HAYWARD®

FLOW CONTROL

Industrial Product Guide

define
design
deliver

COMPANY HISTORY AND REPUTATION

Hayward® Flow Control, a division of Hayward Industries, Inc., has been manufacturing industrial thermoplastic valves and process control products for more than 50 years. 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.

Irving M. Hayward formed Hayward Industries in 1923. It was a small company, located in Brooklyn, NY, making specialty metal valves and industrial flow control products. When Mr. Hayward retired in 1964, its present management acquired the company. With that, 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 valve and pipeline strainer business grew as well—and became Hayward Flow Control.

When Selecting Thermoplastic Valves and Process Control Products, Consider the Following:

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. Pressure and prolonged operation will not fatigue Hayward valves, allowing them to provide years of maintenance-free service.

QUALITY

As an ISO 9001:2008 certified company, Hayward Flow Control adheres to the strictest guidelines relative to component manufacture, assembly, and testing. Hayward valves and flow controls are 100% tested with the latest industry testing equipment. Every Hayward product must pass pneumatic/hydrostatic tests before it is released for shipment. Our reputation for quality and reliability is unmatched. Our commitment to, and support of, the industry is strong. In addition to a tradition of experience and expertise, Hayward also has a highly qualified field sales organization that provides customer assistance, training, and field support.

COMMITMENT

Hayward remains dedicated to new product developments 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 valves and process control products.

HAYWARD POOL PRODUCTS

Hayward Pool Products, Inc., is the largest manufacturer of swimming pool equipment in the world. It manufactures and distributes products that move, clean, heat, light, and control the flow of water in commercial and residential swimming pools across the globe. The swimming pool equipment manufactured includes pool filters used to continuously clean the pool water, pumps that circulate the water, and fittings such as skimmers, automatic vacuum cleaners, chlorinators, heaters, and underwater lights—including fiber optic systems.

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 fiber reinforced 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 process control products include:

NONTOXIC

Hayward PVC and CPVC products are suitable for use with potable water and are consistent with National Sanitation Foundation (NSF) and Canadian Standards Association (CSA) requirements. Hayward products are made to ASTM and ANSI standards. See specific products in this catalog for NSF / ANSI 61 compliance.

CORROSION RESISTANCE

Hayward thermoplastic flow control products are immune from corrosion. They are dielectric, meaning they will not support a charge, and will remain free from the ionization and corrosion that occurs 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 valves 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 absolutely 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 process control products are capable of handling corrosive chemicals at elevated temperatures—up to 250°F with glass fiber reinforced PP (GFPP).

EASY INSTALLATION

Hayward thermoplastic valves and process 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.

CONSERVATION

Hayward thermoplastic valves and flow controls are energy efficient. The use of natural resources or fuels to produce a Hayward thermoplastic valve is half that of a comparative size metal one.

ECONOMICS

When evaluating the economics of Hayward thermoplastic valves and 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 valves and flow controls are a cost effective alternative to metal piping products.

Table of Contents

VALVES AND ACCESSORIES

FLOW CONTROL VALVES

AUTOMATED VALVES AND ACTUATORS

BULKHEAD FITTINGS AND ACCESSORIES

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TECHNICAL INFORMATION

TB Series
True Union Ball Valves

1/4" TO 2" PVC AND CPVC

NSF

Sizes 1/4" – 2"

KEY FEATURES

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

OPTIONS

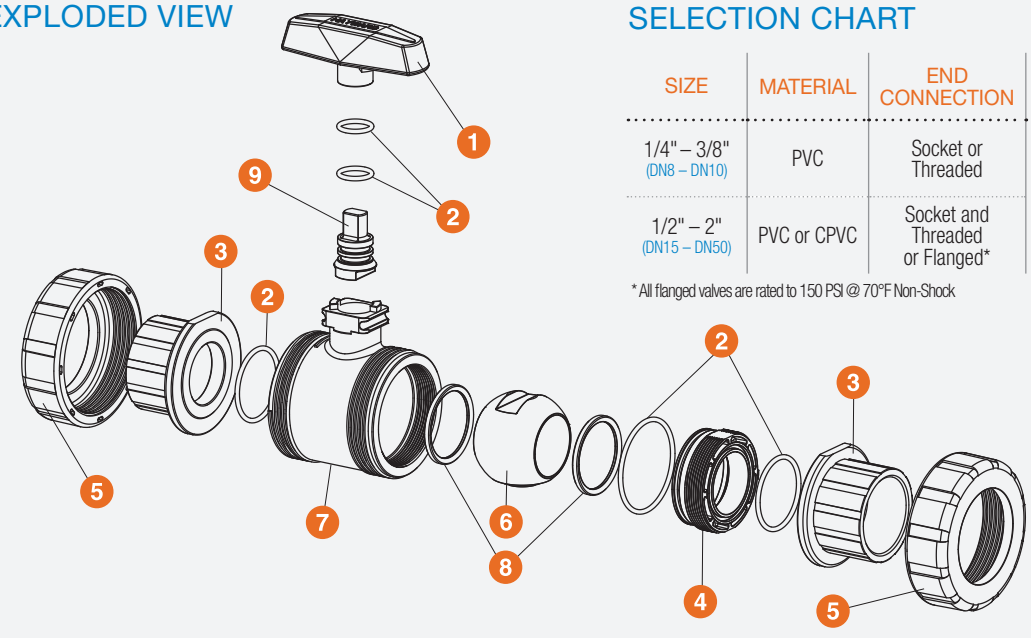
- Lockouts Available
- 2" Square Operating Nut
- Stem Extensions
- Pneumatic and Electric Actuated
- Spring Return Handle

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

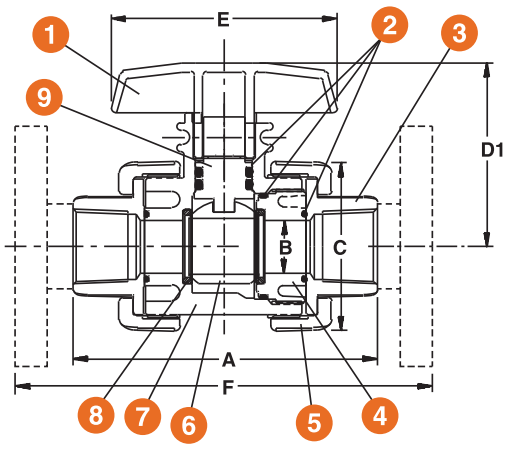
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 3/8" (DN8 – DN10)	PVC	Socket or Threaded	FPM or EPDM	250 PSI @ 70°F Non-Shock
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded or Flanged*		

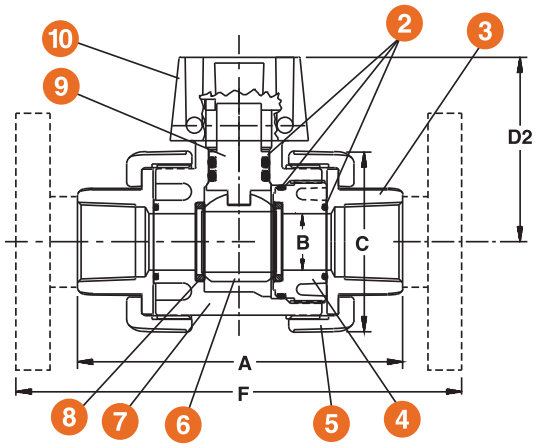
* All flanged valves are rated to 150 PSI @ 70°F Non-Shock

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





DIMENSIONS – INCHES / MILLIMETERS

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	WEIGHT lbs / kg 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 GPM	SIZE in / DN	Cv VALUES GPM
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

PRESSURE LOSS CALCULATION FORMULA

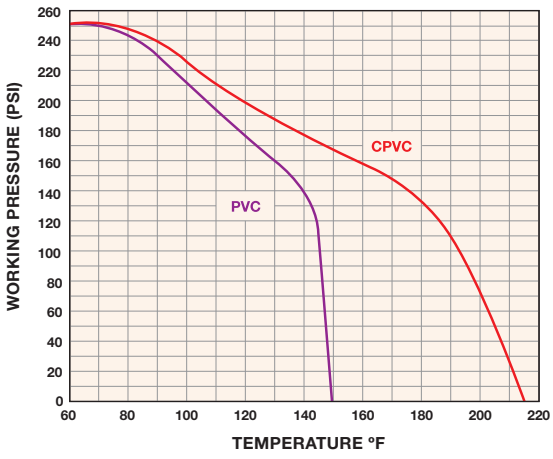
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



Sizes 2-1/2" – 4"

TB Series
True Union Ball Valves

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

KEY FEATURES

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

OPTIONS

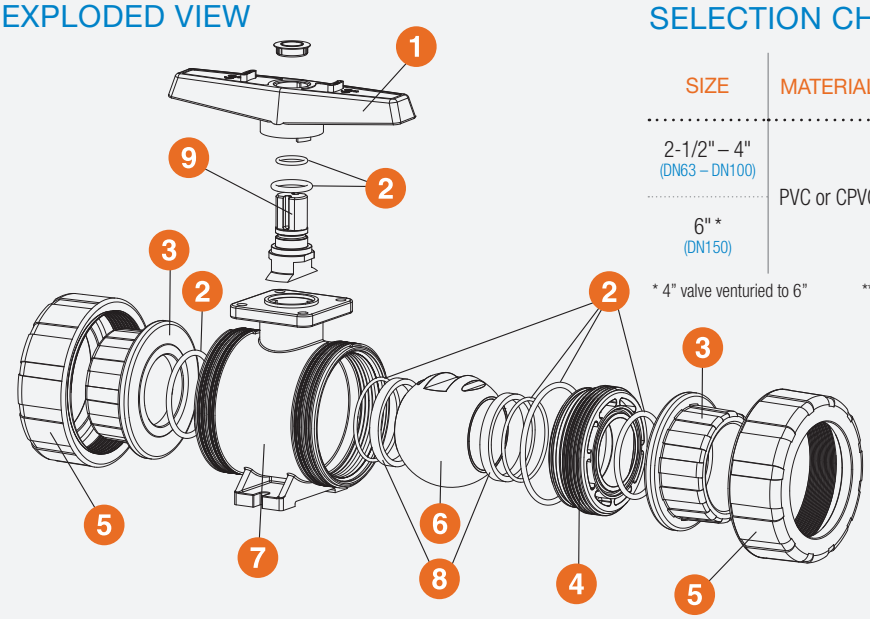
- Pneumatic and Electric Actuators
- Lockouts Available
- Gear Operator
- 2" Square Operating Nuts
- Stem Extensions
- Spring Return Handle

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" (DN63 – DN100)	PVC or CPVC	Socket, Threaded or Flanged**	FPM or EPDM	235 PSI @ 70°F Non-Shock
6" * (DN150)		Flanged		150 PSI @ 70°F Non-Shock

* 4" valve venturied to 6"

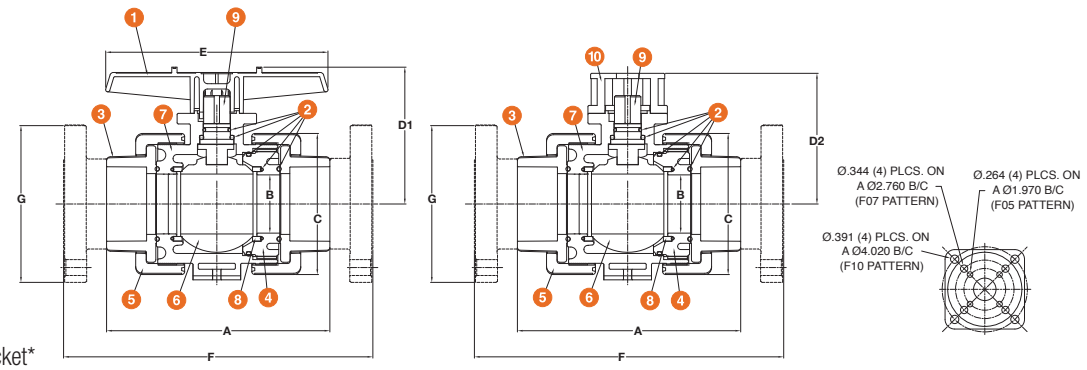
** All flanged valves are rated to 150 PSI @ 70°F Non-Shock

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 – INCHES / MILLIMETERS

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	WEIGHT lbs / kg FLANGED
2-1/2 / 63	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 GPM	SIZE in / DN	Cv VALUES GPM
2-1/2 / 63	340.0	4 / 100	600.0
3 / 80	490.0	6 / 150	550.0

PRESSURE LOSS CALCULATION FORMULA

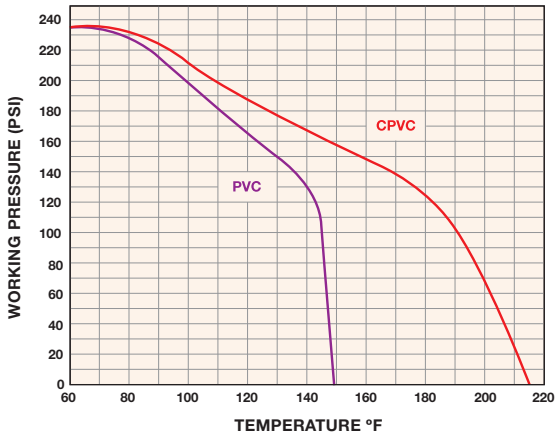
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



TBZ Series "Z-Ball" True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

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

OPTIONS

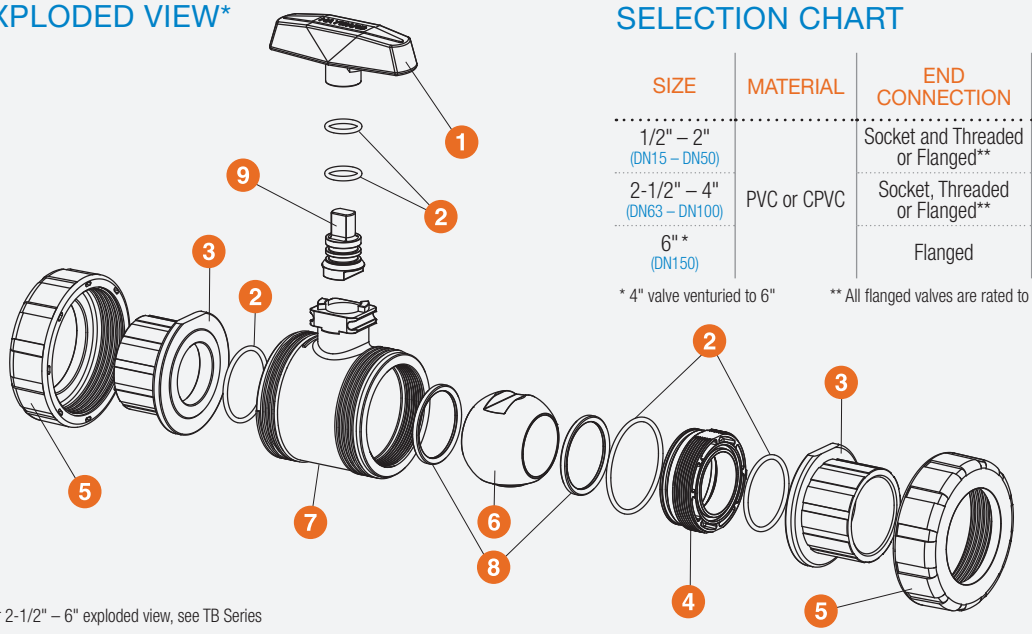
- Lockouts Available
- Stem Extensions
- Spring Return Handle
- Pneumatic and Electric Actuators
- 2" Square Operating Nut

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 Non-Shock
2-1/2" – 4" (DN63 – DN100)		Socket, Threaded or Flanged**		235 PSI @ 70°F Non-Shock
6" * (DN150)		Flanged		150 PSI @ 70°F Non-Shock

* 4" valve venturied to 6"

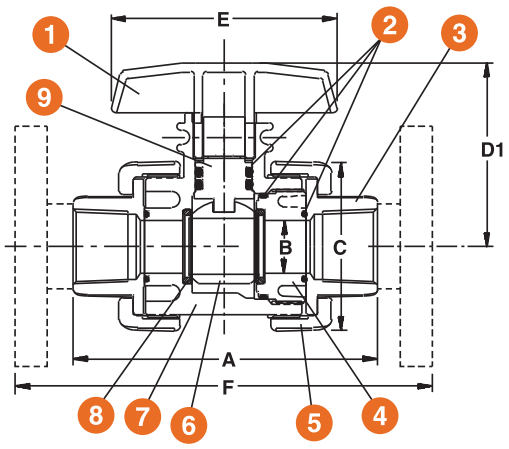
** All flanged valves are rated to 150 PSI @ 70°F Non-Shock

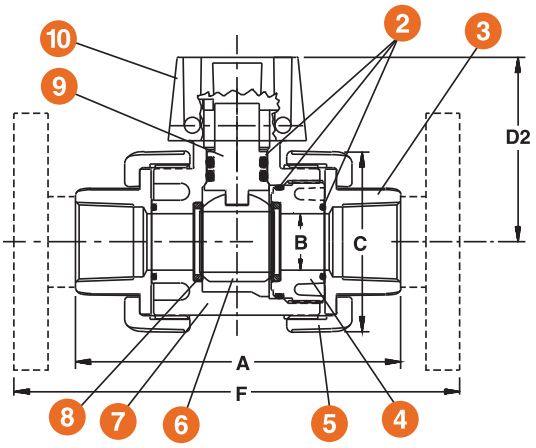
TECHNICAL INFORMATION, *CONTINUED*

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





DIMENSIONS – INCHES / MILLIMETERS

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	WEIGHT lbs / kg 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 / 63	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 GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	8.0	2 / 50	150.0
3/4 / 20	16.0	2-1/2 / 63	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

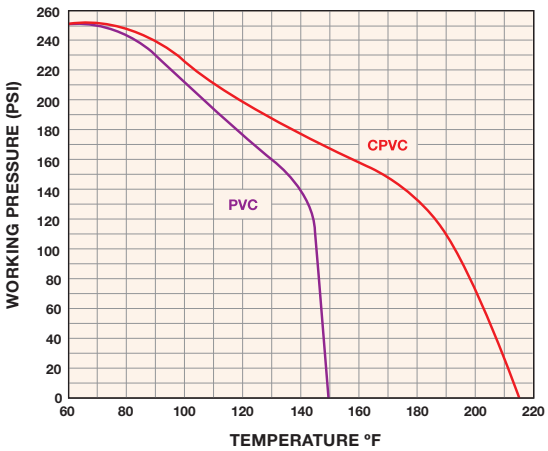
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



CV Series Profile2™ Proportional Control Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- PVC and CPVC
- Reversible Seats
- True Union Design
- Manual or Actuated
- Precise Flow Control

TYPICAL APPLICATIONS

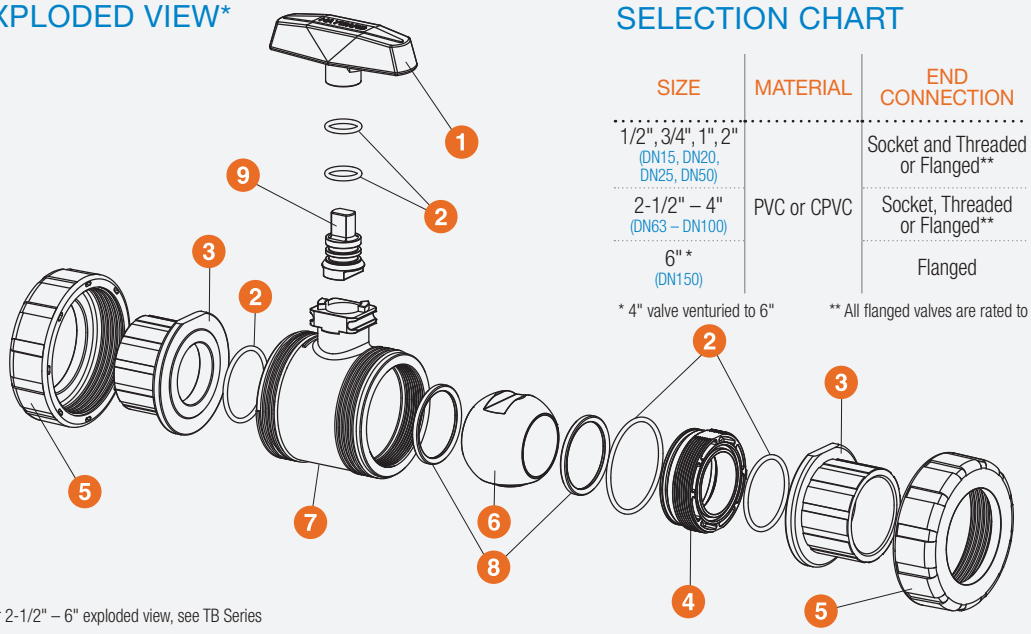
- Fill Station Lines
- Lateral Take-Off Line Flow Control
- Flow Reduction in Systems with Oversized Pumps
- Control Flow From Tanks

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", 2" (DN15, DN20, DN25, DN50)	PVC or CPVC	Socket and Threaded or Flanged**	FPM or EPDM	250 PSI @ 70°F Non-Shock
2-1/2" – 4" (DN63 – DN100)		Socket, Threaded or Flanged**		235 PSI @ 70°F Non-Shock
6"* (DN150)		Flanged		150 PSI @ 70°F Non-Shock

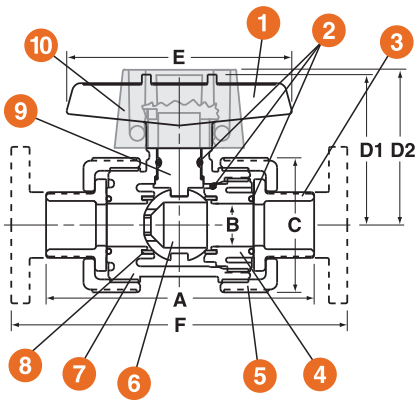
* 4" valve venturied to 6"

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

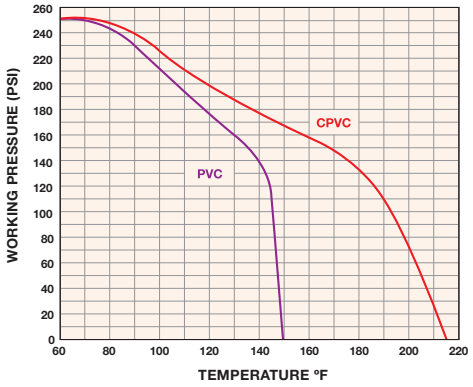
TECHNICAL INFORMATION, *CONTINUED*

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



OPERATING TEMPERATURE / PRESSURE



DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D1 in / mm	D2 in / mm	E in / mm	F in / mm
1/2 / 15	4.77 / 121	.50 / 13	2.25 / 57	2.81 / 71	2.63 / 67	3.50 / 89	6.75 / 171
3/4 / 20	4.85 / 123	.75 / 19	2.63 / 67	3.02 / 77	2.81 / 71	3.50 / 89	7.13 / 181
1 / 25	5.44 / 138	.93 / 24	3.00 / 76	3.26 / 83	3.05 / 77	4.00 / 102	8.00 / 203
2 / 50	8.00 / 203	1.94 / 49	4.75 / 120	4.43 / 113	4.00 / 102	5.00 / 127	11.38 / 289
3 / 80*	10.56 / 268	2.75 / 70	6.66 / 169	6.46 / 164	6.17 / 157	10.50 / 267	14.60 / 371
4 / 100*	12.30 / 312	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 169	10.50 / 267	17.26 / 438
6 / 150*	N/A	3.81 / 97	8.56 / 217	7.62 / 194	6.64 / 169	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

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.10	.10	.10
30°	.30	.50	.30
45°	1.4	2.7	1.1
60°	2.6	4.3	2.5
75°	4.9	5.2	7.2
90°	5.4	5.4	8.0

3/4" PROFILE2 PROPORTIONAL CONTROL VALVE

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.10	.10	.10
30°	.70	1.2	.70
45°	2.8	5.3	2.5
60°	5.3	8.5	5.3
75°	9.4	10.1	14.4
90°	10.4	10.4	16.0

1" PROFILE2 PROPORTIONAL CONTROL VALVE

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	.50	1.0	1.2
30°	1.9	3.4	3.5
45°	3.7	7.0	7.5
60°	8.0	13.0	15.3
75°	14.7	18.8	27.8
90°	21.0	21.0	29.0

2" PROFILE2 PROPORTIONAL CONTROL VALVE

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	1.0	2.5	10.0
30°	4.0	11.0	16.0
45°	11.0	25.0	35.0
60°	21.0	44.0	72.0
75°	37.0	54.0	117.0
90°	56.0	56.0	150.0

3" PROFILE2 PROPORTIONAL CONTROL VALVE

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	3.0	10.0	10.0
30°	12.0	26.0	26.0
45°	30.0	50.0	55.0
60°	60.0	79.0	110.0
75°	89.0	112.0	212.0
90°	128.0	128.0	490.0

4" PROFILE2 PROPORTIONAL CONTROL VALVE

OPENING ANGLE	SLOW OPEN	FAST OPEN	FULL PORT VALVE
15°	5.0	18.0	38.0
30°	30.0	55.0	90.0
45°	65.0	114.0	165.0
60°	120.0	183.0	250.0
75°	185.0	200.0	458.0
90°	215.0	215.0	600.0

PRESSURE LOSS CALCULATION FORMULA

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

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

TW Series Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- 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
- NT 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

