	X	X	A	X	A	A	X				X		
Perchloroethylene	X	C	A	X	X	A	X	A	X	A	A	AB	A			
Perphosphate	A	A	A	A	A		A	A								
Petrolatum	A	A	A	A	A	A	C	A	A	A	A	A	A			
Petroleum (Sour)				A	A		X	A	A						C	
Petroleum Oils	A	B	A	A	A	A	X	A	A					A		
Phenols 100%	A	A	A	X	X	A	X	C	B	X	A	B	A	A		C
Phenylacetate		A					B	X	X							
Phenylhydrazine Hydrochl	A	X		X	X	A										
Phenylhydrazine	X	X	A	X	X	A	C	C	X							
Phosgene Gas	X	C		X	X	A	A	X	X							
Phosgene Liquid	X	X		X	X	C	A	X	X							
Phosphate Alum				A				A	A	A						
Phosphoric Acid 10%	A	A	A	A	A	A	A	A	C	A		A	A	B		
Phosphoric Acid 100%	A	A	A	A	A			B	A	X	A		A	B	B	
Phosphoric Acid 20%	A	A	A	A	A	A	A	A	A	C	A		A			
Phosphoric Acid 40%	A	A	A	A	A	A	A	B	A	X	A		A	A	A	
Phosphoric Acid 50%	A	A	A	A	A	A	A	A	A	C	A		A	B	B	
Phosphoric Acid 80%	A	A	A	A	A	A	A	A	A		AB					
Phosphoric Acid 85%	A	A	A	A	A	B	A	A	A	C	A		AB	B	C	
Phosphoric Acid Crude			A					B	A	C				C	C	
Phosphorous Oxychloride			A									X				
Phosphorous Red	A	A	A	A	A	A										
Phosphorous Trichloride	X	C	A	X	X	A		C	C	X	A	A	A	A		
Phosphorous Yellow	A	A	A	A	A	A										
Photographic Developer	A	A		A	A	A		A	A	A	A	C	A	A		
Photographic Solutions	A	A		A	A	A		A	A	AB	AC	C				
Phthalic Acid	X	X	A	X	X	A		A	A	A	X	C		B		
Phthalic Anhydride	X	X	A	X	X			A	A	C	A	A	B	B	A	
Pickle Brine	A	A		A	A	A										
Pickling Solutions	A	A	A	A	A	A		C	B	X						
Picric Acid	C	A	A	X	X	A		C	A	B	B	X	AB	A	B	
Plating Solutions, Antimony	A	A	A	A	A			A	A	A	A		A	A		
Plating Solutions, Arsenic	A	A		A	A			A	A	A			A	A		
Plating Solutions, Brass	A	A	A	A	A	A		A	A	A	A		A	A		
Plating Solutions, Bronze	A	A	A	A	A			A	A	A			A	A		
Plating Solutions, Cadmium	A	C	A	A	A	A		A	A	A	A		A	A		
Plating Solutions, Chrome	A	C	A	A	A	A		B	C	X	X	C		C	A	A
Plating Solutions, Copper	A	A	A	A	A	A		A	A	A	A			X	A	
Plating Solutions, Gold	A	C	A	A	A	A		A	A	A	A			C	A	
Plating Solutions, Iron	A	C	A	X	X			A	A	A				C	A	
Plating Solutions, Lead	A	A	A	A	A	A		A	A	B	A	A		C	X	
Plating Solutions, Indium	A	A	A	A	A			A	A					C	A	
Plating Solutions, Nickel	A	A	A	A	A	A		A	A	A	A			C	A	
Plating Solutions, Rhodium	A	A	A	A	A	A		A	A	A				X	X	
Plating Solutions, Silver	A	A	A	A	A	A		A	A	A	A			A	A	
Plating Solutions, Tin	A	A	A	A	A	A		A	A	B	A	A		C	X	
Plating Solutions, Zinc	A	A	A	A	A	A		A	A	A	A			X	A	
Polyethylene Glycol	A	A	A	A	A	A		A	A	A						
Polyvinyl Acetate Emul			A			A		A	A							

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 Butterfly valves, Solenoid valves, Diaphragm valves and all other valves with elastomers fully exposed to process media should derate elastomer scores by one level (i.e. "B" becomes "C", "C" becomes "X").

Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibergl SM)	PVDF	Ultr SM (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy SM C	Monel SM C	18-8 SS	316 SS	416 SS	Titanium
Polyvinyl Alcohol	X	A	A	A	A	A	A	A								
Potash	A	A	A	A	A	A	B	C	C				A			
Potassium Acetate	A	A	A	A	A	A	A	X	B		A	C				
Potassium Alum	A	A	A	A	A	A	A	A	A					X		
Potassium Bichromate	A	A	A	A	A	A	A	A	A	AC	AB		B			
Potassium Bisulfate	A	A	A	A	A	A	A	A	A							
Potassium Bromate	A	A	A	A	A	A	A	A	A							
Potassium Bromide	A	A	A	A	A	A	A	A	A	A	AC	B	B	A		
Potassium Carbonate	A	A	A	A	A	A	A	A	B	AB	A	AB	A	B	A	
Potassium Chlorate	A	A	A	A	A	A	A	A	A	AC	AB	A	B	A		
Potassium Chloride	A	A	A	A	A	A	A	A	A	AB	C	A	B	A		
Potassium Chromate	A	A	A	A	A	A	A	A	A	A	C	B	B			
Potassium Coppercyanide	A	A	A	A	A	A	A	A								
Potassium Cyanide	A	A	A	A	A	A	A	B	A	B	B	AC	B	B	A	
Potassium Dichromate	A	A	A	A	A	A	A	A	A				A	B	A	
Potassium Ferricyanide	A	A	A	A	A	A	A	A	A	BC	AC		A			
Potassium Ferrocyanide	A	A	A	A	A	A	A	A	C	B	AC	B		A		
Potassium Fluoride	A	A	A	A	A	A	A	A		A						
Potassium Hydroxide 25%	A			A						A	A	A				
Potassium Hydroxide 50%	A	A		A	A	B				A	A	A				
Potassium Hydroxide	A	A	A	A	A	A	B	C	C	AB	A	A	C	B	C	
Potassium Hypochlorite	A	A	A	A	A	A	A	A	X	B	X	X		X		
Potassium Iodide	A	A	A	A	A	A	A	A	A	AB	A		A			
Potassium Nitrate	A	A	A	A	A	A	A	B	A	AB		A	B	B	A	
Potassium Perborate	A	A	A	A	A	A										
Potassium Perchlorate	A	A	A	A	A	A	A									
Potassium Permanganate	A	B	A	A	A	A	A	B	C	B	AC	AC	B	B	B	
Potassium Persulfate	A	A	A	A	A	A	A			A	X					
Potassium Phosphate	A									A						
Potassium Salts		A	A		A	A	A	A								
Potassium Sulfate	A	A	A	A	A	A	A	A	A	A	AB	B	B	A		
Potassium Sulfide	A		A	A	A		A	A	A	AB		A		B		
Potassium Thiosulfate		A					A	A								
Potassium Bicarbonate	A	A	A	A	A	A	A	A	A				B	B	A	
Propane	A	B	A	A	A	A	X	A	A	A	A	A	A	A		
Propargyl Alcohol	A	A		A	A	A										
Propyl Acetate			A		A		B	X	X		A					
Propyl Alcohol (Propanol)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Propylene Dichloride	X	C	A	X	X	A	X	B	X		A	C				
Propylene Glycol	C		A			A	A	A	A	B	B	AB	A			