ACTUATED VALVE

SELECTION CHART

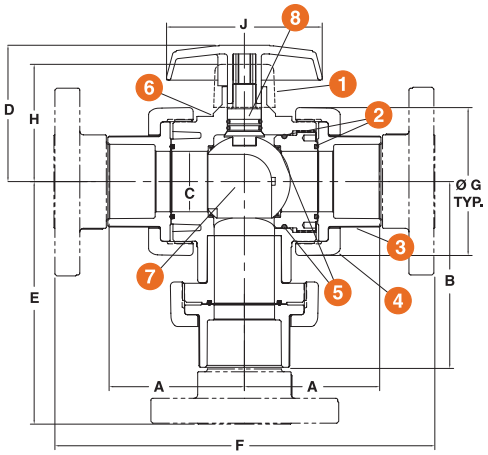
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F Non-Shock
6" * (DN150)		Flanged		

* 4" valve venturied to 6"

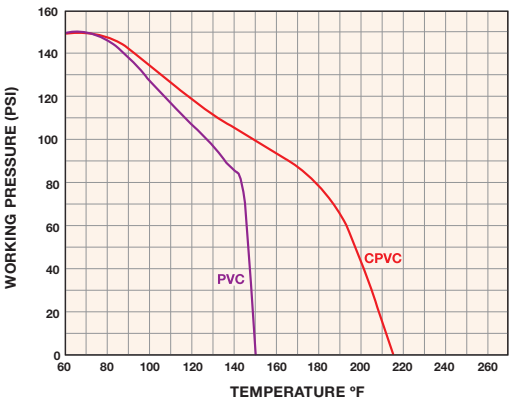
TECHNICAL INFORMATION, *CONTINUED*

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 – INCHES / MILLIMETERS

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 / 63	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 GPM	SIZE in / DN	Cv VALUES GPM
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

FLOW AT	NT OR TN BALL
0°	Port A  Port B
45° *No Deadhead*	Port A  Port B
90°	Port A  Port B

FLOW AT	CROSS FLOW BALL
0°	Port A  Port B
90°	Port A  Port B
180°	Port A  Port B

FLOW AT	TW BALL
0°	Port A  Port B
90° *Center-Off*	Port A  Port B
180°	Port A  Port B

FLOW AT	TP BALL
0°	Port A  Port B
90°	Port A  Port B

LA Series Lateral Three-Way True Union Ball Valves

1/2" TO 6" PVC AND CPVC

KEY FEATURES

- 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
- 90º Ball

MATERIALS

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

TECHNICAL INFORMATION

ACTUATED VALVE

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 Non-Shock
6" * (DN150)		Flanged		

* 4" valve venturied to 6"

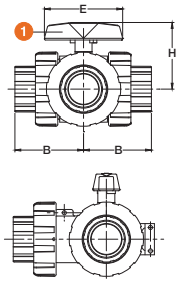
LA Series Lateral Three-Way True Union Ball Valves

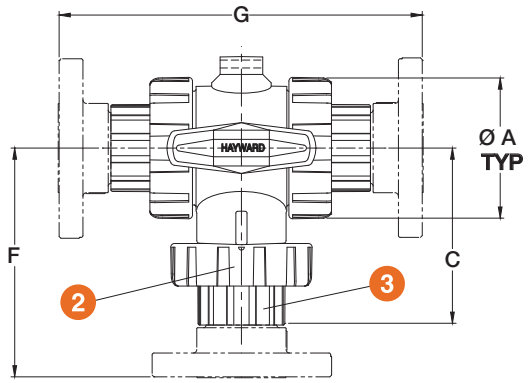
1/2" TO 6" PVC AND CPVC

TECHNICAL INFORMATION, *CONTINUED*

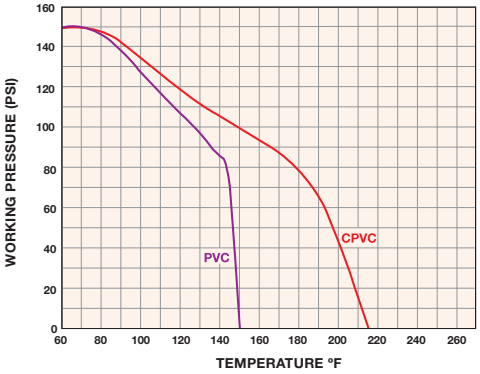
PARTS LIST

1. Handle
2. Assembly Nut
3. End Connector





OPERATING TEMPERATURE / PRESSURE



DIMENSIONS – INCHES / MILLIMETERS

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 / 63	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 GPM	SIZE in / DN	Cv VALUES GPM
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

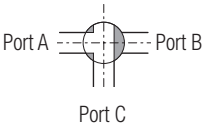
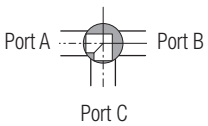
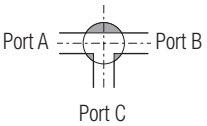
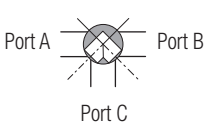
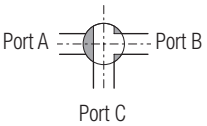
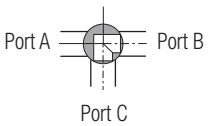
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

FLOW SCHEMATICS – TOP VIEW

FLOW AT	STANDARD BALL	FLOW AT	90° BALL *TYPICALLY USED IN ACTUATION*
0°		0°	
90°		90°	
180°		180°	

QV Series QIC2™ Compact Ball Valves

1/2" TO 2" PVC

KEY FEATURES

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

MATERIALS

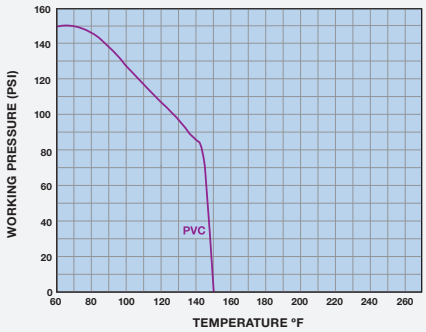
- PVC Cell Class 12454 per ASTM D1784

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC	Socket or Threaded	EPDM	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION

OPERATING TEMPERATURE / PRESSURE



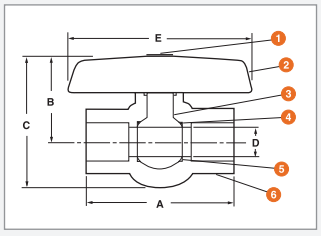
PRESSURE LOSS CALCULATION FORMULA

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

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

PARTS LIST

Component	Material
1. Cap	ABS
2. Handle	ABS
3. Stem and Ball	PVC
4. O-Ring	EPDM
5. Seat	PTFE
6. Body	PVC



DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	WEIGHT lbs / kg
1/2 / 15	3.10 / 78	1.61 / 41	2.58 / 66	.59 / 15	2.83 / 72	.22 / .10
3/4 / 20	3.57 / 91	1.93 / 49	3.11 / 79	.78 / 19	3.14 / 80	.44 / .20
1 / 25	4.16 / 106	2.21 / 56	3.46 / 88	.98 / 25	3.73 / 95	.69 / .31
1-1/4 / 32	4.83 / 123	2.60 / 66	3.86 / 98	1.26 / 32	4.36 / 111	.90 / .41
1-1/2 / 40	5.09 / 129	2.85 / 72	4.34 / 110	1.53 / 39	4.63 / 118	1.19 / .54
2 / 50	5.90 / 150	3.45 / 88	5.29 / 134	1.96 / 50	5.49 / 139	1.86 / .84

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

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	8.0	1-1/4 / 32	75.0
3/4 / 20	16.0	1-1/2 / 40	90.0
1 / 25	30.0	2 / 50	150.0

Valve-Safe Lockouts

FOR BALL VALVES UP TO 6"

KEY FEATURES (A)

- For Ball Valves up to 6"
- Latches and Lockable in Open / Close Position
- Simple Trigger Mechanical Design
- Can Use with Lockout / Tagout Hasp

KEY FEATURES (B)

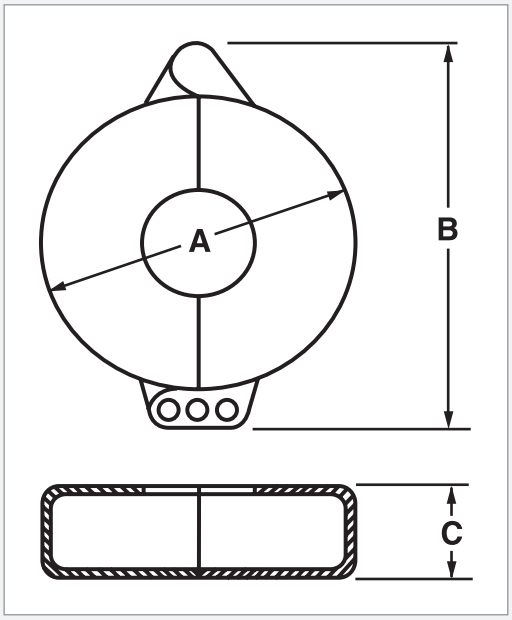
- PP Housing Material
- For All Ball Valves up to 6"
- Use with up to 3 Padlocks

TECHNICAL INFORMATION

DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	A in / mm	B in / mm	C in / mm
1/2" to 2" Ball Valves (DN15 – DN50)	5.50 / 140	7.00 / 178	1.75 / 44
2-1/2" to 6" Ball Valves (DN63 – DN150)	14.50 / 368	16.00 / 406	3.00 / 76

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



TBB Series True Union Commercial Ball Valves

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

KEY FEATURES

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

TECHNICAL INFORMATION

SELECTION CHART

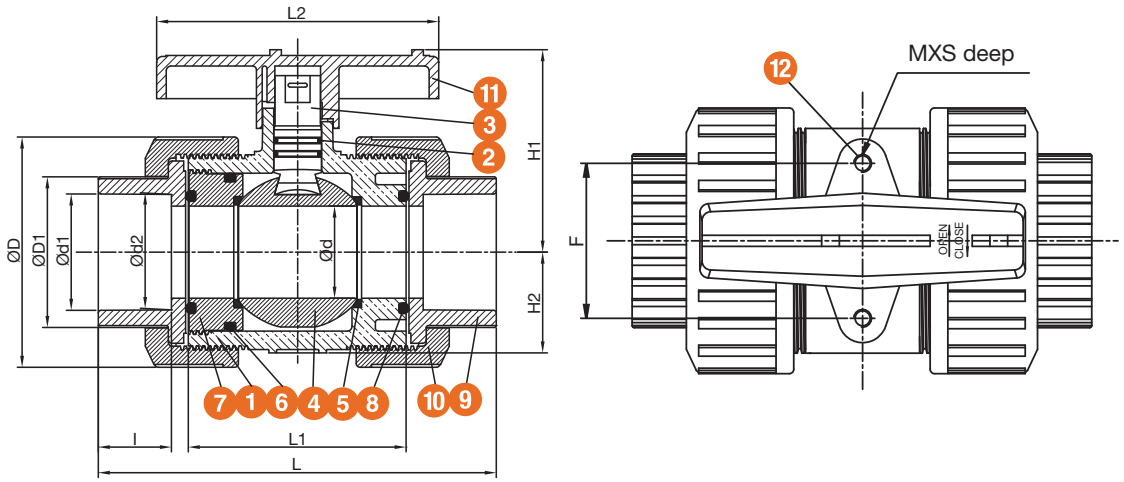
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded or Flanged*	FPM or EPDM	225 PSI @ 70°F Non-Shock
1/2" – 4" (DN15 – DN100)	PP	Threaded or Flanged	FPM	150 PSI @ 70°F Non-Shock
1/2" – 4" (DN15 – DN100)	PVDF			

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

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
12. Inserted Nut

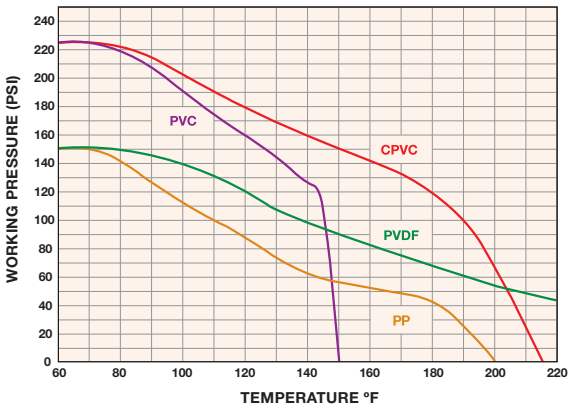


DIMENSIONS – INCHES / MILLIMETERS

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 / 63	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

OPERATING TEMPERATURE / PRESSURE



QTA Series True Union Compact Ball Valves

1/2" TO 2" PVC

KEY FEATURES

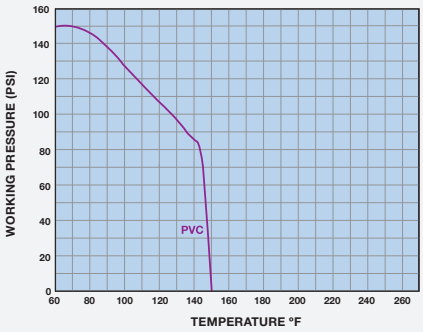
- Gray and White PVC
- True Union End Connections
- Rated at a Full 150 PSI
- Santoprene® (TPV) Seats
- EPDM O-Ring Seals
- No Internal Parts to Replace
- Low Torque Easy 1/4-Turn Operation
- Perfect for OEM Applications
- Socket or Threaded End Connections

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN100)	PVC (Gray or White)	Socket and Threaded	EPDM	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION

OPERATING TEMPERATURE / PRESSURE



PRESSURE LOSS CALCULATION FORMULA

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

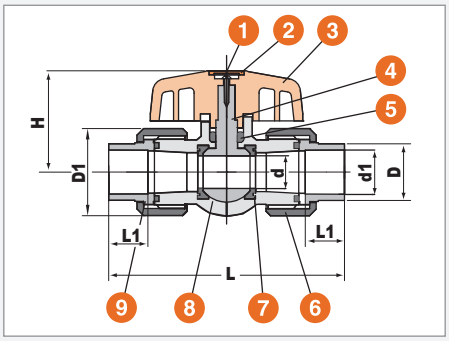
ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

PARTS LIST

1. Screw
2. Cap
3. Handle
4. Ball
5. O-Ring
6. Nut
7. Seat
8. Body
9. Adaptor



DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	d1 in / mm	D in / mm	D1 in / mm	L1 in / mm	L in / mm	H in / mm
1/2 / 15	.83 / 21	1.07 / 27	1.61 / 41	.69 / 18	4.30 / 109	1.78 / 45
3/4 / 20	1.05 / 27	1.33 / 34	1.97 / 50	.76 / 19	4.60 / 117	2.01 / 51
1 / 25	1.31 / 33	1.64 / 42	2.32 / 59	.97 / 25	5.30 / 134	2.26 / 57
1-1/4 / 32	1.66 / 42	2.04 / 52	2.75 / 70	1.13 / 29	6.20 / 157	2.66 / 68
1-1/2 / 40	1.90 / 48	2.43 / 62	3.37 / 86	1.30 / 33	6.90 / 175	2.91 / 74
2 / 50	2.37 / 60	3.09 / 78	4.13 / 105	1.59 / 40	8.00 / 203	3.32 / 84

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

QVC Series
Compact Ball Valves

1/2" TO 4" PVC

KEY FEATURES

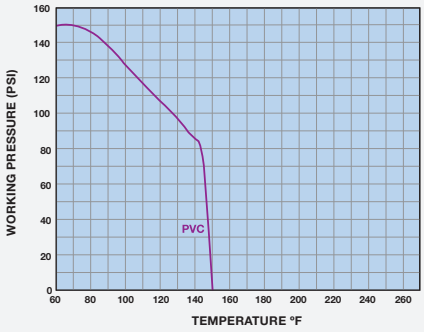
- Gray and White PVC
- Compact and Lightweight Design
- Low Torque Easy 1/4-Turn Operation
- Santoprene® (TPV) Seats
- EPDM O-Ring Seals
- No Internal Parts to Replace

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC (Gray or White)	Socket or Threaded	EPDM	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION

OPERATING TEMPERATURE / PRESSURE



PRESSURE LOSS CALCULATION FORMULA

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

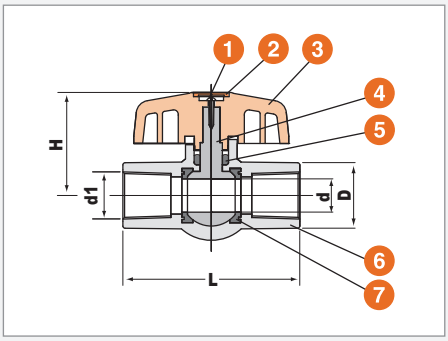
ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

PARTS LIST

1. Screw
2. Cap
3. Handle
4. Ball
5. O-Ring
6. Body
7. Seat



DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	d1 in / mm	D in / mm	d in / mm	L in / mm	H in / mm
1/2 / 15	.83 / 21	1.24 / 31	.80 / 20	2.90 / 74	1.78 / 45
3/4 / 20	1.05 / 27	1.45 / 37	.89 / 23	3.04 / 77	2.01 / 51
1 / 25	1.31 / 33	1.77 / 45	1.08 / 27	4.00 / 102	2.26 / 57
1-1/4 / 32	1.66 / 42	2.07 / 53	1.06 / 27	4.30 / 109	2.66 / 68
1-1/2 / 40	1.90 / 48	2.49 / 63	1.14 / 29	4.80 / 122	2.91 / 74
2 / 50	2.37 / 60	3.01 / 76	1.42 / 36	5.70 / 145	3.32 / 84
2-1/2 / 63	2.87 / 73	3.54 / 90	1.80 / 46	7.20 / 183	4.07 / 103
3 / 80	3.50 / 89	4.25 / 108	2.40 / 61	9.30 / 236	4.47 / 114
4 / 100	4.50 / 114	5.21 / 132	2.52 / 64	10.10 / 257	4.89 / 124

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

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

SW Series Swing Check Valves

3" TO 8" PVC, CPVC AND GFPP

KEY FEATURES

- PVC, CPVC and GFPP
- Horizontal or Vertical Installation*
- Two-in-One Seat Design
- Built-in Flange Seals
- Two Drain Ports
- Self-Aligning Clapper Seals

OPTIONS

- Counterweight for Closing Assistance
- Limit Switch for Position Indication
- Spring Assist Closure

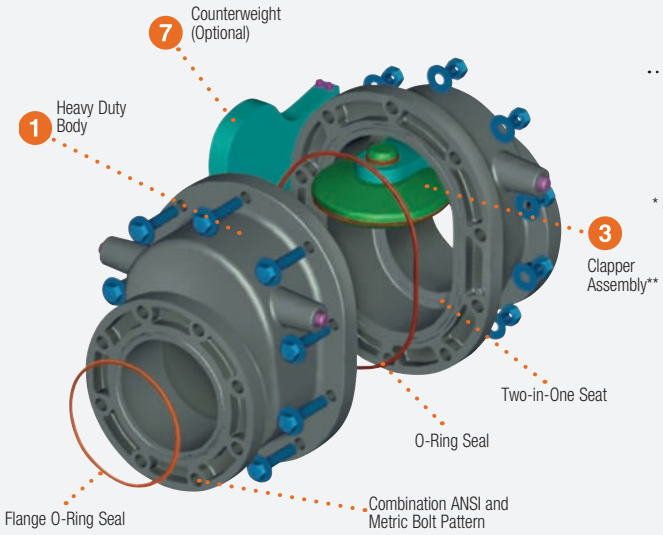
MATERIALS

- 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

* For instructions, see IOM manual

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

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

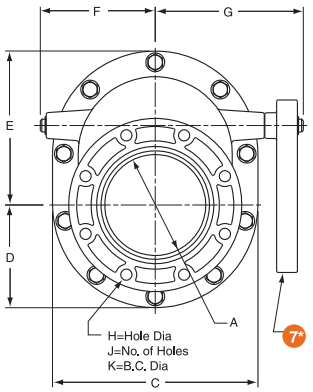
* 8" not available in CPVC

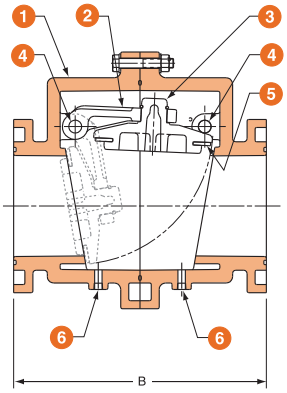
TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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

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





DIMENSIONS – INCHES / MILLIMETERS

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

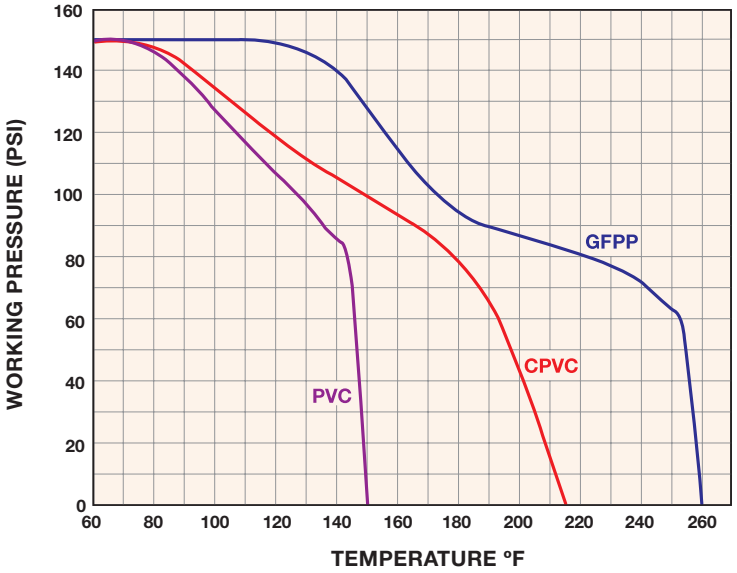
PRESSURE LOSS CALCULATION FORMULA

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

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

OPERATING TEMPERATURE / PRESSURE

3" TO 8" SWING CHECK VALVE



TC Series True Union Ball Check Valves

1/4" TO 6" PVC, CPVC AND PP

NSF

Sizes 1/4" – 4" PVC and CPVC

KEY FEATURES

- PVC, CPVC and PP
- For Horizontal or Vertical Installation*
- Square Cut Seat for Positive Sealing
- Seats with Minimum Back Pressure
- 1/4" and 3/8" are Trim Check Design

OPTIONS

- Foot Valve Screens

MATERIALS

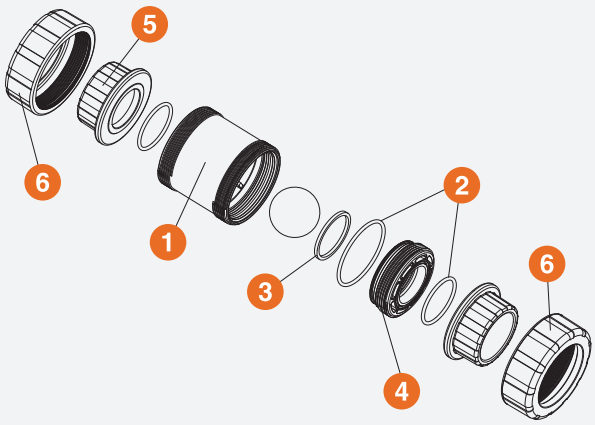
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- PP per ASTM D4101
- FPM and EPDM O-Ring Seals

Ball check valve with foot valve screen installed

* For installation information, see IOM manual

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 Non-Shock
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded or Flanged****	FPM or EPDM	
	PP**	Threaded		
2-1/2" – 4" (DN15 – DN50)	PVC or CPVC	Socket, Threaded or Flanged		
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

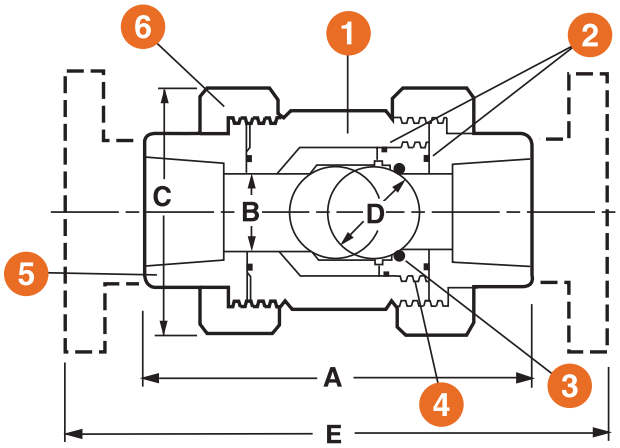
TC Series True Union Ball Check Valves

1/4" TO 6" PVC, CPVC AND 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 – INCHES / MILLIMETERS

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	WEIGHT lbs / kg 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 / 63*	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 GPM	SIZE in / DN	Cv VALUES GPM
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 / 63	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

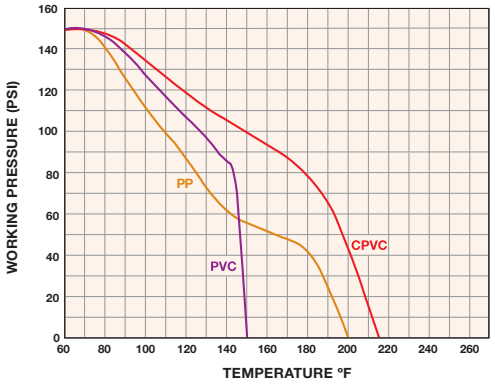
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