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fibergl SM)	PVDF	Ultr SM (GF 40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy SM C	Monel SM C	18-8 SS	316 SS	416 SS	Titanium
Propylene			A				X	A	X			A				
Pyridine	X	C	B	X	X	C	X	C	X	X	A	A	B	C	B	
Pyrogalllic Acid			A	B	C	X			A	A	AB	AB	AB	A	B	
Rayon Coagulating Bath	A	A		A	A	A										
Rhodan Salts	A	A	A	A	A	A	A	A								
Rosins		A	A						A	A				A	B	
Rum		A	A	A	A			A	B	A						
Rust Inhibitors		A							A	A				A		
Salad Dressings		A		A	A				A	A				A		
Salicylaldehyde			A	X	X	C	X	A	A							
Salicylic Acid			A	A	A	A	A	A	C	A	AB	A		B		
Saline Solutions	A	A		A	A	A										
Salt Brine	A	A	A	A	A	A	A	A	A	A	A					
Sea Water	A	A	A	A	A	A	A	A	A	A	B	AB	C	C	A	
Selenic Acid	A	A		A	A	A										
Sewage	A	A	A	A	A	A	A	A	A	A	A	A				
Shellac Orange		A	A							A						
Shellac Bleached		A	A							A				A	A	
Silicic Acid	A	A	A	A	A	A	A	A								
Silicone Oil	A	A	A	A	A		A	A	A	A	A	A	A	A		
Silver Bromide											A	B	X	C	X	
Silver Cyanide	A	A	A	A	A	A	A	A	A	A	AB	A		A		
Silver Nitrate	A	A	A	A	A	A	C	A	C	AB	X	B	B	B	A	
Silver Salts		A	A	A	A	A	A	A						A		
Silver Sulfate	A	A	A	A	A	A	A	A	C						A	
Soap Solutions	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Soda Ash			A				A	A	A							
Sodium Acetate	A	A	A	A	A	A	A	C	C	A	A	AB	B	B	A	
Sodium Aluminate	A	A	A	A	A	A	A	A	A	AB	AB	AB	A	C	B	
Sodium Benzoate	A	A	A	A	A	A				A	AB					
Sodium Bicarbonate	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Bichromate	A	A	A	A	A	A	A	A		B		AC		B		
Sodium Bisulfate	A	A	A	A	A	A	A	A	B	B	AB	X	A	A	A	
Sodium Bisulfite	A	A	A	A	A	A	A	A	A	B	B	C	A	C	A	
Sodium Borate	A	A	A	C	C	A	A	A	A	AB	A			A		
Sodium Bromide	A	A	A	A	A	A	A	A		AB	AC	A		C		
Sodium Carbonate	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Sodium Chlorate	A	A	A	A	A	A	A	A	C	A	X	BC	B	B	A	
Sodium Chloride	A	A	A	A	A	A	A	A	A	A	A	A	C	B	A	
Sodium Chlorite	X	X	B	X	X		X	X								



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Sodium Chromate	A	A	A					B	A	A	AB	AC	A	B			Sorghum									A	A								
Sodium Cyanide	A	A	A	A	A	A		A	A	A	X	A	A	A	A		Soy Sauce									A	A								
Sodium Dichromate	A	A	A	A	A	A		A	A								Soybean Oil	A	A	A	A	A	A		A	A	A	AB	A						
Sodium Ferricyanide	A	A	A	A	A	A		A	A	A	AC	C		B			Stannic Chloride	A	A	A	A	A	A		A	A	A	AB	X	X	A	X	A		
Sodium Ferrocyanide	A	A	A	A	A	A		A	A	A	A						Stannic Salts		A	A	A	A	A		A	A									
Sodium Fluoride	A	A	A	A	A	A		A	B	C	A	A	B		C	A	Stannous Chloride	A	A	A	A	A	A		B	B	C	B	C	X	C	C	A		
Sodium Hydrosulfide											A	A					Starch	A	A	A	A	A			A	A	A	A	AB	A					
Sodium Hydrosulfite			A	C				A		A	A						Stearic Acid	A	B	A	A	A	A		C	A	B	A	A	A	B	B	A		
Sodium Hydroxide 15%	A	A	A	A	A	A	A	A	C	A	A			B	B	A	Stoddard Solvent	X	C	A	X	X	A		X	A	B	A	A	A	A		A		
Sodium Hydroxide 20%	A	A	A	A	A	A		A	C	A	A			B	B	A	Styrene			A				X	C	X		AC	A	A					
Sodium Hydroxide 30%	A	A	A	A	A	A		A	C		A			B	B		Succinic Acid	A	A	A	A	A	A		A	A	A	AC	B						
Sodium Hydroxide 50%	A	A	A	A	A	A		A	C	X	A			B	C	A	Sugar Solutions	A	A	A					A	A				A	A				
Sodium Hydroxide 70%	A	B	A	A	A	B		A	X	X	A			X	A		Sulfamic Acid	X	X		X	X	X				B								
Sodium Hydroxide Conc	A	A	A	A	A	A		A	B	X	A	AB	A		C		Sulfate Liquors	A	A		A	A	A		A	A	A	A	B	X	C	A			
Sodium Hypochlorite 20%	A	C	A	A	A	A		X	A	C	A			C	A		Sulfated Detergents	A	A		A	A	A												
Sodium Hypochlorite 5% (Bleach)	A	C	A	A	A	A	A	B	A	X	AB	X	X	B	X	AC	Sulfite Liquor	A	A	A	A	A	A		A	A	B	A	C	C		X			
Sodium Hypochlorite	A	C	A	A	A	A	A	X	X	X	AB	X	X		X		Sulfur 10%	A	A	A	A	A			X	A	C	A		A	C		A		
Sodium Hyposulfate			A											A			Sulfur Chloride	A	C	A	A	A	A		X	A	X	A	C	X	X	C			
Sodium Metaphosphate	A	C	A	A	A	A		A	A	A		A	A	A			Sulfur Dioxide Dry	A	A	A	A	A	A		A	A	X	B		A	B	B			
Sodium Metasilicate	A	A	A	A	A	A		A	A	A	A	A	A	A	A		Sulfur Dioxide Wet	A	A	A	X	X	A		A	A	X	AC	X	A		B			
Sodium Nitrate	A	A	A	A	A	A		A	B	C	AB	B	A	B	B	A	Sulfur Dioxide		X	A	X	C			A	C	X			A		A			
Sodium Nitrite	A	A	A	A	A	A		A	A		AC	BC	A	B			Sulfur Slurries	A	A		A	A	A												
Sodium Palmitrate	A	A	A	A	A	A											Sulfur Trioxide Dry	C	X	B	C	C	X		C	C	C		AB	A	C	B			
Sodium Perborate	A	A	A	A	A	A		A	A	C	A	A	AB	C	B		Sulfur	A	X	A	A	A	A		C	A	C	A		BC		A			
Sodium Perchlorate	A	A	A	A	A	A					B	A					Sulfuric Acid 10%	A	A	A	A	A	A	A	B	A	C				C	X	A		
Sodium Peroxide	A	A	A	A	A	A		B	A	C	AB	AC	A	A	A		Sulfuric Acid 100%	A	X	B	X	X	C		X	C	X				C	C	X		
Sodium Phosphate Acid	A	A	A	A	A	A		A	A	A	A	A	B				Sulfuric Acid 30%	A	A	A	A	A	A		A	A	C				X	X	C		
Sodium Phosphate Alkaline	A	A	A	A	A	A		A	A	A	A	A	A				Sulfuric Acid 50%	A	A	A	A	A	A		B	A	C				X	X	C		
Sodium Phosphate Neutral	A	A	A	A	A	A		A	A	A	A	AB	AC				Sulfuric Acid 60%	A	A	A	A	A	B		B	A	X				X	X	C		
Sodium Polyphosphate			A					A	A	B				A	A		Sulfuric Acid 70%	A	C	A	A	A	A		A	A	C				X	X	C		
Sodium Silicate	A	A		A	A	A		A	A	A	A	A	AB	B	B	A	Sulfuric Acid 80%	A	A	A	X	X	A		A	A	C				X	X	X		
Sodium Sulfate	A	A	A	A	A	A		A	A	A	A	A	A	B	B	A	Sulfuric Acid 90%	A	C	A	X	X	A		A	A	C				X	X	X		
Sodium Sulfide	A	A	A	A	A	A		A	A	C	A	AB	AC	B	X	A	Sulfuric Acid 95%	A	X	A	X	X	A	X	X	A	X				X	X	X		
Sodium Sulfite	A	A	A	A	A	A		A	A	A	A	B	A	C	B	A	Sulfuric Acid 98%	A	X	B	X	X	A		X	X					X	X			
Sodium Tetraborate				A				A	A	A	AB	A	A	A			Sulfurous Acid	A	A	A	A	A	A		C	A	X	B	X	BC	B	C	A		
Sodium Thiocyanate	A	A	A	A	A	A		A	A								Sulfuryl Chloride			A	A														
Sodium Thiosulfate	A	A	A	A	A	A		A	A	B	A	AB	A	A	A		Syrup		A	A	A	A			A	A				A					
Sodium	A	A	A	A	A	A		A	A								Tall Oil	A	A	A	A	A	A		X	A	A	A	A	C		X			

A = Excellent, no effect • B = Good, minor effect • C = Fair, data not conclusive, testing recommended • X = Not recommended.

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Chemical Resistance Guide, CONTINUED

CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Ultem® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium	CHEMICALS	CPVC	PP	PTFE	PVC	PVC-GF (Fiberc®)	PVDF	Ultem® (GF-40%)	EPDM	FPM	Nitrile (Buna N)	Hastelloy® C	Monel®	18-8 SS	316 SS	416 SS	Titanium
Tallow	A	A			A		A	A	A		B	A	A				Vanilla Extract	A	A		A												
Tannic Acid	A	A	A	A	A		B	A	C	A	A	AC	C	B	A		Varnish	A	A			A		X	A	B	A	A	A	A	A		
Tanning Liquors	A	A	A	A	A		B	A	C	A			A		A		Vaseline	A	A	A	X	X	A		X	A	A	A	A	A			
Tar	X	B	A	X	X	A	X	A	C	A	A	A			B		Vegetable Oil	C	A	A	A	A	A		A	A	A	A	A	A	A		
Tartaric Acid	A	A	A	A	A		B	A	C	A	A	A	B	B	A		Vinegar	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	
Tertiary Butyl Alcohol	A	A	A	A	A		B	A									Vinyl Acetate	X		A	X	X	A	X	B	X	X	A		AC			
Tetrachlorethane		A	A	X	X		X	A	X	A	A	AB	A		A		Vinyl Chloride			A				C	A	X	A	B	B		A		
Tetrachloroethane			A		X	A	X	A		A	A	A					Vinyl Ether			A					X	B							
Tetraethyl Lead	A	A	A	B	C	A	X	B	C		A						Water Potable	A	A	A	A	A	A		A	A	A	A	A	A	A	A	
Tetrahydrofuron	X	B	A	X	X	B	X	X	X	A	B		A				Water Salt	A	A	A	A	A	A		A	A	A	A	B	AB	A	C	
Tetralin	X	X	A	X	X	A	X	A	X								Water Sewage	A	A	A	A	A	A		A	A	A						
Thionylchloride	X	X	A	X	X	X											Water, Acid Mine	A	A	A	A	A	A		A	A	A			A	C		
Thread Cutting Oils	A	A		A	A	A	X			A		A					Water, Deionized	A	A	A	A	A	A		A	B	A	A	A	A	A		
Titanium Tetrachloride	X	X	A	X	X	X	X	A	C	A	B	A					Water, Demineralized	A	A		A	A	A		A	A	A	A	A	A			
Titanous Sulfate	A	A	A	A	A												Water, Distilled	A	A	A	A	A	A		A	A	A	A	A	A	A	A	
Toluene (Toluol)	X	C	A	X	X	B	C	X	C	X	A	A	A	A	A		Weed Killers									A	B			A			
Tomato Juice	A	C	A	A	A	A	A			A	A	AB	A	A	C		Whey									A	A			A			
Toxaphene-Xylene	X	X		X	X	A											Whiskey	A	A	A	A	A	A		A	A	A	A	AB	A	A		
Transformer Oil	A	A	A	A	A	A	X	A	A	A	A	A					White Acid			A		A											
Tributyl Phosphate	X	C	A	X	X	A	A	X	X								White Liquor	A	A	A	A	A	A		A	A	B	A	A		A		
Trichloroacetic Acid	A	C	A	A	A	A	X	X	X	A	BC	X	X	X			Wines	A	A	A	A	A	A		A	A	A	A	AB	A	A	C	
Trichloroethane			A		X		X	A	X	A	C		A		A		Xenon			A				A	A	A		A					
Trichloroethylene	X	B	A	X	X	A	X	X	A	C	A	B	A	A	A	B	Xylene	X	X	A	X	X	A	X	X	B	X	A	A	A	A		
Trichloropropane			A		X			A	A	A	A	A	A	A			Xyol	X	X	A	X	X	A		X	A	C						
Tricresyl Phosphate			A	X	X		A	B	X	A		A	A		B		Yeast		A	A		A		A	A								
Triethanolamine		C		B	C	C	A	X		A	A	A				Zeolite			A					A	A	B							
Triethyl Phosphate	A	A	A	A	A	A	C	A	A				A				Zinc Acetate	A	A	A	A	A	A		A	C	B		A				
Triethylamine	A	X		A	A	C	A		A	A		A	A				Zinc Carbonate	A		A					A	A	B	B	C		B		
Trimethylpropane	A	A	A	A	A												Zinc Chloride	A	A	A	A	A	A		A	A	A	A	B	X	B	C	A
Trisodium Phosphate	A	A	A	A	A		A	A	A				A		B		Zinc Chromate			A													
Turbine Oil	A	B	A	A	A		X	A	B			A					Zinc Nitrate	A	A	A	A	A	A		A	A							
Turpentine	A	B	A	X		A	A	C	A	C	A	AB	AB	A	B		Zinc Salts		A	A		A	A		A	A	A						
Urea	A	A	A	A	A	A	A	A	C	A							Zinc Sulfate	A	A	A	A	A	A		A	A	A	A	A	B	A	A	A
Urine	A	A	A	A	A		A	A	A		A		A				Zirillite			A					A	C	B						

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Engineering Terminology

ABRASION RESISTANCE

Ability to withstand the repeated action of rubbing, scratching, wearing, etc.

ADHESIVE

A substance capable of holding two or more objects together by attaching to their surfaces.

AGING

The effect of exposing plastic to a specific environment for an extended period of time.

ANNEAL

A procedure for preventing or removing stresses within a material through the use of controlled heating and subsequent cooling of the material.

BOND

To attach two or more objects by means of an adhesive.

BURST STRENGTH

The hydraulic pressure required to cause a pipe, fitting or vessel to fail. This value is typically dependent on the rate at which the pressure is applied as well as the pressure duration.

CALENDARING

A process by which sheet material (esp. rubber or plastic) is passed between sets of rollers to produce a specific thickness or finish. In certain applications this process may be used to combine two or more dissimilar sheet materials (e.g. cloth and rubber) to produce a single multi-layered sheet.

CEMENT

Any of a variety of solutions commonly used in the plastics industry for bonding objects. The solution either dissolves or softens the common surfaces of the objects such that they may be fused together.

CHEMICAL RESISTANCE

The degree to which a given plastic will resist degradation due to contact with certain chemicals. This characteristic will usually vary with chemical concentration and temperature.

COLD FLOW

The deformation of a material attributed to forces or pressures acting at ambient temperatures.

COMPLETE TURBULENT FLOW

Pipe fluid flow characterized by a constant friction factor for increasing Reynolds Number.

COMPRESSION SET

Unrecoverable deformation (strain) that remains in a material after compressive loading has been removed.

CREEP

The elongation a material undergoes when subjected to a force or pressure loading. This elongation is in addition to the initial elastic elongation and will increase over time provided the loading is maintained.

CRITICAL FLOW

Fluid flow characterized by a Reynolds Number typically between 2000 and 4000. Flow in this region is neither laminar nor turbulent.