WC Series Wafer Check Valves

2" TO 20" PVC, PP AND PVDF

* Valve shown with spring option

KEY FEATURES

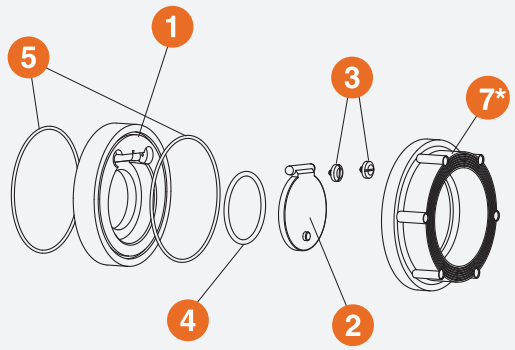
- PVC, PP and PVDF
- FPM, EPDM and PTFE O-Ring Seats
- Compact and Lightweight
- Easy Installation
- Vertical or Horizontal Operation

OPTIONS

- Spacers
- Stainless Steel or Hastelloy® Disc Springs*

TECHNICAL INFORMATION

EXPLODED VIEW



* Spacer (optional)

SELECTION CHART

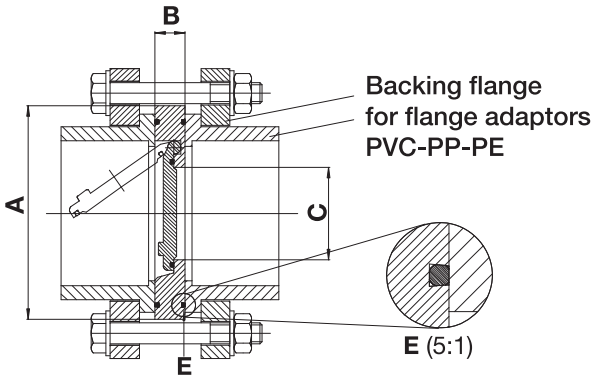
SIZE	MATERIAL	END CONNECTION	O-RING	SPRING	PRESSURE RATING
2" – 6" * (DN50 – DN150)	PVC, PP or PVDF	Flanged	FPM, EPDM or PTFE***	316 SS, Hastelloy	150 PSI @ 70°F Non-Shock
8" * (DN200)					100 PSI @ 70°F Non-Shock
10" – 12" (DN250 – DN300)					90 PSI @ 70°F Non-Shock
14" – 20" ** (DN350 – DN500)					Consult with Factory

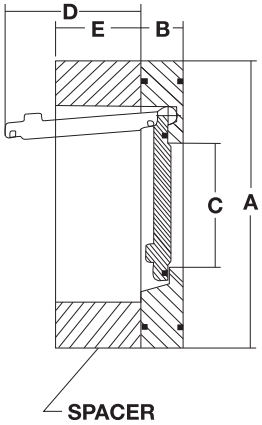
* Spacers standard for PVC, PP up to 8" ** Up to 40" special order *** PTFE encapsulated FPM

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 – INCHES / MILLIMETERS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D (WITH SPRING) in / mm	E in / mm
2 / 50	4.30 / 109	.80 / 20	1.30 / 33	1.80 / 46	1.00 / 25
2-1/2 / 63	4.90 / 124	.80 / 20	1.60 / 41	2.00 / 51	1.50 / 38
3 / 80	5.40 / 137	.80 / 20	2.00 / 51	2.90 / 74	1.60 / 41
4 / 100	6.50 / 165	.90 / 23	2.80 / 71	3.60 / 91	2.00 / 51
6 / 150	8.70 / 221	1.00 / 25	4.40 / 112	5.80 / 147	2.00 / 51
8 / 200	10.80 / 274	1.40 / 36	5.90 / 150	7.50 / 191	3.50 / 89
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

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

Cv VALUES

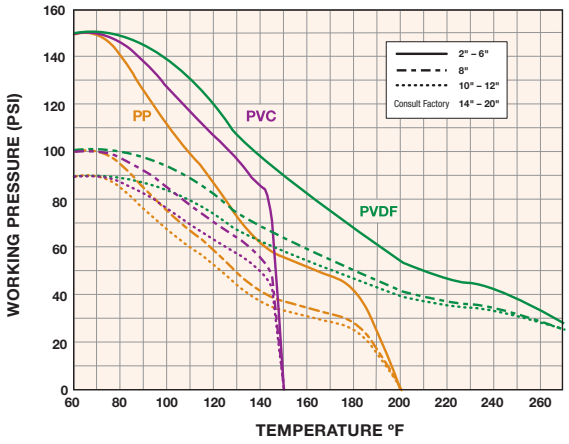
SIZE in / DN	SCH 40 W/O SPACER	SCH 80 W/ SPACER
2 / 50	58	74
2-1/2 / 63	77	108
3 / 80	105	203
4 / 100	224	300
6 / 150	718	949
8 / 200	980	1175
10 / 250	1880	2050
12 / 300	2520	2940

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



YC Series
Y-Check Valves

1/2" TO 4" PVC AND CPVC

KEY FEATURES

- 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

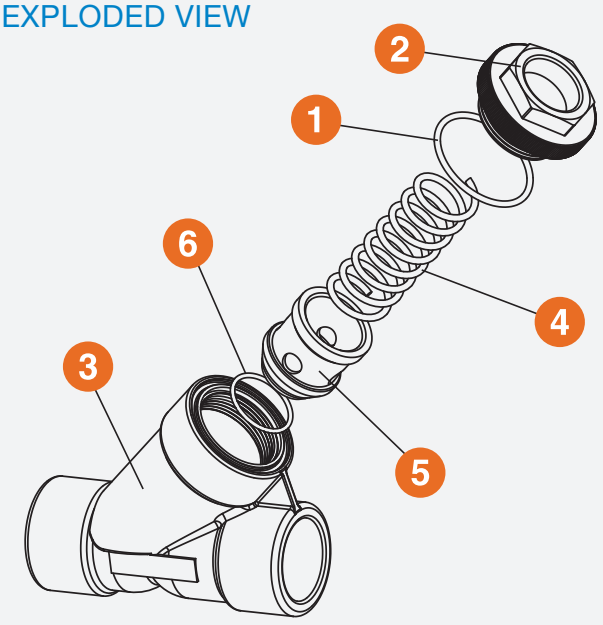
- Drilled Cap for Easy Drainage
- True Union End Connections

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



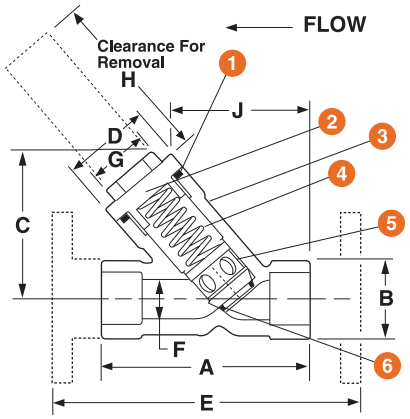
SELECTION CHART

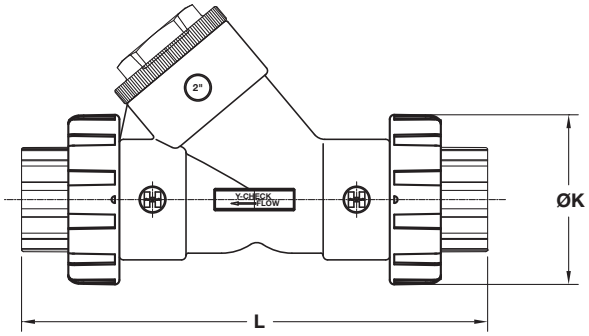
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded, Flanged or True Union	FPM or EPDM	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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





DIMENSIONS – INCHES / MILLIMETERS

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	WEIGHT lbs / kg FLANGED
1/2 / 15	3.38 / 86	1.38 / 35	2.25 / 57	1.50 / 38	N/A	0.56 / 14	1.00 / 25	1.50 / 38	2.50 / 64	2.25 / 57	6.64 / 169	0.25 / 0.11	N/A
3/4 / 20	4.18 / 106	1.69 / 43	2.88 / 73	2.00 / 51	N/A	0.81 / 21	1.25 / 32	1.75 / 44	3.00 / 76	2.63 / 67	7.42 / 188	0.63 / 0.29	N/A
1 / 25	5.19 / 132	2.00 / 51	3.63 / 92	2.16 / 55	N/A	1.00 / 25	1.50 / 38	2.25 / 57	3.32 / 84	3.00 / 76	8.97 / 228	0.88 / 0.40	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	3.00 / 76	4.45 / 113	4.75 / 121	13.01 / 330	1.75 / 0.79	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	3.00 / 76	4.45 / 113	4.75 / 121	12.07 / 307	1.63 / 0.74	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	3.25 / 83	4.88 / 124	4.75 / 121	13.05 / 331	3.00 / 1.36	5.00 / 2.27
2-1/2 / 63	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	N/A	2.90 / 74	3.50 / 89	4.25 / 108	6.54 / 166	6.40 / 163	16.77 / 426	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	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

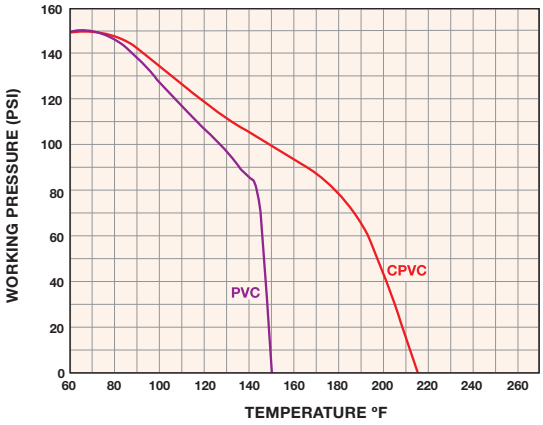
SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	0.8	2 / 50	65.0
3/4 / 20	3.0	2-1/2 / 63	75.0
1 / 25	9.0	3 / 80	110.0
1-1/4 / 32	26.0	4 / 100	240.0
1-1/2 / 40	45.0		

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



SLC Series Spring-Loaded Y-Check Valves

1/2" TO 4" PVC

KEY FEATURES

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

OPTIONS

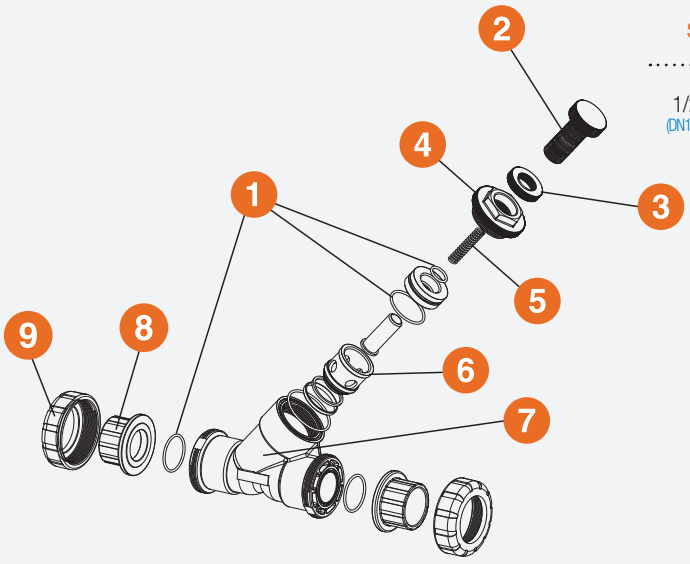
- True Union End Connections

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, Flanged or True Union	FPM or EPDM	150 PSI @ 70°F Non-Shock

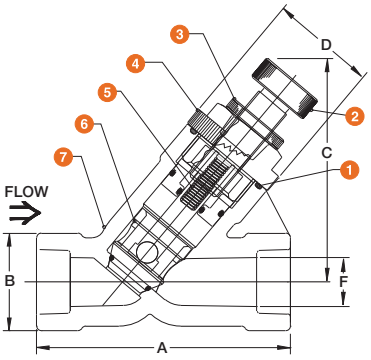
SLC Series Spring-Loaded Y-Check Valves

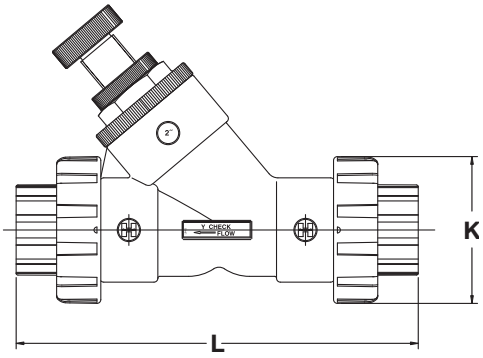
1/2" TO 4" PVC

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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



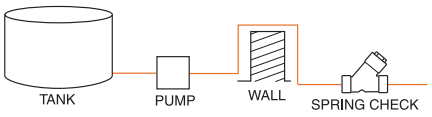


DIMENSIONS – INCHES / MILLIMETERS

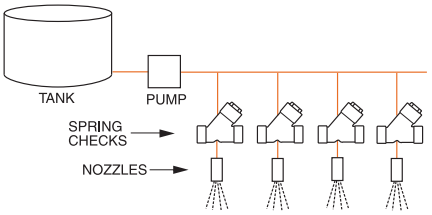
SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	F in / mm	K in / mm	L in / mm	WEIGHT lbs / kg SOC / THD
1/2 / 15	6.19 / 158	2.00 / 51	4.58 / 116	2.13 / 54	1.00 / 25	2.25 / 57	6.64 / 169	0.88 / 0.40
3/4 / 20	6.19 / 158	2.00 / 51	4.58 / 116	2.13 / 54	1.00 / 25	2.63 / 67	7.42 / 188	0.88 / 0.40
1 / 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

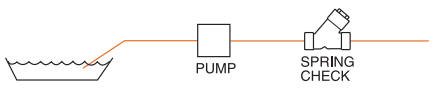
TYPICAL APPLICATIONS



PREVENT SIPHONING OF TANK WHEN PUMP SHUTS OFF



PREVENT LOSS OF PROCESS FLUID WHEN PROCESS FLOW IS STOPPED



MINIMIZE RISK OF WATER HAMMER RESULTING FROM STARTING PUMP IN AN OPEN LINE

Cv VALUES

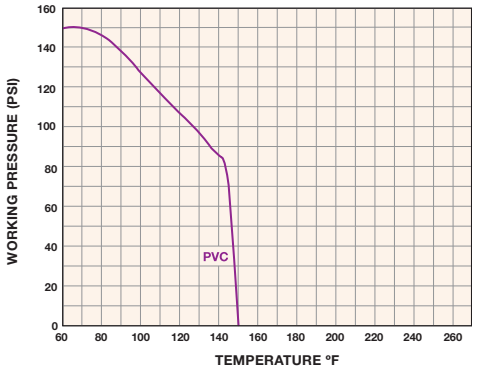
SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	0.8	2 / 50	65.0
3/4 / 20	3.0	3 / 80	110.0
1 / 25	9.0	4 / 100	240.0
1-1/2 / 40	45.0		

PRESSURE LOSS CALCULATION FORMULA

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

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

OPERATING TEMPERATURE / PRESSURE



BY Series Butterfly Valves

1-1/2" TO 12" PVC, CPVC AND GFPP

KEY FEATURES

- PVC, CPVC and GFPP Bodies and Discs
- FPM, EPDM and Nitrile Seat Materials
- Fully Supported Flange Bolt Holes
- V-Notch Seal of Liner to Body
- Seven-Position Lever Handle or Gear Box Operator*
- 316 Grade Stainless Steel Shaft
- Meets ANSI B16.10 Face-to-Face Dimensions**

OPTIONS

- Stem Extensions
- Gear Operators
- Pneumatic or Electric Actuators
- Stainless Steel Lugs
- 2" Square Operating Nut
- Titanium or Hastelloy® Shaft
- Chain Operator for Gear Box

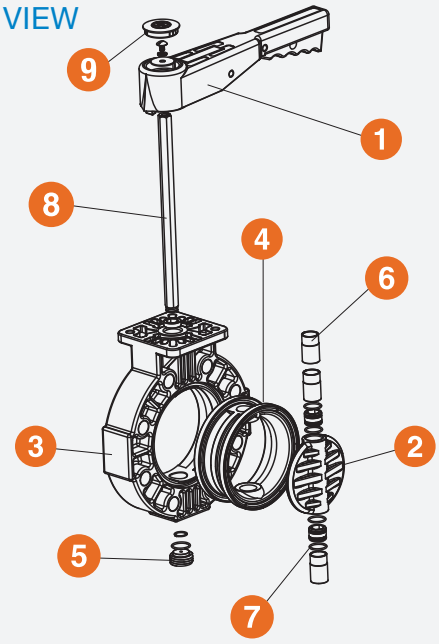
MATERIALS

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

* Typical operation: Lever up to 6"; Lever or gear at 8"; Gear only 10" and up
** Except 10"

TECHNICAL INFORMATION

EXPLODED VIEW



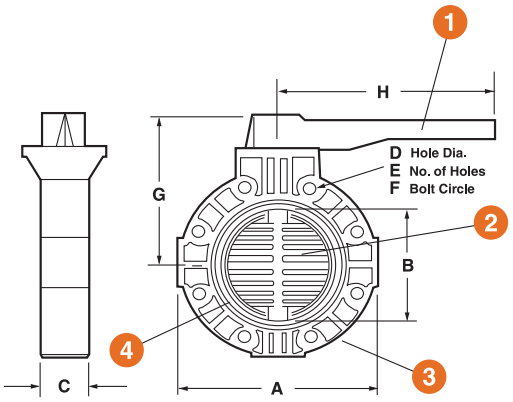
SELECTION CHART

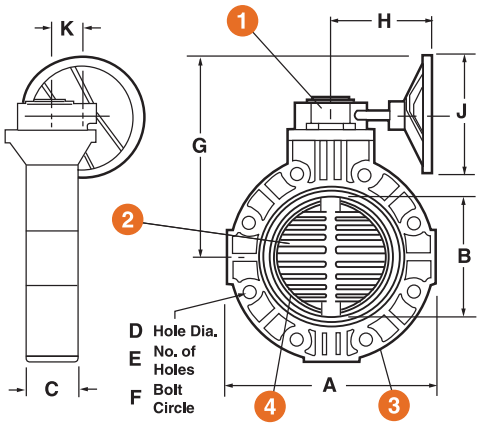
SIZE	BODY MATERIAL	DISC MATERIAL	LINER MATERIAL	PRESSURE RATING
1-1/2" – 8" (DN40 – DN200)	PVC, CPVC or GFPP	PVC, CPVC or GFPP	FPM, EPDM or Nitrile	150 PSI @ 70°F Non-Shock
10" – 12" (DN250 – DN300)	GFPP	PVC or GFPP		

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

1. Operator (Lever or Gear Box)
2. Disc
3. Body
4. Liner
5. Bottom Plug
6. Bearings
7. Seal Retainer
8. Shaft
9. Bezel, Screw and O-Ring





DIMENSIONS – INCHES / MILLIMETERS

SIZE in / DN	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	GEAR BOX G in / mm	LEVER G in / mm	GEAR BOX H in / mm	LEVER H in / mm	J in / mm	K in / mm	WEIGHT lbs / kg
1-1/2 / 40	6.00 / 152	1.75 / 44	1.66 / 38	.63 / 16	4 / 102	3.88 / 99	9.31 / 236	6.25 / 159	7.13 / 181	10.50 / 267	8.00 / 203	1.88 / 48	10.50 / 4.76
2 / 50	6.00 / 152	1.75 / 44	1.66 / 38	.75 / 19	4 / 102	4.75 / 121	9.31 / 236	6.25 / 159	7.13 / 181	10.50 / 267	8.00 / 203	1.88 / 48	10.50 / 4.76
3 / 80	7.75 / 197	3.13 / 80	1.88 / 48	.75 / 19	4 / 102	6.00 / 152	9.75 / 248	6.69 / 170	7.13 / 181	10.50 / 267	8.00 / 203	1.88 / 48	11.60 / 5.26
4 / 100	9.25 / 235	3.94 / 100	2.06 / 52	.75 / 19	8 / 203	7.50 / 191	10.19 / 259	7.94 / 202	7.13 / 181	12.00 / 305	8.00 / 203	1.88 / 48	14.30 / 6.49
6 / 150	11.25 / 286	5.81 / 148	2.19 / 56	.88 / 22	8 / 203	9.50 / 241	12.38 / 314	9.50 / 241	7.13 / 181	14.00 / 356	8.00 / 203	1.88 / 48	15.40 / 6.99
8 / 200	13.75 / 349	7.75 / 197	2.38 / 60	.88 / 22	8 / 203	11.75 / 298	13.50 / 343	10.63 / 270	7.13 / 181	16.00 / 406	8.00 / 203	1.88 / 48	23.50 / 10.66
10 / 250	16.00 / 406	9.76 / 248	3.00 / 76	1.00 / 25	12 / 305	14.25 / 362	16.00 / 406	N/A	8.09 / 205	N/A	8.00 / 203	2.36 / 60	39.00 / 17.69
12 / 300	19.00 / 483	11.50 / 292	3.18 / 81	1.00 / 25	12 / 305	17.00 / 432	17.50 / 445	N/A	8.09 / 205	N/A	8.00 / 203	2.36 / 60	51.00 / 23.13

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

Cv VALUES

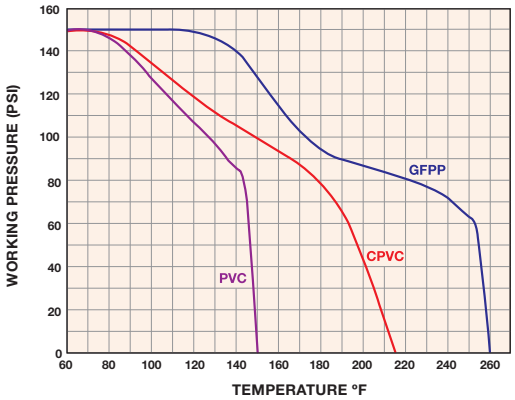
SIZE in / DN	DISC ANGLE 15°	30°	45°	60°	75°	FULL OPEN
	Cv VALUES					
1-1/2 / 40	1	8	15	25	58	90
2 / 50	2	11	21	35	81	125
3 / 80	11	28	55	90	170	280
4 / 100	16	55	75	145	340	600
6 / 150	35	110	255	545	940	1300
8 / 200	160	220	580	1035	1820	2500
10 / 250	200	450	1000	1800	3100	4700
12 / 300	250	750	1300	2800	4500	7100

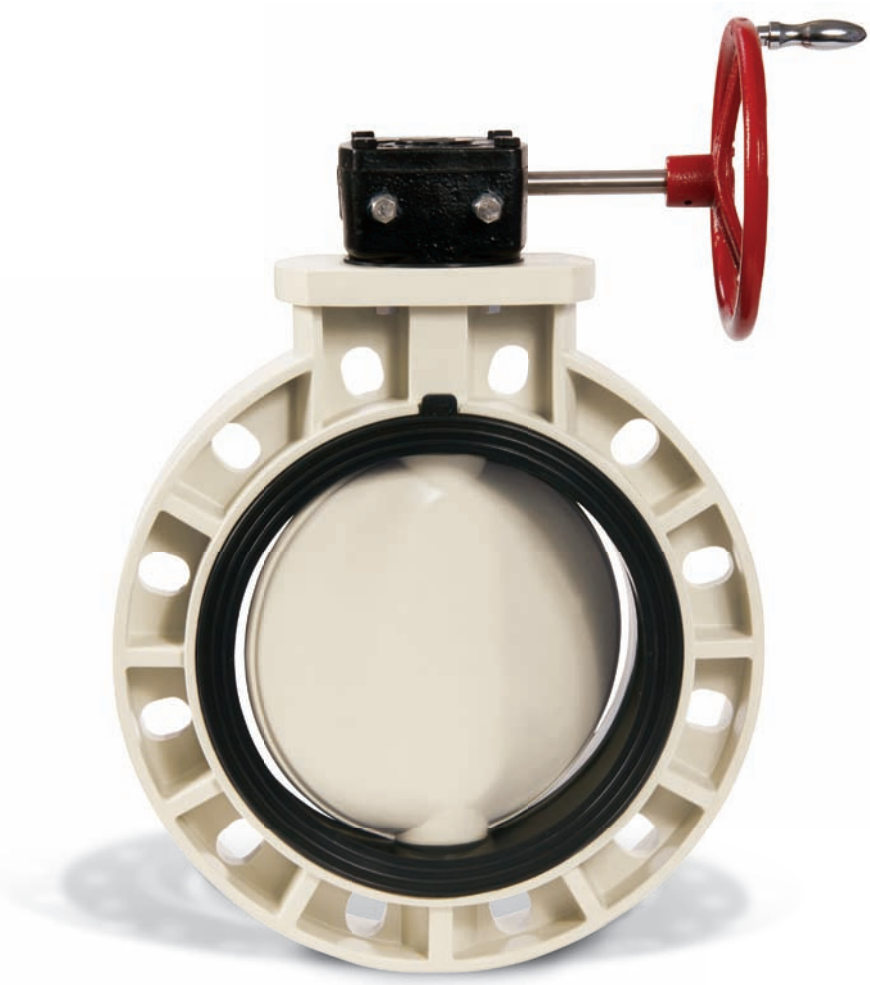
PRESSURE LOSS CALCULATION FORMULA

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

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

OPERATING TEMPERATURE / PRESSURE





BYB Series Large Diameter Butterfly Valves

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

KEY FEATURES

- PVC, CPVC, PP and PVDF Bodies
- 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

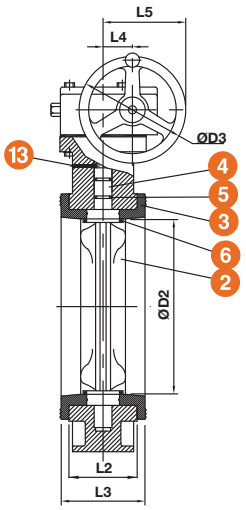
SELECTION CHART

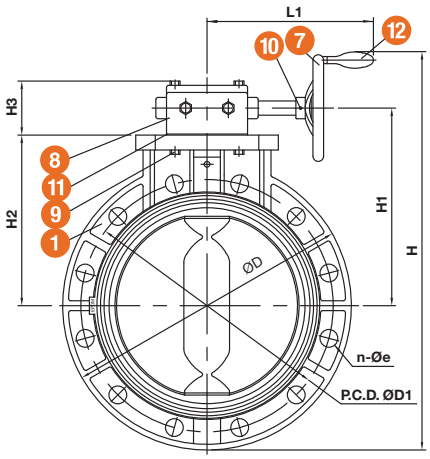
SIZE	BODY MATERIAL	DISC MATERIAL	LINER MATERIAL	PRESSURE RATING
10" (DN250)	PVC, CPVC, PP or PVDF	CPVC, PP or PVDF	FPM, EPDM or Nitrile	150 PSI @ 70°F Non-Shock
12" (DN300)				100 PSI @ 70°F Non-Shock
14" – 16" (DN350 – DN400)				86 PSI @ 70°F Non-Shock
18" (DN450)				72 PSI @ 70°F Non-Shock
20" – 24" (DN500 – DN600)				51 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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



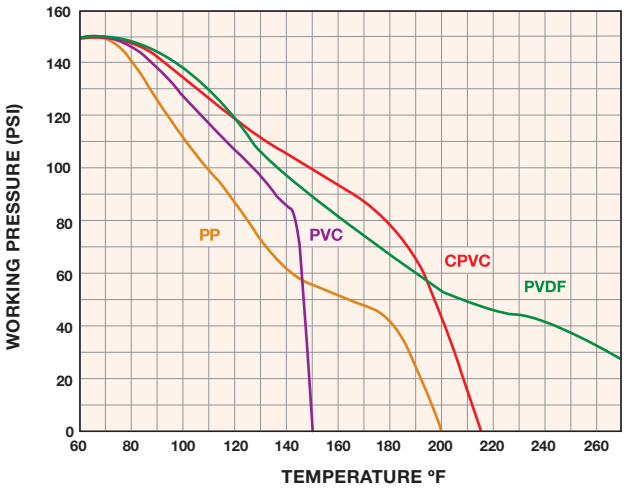


DIMENSIONS – INCHES / MILLIMETERS

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
10 / 250	12-25	16.18 / 411	14.25 / 362	10.04 / 255	7.95 / 202	23.27 / 591	11.26 / 286	9.53 / 242	3.05 / 77	11.20 / 284	3.76 / 96	4.29 / 109	2.36 / 60	6.34 / 161
12 / 300	12-25	19.29 / 490	17.01 / 432	12.19 / 310	9.84 / 250	27.80 / 706	13.54 / 344	11.89 / 302	2.99 / 76	12.99 / 330	4.59 / 117	5.24 / 133	2.36 / 60	7.28 / 185
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



BYC Series Butterfly Valves

2" TO 8" PVC

KEY FEATURES

- Wafer Body Design
- PVC Body with PVC Disc
- 316 Grade Stainless Steel Stem
- ISO 5211 Mounting Pad
- Standard Lockout

OPTIONS

- Gear Operators
- Pneumatic or Electric Actuators

MATERIALS

- PVC Cell Class 12454 per ASTM D1784

TECHNICAL INFORMATION

ACTUATED VALVE

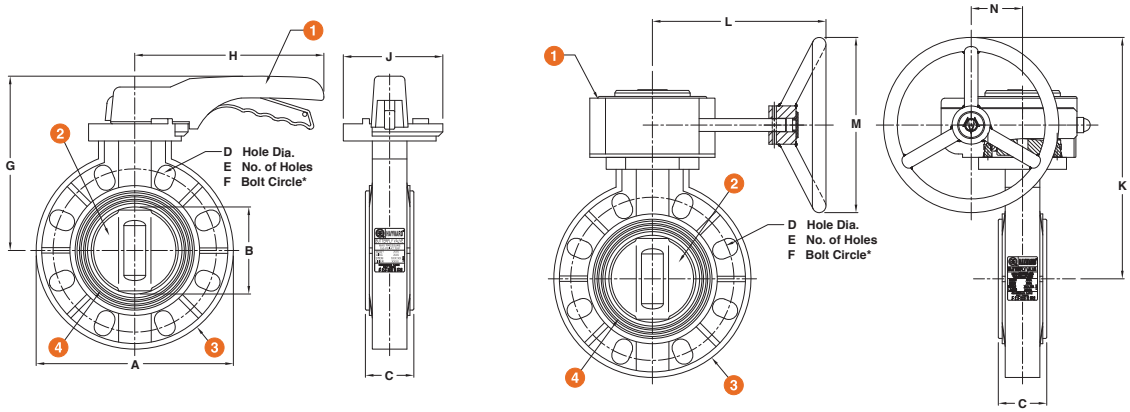
SELECTION CHART

SIZE	BODY MATERIAL	DISC MATERIAL	LINERS	PRESSURE RATING
2" – 6" (DN50 – DN150)	PVC	PVC	EPDM	150 PSI @ 70°F Non-Shock
8" (DN200)				100 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

1. Operator (Lever or Gear box)
2. Disc
3. Body
4. Liner



* Fits PN10 Flanges

DIMENSIONS – INCHES / MILLIMETERS

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	N in / mm
2 / 50	6.30 / 160	2.13 / 54	1.75 / 44	.75 / 19	4 / 102	4.75 / 121	6.37 / 162	8.66 / 220	4.26 / 108	9.52 / 242	9.69 / 246	8.00 / 203	2.36 / 60
2-1/2 / 63	7.08 / 180	2.64 / 67	1.89 / 48	.75 / 19	4 / 102	5.50 / 140	6.73 / 171	8.66 / 220	4.26 / 108	9.88 / 251	9.69 / 246	8.00 / 203	2.36 / 60
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

Cv VALUES

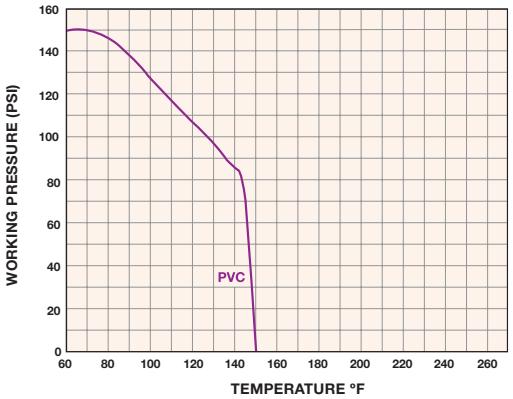
DISC ANGLE	15°	30°	45°	60°	75°	FULL OPEN
SIZE in / DN	Cv VALUES					
2 / 50	1	6	24	32	84	120
2-1/2 / 63	3	13	50	108	175	250
3 / 80	4	15	60	129	210	300
4 / 100	7	24	94	202	329	470
5 / 125	13	42	166	357	581	830
6 / 150	18	55	220	473	770	1,100
8 / 200	90	125	500	1,075	1,750	2,500

PRESSURE LOSS CALCULATION FORMULA

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

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

OPERATING TEMPERATURE / PRESSURE



DAB Series True Union Diaphragm Valves

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

KEY FEATURES

- PVC, CPVC, PP and PVDF
- Position Indicator
- Ergonomic 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
- PP per ASTM D4101
- PVDF
- FPM, EPDM and PTFE O-Ring Seals

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

TECHNICAL INFORMATION

EXPLODED VIEW

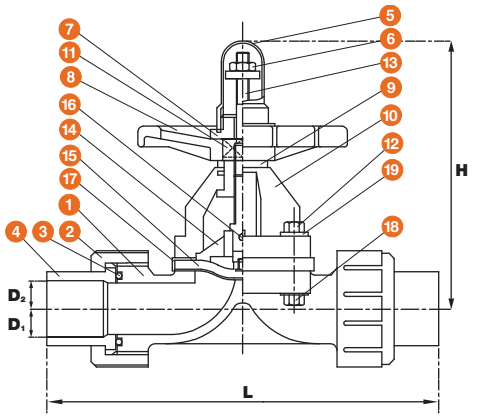
SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded	FPM, EPDM, PTFE or PVDF Vapor Barrier	FPM or EPDM	150 PSI @ 70°F Non-Shock
	PP or PVDF	Threaded			

TECHNICAL INFORMATION, *CONTINUED*

1/2" – 1" PARTS LIST (A)

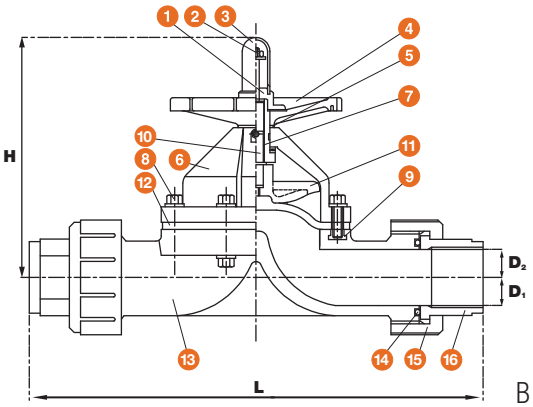
1. Union Body
2. Union Gland Cap
3. Union O-Ring
4. Union Body Cap
5. Gauge Cap
6. Stopper Nut
7. Lock Nut
8. Hand Wheel
9. Thrust Washer
10. Bonnet
11. Sleeve
12. Nut
13. Stem
14. Compressor
15. Diaphragm
16. Pin
17. Diaphragm Cover Plate
18. Bolt
19. Washer



A

1-1/4" – 2" PARTS LIST (B)

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



B

DIMENSIONS – INCHES / MILLIMETERS

THREADED (PVC, CPVC, PP AND PVDF)				SOCKET (PVC, CPVC AND PP)				SOCKET (PVDF)			
SIZE in / DN	L in / mm	d2	H in / mm	SIZE in / DN	L in / mm	d1 in / mm	H in / mm	SIZE in / DN	L in / mm	d1 in / mm	H in / mm
1/2 / 15	5.55 / 141	1/2 – NPT	3.74 / 95	1/2 / 15	5.90 / 150	.85 / 22	3.74 / 95	1/2 / 15	5.90 / 150	.88 / 22	3.74 / 95
3/4 / 20	6.22 / 158	3/4 – NPT	3.94 / 100	3/4 / 20	6.69 / 170	1.06 / 27	3.94 / 100	3/4 / 20	6.69 / 170	1.04 / 26	3.94 / 100
1 / 25	7.17 / 182	1 – NPT	4.33 / 110	1 / 25	7.95 / 202	1.32 / 34	4.33 / 110	1 / 25	7.95 / 202	1.28 / 33	4.33 / 110
1-1/4 / 30	10.63 / 270	1-1/4 – NPT	7.67 / 195	1-1/4 / 30	11.22 / 285	1.91 / 48	7.67 / 195	1-1/4 / 30	11.22 / 285	1.91 / 48	7.67 / 195
1-1/2 / 40	10.63 / 270	1-1/2 – NPT	7.67 / 195	1-1/2 / 40	11.22 / 285	1.91 / 48	7.67 / 195	1-1/2 / 40	11.22 / 285	1.91 / 48	7.67 / 195
2 / 50	12.13 / 308	2 – NPT	8.27 / 210	2 / 50	12.79 / 325	2.39 / 61	8.27 / 210	2 / 50	12.79 / 325	2.39 / 61	8.27 / 210

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

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
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

DAB Series Flanged Diaphragm Valves

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

KEY FEATURES

- 1/2" to 6" PVC and 1/2" to 4" CPVC
- Position Indicator
- Sure-Grip Handwheel
- Choice of FPM, EPDM or PTFE Diaphragms*

OPTIONS

- Pneumatic or Electric Actuation to 4" **
- PVDF Vapor Barrier***

MATERIALS

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

* All PTFE diaphragms are EPDM backed
** Over 4" Actuation, Consult Factory
*** PVDF Vapor Barrier available with EPDM and PTFE diaphragm only

TECHNICAL INFORMATION

EXPLODED VIEW

SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC	Flanged	FPM, EPDM, PTFE or PVDF Vapor Barrier	150 PSI @ 70°F Non-Shock
6" (DN150)				75 PSI @ 70°F Non-Shock
1/2" – 4" (DN15 – DN100)	CPVC			150 PSI @ 70°F Non-Shock

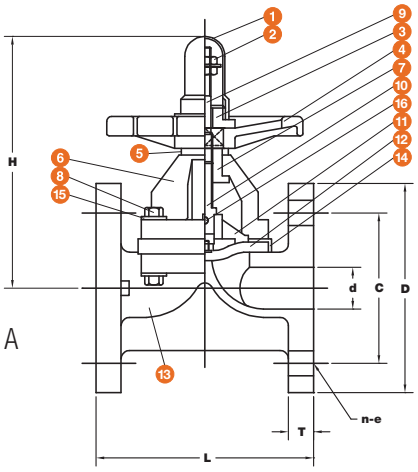
DAB Series Flanged Diaphragm Valves

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

TECHNICAL INFORMATION, *CONTINUED*

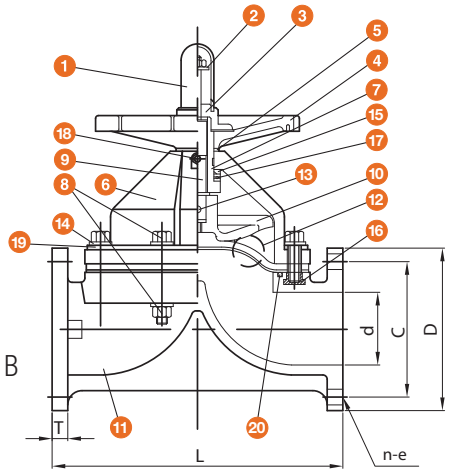
1/2" – 6" PARTS LIST (A)

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



1/2" – 4" PARTS LIST (B)

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



DIMENSIONS – INCHES / MILLIMETERS

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	5.12 / 130	.51 / 13	4-15.7
1-1/4 / 32	3.50 / 89	1.20 / 30	4.60 / 117	5.75 / 146	5.30 / 134	.60 / 15	4-15.7
1-1/2 / 40	3.88 / 99	1.61 / 41	5.00 / 127	7.76 / 197	7.09 / 180	.63 / 16	4-15.7
2 / 50	4.75 / 121	2.05 / 52	6.00 / 152	8.58 / 218	8.27 / 210	.79 / 20	4-19
2-1/2 / 63	5.50 / 140	2.64 / 67	7.00 / 178*	10.24 / 260	9.84 / 250	.91 / 23	4-19
3 / 80	6.00 / 152	3.07 / 78	7.50 / 191	10.63 / 270	11.02 / 280	.91 / 23	4-19
4 / 100	7.50 / 190	3.94 / 100	9.00 / 229	11.81 / 300	13.39 / 340	.94 / 24	8-19
6 / 150**	9.59 / 244	5.83 / 148	11.00 / 279	18.74 / 476	18.90 / 480	1.06 / 27	8-22

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

* CPVC "D" dimension = 6.90 / 175

** 6" available in PVC only

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	5.0	1-1/4 / 30	18.0	2-1/2 / 63	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		

DAB Series Flanged Diaphragm Valves

1/2" TO 10" PP AND 1/2" TO 8" PVDF

KEY FEATURES

- 1/2" to 10" PP and 1/2" to 8" PVDF
- Position Indicator
- Sure-Grip Handwheel
- Choice of FPM, EPDM or PTFE Diaphragms*

OPTIONS

- Pneumatic or Electric Actuation to 4" **
- PVDF Vapor Barrier***

MATERIALS

- PP per ASTM D4101
- PVDF

* All PTFE diaphragms are EPDM backed
** Over 4" Actuation, Consult Factory
*** PVDF Vapor Barrier available with EPDM and PTFE diaphragm only

TECHNICAL INFORMATION

EXPLODED VIEW

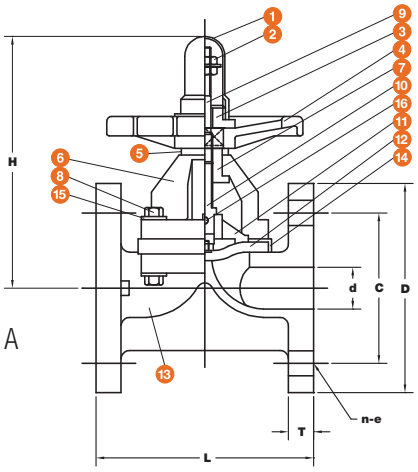
SELECTION CHART

SIZE	MATERIAL	END CONNECTION	DIAPHRAGM	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PP	Flanged	FPM, EPDM, PTFE or PVDF Vapor Barrier	150 PSI @ 70°F Non-Shock
6" – 10" (DN150 – DN250)				75 PSI @ 70°F Non-Shock
1/2" – 4" (DN15 – DN100)	PVDF		PTFE	150 PSI @ 70°F Non-Shock
6" – 8" (DN150 – DN200)				75 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*

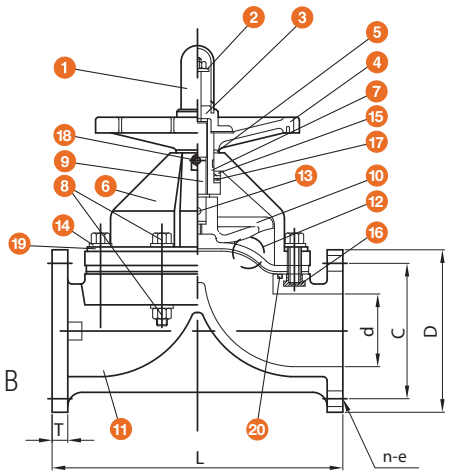
1/2" – 10" PARTS LIST (A)

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



1/2" – 8" PARTS LIST (B)

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



DIMENSIONS – INCHES / MILLIMETERS

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 / 63	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
8 / 200	11.70 / 297	7.64 / 194	13.50 / 343	24.69 / 627	22.44 / 570	1.24 / 31	8-22
10 / 250*	14.25 / 362	9.72 / 247	16.00 / 406	17.55 / 699	26.70 / 678	1.46 / 37	12-25

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

* 10" available in PP only

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	5.0	1-1/4 / 30	18.0	2-1/2 / 63	80.0	6 / 150**	400.0
3/4 / 20	8.0	1-1/2 / 40	26.0	3 / 80	115.0	8 / 200	700.0
1 / 25	10.0	2 / 50	56.0	4 / 100	190.0	10 / 250	1000.0

SV Series True Union Solenoid Valves

1/4" TO 1" PVC AND CPVC

KEY FEATURES

- PVC and CPVC
- Continuous or 100% Duty Applications
- 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.

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

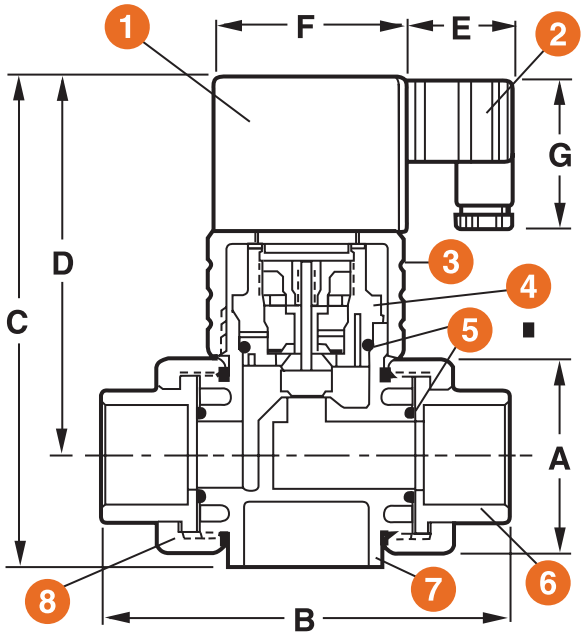
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 1" * (DN8 – DN25)	PVC or CPVC	Socket and Threaded	FPM or EPDM	150 PSI @ 70°F Non-Shock

* Sizes are 1/4", 1/2", 3/4" and 1"

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 – INCHES / MILLIMETERS

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 GPM	SIZE in / DN	Cv VALUES GPM
1/4 / 8	1.3	3/4 / 20	3.2
1/2 / 15	2.3	1 / 25	3.8

PRESSURE LOSS CALCULATION FORMULA

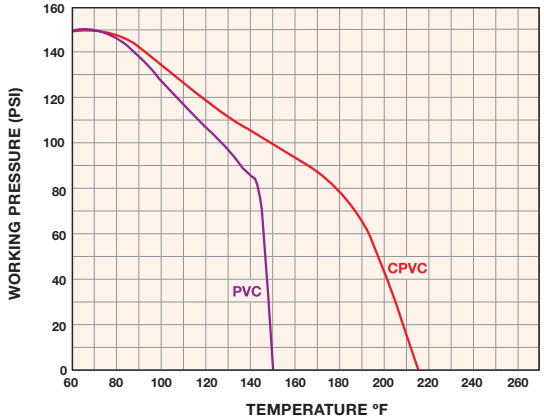
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



RV Series Pressure Relief Valves

1/2" TO 2" PVC AND CPVC

KEY FEATURES

- 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 Gauge
- 0 to 60 PSI Gauge
- 0 to 160 PSI 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 Non-Shock

* Inlet pressure over 75 PSI cannot be regulated

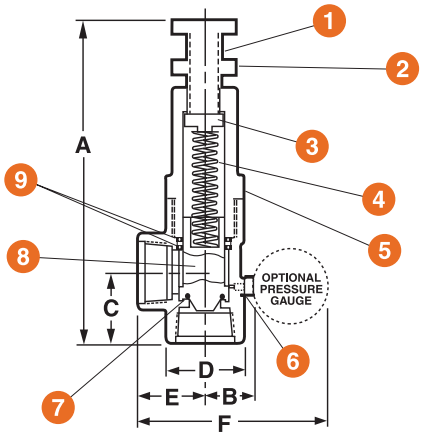
RV Series Pressure Relief Valves

1/2" TO 2" PVC AND CPVC

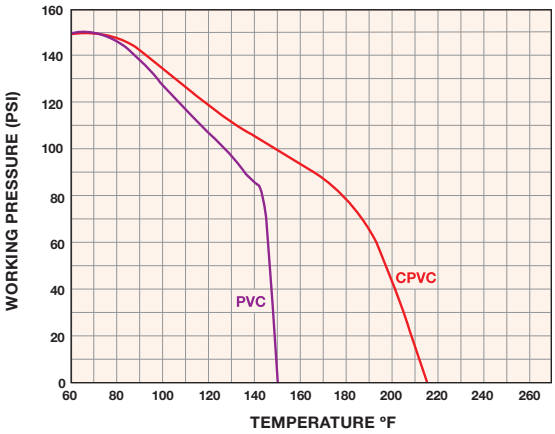
TECHNICAL INFORMATION, *CONTINUED*

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) +5	+10	+20	OVERPRESSURE (PSI) +5	+10	+20	OVERPRESSURE (PSI) +5	+10	+20	OVERPRESSURE (PSI) +2* +5	+5* +10	+20	OVERPRESSURE (PSI) +2* +10	+5* +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

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

PR Series Pressure Regulator Valves

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

KEY FEATURES

- 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 Gauge
- 0 to 60 PSI Gauge
- 0 to 160 PSI Gauge
- Gauge Guards
- 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

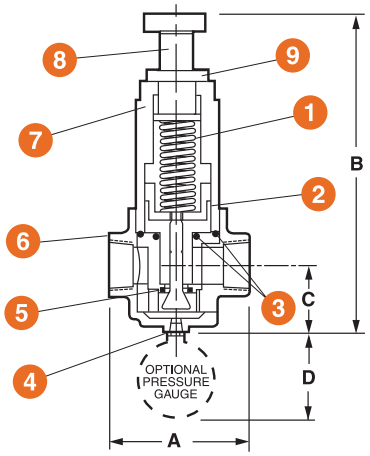
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE SETTING	PRESSURE RATING
1/4" – 1-1/2" (DN8 – DN40)	PVC or CPVC	Threaded or Flanged	FPM	5 to 75* PSI	150 PSI @ 70°F Non-Shock

* Inlet pressure over 75 PSI cannot be regulated

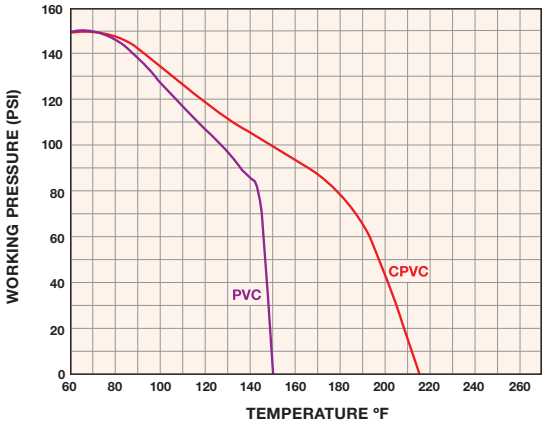
TECHNICAL INFORMATION, *CONTINUED*

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

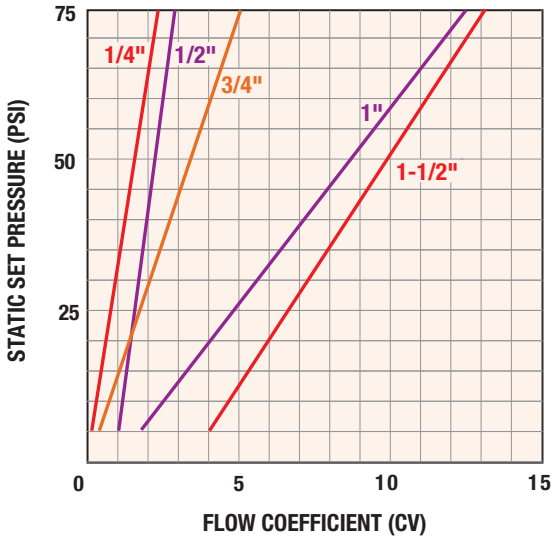
Pressure regulator selection is based on the desired flow, inlet pressure and the desired outlet pressure.
Example: A system requires a flow rate of 10 GPM at a set pressure of 30 PSI, and the inlet pressure is 50 PSI. From the graph at right, a 1" regulator has a flow coefficient of 5.5 at a 30 PSI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