DEFLECTION TEMPERATURE

The temperature at which a plastic structure will deflect a specific distance for a given loading. Standardized conditions for this test may be found in ASTM D 648.

DELAMINATION

Separation in the layers of material.

DEGRADATION

A deleterious change in the chemical composition, appearance, physical or mechanical properties of a plastic.

DENSITY

The mass per unit volume of a substance. For solids and liquids, typically, temperature would also be provided with density. For gasses, both temperature and pressure should be given with the density.

DIMENSIONAL STABILITY

The ability of a part to retain its size and proportion over time.

DUROMETER

A numerical scale for measuring the hardness of rubber or plastic based on the depth of penetration of an indenter point on the surface of a test specimen.

ELASTICITY

The property that describes the tendency of a plastic material to return to its original dimensions after undergoing a deformation.

ELASTOMER

A material that exhibits almost complete recovery to its original size after undergoing dramatic strain levels (as high as 100% and sometimes more).

ENVIRONMENTAL STRESS CRACKING

The tendency of a material to craze and/or crack due to the combination of residual or applied stress in the material and chemical, thermal or electromagnetic environments.

FILLER

A substance added to plastic to alter its properties.

FRICITION FACTOR

A quantity that relates the head loss to the fluid velocity for a fluid flowing through a specific diameter and length of pipe.

FUSE

To join two or more plastic parts by the action of heat or solvents.

FULL PORT VALVE

A valve in which the resistance to flow, in the fully open position, is comparable to the equivalent length of pipe.

GASKET

A device installed within the gap of a joint for the purpose of retaining a fluid.

HEAD

A unit of measure representing the relative energy of a flowing fluid. Commonly recorded in "feet" of fluid, it provides a convenient means of combining the pressure, velocity and elevation energy portions of a flowing fluid.

HEAD LOSS

Energy loss in a fluid as it passes through a flow passage. The loss is due to friction between fluid particles and can be expressed as a linear change in the height of a column of fluid.

HOOP STRESS

The circumferential stress in a cylindrical shell due to internal or external pressure.

HOT STAMP

Process for marking plastic by applying roll leaf to the surface through the use of hot metal dies.

IMPACT STRENGTH

The degree to which a plastic will withstand the sudden application of a load.

IMPERMEABLE

Describes a material that prevents the passage of a substance into or through it.

LAMINATE

Object composed of two or more sheets or shells of material unitized by means of a bonding agent.

LAMINAR FLOW

Fluid flow characterized by a Reynolds Number typically less than 2000.

LIGHT STABILITY

Degree to which a plastic will resist degradation due to light exposure (especially ultraviolet).

MODULUS OF ELASTICITY

The ratio of applied stress to the associated strain developed within a material that has been elastically deformed.

NEWTONIAN FLUID

A fluid for which the ratio of the shear stress to the shear rate is equivalent to the absolute viscosity.

NOZZLE

A fluid flow passage characterized by a rapid transition from a large cross sectional area to a small cross sectional area.

OPERATING PRESSURE RANGE

The range of pressures for which the component will perform normally.

PLASTIC DEFORMATION

Unrecoverable deformation due to stresses beyond the yield strength of the material.

POISE

Unit of measure for absolute viscosity with dimensions of gram per centimeter per second. A one poise fluid would require a force of one dyne to move a one square centimeter layer at a velocity of one centimeter per second relative to a second parallel layer one centimeter away.

POROSITY

The presence of voids within an object.

PRESSURE DROP

Energy loss in a fluid as it passes through a flow passage. The loss is due to friction between fluid particles and can be measured as a decrease in pressure in the direction of flow.

RELATIVE ROUGHNESS

The ratio between the experimentally determined roughness to the pipe I.D.

REYNOLDS NUMBER

A dimensionless ratio of inertial to viscous forces for a fluid flowing through a conduit.

ROUGHNESS

An experimentally determined length that characterizes the degree to which the surface finish of a pipe tends to resist the motion of a fluid.

RUBBER

Polymers that can endure dramatic strain levels and still be able to return to their original form.



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Engineering Terminology, *CONTINUED*

SOLVENT

A substance that is capable of dissolving another material.

SCHEDULE

A system of pipe sizes that provides for standardized outside diameters and wall thicknesses.

SPECIFIC GRAVITY

The ratio of the weight density of a substance (solid or liquid) at a specific temperature and the weight density of water at 600°F. For solids and liquids the effect of pressure on the weight density of a substance is typically negligible, however, temperature usually has a more significant effect.

SPRING RATE

The force per unit deflection for a given object (especially a spring).

STRESS

The internal force per unit area that resists deformation due to applied external forces.

STRESS CRACKS

Cracks that form on the inside or outside of an object and are attributable to tensile stresses below the short term mechanical strength of the material.

STRAIN

The ratio of the change in dimension of an object, due to external loading and the original undeformed dimension.

THERMOPLASTIC

Material which when heated becomes sufficiently pliable that it can be formed into a variety of shapes and then quickly hardened by cooling.

TRANSITIONAL FLOW

Fluid flow region between critical flow and complete turbulent flow.

TURBULENT FLOW

Fluid flow region that encompasses transitional flow and complete turbulent flow. Typically it begins at a Reynolds Number greater than 4000.

VENTURI

A fluid flow passage characterized by smooth transitions from a large cross sectional area to a small cross sectional area, and back to a large cross sectional area.

VIRGIN MATERIAL

Plastic material that has not undergone any processing other than that required to prepare it for manufacturing parts.

VISCOSITY

The property of a fluid that describes its resistance to flow. It is due to shear stresses that result from friction between fluid particles.

WATER HAMMER

A phenomenon whereby a pressure shock wave is generated, due to a sudden change in fluid velocity within a piping system. The resulting pressure pulses can be significantly higher than the nominal working pressure of the system.

WEEPING

A very low leakage rate evidenced by the appearance of fluid at a pipe joint or fitting.

WEIGHT DENSITY

The weight per unit volume at a substance. For solids and liquids, typically, temperature would also be provided with density. For gasses, both temperature and pressure should be given with the density.