$\Delta P = (Q \div Cv)^2$ ΔP = Pressure Drop
$\Delta P = (10 \div 5.5)^2$ Q = Flow in GPM
$\Delta P = 3.3$ PSI Cv = 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:

$Q = Cv \sqrt{\Delta P}$
$Q = 5.5 \sqrt{20}$
$Q = 24.6$ GPM

FLOW COEFFICIENTS



AV Series Angle Globe Valves

1/4" TO 2" PVC

KEY FEATURES

- PVC
- Space Saving 90° Body
- Panel Mount Lugs on 1/4" Size
- Fine Pitch Stem Threads for Precision Adjustment
- Reliable Globe Valve Design
- Perfect for Throttling and Changing Flow Direction

OPTIONS

- Flanged Ends 1/2" to 2"

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" – 2" (DN8 – DN50)	PVC	Threaded or Flanged	FPM	150 PSI @ 70°F Non-Shock

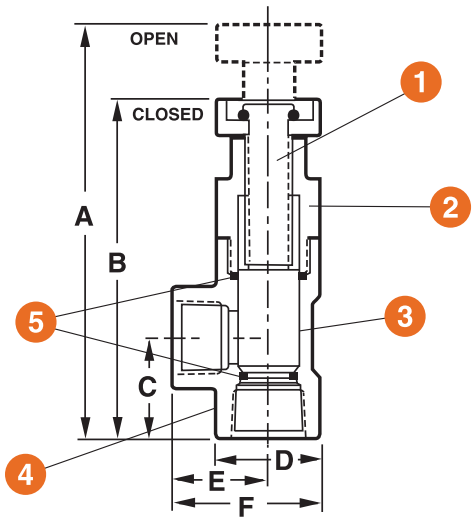
AV Series Angle Globe Valves

1/4" TO 2" PVC

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 GPM
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

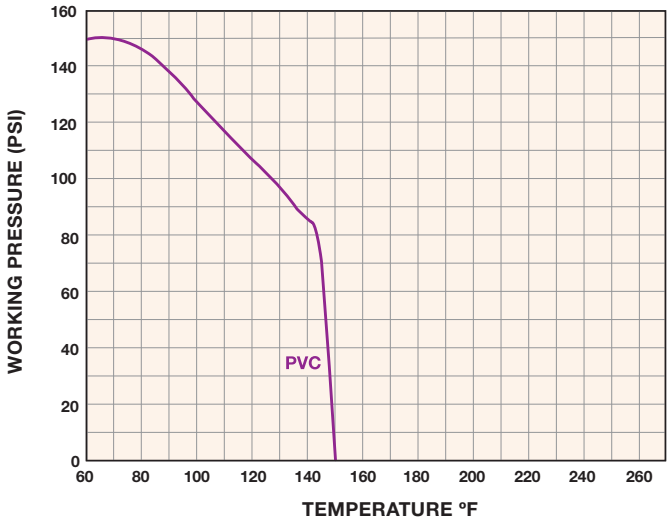
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



NVA Series Needle Valves*

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

KEY FEATURES

- Available in PVC and GFPP
- 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

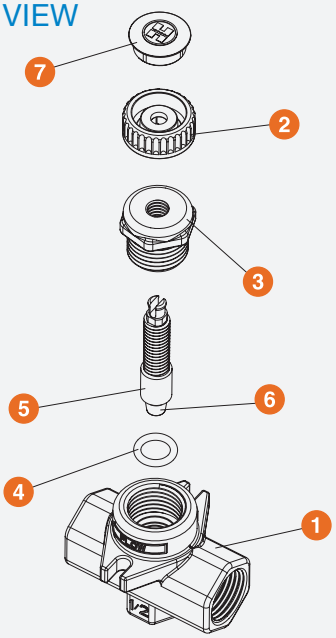
MATERIALS

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

* Patent Pending

TECHNICAL INFORMATION

EXPLODED VIEW



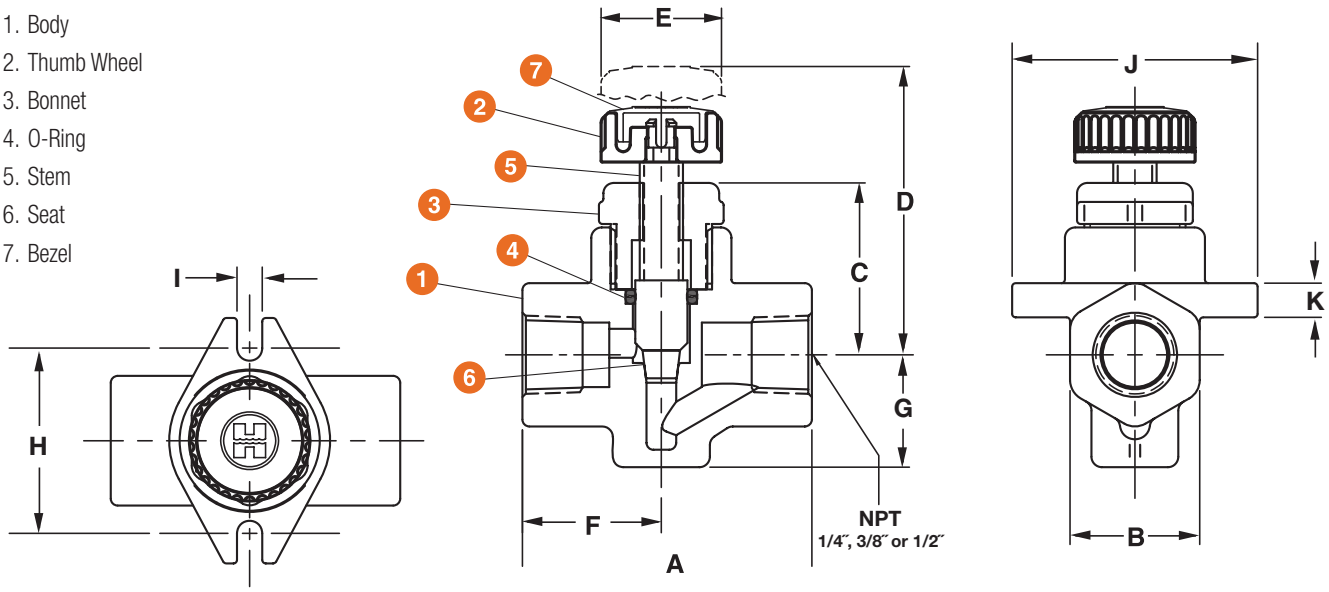
SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" – 1/2" (DN8 – DN15)	PVC or GFPP	Threaded	FPM	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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



DIMENSIONS – INCHES / MILLIMETERS

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 GPM
1/4 / 8	.64
3/8 / 10	.72
1/2 / 15	.79

PRESSURE LOSS CALCULATION FORMULA

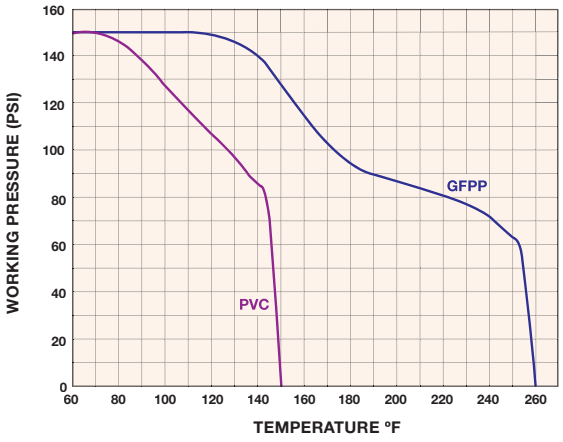
$$\Delta P = \left[\frac{Q}{Cv}\right]^2$$

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

OPERATING TEMPERATURE / PRESSURE



LC Series Universal Stopcock™

1/4" PVC

KEY FEATURES

- PVC
- Six End Connections in One Package
- EPDM Seals
- Hex Wrench Included for End Connection Installation
- NSF / ANSI 61 Listed

MATERIALS

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

TECHNICAL INFORMATION

SELECTION CHART

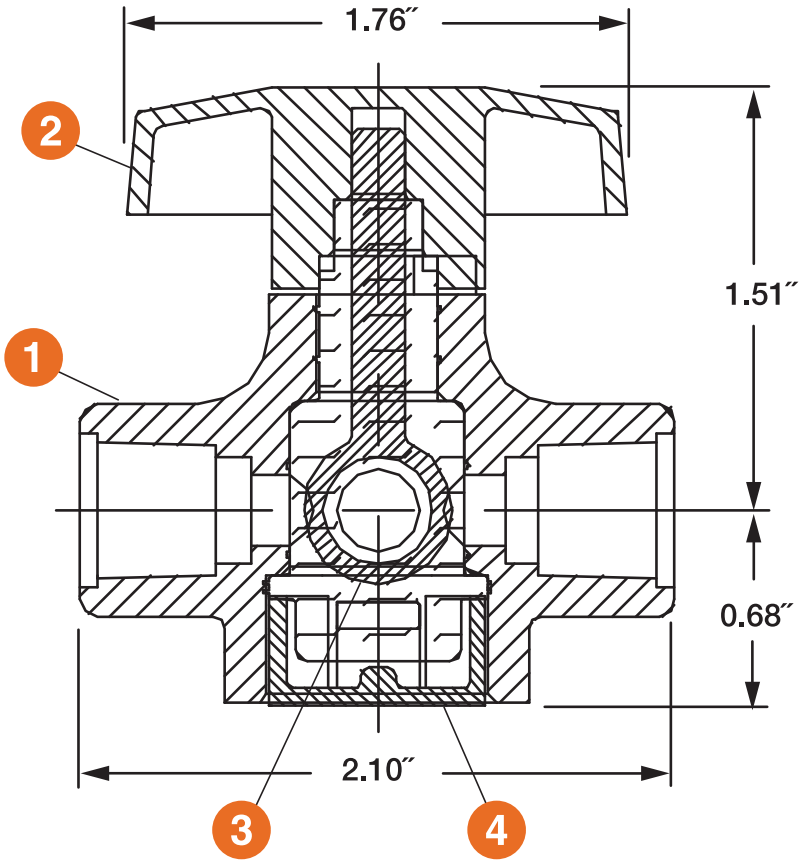
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/4" (DN8)	PVC	FPT x FPT FPT x MPT FPT x Hose MPT x MPT MPT x Hose Hose x Hose	EPDM	150 PSI @ 70°F Non-Shock

FPT = female pipe thread, MPT = male pipe thread

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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

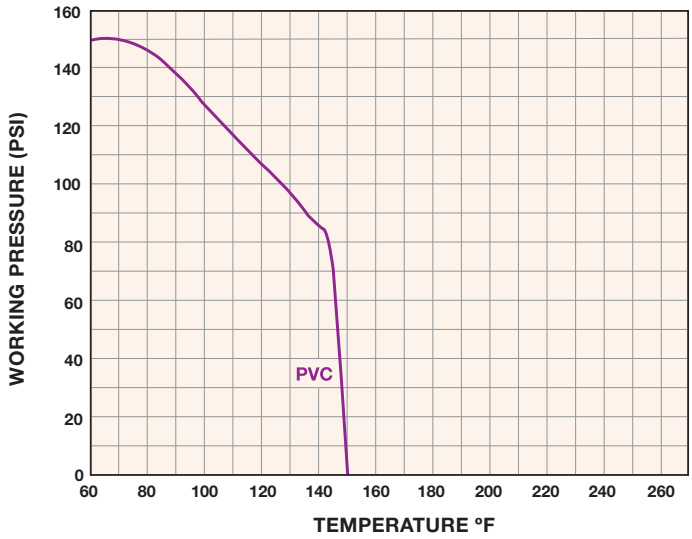


DIMENSIONS

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

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

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

EA Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

- PVC and CPVC
- EPDM Seals
- PTFE Seats
- Full Port Design
- Fully Serviceable
- Double O-Ring Stem Seals
- NSF / ANSI 61 Listed

MATERIALS

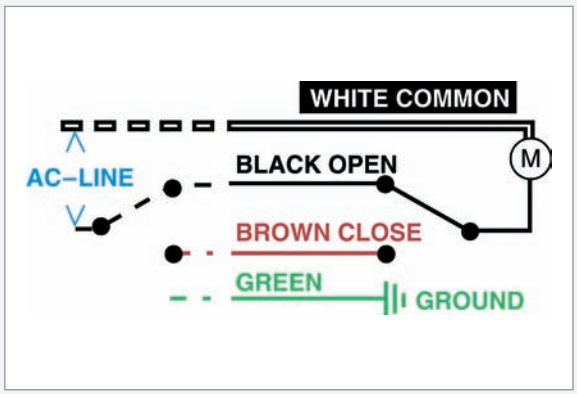
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM O-Ring Seals

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

TECHNICAL INFORMATION

WIRING DIAGRAM



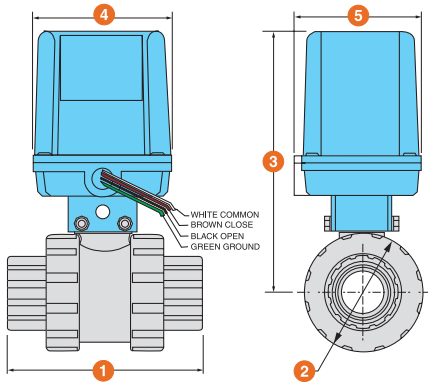
SELECTION CHART

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 Non-Shock

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	EATB
Torque Output (in-lbs)	140
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 GPM	SIZE in / DN	Cv VALUES GPM
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

EAU Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

- PVC and CPVC
- FPM or EPDM Seals
- PTFE Seats
- Full Port Design
- Fully Serviceable
- Double O-Ring Stem Seals
- NSF / ANSI 61 Listed

MATERIALS

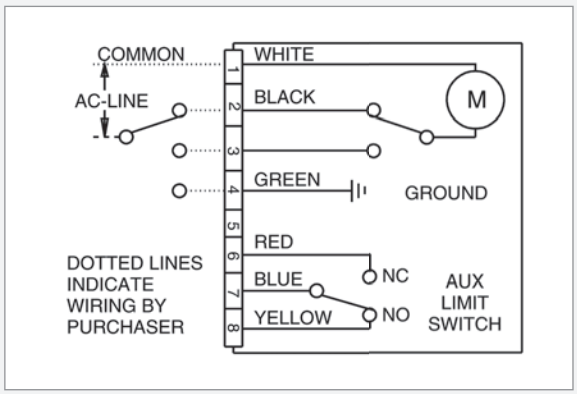
- PVC Cell Class 12454 per ASTM D1784
- CPVC Cell Class 23447 per ASTM D1784
- FPM and EPDM Seals

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
- Voltage Options
- SPDT Aux. Limit Switch

TECHNICAL INFORMATION

WIRING DIAGRAM



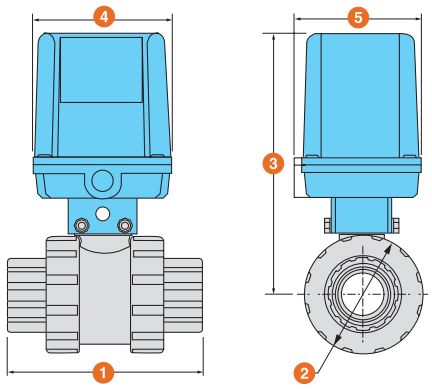
SELECTION CHART

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 Non-Shock

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	EATB
Torque Output (in-lbs)	140
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

* EAU28 = 5.0, EAU29 = 2.5

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 GPM	SIZE in / DN	Cv VALUES GPM
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

PM Series Automated True Union Ball Valves

1/2" TO 2" PVC AND CPVC

VALVE FEATURES

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

ACTUATOR FEATURES

- Corrosion-Resistant Thermoplastic Housing
- Permanently Lubricated Gear Train
- Manual Override
- Two-Piston Rack and Pinion Design
- Namur-Style Solenoid Mounting
- Position Indicator
- Air-to-Air (Double Acting) or Spring Return

MATERIALS

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

TECHNICAL INFORMATION

SPECIFICATIONS

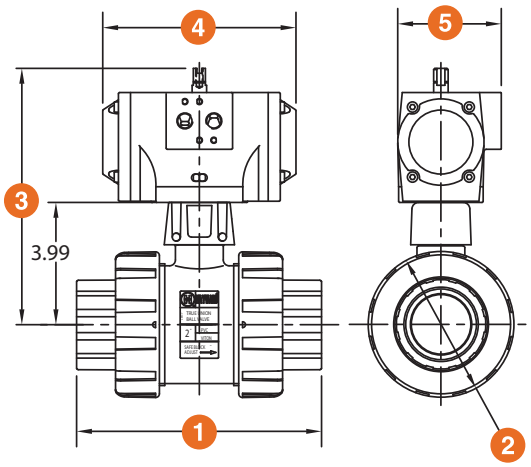
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 2" (DN15 – DN50)	PVC or CPVC	Socket and Threaded	FPM or EPDM	250 PSI @ 70°F Non-Shock

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	4.63 / 118	2.25 / 57	6.67 / 169	6.30 / 160	3.39 / 86
3/4 / 20	4.75 / 121	2.63 / 67	6.86 / 174	6.30 / 160	3.39 / 86
1 / 25	5.25 / 133	3.00 / 76	7.36 / 187	6.30 / 160	3.39 / 86
1-1/4 / 32	6.30 / 160	4.00 / 102	7.76 / 197	6.30 / 160	3.39 / 86
1-1/2 / 40	6.75 / 171	4.00 / 102	7.76 / 197	6.30 / 160	3.39 / 86
2 / 50	8.00 / 203	4.75 / 121	8.36 / 212	6.30 / 160	3.39 / 86
DOUBLE ACTING (PMD)					
1/2 / 15	4.63 / 118	2.25 / 57	5.88 / 149	4.69 / 119	2.64 / 67
3/4 / 20	4.75 / 121	2.63 / 67	6.07 / 154	4.69 / 119	2.64 / 67
1 / 25	5.25 / 133	3.00 / 76	6.57 / 167	4.69 / 119	2.64 / 67
1-1/4 / 32	6.30 / 160	4.00 / 102	6.97 / 177	4.69 / 119	2.64 / 67
1-1/2 / 40	6.75 / 171	4.00 / 102	6.97 / 177	4.69 / 119	2.64 / 67
2 / 50	8.00 / 203	4.75 / 121	7.57 / 192	4.69 / 119	2.64 / 67

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



ACTUATOR SPECIFICATIONS

MODEL	PMD10	MODEL	PMS15
Torque Output (in-lbs) @ 80 PSI	125	Torque Output (in-lbs) @ 80 PSI	107
Enclosure Material	Polyamide	Enclosure Material	Polyamide
Output Shaft	Stainless Steel	Output Shaft	Stainless 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)	1.3 / .6	Weight (lbs / kg)	3.1 / 1.4

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
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

PMD Series Double Acting Pneumatic Actuators

FOR 1/4" TO 2" BALL VALVES

KEY FEATURES

- Corrosion-Resistant Thermoplastic Housing
- Two-Piston Rack and Pinion Design
- Manual Override
- Position Indicator
- Permanent Lubrication
- Lightweight
- Namur-Style Solenoid Mounting
- ISO 5211 Mounting Base

OPTIONS

- Double Acting Air-to-Open and Close
- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Speed Controls

TECHNICAL INFORMATION

EXPLODED VIEW

SPECIFICATIONS

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

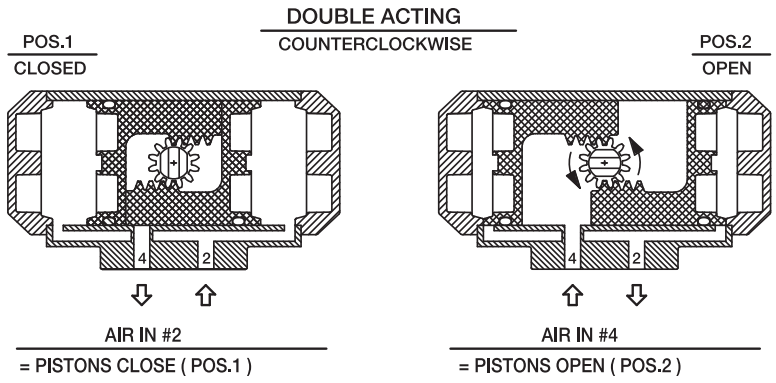
TECHNICAL INFORMATION, *CONTINUED*

DIMENSIONS

MODEL	øA in / mm	B in / mm	C in / mm	L in / mm	P in / mm	R in / mm
PMD10	.43 / 11 ISO F05	10-32 x .32 UNF-ISO F05	ø1.65 / 42 ISO F05	4.69 / 119	3.58 / 91	2.64 / 67

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

ACTUATOR OPERATING SYSTEMS



ACTUATOR SPECIFICATIONS

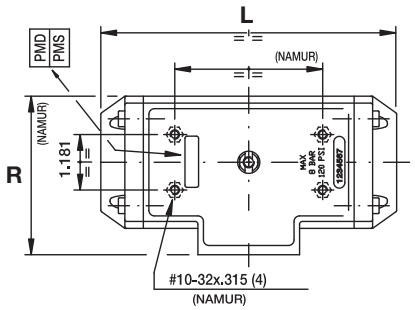
MODEL	PMD10
Torque Output (in-lbs) @ 80 PSI	125
Enclosure Material	Polyamide
Output Shaft	Stainless Steel
Air Port Connections	1/4" NPT
Air Consumption (cu. in.)	13.5
Air Transfer	Internal
Stroke Time (seconds)	.5
Cycle Time	1/2 Second
Minimum Air Pressure	80 PSI
Maximum Air Pressure	120 PSI
Operation	Rack and Pinion
Weight (lbs / kg)	1.3 / .6

VALVE SELECTION CHART

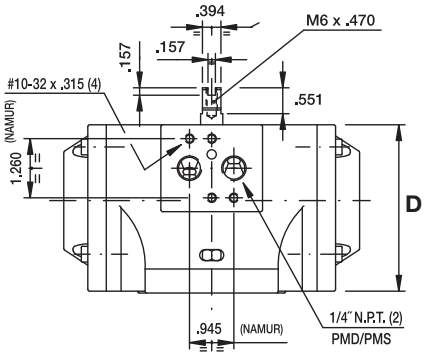
SIZE* in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE
1/4 – 2 / 8 – 50	PMD10	PMD10

* Actuator selection based on clean water @ 70°F

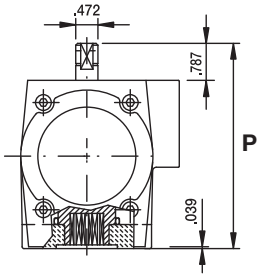
TOP



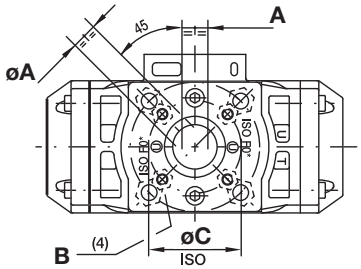
FRONT



SIDE



BOTTOM



PMS Series Spring Return Pneumatic Actuators

FOR 1/4" TO 2" BALL VALVES

KEY FEATURES

- Corrosion-Resistant Thermoplastic Housing
- Two-Piston Rack and Pinion Design
- Manual Override
- Position Indicator
- Permanent Lubrication
- Lightweight
- Namur-Style Solenoid Mounting
- ISO 5211 Mounting Base

OPTIONS

- Air to Spring Fail-Safe Operation
- Solenoid Valves with Optional Voltages
- Auxiliary Limit Switch
- Cycle Speed Controls

TECHNICAL INFORMATION

EXPLODED VIEW

SPECIFICATIONS

HOUSING:	Polyamide
OUTPUT SHAFT:	Stainless Steel
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 1/4" TO 2" BALL VALVES

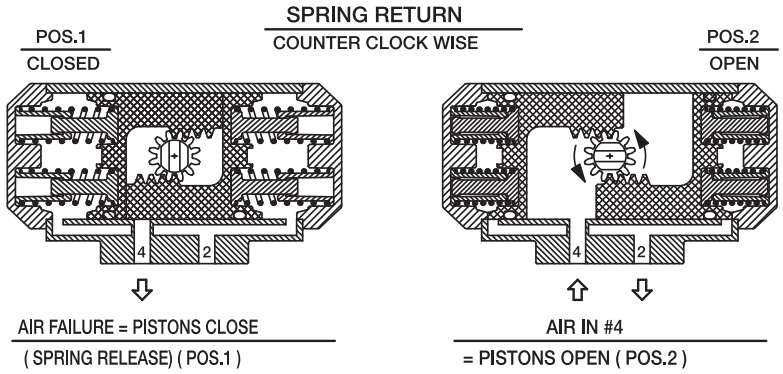
TECHNICAL INFORMATION, *CONTINUED*

DIMENSIONS

MODEL	øA in / mm	B in / mm	C in / mm	L in / mm	P in / mm	R in / mm
PMS15	.55 / 14 ISO F05	10-32 x .32 UNF-ISO F05	ø1.65 / 42 ISO F05	6.30 / 160	4.37 / 111	3.39 / 86

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

ACTUATOR OPERATING SYSTEMS



ACTUATOR SPECIFICATIONS

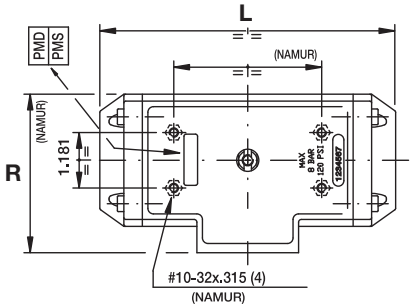
MODEL	PMS15
Torque Output (in-lbs) @ 80 PSI	107
Enclosure Material	Polyamide
Output Shaft	Stainless Steel
Air Port Connections	1/4" NPT
Air Consumption (cu. in.)	10.8
Air Transfer	Internal
Stroke Time (seconds)	.5
Cycle Time	1/2 Second
Minimum Air Pressure	80 PSI
Maximum Air Pressure	120 PSI
Operation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

VALVE SELECTION CHART

SIZE* in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE
1/4 – 2 / 8 – 50	PMS15	PMS15

* Actuator selection based on clean water @ 70°F

TOP



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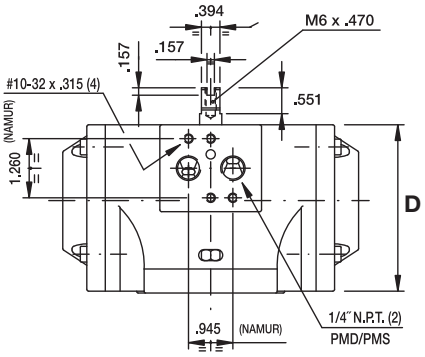
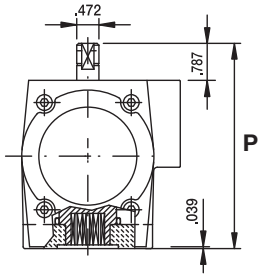


SIDE



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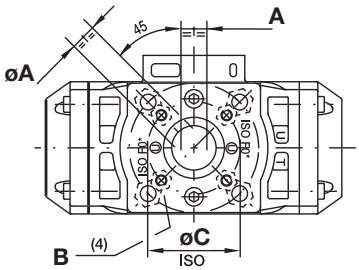


PCD Series Double Acting Pneumatic Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"

KEY FEATURES

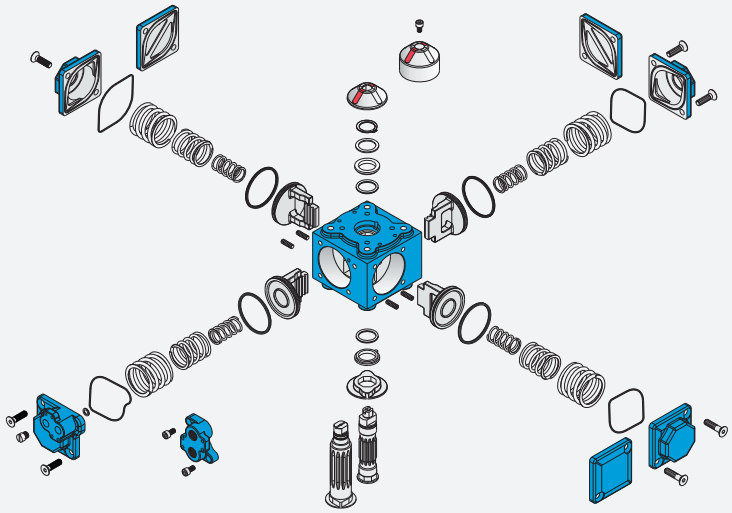
- For All Sizes of Ball and Butterfly Valves
- Four-Piston Rack and Pinion Design
- Manual Override
- Compact, Lightweight
- Position Indicator
- Namur-Style Solenoid Mounting (Inlet / Outlet)
- Adjustable Travel Stops
- ISO 5211 Mounting Base

OPTIONS

- Double Acting Air-to-Open and Close
- 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

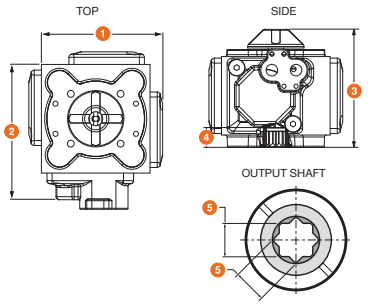
PCD Series Double Acting Pneumatic Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"

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 30	5.94 / 150	6.64 / 169	5.37 / 136	.87 / 22	.67 / 17	F07 (2.76)	33
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	N/A	7.64 / 194	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	F16 (6.50)	351



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

ACTUATOR SPECIFICATIONS

MODEL	PCD15	PCD20	PCD25	PCD30	PCD35	PCD45	PCD60	PCD75
Torque Output (in-lbs) @ 80 PSI	172	311	639	1,052	1,848	3,622	2,857	5,166
Enclosure Material	Epoxy-Coated Aluminum							
Output Shaft	Plated Steel							
Air Port Connections	1/4" NPT							
Air Consumption (cu. in.)	3	6	13	25	49	81	195	351
Air Transfer	Internal							
Stroke Time (seconds)	.5	.5	.7	.8	.5	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)	1.5 / .7	2 / .9	4.3 / 2	6.8 / 3.1	16 / 7.3	22 / 10	57 / 26	112 / 51

VALVE SELECTION CHART

SIZE* in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE	BUTTERFLY VALVE
1/4 – 1-1/4 / 8 – 32	PCD15	PCD15	N/A
1-1/2 – 2 / 40 – 50	PCD15	PCD15	PCD20
2-1/2 / 63	PCD20	PCD20	N/A
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 – 16 / 350 – 400	N/A	N/A	PCD60
18, 20 and 24 / 450, 500 and 600	N/A	N/A	PCD75

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

PCS Series Spring Return Pneumatic Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"

KEY FEATURES

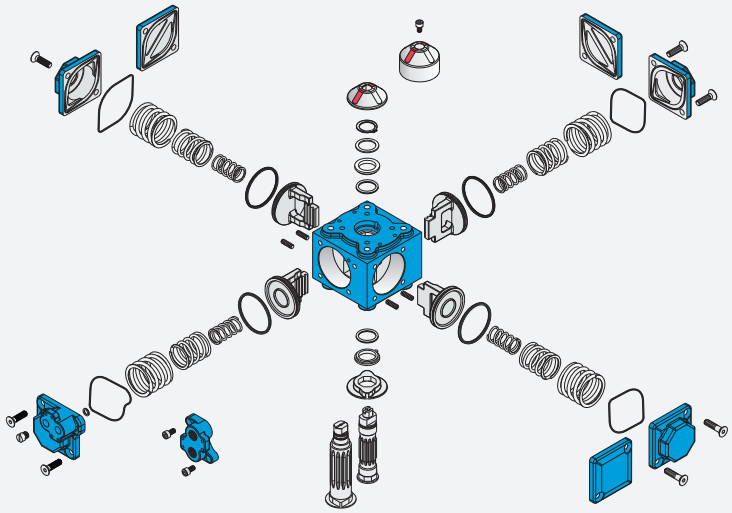
- For All Sizes of Ball and Butterfly Valves
- Four-Piston Rack and Pinion Design
- Manual Override
- Compact, Lightweight
- Position Indicator
- Namur-Style Solenoid Mounting (Inlet / Outlet)
- Adjustable Travel Stops
- ISO 5211 Mounting Base

OPTIONS

- Spring Return Fail-Safe Operation
- 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

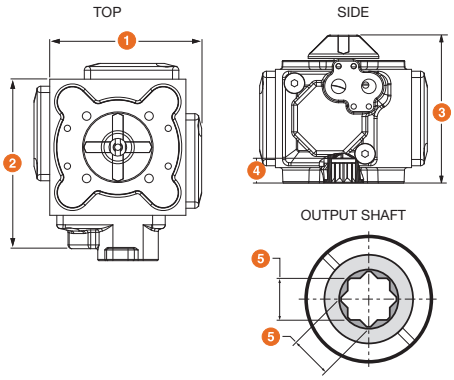
FOR BALL AND BUTTERFLY VALVES UP TO 24"

TECHNICAL INFORMATION, *CONTINUED*

DIMENSIONS

MODEL	1 in / mm	2 in / mm	3 in / mm	5 in / mm	ISO 5211 MOUNT	AIR CONSUMPTION cu. in.
PCS 15	4.31 / 109	3.50 / 89	.53 / 13	.35 / 9	F05 (1.97)	4.3
PCS 20	5.17 / 131	3.96 / 101	.59 / 15	.43 / 11	F05 (1.97)	7.3
PCS 25	6.34 / 161	4.61 / 117	.77 / 20	.55 / 14	F07 (2.76)	15
PCS 30	7.33 / 186	5.37 / 136	.87 / 22	.67 / 17	F07 (2.76)	27
PCS 35	8.74 / 222	6.10 / 155	1.02 / 26	.87 / 22	F10 (4.02)	45
PCS 45	10.59 / 269	7.64 / 194	1.30 / 33	1.06 / 27	F12 (4.92)	81
PCS 60	14.17 / 360	9.76 / 248	1.69 / 43	1.42 / 36	F14 (5.51)	195
PCS 75	17.20 / 437	11.81 / 300	1.69 / 43	1.42 / 36	F16 (6.50)	351

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



ACTUATOR SPECIFICATIONS

MODEL	PCS15	PCS20	PCS25	PCS30	PCS35	PCS45	PCS60	PCS75
Torque Output (in-lbs) @ 80 PSI	61	109	217	345	607	1,218	2,857	5,166
Enclosure Material	Epoxy-Coated Aluminum							
Output Shaft	Plated Steel							
Air Port Connections	1/4" NPT							
Air Consumption (cu. in.)	3	9.2	13	25	41	81	195	351
Air Transfer	Internal							
Stroke Time (seconds)	.5	.4	.7	.8	.8	1.5	1.5	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)	1.8 / .8	4 / 1.9	5.7 / 2.6	9.2 / 4.2	17.4 / 7.9	27.5 / 12.5	27.5 / 12.5	27.5 / 12.5

VALVE SELECTION CHART

SIZE* in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE	BUTTERFLY VALVE
1/4 – 1 / 8 – 25	PCS15	PCS15	N/A
1-1/4 – 2 / 32 – 50	PCS20	PCS20	PCS25
2-1/2 / 63	PCS25	PCS25	N/A
3 / 80	PCS25	PCS25	PCS25
4 / 100	PCS25	PCS30	PCS30
6 / 150	PCS25	PCS30	PCS35
8 / 200	N/A	N/A	PCS45
10 – 12 / 250 – 300	N/A	N/A	PCS60
14 – 16 / 350 – 400	N/A	N/A	POA
18, 20 and 24 / 450, 500 and 600	N/A	N/A	POA

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

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

EAU Series Electric Actuators

FOR BALL VALVES UP TO 2"

KEY FEATURES

- Thermoplastic NEMA 4/4X Enclosure
- 90° or 180° Operation
- Lightweight, Compact and Inexpensive
- On/Off Service Applications, Unidirectional
- UL / CSA Listed Motor Permanently Lubricated

OPTIONS

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

MATERIALS

- PP per ASTM D4101

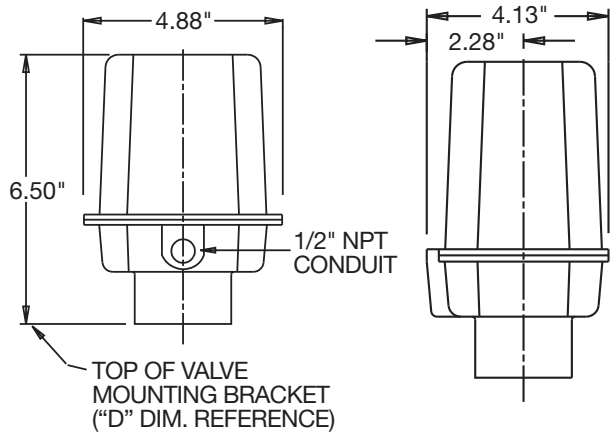
TECHNICAL INFORMATION

SPECIFICATIONS

HOUSING:	GFPP
OPERATION:	Unidirectional
CONDUIT SIZE:	1/2"
DUTY CYCLE:	25%
CYCLE TIMES:	2-1/2 Seconds, 90º Rotation; 5 Seconds, 180º Rotation
ENCLOSURE:	NEMA 4/4X
VOLTAGE:	120 VAC
THERMAL OVERLOAD PROTECTION MECHANICAL BRAKE MOTOR:	UL / CSA Listed
AUXILIARY LIMIT SWITCHES:	One

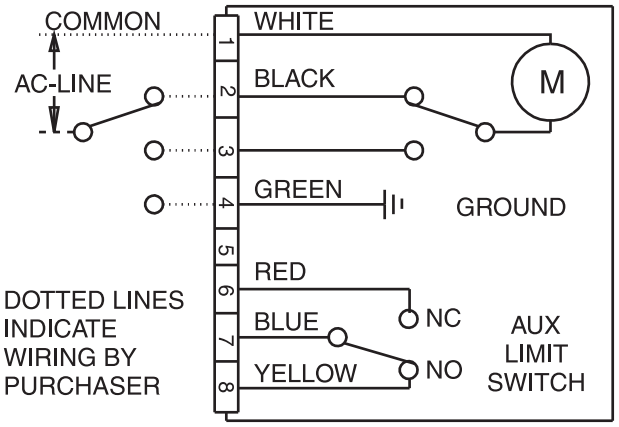
TECHNICAL INFORMATION, *CONTINUED*

DIMENSIONS



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

WIRING DIAGRAM



ACTUATOR SPECIFICATIONS

MODEL	EAU
Torque Output (in-lbs)	140
Standard Voltage	115 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 @ 115 VAC	1.8
Weight (lbs / kg)	6.2 / 2.7

* EAU28 = 5.0, EAU29 = 2.5

VALVE SELECTION CHART

SIZE in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE
1/2 – 2 / 15 – 50	EAU29 (90º)	EAU28 (180º)

* Actuator size selections based on clean water at 70ºF

Manual Override Option (EPM8 and up)- Handwheel Shown

EPM Series On/Off and Proportional Control Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 24"

KEY FEATURES

- Modular Design
- Superior Gear Design
- Thermal Management (Proportional Control Only)
- Data Logging and Diagnostics (Proportional Control Only)
- 4 Limit Switches (2 Auxiliary)
- Internal Low Power Heater
- NEMA 4/4X Enclosure
- Position Indicator
- Clutchless Manual Override
- Self-Locking Drive
- Permanently Lubricated
- Thermal Overload
- CE Listed and CSA Certified
- ISO 5211 Mounting Base

OPTIONS*

- Positioners
- Power Supply Flexibility – 3 Phase 2/230 VAC, 380 VAC or 460 VAC
- Extended Duty Motors
- Feedback Potentiometer
- Local Control Station

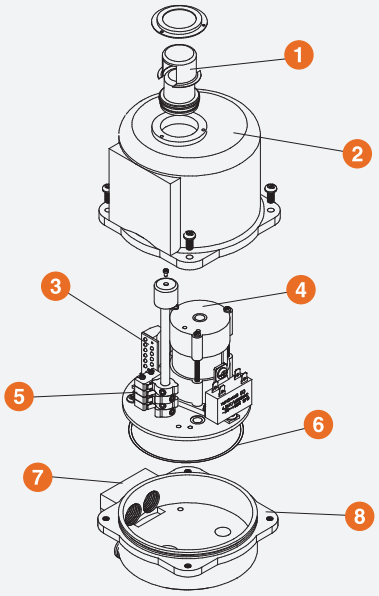
PARTS LIST

1. Easily Distinguishable Yellow/Red Position Indicator
2. Aluminum Casting 4X Protection
3. Modular Control Cards
4. Heavy Duty Drive Motor
5. Easily Accessible Switch and Cam Stacks
6. NEMA 4 Cover Seal
7. 1/2" EMT Ports (2)
8. Aluminum Casting 4X Protection

* Not Available on All Models

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION:	Reversing
CONDUIT SIZE:	1/2"
DUTY CYCLE:	(EPM2) 25-50% On/Off Only (EPM3) 25-50% On/Off, 75% Proportional Control (EPM8, 13, 35 and 130) 25-50% On/Off, 100% Managed Proportional Control
CYCLE TIMES:	8-46 Seconds, Depending On Model
ENCLOSURE:	NEMA 4/4X
VOLTAGES:	(EPM2) 12 VDC, 24 VDC, 120 VAC, 230 VAC (EPM3, 8 and 13) 12 VAC/DC, 24 VAC/DC, 120 VAC, 230 VAC (EPM35) 12 VAC, 24 VAC,120 VAC, 230 VAC (EPM130) 120 VAC, 230 VAC
THERMAL OVERLOAD PROTECTION MECHANICAL BRAKE OVERRIDE:	Clutchless Manual
HOUSING:	Aluminum Alloy Dry Powder Coated

TECHNICAL INFORMATION, *CONTINUED*

ACTUATOR SPECIFICATIONS

	EPM2*	EPM3	EPM8	EPM13	EPM35	EPM130
Torque Output (in.-lb / Nm)	135 / 15	300 / 35	800 / 90	1300 / 150	3500 / 400	13500 / 1500
Supply Voltage	12 VDC 24 VDC 120 VAC 230 VAC	12 VAC/DC 24 VAC/DC 120 VAC 230 VAC	12 VAC/DC 24 VAC/DC 120 VAC 230 VAC	12 VAC/DC 24 VAC/DC 120 VAC 230 VAC	12 VAC 24 VAC 120 VAC 230 VAC	120 VAC 230 VAC
Duty Cycle	12 V and 24 V - 75% 120 V and 230 V - 25% to 50%	12 V and 24 V - 75% 120 V and 230 V - 25% to 50% Proportional Control - 75%	25% to 50% On/Off Control, Proportional Control 100% Managed			
Thermal Overload	Standard					
Cycle Time - Secs. @ 90º	8	12	15	22	16	46
Auxiliary Limit Switch Rating	3A @ 250 V		10A @ 250 V			
Conduit Entry (2)	1/2" NPT		3/4" NPT			
Enclosure	NEMA 4/4X					
Enclosure Material	Aluminum Alloy Powder Coated					
Maximum Inrush Current	5.1A @ 12 VDC 5.4A @ 24 VDC 1.5A @ 120 VAC 1.0A @ 230 VAC	3.0A @ 12 VAC/DC 0.8A @ 24 VAC/DC 1.5A @ 120 VAC 1.0A @ 230 VAC	5.0A @ 12 VAC/DC 5.0A @ 24 VAC/DC 3.0A @ 120 VAC 1.5A @ 230 VAC	5.0A @ 12 VAC/DC 5.0A @ 24 VAC/DC 3.0A @ 120 VAC 1.5A @ 230 VAC	8.5A @ 12 VAC 8.0A @ 24 VAC 3.1A @ 120 VAC 1.5A @ 230 VAC	14.0A @ 120 VAC 3.6A @ 230 VAC
Running Current	1.7A @ 12 VDC 1.8A @ 24 VDC 0.5A @ 120 VAC 0.3A @ 230 VAC	0.5A @ 12 VAC/DC 0.6A @ 24 VAC/DC 0.5A @ 120 VAC 0.3A @ 230 VAC	3.4A @ 12 VAC/DC 3.0A @ 24 VAC/DC 1.0A @ 120 VAC 0.5A @ 230 VAC	3.4A @ 12 VAC/DC 3.0A @ 24 VAC/DC 1.0A @ 120 VAC 0.5A @ 230 VAC	12.0A @ 12 VAC 6.0A @ 24 VAC 1.3A @ 120 VAC 0.5A @ 230 VAC	4.0A @ 120 VAC 2.0A @ 230 VAC
Weight (lbs / kg)	5 / 2	5 / 2	25 / 11	25 / 11	49 / 22	80 / 36

* On/Off Only

BALL VALVE SELECTION CHART*

SIZE in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE
1/2 – 2 / 15 – 50	EPM2 / EPM3	EPM2 / EPM3
2-1/2 – 3 / 63 – 80	EPM3	EPM3
4 – 6 / 100 – 150	EPM3	EPM8

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

BUTTERFLY VALVE SELECTION CHART*

SIZE in / DN	BUTTERFLY VALVE
1-1/2, 2, 3 / 40, 50, 80	EPM3
4 – 6 / 100 – 150	EPM8
8 / 200	EPM13
10, 12 / 250, 300	EPM35
14 – 24 / 350 – 600	EPM130

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

Please Note: All EPM, EPS, and EPL 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.

EPS Series On/Off and Proportional Control Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 8"

KEY FEATURES

- Clockwise or Counter-Clockwise Spring Return
- 4 Limit Switches (2 Auxiliary)
- Internal Low Power Heater
- NEMA 4/4X Enclosure
- Position Indicator
- Rack and Pinion Drive
- Permanently Lubricated
- Thermal Overload
- CSA Certified
- ISO 5211 Mounting Base

OPTIONS*

- Positioners
- Two Additional Auxiliary Switches
- Clutchless Manual Override Shown
- Local Control Station

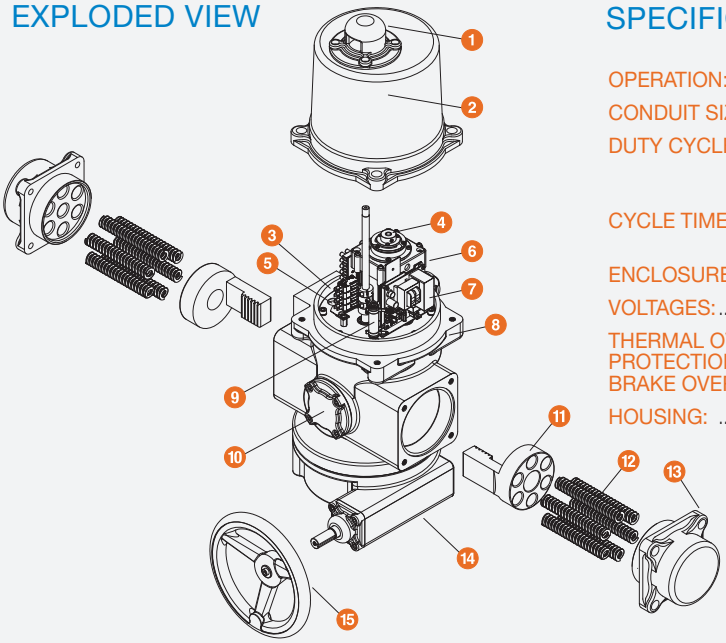
PARTS LIST

1. Easily Distinguishable Yellow/Red Position Indicator
2. Aluminum Casting 4X Protection
3. Auxiliary Switches (2)
4. Motor Brake
5. Spring Wind-Up Travel Control Switches
6. Heavy Duty Motor Drive
7. Modular Control Cards
8. Aluminum Casting 4X Protection
9. Heater
10. Rack Guidance Thrust Bearings
11. Piston/Rack Component (2)
12. Spring Pack (2)
13. End Cap (2)
14. ISO5211 Base Mounting System (Size F07)
15. Clutchless Override Handwheel

* Not Available on All Models

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION:	Reversing
CONDUIT SIZE:	3/4"
DUTY CYCLE:	(EPS5, 12 and 18) 75% - 24V On/Off (EPS5, 12 and 18) 50% - 120V and 230V On/Off (EPS5, 12 and 18) 75% Proportional Control
CYCLE TIMES:	7-11 Seconds, 24V/120-230V 3 Seconds, Spring 24V/120-230V
ENCLOSURE:	NEMA 4/4X
VOLTAGES:	(EPS5, 12 and 18) 24VAC/DC, 120VAC, 230VAC
THERMAL OVERLOAD PROTECTION MECHANICAL BRAKE OVERRIDE:	Clutchless Manual (Optional)
HOUSING:	Aluminum Alloy Dry Powder Coated

TECHNICAL INFORMATION, *CONTINUED*

ACTUATOR SPECIFICATIONS

	EPS5	EPS12	EPS18
Torque Output (in. lb / Nm)	450 / 50	1150 / 130	1750 / 200
Supply Voltage	24 VAC/DC 120 VAC 230 VAC	24 VAC/DC 120 VAC 230 VAC	24 VAC/DC 120 VAC 230 VAC
Duty Cycle		24V - 75% 120V and 230V - 50% Proportional Control - 75%	
Thermal Overload		Standard	
Cycle Time - Secs. @ 90º 24V/120-230V	7.0 / 7.0	8.0 / 7.0	11.0 / 11.0
Cycle Time - Secs. @ 90º Spring 24V/120-230V	3.0 / 3.0	3.0 / 8.0	3.0 / 12.0
Auxiliary Limit Switch Rating		3A @ 250 VAC	
Conduit Entry		3/4" NPT	
Enclosure		NEMA 4/4X	
Enclosure Material		Aluminum Alloy, Dry Powder Coated	
Maximum Inrush Current	4.0A @ 24 VAC/DC 2.8A @ 120 VAC 1.3A @ 230 VAC	19.0A @ 24 VAC/DC 11.0A @ 120 VAC 5.6A @ 230 VAC	19.0A @ 24 VAC/DC 11.0A @ 120 VAC 5.6A @ 230 VAC
Running Current	3.0A @ 24 VAC/DC 1.5A @ 120 VAC 0.7A @ 230 VAC	9.0A @ 24 VAC/DC 3.8A @ 120 VAC 2.1A @ 230 VAC	9.0A @ 24 VAC/DC 3.8A @ 120 VAC 2.1A @ 230 VAC
Weight (lbs / kg)	82 / 37	163 / 74	297 / 135

BALL VALVE SELECTION CHART*

SIZE in / DN	TRUE UNION BALL VALVE	THREE-WAY BALL VALVE
1/2 – 3 / 15 – 80	EPS5	EPS5
4, 6 / 100, 150	EPS5	EPS12

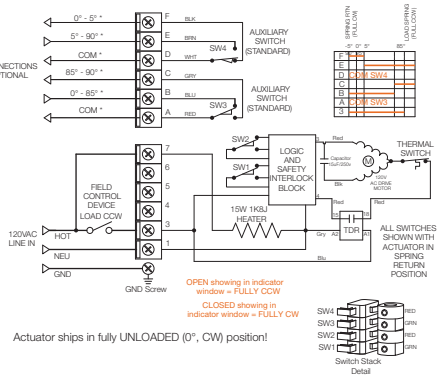
* Actuator size selections based on clean water at 70°F

BUTTERFLY VALVE SELECTION CHART*

SIZE in / DN	BUTTERFLY VALVE
1-1/2, 2, 3 / 40, 50, 80	EPS5
4 – 6 / 100 – 150	EPS12
8 / 200	EPS18

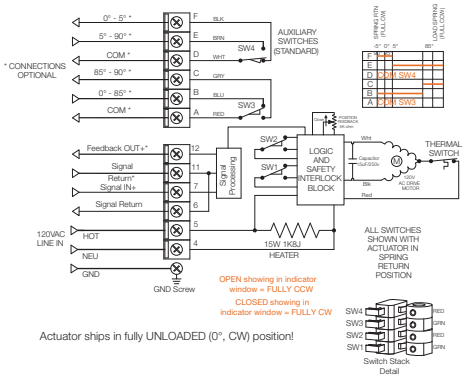
* Actuator size selections based on clean water at 70°F

EPS ON/OFF CONTROL



Actuator ships in fully UNLOADED (0°, CW) position!