Glossary of Actuation Terms

AUTOMATIC RESET

(Electric) A component of the thermal overload device that permits it to automatically engage when the temperature falls to an acceptable level.

AMPERAGE RATING AUXILIARY LIMIT SWITCH

The maximum current carrying capacity of the extra limit switches contained within the actuator housing.

CONDUIT ENTRY, SIZE NPT

The electrical entrance into the housing of the actuator through which the operating wires are connected. The exterior of the entrance hole is usually tapped with an NPT thread (National Pipe Thread).

CONSTANT TORQUE OUTPUT

(Pneumatic) The torque in inch pounds developed by a double acting pneumatic rack and pinion or vane type actuator as measured at the beginning and end of a stroke or at any point in between.

CYCLE TIME

The time required for an actuator to rotate one complete cycle (typically 90° or 180°), expressed in seconds.

DESIGN TYPE

The basic design type of the actuator in terms of the method used to deliver rotational torque to the output shaft.

DIRECT MOUNTING

A method used to attach a valve to an actuator, being coupled without the use of separate bracketry or special mounting hardware.

DISCRETE MOUNTING BRACKET

A method used to attach a valve to an actuator, being a separate part from either the valve, actuator or both.

DPDT

Double Pole, Double Throw.

DUTY CYCLE

(Electric) The ratio of actual motor run time as compared to 100%. (Example: an actuator with a 20% duty cycle, having a required run time of 5 seconds to rotate 90°, would require an off time of 25 seconds before it can be cycled another 90°).

EMF

Electro-Magnetic Force.

ENCLOSURE MATERIALS (TOP AND BOTTOM)

Material of construction of the actuator base (bottom) and cover (top).

END OF STROKE TRAVEL STOPS (ADJUSTABLE)

A mechanical component on the actuator that can be adjusted to position the valve either open or closed.

EXTERIOR FINISH

The exterior coating or finish used to protect the actuator housing from corrosion.

EXTERNAL HARDWARE

The materials of construction of the fasteners and/or other hardware used to assemble the actuator components.

FEMALE OUTPUT SHAFT

The output drive of the actuator having a recessed opening into which the valve stem or coupling shaft fits.

HIGH AMBIENT LIMIT

The maximum operating temperature of the actuator, as designated by the actuator manufacturer.

HYSTERESIS

The cumulative rotational twist resulting from the “take-up” of clearances between the fitting dimensions of the ball, stem, coupling and actuator mechanism.

INTEGRAL MOUNTING BRACKET

A method used to attach a valve to an actuator, being a part of either the valve, actuator or both.

INTERNAL AIR PORTING

The high pressure (100 PSI) air passages contained within the actuator that shuttle the air pressure to either side of the torque producing components.

LOW AMBIENT LIMIT (°F)

The minimum operating temperature of the actuator as set by the actuator’s manufacturer, expressed in degrees Fahrenheit.

LOW AMBIENT LIMIT W/OUT “T” (HEATER AND THERMOSTAT)

The minimum operating temperature of the actuator, as designated by the actuator manufacturer without the use of a heater and thermostat.

MALE OUTPUT SHAFT

The output drive of the actuator consisting of an externally protruding shaft.

MANUAL OVERRIDE, (DE-CLUTCHING)

(Electric) An actuator component that allows mechanical turning of the valve, while simultaneously disengaging the gear train.

MANUAL OVERRIDE

An actuator component that allows mechanical turning of the valve.



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Glossary of Actuation Terms, *CONTINUED*

MAXIMUM OPERATING PRESSURE (PSI)

(Pneumatic) The pressure limitation established as the maximum safe operating pressure.

MOTOR BRAKE/MECHANICAL BRAKE (STANDARD ON BUTTERFLY VALVES)

(Electric) A mechanical device that is designed to apply a force to a motor shaft to prevent back drive of the actuator geartrain resulting from hydraulic pressure transfer of the process fluid through the valve.

MIN / MAX WIRE SIZE

The minimum and maximum wire size that the actuator requires or that will fit into the actuator's terminal connections.

MODULATING SERVICE

The ability of the actuator to be used in systems that require continuous control, typically with a positioner.

MOTOR DRIVE ROTATION

(Electric) The rotation of the actuator output shaft in either one direction (uni-directional) or two directions (reversing).

MOTOR SWITCHES (SPDT)

(Electric) The switches that control the motor's starting and stopping. (SPDT means Single Pole Double Throw).

MOTOR THERMAL PROTECTOR

(Electric) A device that protects the motor against overheating and subsequent burn-out due to (typically a 120 VAC 25% duty cycle motor is protected at 100°C) heat buildup resulting from excessive starting, stopping or continuous running.

MOUNTING POSITION

The ability of the valve/actuator to be physically mounted in the piping system.

NEMA RATING (AVAILABLE)

1, 4, 4X, 7, 9 National Electrical Manufacturers Association Rating.

NUMBER OF PISTONS

(Pneumatic) The number of torque producing surfaces within the actuator.

PERMANENT LUBRICATION

A type of lubrication sealed within the actuator to prolong cycle life.

PISTON SEALING MATERIAL

(Pneumatic) The type of elastomer used to maintain an airtight seal between the piston and the cylinder.

POSITION INDICATOR WITH LED

Light emitting diodes which, when illuminated, indicate visual confirmation of the valve's position in terms of open or closed.

POSITION INDICATOR

A mechanical or electrical device that allows visual confirmation of the valve's position in terms of open or closed (e.g., Red = "closed" or Green = "open").

PREWIRED TO TERMINAL STRIP

Internal component wire leads or printed circuit board connector pins which terminate at a terminal strip to which field wiring can be attached.

REVERSING

The output shaft of the actuator rotates in both CW and CCW directions.

SELF-LOCKING GEAR TRAIN

(Electric) Design of an actuator gear train that locks the actuator output shaft, thus preventing valve rotation.

SPDT

Single Pole, Double Throw.