EPS PROPORTIONAL CONTROL



Actuator ships in fully UNLOADED (0°, CW) position!

Please Note: All EPM, EPS, and EPL 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.

EPL Series Linear Drive, Non-Spring Return Actuators

FOR MOST RISING STEM DIAPHRAGM VALVES UP TO 10"

KEY FEATURES

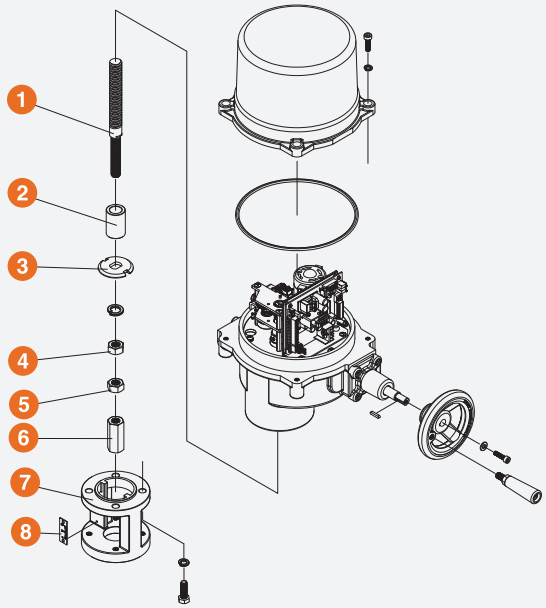
- Modular Design
- 4 Different Output Forces
- Internal Low Power Heater
- NEMA 4/4X Enclosure
- Position Indicator
- Manual Override
- Self-Locking Drive
- Permanently Lubricated
- Thermal Overload
- CSA Certified
- Universal Bonnet Mounting
- Choice of Voltages: 24 VAC/DC, 120 VAC and 230 VAC

PARTS LIST

1. Drive Shaft
2. Stem UP Stop
3. Position Indicator
4. Shaft Lock Nut
5. Coupling Lock Nut
6. Shaft Coupling
7. Lower Casting
8. Position Scale

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION:	Down and Up
STROKE LENGTH:	0.79" – 3.94", Depending Upon Model
FULL TRAVEL TIME:	78-416 seconds, 24 VAC/DC, Depending Upon Model 85-430 seconds, 120/1/60 VAC, Depending Upon Model 87-424 seconds, 230/1/60 VAC, Depending Upon Model
ENCLOSURE:	NEMA 4/4X
VOLTAGE:	24 VAC/DC, 120 VAC, 230 VAC (EPL550-20 and 38, EPL550-1100-38 and 50, EPL2200-38, 50, 75 and 100, EPL 4400-50, 75 and 100)
THERMAL OVERLOAD PROTECTION OVERRIDE:	Manual
HOUSING:	Aluminum Alloy Dry Powder Coated

EPL Series Linear Drive, Non-Spring Return Actuators

FOR MOST RISING STEM DIAPHRAGM VALVES UP TO 10"

TECHNICAL INFORMATION, *CONTINUED*

LINEAR DRIVE SPECIFICATIONS

ACTUATOR MODEL	FORCE (DN & UP)	STROKE LENGTH	24 VAC/DVC			120/1/60			230/1/60			MOTOR POWER	WEIGHT
	lb / kg	in / mm	Full Travel Time (sec)	Run Amps	In-Rush Amps	Full Travel Time (sec)	Run Amps	In-Rush Amps	Full Travel Time (sec)	Run Amps	In-Rush Amps		lb / kg
EPL550-20	550 / 250	0.79 / 20	78	1.8A	8.0A	85	0.5A	1.0A	87	0.4A	0.6A	15W	18.00 / 8.16
EPL550-38	550 / 250	1.50 / 38	148	1.8A	8.0A	160	0.5A	1.0A	162	0.4A	0.6A	15W	18.00 / 8.16
EPL1100-38	1100/ 499	1.50 / 38	155	1.8A	7.8A	167	0.5A	1.8A	164	0.4A	1.0A	15W	18.00 / 8.16
EPL1100-50	1100 / 499	1.97 / 50	205	1.8A	7.8A	221	0.5A	1.8A	213	0.4A	1.0A	15W	18.00 / 8.16
EPL2200-38	2200 / 998	1.50 / 38	166	2.2A	16A	164	0.6A	1.8A	168	0.5A	1.0A	25W	50.00 / 22.68
EPL2200-50	2200 / 998	1.97 / 50	224	2.2A	16A	221	0.6A	1.8A	220	0.5A	1.0A	25W	50.00 / 22.68
EPL2200-75	2200 / 998	2.95 / 75	338	2.2A	16A	331	0.6A	1.8A	329	0.5A	1.0A	25W	50.00 / 22.68
EPL2200-100	2200 / 998	3.94 / 100	450	2.2A	16A	444	0.6A	1.8A	444	0.5A	1.0A	25W	50.00 / 22.68
EPL4400-50	4400 / 1996	1.97 / 50	212	2.2A	16A	217	0.6A	4.5A	223	0.4A	2.2A	35W	50.00 / 22.68
EPL4400-75	4400 / 1996	2.95 / 75	314	2.2A	16A	321	0.6A	4.5A	320	0.4A	2.2A	35W	50.00 / 22.68
EPL4400-100	4400 / 1996	3.94 / 100	416	2.2A	16A	430	0.6A	4.5A	424	0.4A	2.2A	35W	50.00 / 22.68

DIAPHRAGM VALVE SELECTION CHART* (WITH EPL SERIES LINEAR ACTUATOR)

SIZE in / DN	ACTUATOR SIZE FOR LISTED OPERATING LINE PRESSURE			TOTAL TRAVEL
	< 50 PSI	> 50 to 100 PSI	> 100 to 150 PSI	
1/2 / 15	EPL550-20	EPL550-20	EPL550-20	0.49" (12.4 mm)
3/4 / 20	EPL550-20	EPL550-20	EPL550-20	0.58" (14.7 mm)
1 / 25	EPL550-20	EPL550-20	EPL550-20	0.62" (15.9 mm)
1-1/4 / 32	EPL550-20	EPL550-20	EPL550-20	0.62" (15.9 mm)
1-1/2 / 40	EPL550-38	EPL1100-38	EPL1100-38	0.75" (19.2 mm)
2 / 50	EPL550-38	EPL1100-38	EPL2200-38	1.25" (31.8 mm)
2-1/2 / 63	EPL1100-50	EPL2200-50	EPL4400-50	1.38" (35.1 mm)
3 / 80	EPL2200-50	EPL4400-50	EPL4400-50	1.38" (35.1 mm)
4 / 100	EPL2200-75	EPL4400-75	N/A	1.85" (47.0 mm)

SIZE in / DN	ACTUATOR SIZE FOR LISTED OPERATING LINE PRESSURE			TOTAL TRAVEL
	< 20 PSI	> 20 to 40 PSI	> 40 to 75 PSI	
6 / 150	EPL2200-100	EPL4400-100	N/A	2.91" (73.8 mm)
8 / 200	EPL2200-100	EPL4400-100	N/A	3.86" (98.2 mm)
10 / 250	N/A	N/A	N/A	4.79" (121 mm)

Consult Factory for Linear Actuator Model Recommendation

* Linear Drive Selections based on clean water at 70°F

Please Note: All EPM, EPS, and EPL 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.

EPD Series Spring Return On/Off and Proportional Control Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 6"

KEY FEATURES

- Maintenance Free
- Field Adjustable Speed Control
- Field Adjustable Spring Return Control*
- Auto-Switching Power Supplies
- Hex Key Override and Mounting Screws
- Internal Low Power Heater
- NEMA 4 Enclosure
- Mechanical 12mm Double-Square Drive Shaft Connection
- Manual Override
- Thermal Overload
- ATEX Rated NEMA 4/IP66
- Choice of Voltages: Units Can Operate on Any Voltage from 24 VAC/VDC to 230 VAC/VDC

OPTIONS*

- Two Internal End-of-Travel Nonadjustable Switches
- Externally Mounted Switch Pack with 2 Additional Adjustable Switches
- EMT Enclosure
- Manual Override Handwheel

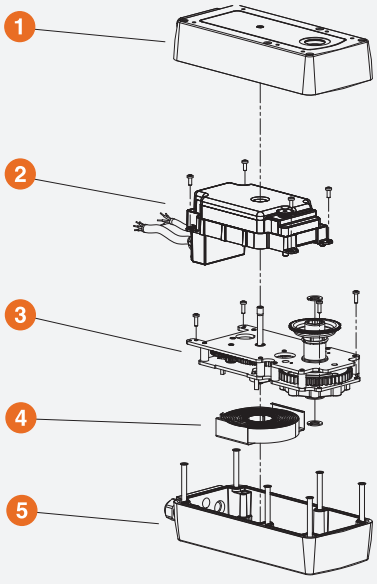
PARTS LIST

1. Cast Aluminum Upper Housing
2. Sealed Electronics Enclosure
3. Steel Geartrain Assembly
4. Memory Action Recoil Spring
5. Cast Aluminum Lower Housing

* Not Available on All Models

TECHNICAL INFORMATION

EXPLODED VIEW



SPECIFICATIONS

OPERATION:..... Drive Open or Closed/Spring Opposite (EPD 2/3 and EPD 4/5 On/Off Control) Drive Open/Closed: Spring Engaged Upon Loss of Electric Supply (EPD 2/3 and EPD 4/5 On/Off Control) Proportional Control (EPD 2/3 and EPD 4/5)

DUTY CYCLE: ..... 100% - 14 Sec. Mode, 10% - 3 Sec. Mode; One Power/Spring Cycle Per Minute Max. (EPD 2/3) 100% - All Models (EPD 4/5)

RUN TIME (POWER): ..... 3/15/30/60/120 @ 90°; Field Selectable (EPD 2/3) 40/60/90/120/150 @ 90°; Field Selectable (EPD 4/5)

RUN TIME (SPRING):..... 3 or 10 Seconds @ 90°; Field Selectable (EPD 2/3) 20 Seconds @ 90°; Fixed (EPD 4/5)

3 SEC. MODE (SPRING): ..... 3-4 Seconds @ 90°; Load Dependant (EPD 2/3) N/A (EPD 4/5)

ENCLOSURE: ..... NEMA 4

THERMAL OVERLOAD PROTECTION OVERRIDE: ..... Manual

HOUSING: ..... Aluminum Die Casting

EPD Series Spring Return On/Off and Proportional Control Actuators

FOR BALL AND BUTTERFLY VALVES UP TO 6"

TECHNICAL INFORMATION, *CONTINUED*

ACTUATOR SPECIFICATIONS

MODEL	EPD2	EPD3	EPD4	EPD5
Torque Output (in.-lb / Nm)	90 / 10	133 / 15	266 / 30	450 / 50
Supply Voltage	24 to 230 VAC/DC, +15% / -20% AC: 50 / 60 Hz			
Amp Draw	Max 4.7A @ 3 Sec Mode, 120 VAC		Max 2.0A @ 40 Sec Mode, 120 VAC	
Duty Cycle Mode	> 14 Sec Mode: 100% 3 Sec Mode: 10%; One Power / Spring Cycle per Minute Max.		All Modes: 100% N/A	
Thermal Overload	Standard			
Runtime (Power) Selectable	3 / 15 / 30 / 60 / 120 @ 90° (Field Selectable)		40 / 60 / 90 / 120 / 150 @ 90° (Field Selectable)	
Runtime (Spring)	3 or 10 seconds @ 90° (Field Selectable)		20 seconds @ 90° (Fixed)	
3 Sec Mode (Spring)	3-4 seconds @ 90° (Load Dependant)		N/A	N/A
Response Time (Spring)	Up to 1 Second After Power Failure			
Auxiliary Limit Switch Rating	230 VAC @ 250 mA and 24 VAC/DC @ 3A Max			
Electrical Connections	1m Cable, Multiconductor (Optional EMT)			
Enclosure	NEMA 4 (IP66)			
Enclosure Material	Aluminum Die Casting			
Drive Configuration	12 mm Double Square, 100% Overload Proof Self-Locking up to 133 in. lb / 15 Nm		16 mm Double Square, 100% Overload Proof Self-Locking up to 445 in. lb / 50 Nm	
Manual Override	Supplied Hex Key (Optional Handwheel)			
Weight (lbs / kg)	7.8 / 3.5 (No Installed Options)		20.9 / 9.5 (No Installed Options)	

TRUE UNION BALL VALVE SELECTION CHART*

SIZE in / DN	ACTUATOR
1/2 – 1 / 15 – 25	EPD2
1-1/4 – 2 / 32 – 50	EPD3
2-1/2 – 6 / 63 – 150	EPD4

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

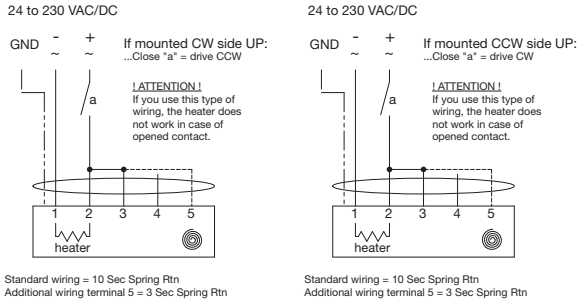
BUTTERFLY VALVE SELECTION CHART*

SIZE in / DN	ACTUATOR
1-1/2 – 4 / 40 – 100	EPD5

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

EPD 2/3 ON/OFF CONTROL

Drive Open or Closed / Spring Opposite

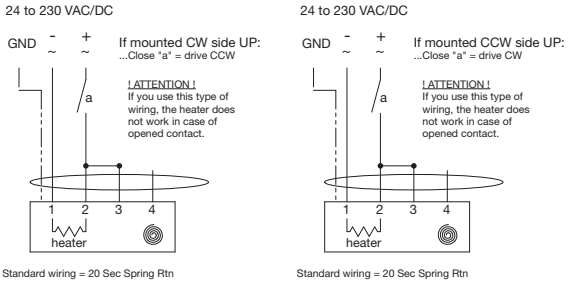


Standard wiring = 10 Sec Spring Rtn
Additional wiring terminal 5 = 3 Sec Spring Rtn

Standard wiring = 10 Sec Spring Rtn
Additional wiring terminal 5 = 3 Sec Spring Rtn

EPD 4/5 ON/OFF CONTROL

Drive Open or Closed / Spring Opposite



Standard wiring = 20 Sec Spring Rtn

Standard wiring = 20 Sec Spring Rtn

Please Note: All EPM, EPS, and EPL 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.

Local Control Station

FOR USE WITH ELECTRIC ACTUATORS

Local Control Stations can be used with Series EPM, EPS, and EPL Actuators, connect through the EMT entry, and are available in four different models to meet specific application requirements. Custom configurations available (consult factory).

KEY FEATURES

- Full Access Backplate
- Door with 1/4 Turn Latch
- NEMA 4 Enclosure
- Multiple Mounting Capabilities
- Remote Status Outputs
- Switches and Indicator Lamps Rated NEMA 4X/IP66
- Interfaces with 12 VAC/DC, 24 VAC/DC, 120 VAC Single Phase and Three Phase Applications

OPTIONS

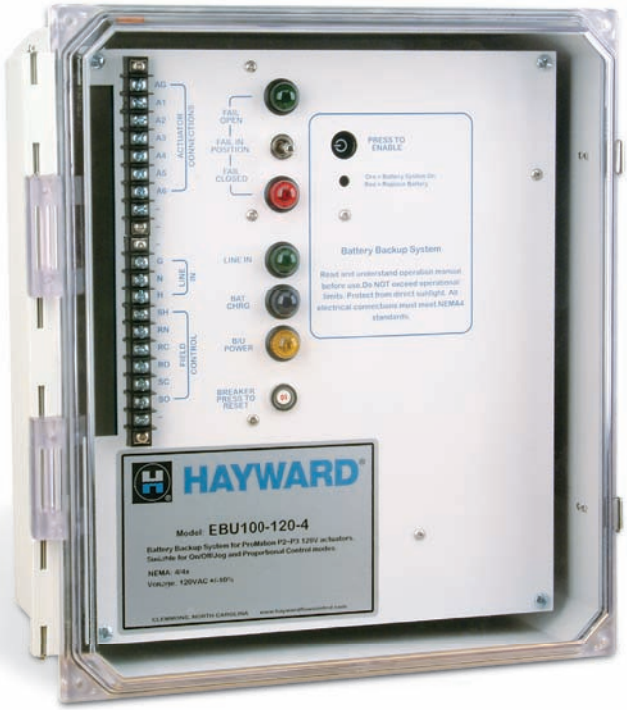
- LA – Basic Version: No Indicator Lamps, No Remote Status Outputs, No Auxiliary Switch Pass-Through
- LB – Mid-Level Version: 2 Status Indicator Lamps, 2 Status Hot Outputs, No Auxiliary Switch Pass-Through
- LC – Full Version: 3 Status Indicator Lamps, Remote Status Monitoring, Auxiliary Switch Termination Block
- LD – 3 Phase with Motor Control Option: Full "LC" Type Controls, Interfaces to Existing MCC-Auxiliary Switch Termination Block

SPECIFICATIONS

LOCAL CONTROL STATION SELECTION CHART

MODEL*	LA SERIES	LB SERIES	LC SERIES	LD SERIES
EPM2/3-120	KIT-LA1-120	KIT-LB1-120	KIT-LC1-120	KIT-LD1-120
EPM2/3-24A or 12A	KIT-LA1-24A or 12A	KIT-LB1-24A or 12A	KIT-LC1-24A or 12A	KIT-LD1-24A or 12A
EPM2/3-24D or 12D	KIT-LA1-24D or 12D	KIT-LB1-24D or 12D	KIT-LC1-24D or 12D	KIT-LD1-24D or 12D
EPM8/13-120	KIT-LA23-120	KIT-LB23-120	KIT-LC23-120	KIT-LD23-120
EPM8/13-24A or 12A	KIT-LA23-24A or 12A	KIT-LB23-24A or 12A	KIT-LC23-24A or 12A	KIT-LD23-24A or 12A
EPM8/13-24D or 12D	KIT-LA23-24D or 12D	KIT-LB23-24D or 12D	KIT-LC23-24D or 12D	KIT-LD23-24D or 12D
EPM35-120	KIT-LA46-120	KIT-LB46-120	KIT-LC46-120	KIT-LD46-120
EPM35-24A or 12A	KIT-LA46-24A or 12A	KIT-LB46-24A or 12A	KIT-LC46-24A or 12A	KIT-LD46-24A or 12A
EPM35-24D or 12D	KIT-LA46-24D or 12D	KIT-LB46-24D or 12D	KIT-LC46-24D or 12D	KIT-LD46-24D or 12D
EPM130-120	KIT-LA78-120	KIT-LB78-120	KIT-LC78-120	KIT-LD78-120

For actuators with proportional control, or for 230 VAC applications, please consult factory
* For EPS and EPL models, consult factory



EBU Battery Backup

FOR USE WITH EP SERIES ELECTRIC ACTUATORS

EBU Battery Backup Systems provide fail-safe operation for Series EPM, EPS and EPL Actuators using 2, 3 or 4 wire connections*, and support both on/off and proportional control.

* Additional field wiring may be required between the EBU and the actuator (consult factory)

KEY FEATURES

- Clear Polycarbonate Cover
- NEMA 4/4X Enclosure
- Field Selectable Fail Direction
- Provides 500% of Power Requirements for a Full Load Cycle
- Interfaces With 2, 3 or 4 Wire Control Systems
- Automatic Battery Charging and Charge Status Indicator
- Sealed Battery Packs
- Remote Alarm Outputs
- UV Stabilized Housing for Outdoor Applications

SPECIFICATIONS

SIZING AND PERFORMANCE CHART

ACTUATOR MODEL**	TORQUE OUTPUT (IN LBS.)	RUNTIME (IN SECS.)	BATTERY DRAW (AMPS)	% CAPACITY USED AT FULL RUNTIME	BATTERY BACKUP MODEL*	REPLACEMENT BATTERY
EPM2-120	135	8	0.5	0.5	EBU100-120-4	RBC-2
EPM2-230	135	8	0.5	0.5	EBU200-230-4	RBC-2
EPM2-24A	135	8	0.5	0.5	EBU300-24-4	RBC-2
EPM3-120	300	12	0.5	0.5	EBU100-120-4	RBC-2
EPM3-230	300	12	0.5	0.5	EBU200-230-4	RBC-2
EPM3-24A	300	12	0.5	0.5	EBU300-24-4	RBC-2
EPM8-120 & 120P	800	15	1.0	1.5	EBU100-120-4	RBC-2
EPM8-230 & 230P	800	15	1.0	1.5	EBU200-230-4	RBC-2
EPM8-24A & 24AP	800	15	1.0	1.3	EBU300-24-4	RBC-2
EPM13-120 & 120P	1335	22	1.0	2.3	EBU100-120-4	RBC-2
EPM13-230 & 230P	1335	22	1.0	2.2	EBU200-230-4	RBC-2
EPM13-24A & 24AP	1335	22	1.0	1.9	EBU302-24-4	RBC-2
EPM35-120 & 120P	3560	16	1.3	2.0	EBU102-120-4	RBC-2
EPM35-230 & 230P	3560	16	1.3	1.8	EBU200-230-4	RBC-2
EPM35-24A & 24AP	3560	16	1.3	1.4	EBU302-24-4	RBC-2
EPM130-120 & 120P	13350	46	4.0	11.3	EBU104-120-4	RBC-32
EPM130-230 & 230P	13350	46	4.0	9.7	EBU204-230-4	RBC-32

* EBU Series Battery Backup System available for use with EPM 24 VAC and 120/230 VAC models only
** For EPS and EPL models, consult factory

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

LHB Series Manual Limit Switch*

1/2" TO 6" TB SERIES AND 1-1/2" TO 8" BY SERIES

KEY FEATURES

- GFPP Body, Cover and Plate
- 304 Stainless Steel Stem and FPM Seals
- Fits Hayward® Ball and Butterfly Valves up to 8"
- Temperature Range 20°F (-7°C) to 200°F (93°C)
- Two Adjustable SPDT 10 Amp at 120 VAC Switches (Open/Close Position)
- Integral Lockout
- 1/2" Conduit Port
- Terminal Blocks for Ease of Wiring
- Meets ISO 5211
- NEMA 4X
- Switches CSA Listed
- Patent Pending

OPTIONS

- Two Additional Switches
- Potentiometer Available
- Optional Handles – Lever or T-Handle
- LED for Open/Close Indication

MATERIALS

- GFPP Cell Class 85580 per ASTM D4101
- Heavy Duty FPM O-Ring Seals

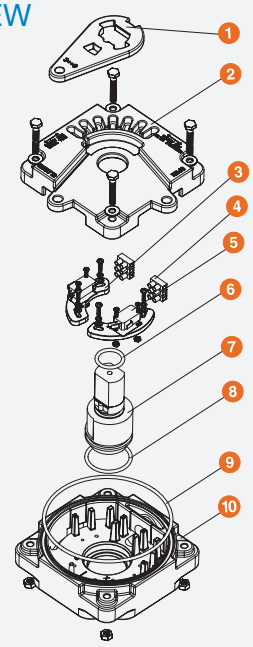
LHB-1

LHB-2

* Patent Pending

TECHNICAL INFORMATION

EXPLODED VIEW



SELECTION CHART

MANUAL LIMIT SWITCH MODEL	VALVE SIZE / SERIES
LHB-1	1/2" – 2" TB 1-1/2" – 4" BY
LHB-2	2-1/2" – 6" TB 6" – 8" BY

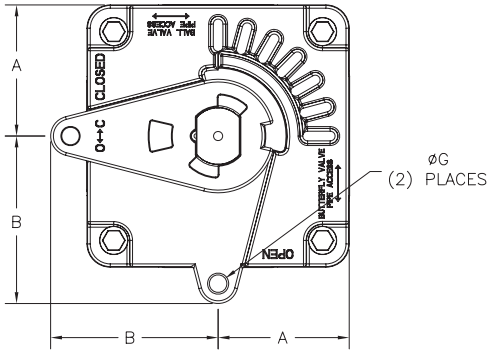
LHB Series Manual Limit Switch

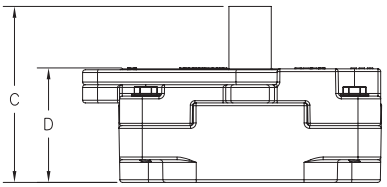
1/2" TO 6" TB SERIES AND 1-1/2" TO 8" BY SERIES