SPRING CONFIGURATION (QTY/TYPE)

(Pneumatic) The quantity and design configuration of the springs used within a pneumatic actuator that affect the spring return (fail-safe) function.

STANDARD VOLTAGE (AC)

Unless otherwise specified, the voltage of all electrical devices in this catalog will be considered to be 115 / 120 VAC/60 Hz. All ratings, performance or specifications are based on standard voltage.

START/FINISH TORQUE

(Pneumatic) The torque in inch pounds, as measured at the actuator output shaft of a pneumatic actuator containing a spring return feature. The torque developed at the beginning of the stroke when the spring is fully compressed (START) and the torque at the end of the stroke (FINISH) when the spring has dissipated its stored energy.

START/STALL TORQUE:

(Electric) The torque in inch pounds, as measured at the actuator output shaft at the instant of the start of rotation, and at maximum stall when the motor is restricted from rotation while energized.

TWO STAGE SHUT-OFF (DRIBBLE CONTROL)

The closing of the valve in two, or more, distinct motions. The first movement, partially closing such that the remaining flow is small. The second movement, fully closing the valve.

UNI-DIRECTIONAL

The output shaft of the actuator rotates in only CW direction, as viewed from the top of the actuator.

UNIFORM BEARING LOAD DISTRIBUTION

The design of the torque producing components to be supported by bearing surfaces that allow high cycle life.

VOLTAGE VARIATIONS

The variations of optional voltages available for all products offered.

WARRANTY & RGA POLICY

- 1. CLAIMS:** All claims must be made in writing and received by Hayward within 10 days after receipt of merchandise. If a shipment is received in a damaged condition, a claim must be filed with the delivering carrier and noted on the freight bill before you accept the merchandise.
- 2. TWO YEAR WARRANTY:** All products manufactured by Hayward are warranted against defects in material or workmanship for a period of two years from date of shipment. Our sole obligation under this warranty is to repair or replace, at our option, any product or any part or parts thereof found to be defective. **HAYWARD MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** The warranty set forth above is the only warranty applicable to Hayward products and in no event shall Hayward be liable for any delay, work stoppage, cartage, shipping, loss of use of equipment, loss of time, inconvenience, loss of profits of any direct or indirect incidental resulting from or attributable to a breach of warranty. **The remedies under this warranty shall be the only remedies available. OUR MAXIMUM LIABILITY SHALL NOT IN ANYEVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.**
- 3. RETURNS OF GOODS FOR NON-WARRANTY CLAIM:** Hayward Flow Control will authorize the return of products purchased within the last twelve (12) months in original “like new” packaging of current design, and listed in the current Complete Price Book. All returns must be accompanied by a “Return Goods Authorization” number, which must be obtained from Hayward Flow Control prior to shipment. All returns are subject to inspection upon receipt. No credit will be issued until the returned material has been inspected, accepted and processed. Customers will be contacted if quantity differences and/or non-acceptable material are found during inspection. Credit will reflect only quantities actually received and accepted. Disposition of product(s) not accepted by Hayward Flow Control must be provided by Distributor within 10 business days; otherwise, it will be subject to disposal. Minimum restock charge is \$50.00. All material returns must be received within thirty (30) days of the RGA issuance and shipped freight prepaid. No collect shipments will be accepted. Prepaid freight does not apply to returns due to Hayward Flow Control order entry or shipping errors. Hayward Flow Control will authorize the return of product considered a stock item with a minimum restock charge of 25%. Hayward Flow Control will authorize the return of standard Pump or Actuated product with a minimum restock charge of 40%. Specialty products such as Strainer or Filtration assemblies and Engineered Products are non-cancelable/non-re-turnable. Restock charges do not apply to returns due to Hayward Flow Control order entry or shipping errors.
- 4. RETURNS OF GOODS FOR WARRANTY CLAIM:** When requesting an RGA for product evaluation, the Customer must first complete and submit an In Service Form obtained from Hayward Flow Control Technical Services. Additionally, a Safety Data Sheet (SDS) must be submitted along with the In Service Form to Technical Services prior to receiving a Return Goods Authorization number. All Warranty Claim returns must be accompanied by the SDS, In Service Form and RGA number. Product must be washed and free of service media prior to returning for evaluation. Failure to do so may result in denial of claim and product returned back freight collect. Customers will be contacted if quantity differences and/or non-acceptable material are found during inspection. The Customer will be notified of the evaluation results. If the Warranty Claim is accepted, credit will be issued or replacement product sent. Freight will be credited upon approval of claim. If the Warranty Claim is declined, disposition of product(s) must be provided to Technical Services within 30 business days; otherwise, it will be subject to disposal. Rejected product returned to the Customer will ship freight collect. All warranty claim returns must be received within thirty (30) days of the RGA issuance and shipped freight prepaid. No collect shipments will be accepted.

Product Listings



NSF/ANSI Standard 61 and NSF/ANSI 372

NSF/ANSI Standard 61 is a standard defining the requirements for products that are destined for use in drinking water systems. In summary, the standard requires immersion testing of all products that will come into contact with drinking water for any chemicals, compounds, elements, etc. that may leach into the water that passes through the product.

Hayward products that are NSF 61 certified can easily be found on the NSF website, www.NSF.org. Additionally, those products certified to NSF61-G are also certified to NSF/ANSI 372 and conforms with the lead content requirements for "lead free" plumbing as defined by California, Vermont, Maryland and Louisiana state laws and the U.S. Safe Drinking Water Act.

The following Hayward Flow Control products comply with this directive:

PRODUCT	SIZE	WATER CONTACT TEMP	WATER CONTACT MATERIAL
TBH SERIES BALL VALVES			
Hayward True Union Ball Valve (PVC)	1/4" - 2"	CLD23	MLTPL
Hayward True Union Ball Valve (CPVC)	1/4" - 2"	CLD23	MLTPL
CVH SERIES BALL VALVES			
CVH Series Ball Valve (CPVC)	1/4" - 2"	CLD 23	MLTPL
CVH Series Ball Valve (PVC)	1/4" - 2"	CLD 23	MLTPL
TB SERIES BALL VALVES			
Hayward True Union Ball Valve (PVC)	1/4" - 4"	CLD23	MLTPL
Hayward True Union Ball Valve (CPVC)	1/4" - 4"	CLD23	MLTPL
TC SERIES CHECK VALVES			
Hayward True Union Ball Check Valve (PVC)	1/4" - 4"	CLD23	MLTPL
Hayward True Union Ball Check Valve (CPVC)	1/4" - 4"	CLD23	MLTPL
BYV SERIES BUTTERFLY VALVES			
Hayward Butterfly Valve (PVC/EPDM)	2" - 12"	CLD23	MLTPL
Hayward Butterfly Valve (CPVC/EPDM)	4" - 12"	D. HOT	MLTPL
BYCN SERIES BUTTERFLY VALVES (PVC/EPDM)*	3" - 8"	CLD23	MLTPL
SIMPLEX SB SERIES STRAINERS**			
Hayward Simplex Basket Strainer (PVC)	1/2" - 8"	CLD23	MLTPL
Hayward Simplex Basket Strainer (CPVC)	1/2" - 8"	D. HOT	MLTPL
BFA SERIES (PVC/EPDM) BULKHEAD	1/2" - 6"	CLD23	MLTPL
BFAS SERIES (PVC/EPDM) BULKHEAD	1/2" - 3"	CLD23	MLTPL
FLOW CONTROL VALVES			
Universal Stopcock™	1/4"	CLD23	MLTPL
RPV SERIES PRESSURE RELIEF VALVES	1/2" - 4"***	CLD23	MLTPL
PBV SERIES BACK PRESSURE VALVES	1/2" - 4"***	CLD23	MLTPL

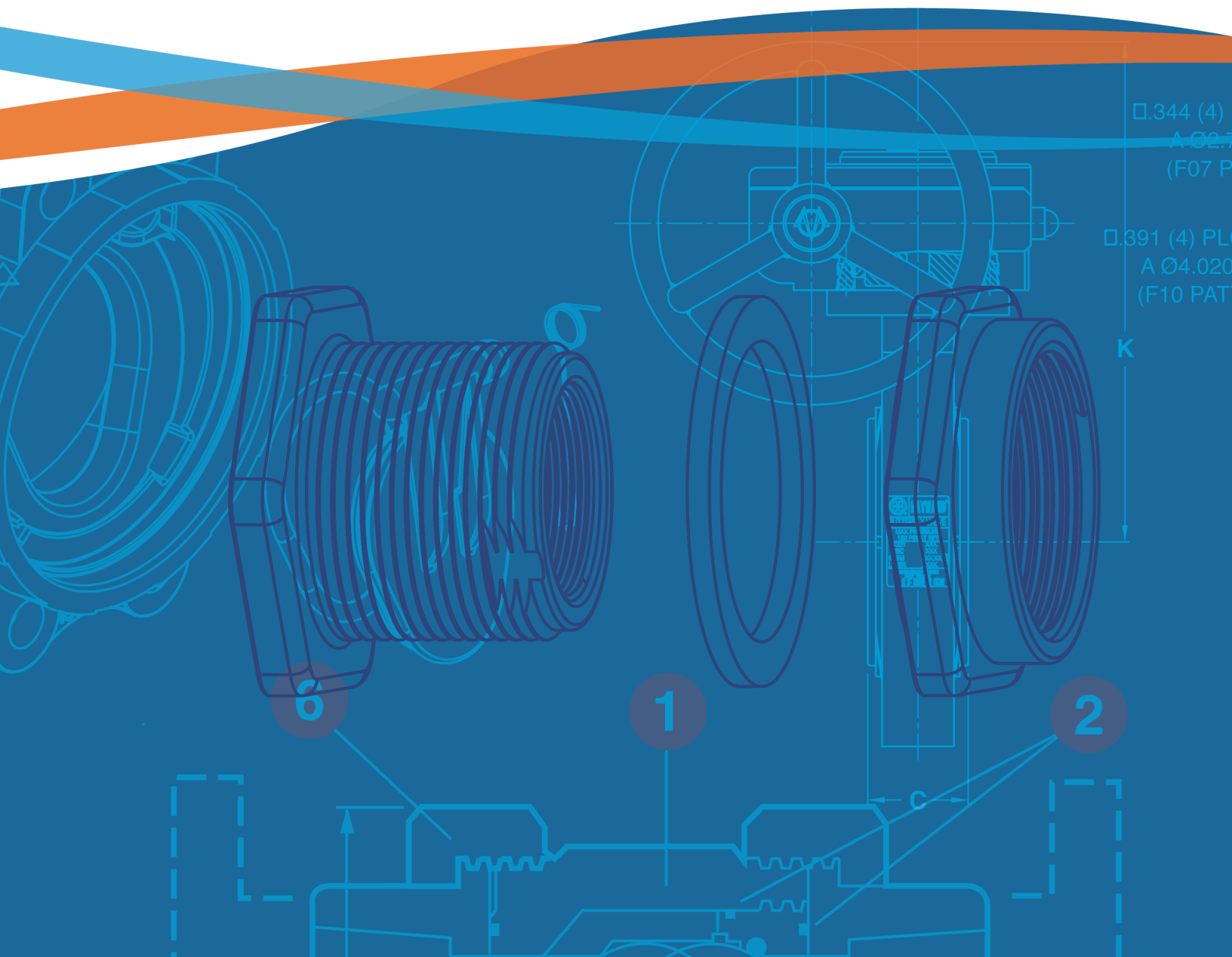
* Certified for use in distribution systems only.

** Certified for use in water treatment plant applications only with a minimum daily flow rate of 3,120 gallons.

*** See listing for specific size and material combination.

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing.

Always consult NSF Listing online as changes and updates may occur.



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– SENTINEL is a registered trademark and SNAP-RING is a trademark of Eaton Filtration.
– Teflon is a registered trademark of DuPont.

IPG0318