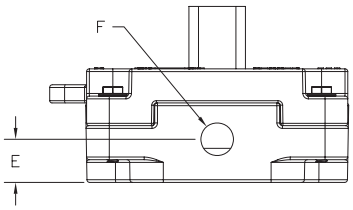
TECHNICAL INFORMATION, *CONTINUED*

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







DIMENSIONS – INCHES / MILLIMETERS

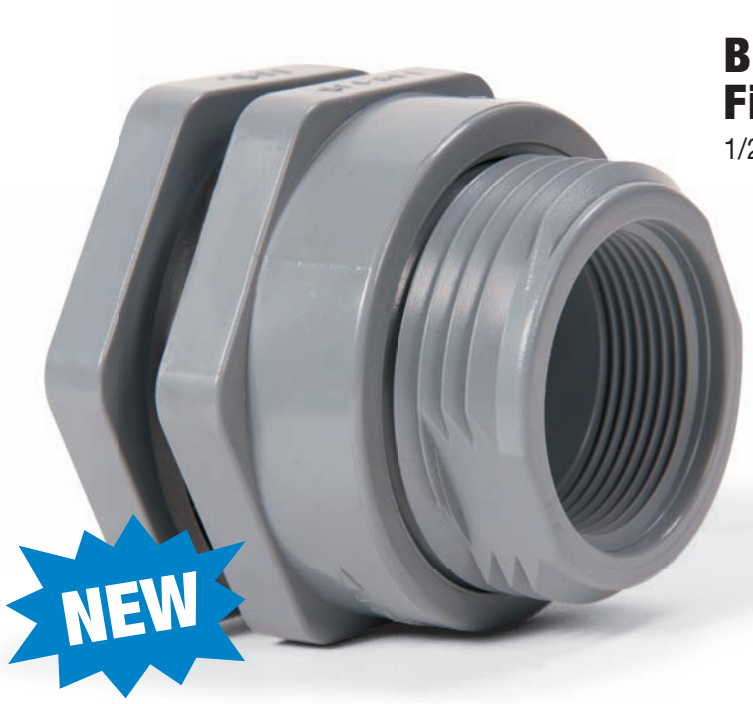
MANUAL LIMIT SWITCH MODEL	VALVE SIZE/SERIES	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in	G in / mm
LHB-1	1/2" – 2" TB 1-1/2" – 4" BY	2.38 / 60	3.19 / 81	3.88 / 99	2.52 / 64	.95 / 24	1/2" NPT	.38 / 10
LHB-2	2 -1/2" – 6" TB 6" and 8" BY	2.89 / 73	3.69 / 94	3.88 / 99	2.52 / 64	.95 / 24	1/2" NPT	.38 / 10

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

PART NUMBERS

PART NUMBER	DESCRIPTION
LHB1TB1S2	LHB-1 Series Limit Switch for 1/2" – 2" TB with 2 Switches
LHB1BY2S2	LHB-1 Series Limit Switch for 2" – 3" BY with 2 Switches
LHB1BY4S2	LHB-1 Series Limit Switch for 4" BY with 2 Switches
LHB1TB1S4	LHB-1 Series Limit Switch for 1/2" – 2" TB with 4 Switches
LHB1BY2S4	LHB-1 Series Limit Switch for 2" – 3" BY with 4 Switches
LHB1BY4S4	LHB-1 Series Limit Switch for 4" BY with 4 Switches

PART NUMBER	DESCRIPTION
LHB2TB3S2	LHB-2 Series Limit Switch for 2 1/2" – 6" TB with 2 Switches
LHB2BY6S2	LHB-2 Series Limit Switch for 6" BY with 2 Switches
LHB2BY8S2	LHB-2 Series Limit Switch for 8" BY with 2 Switches
LHB2TB3S4	LHB-2 Series Limit Switch for 2 1/2" – 6" TB with 4 Switches
LHB2BY6S4	LHB-2 Series Limit Switch for 6" BY with 4 Switches
LHB2BY8S4	LHB-2 Series Limit Switch for 8" BY with 4 Switches



BFAS Series Bulkhead Fittings – Standard Flange

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

KEY FEATURES

- PVC, CPVC and PP
- FPM or EPDM Gasket Seal
- Left-Hand Threads
- Buttress Threads
- Hex Body
- Rated at 150 PSI

OPTIONS

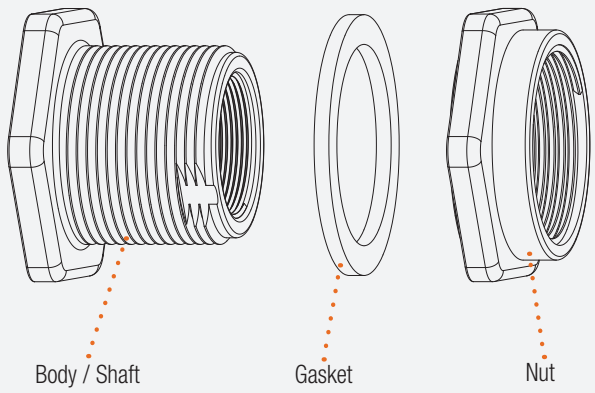
- Vacuum Breaker
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™

MATERIALS

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

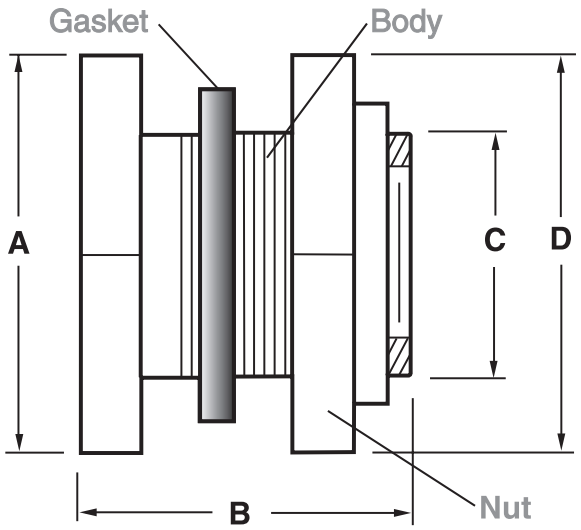
BFAS Series Bulkhead Fittings – Standard Flange

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

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"	10.10"	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"



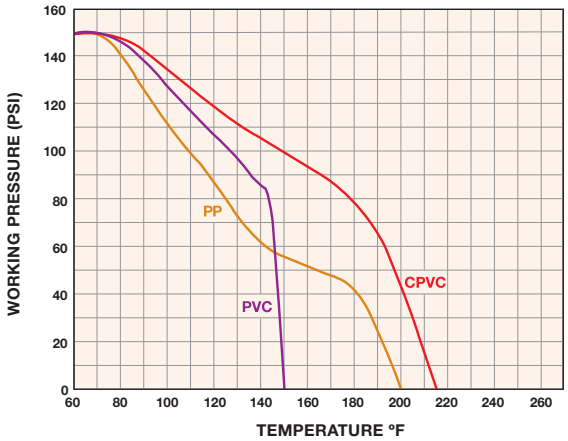
DIMENSIONS – INCHES / MILLIMETERS

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



BFA Series Bulkhead Fittings – Standard Flange

1/2" TO 6" PVC, CPVC AND PP – LONG PATTERN

KEY FEATURES

- 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
- Buttress Threads

OPTIONS

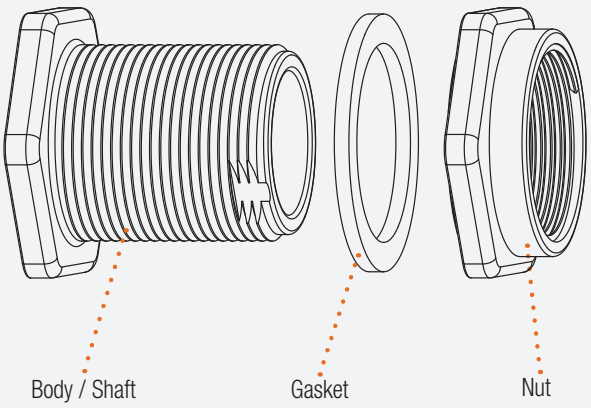
- Vacuum Breaker
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™

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 Thread x Thread	FPM or EPDM	150 PSI @ 70°F Non-Shock
	CPVC			
	PP	Thread x Thread		

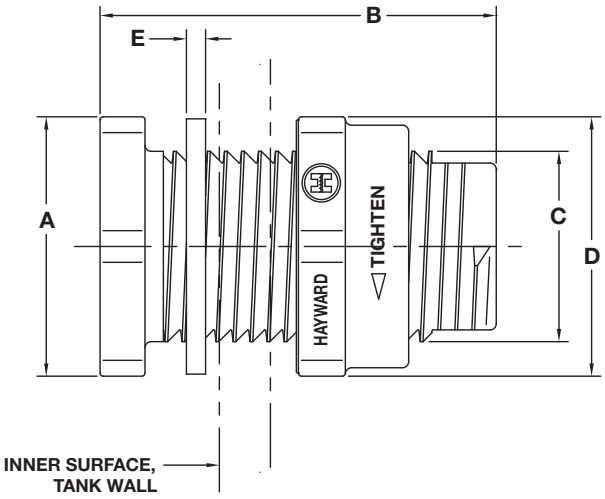
BFA Series Bulkhead Fittings – Standard Flange

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"

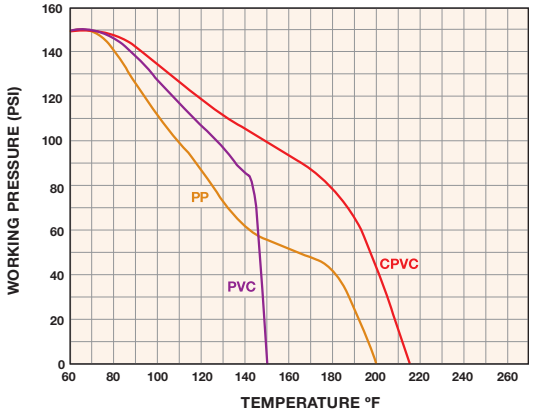


DIMENSIONS – INCHES / MILLIMETERS

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



BFA Series Bulkhead Fittings – Oversized Flange

1/2" TO 1" PVC, CPVC AND PP – LONG PATTERN

KEY FEATURES

- PVC, CPVC and PP – Large Flange
- 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

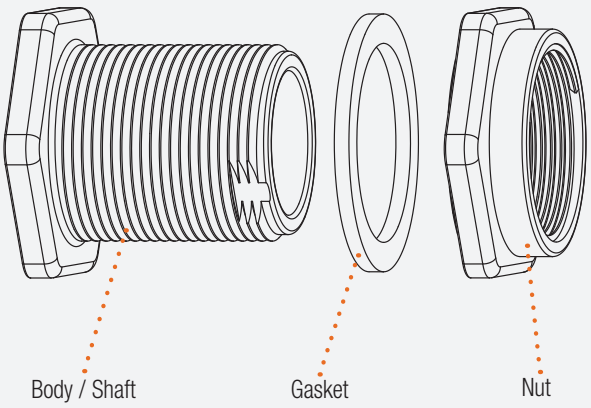
- Ready Flanges (for Making Flanged Connections to Tanks)
- Tank-Tite™

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



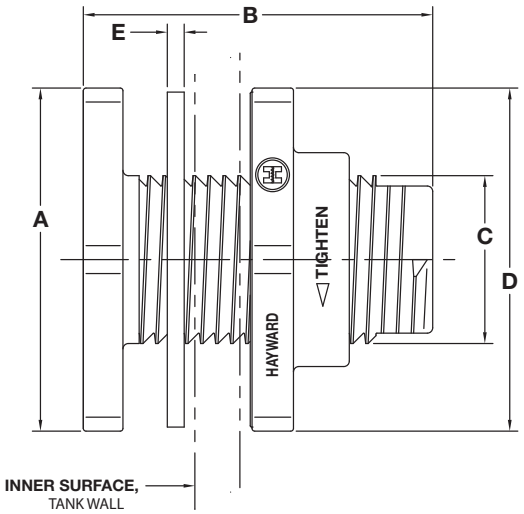
SELECTION CHART

SIZE	MATERIAL	END CONNECTION	GASKETS	PRESSURE RATING
1/2" – 1" (DN15 – DN25)	PVC	Socket x Socket Socket x Thread Thread x Thread	FPM or EPDM	150 PSI @ 70°F Non-Shock
	CPVC			
	PP	Thread x Thread		

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"



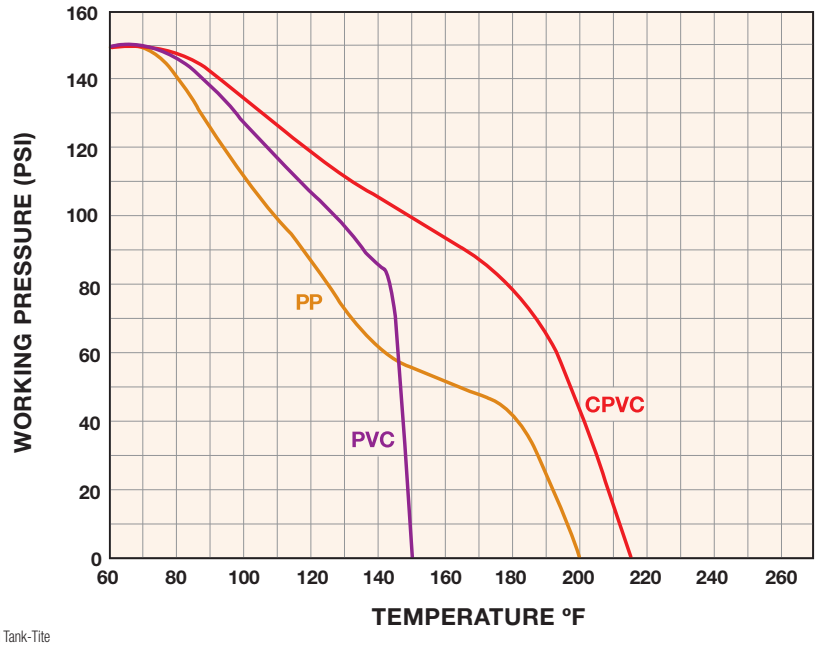
DIMENSIONS – INCHES / MILLIMETERS

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



TANK TITE™

CCP Series Tank-Tite™*

1/2" TO 4" PVC

A revolutionary and patent pending designed PVC compression spring pack that 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
- 17.4 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

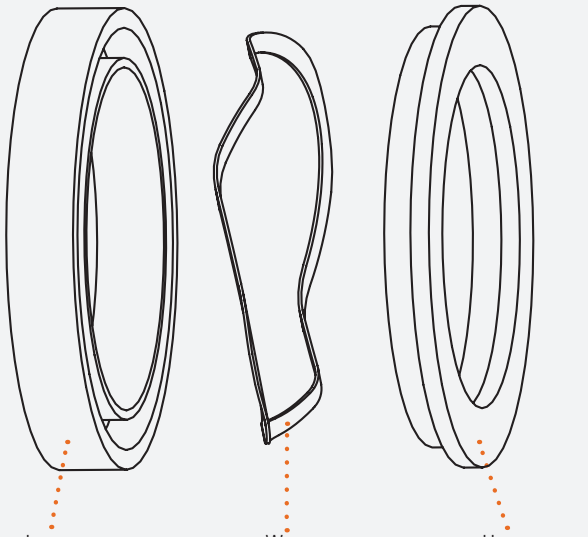
MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- 17.4 PH Stainless Steel

* Patent Pending

TECHNICAL INFORMATION

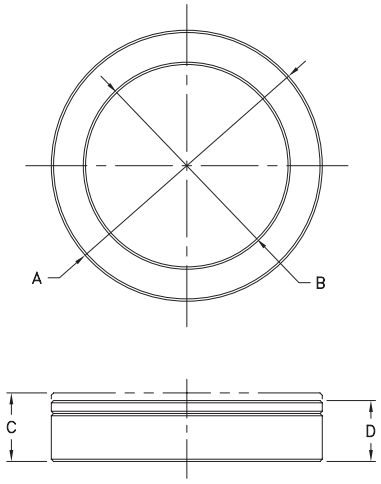
EXPLODED VIEW

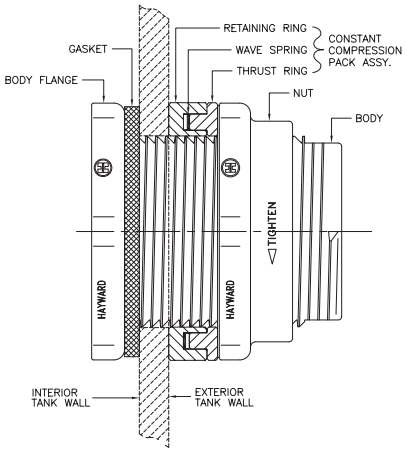


SELECTION CHART

SIZE	MATERIAL	SPRING	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC	17.4 PH SSTL	150 PSI @ 70°F Non-Shock

TECHNICAL INFORMATION, *CONTINUED*



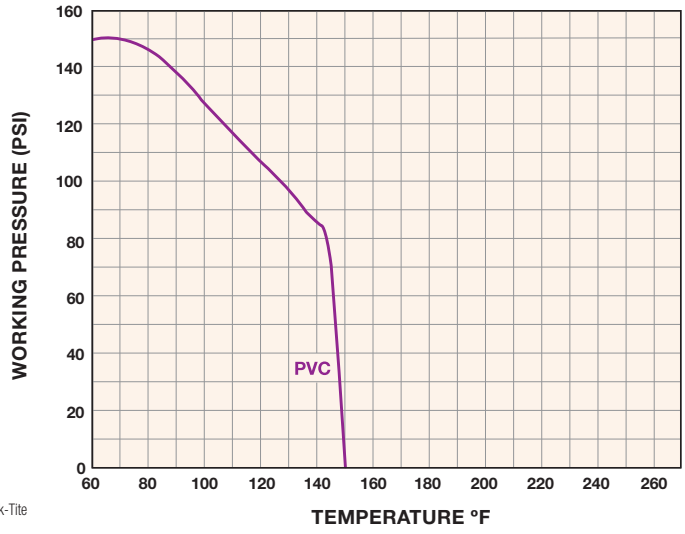


DIMENSIONS – INCHES / MILLIMETERS

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

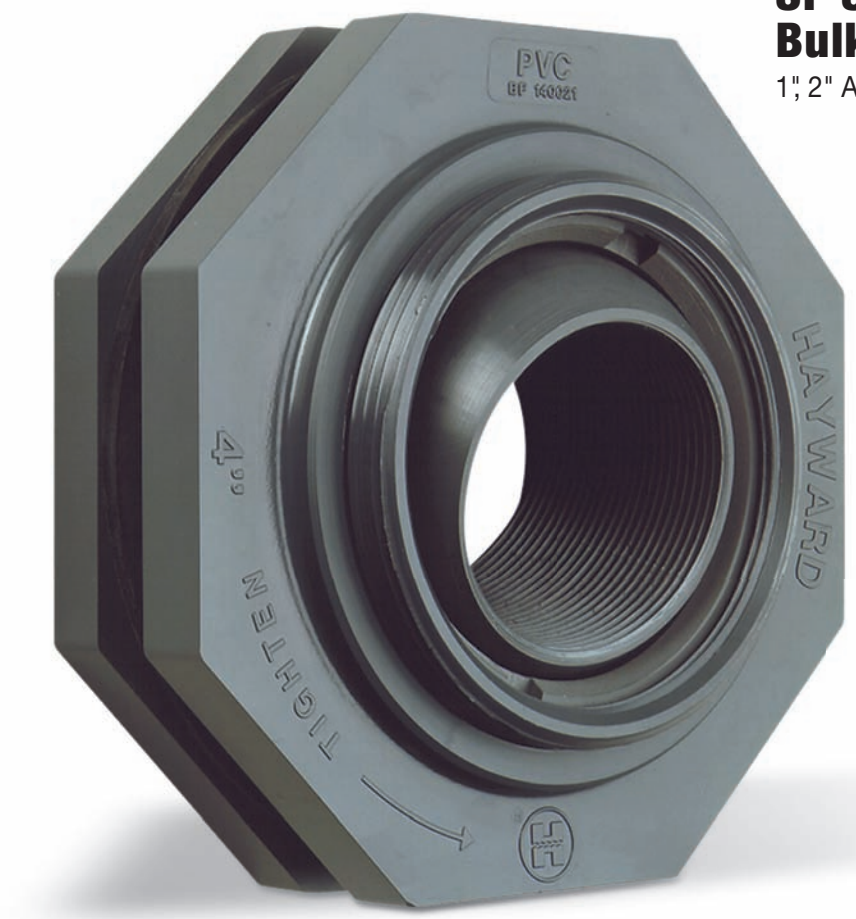
Dimensions are subject to change without notice – consult factory for installation information

OPERATING TEMPERATURE / PRESSURE



SF Series Self-Aligning Bulkhead Fittings

1", 2" AND 3" PVC



KEY FEATURES

- 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

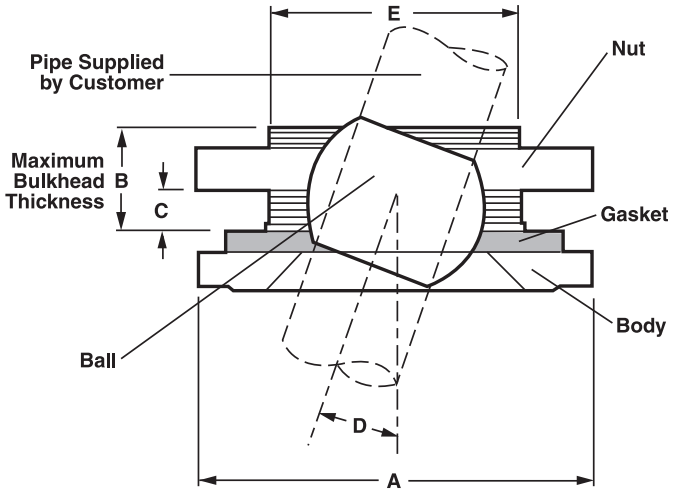
SELECTION CHART

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

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"

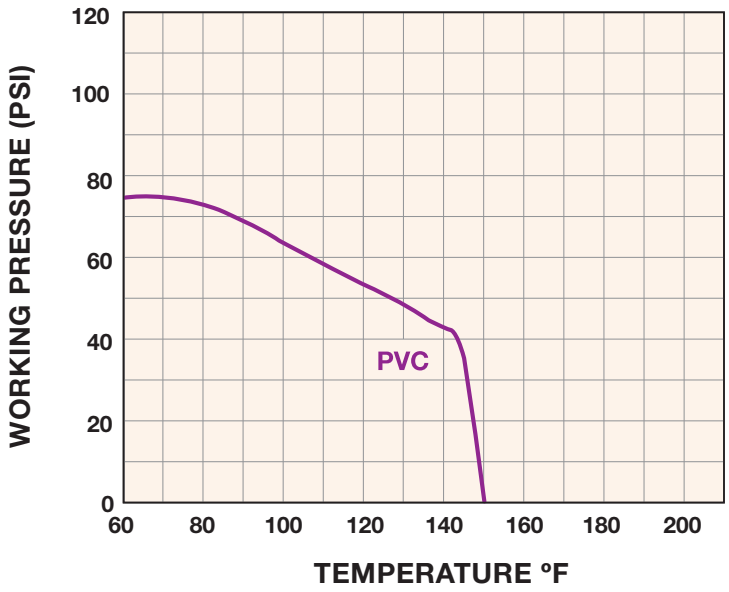


DIMENSIONS – INCHES / MILLIMETERS

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



AR Series Air Release Valves

3/4" PVC BODY WITH PP BALL

KEY FEATURES

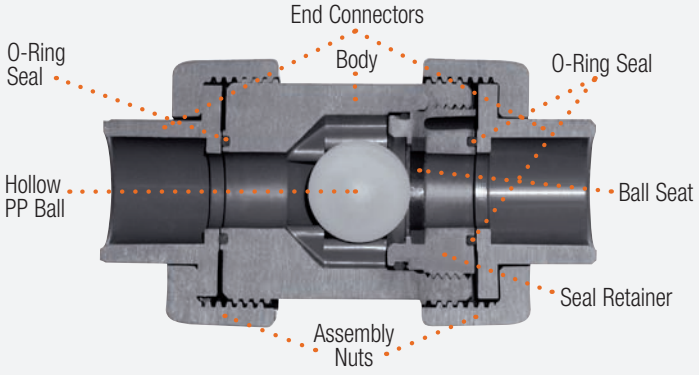
- PVC Body with PP Ball
- Reliable Tank Air Venting
- Prevents Tank Overflow
- Hollow, Floating Ball Design
- Closes at 0 PSI
- FPM or EPDM Seals
- Standard Screen

MATERIALS

- PVC Cell Class 12454 per ASTM D1784
- PP per ASTM D4101

TECHNICAL INFORMATION

CUTAWAY OF AIR RELEASE VALVE



SELECTION CHART

SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
3/4" (DN20)	PVC 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.

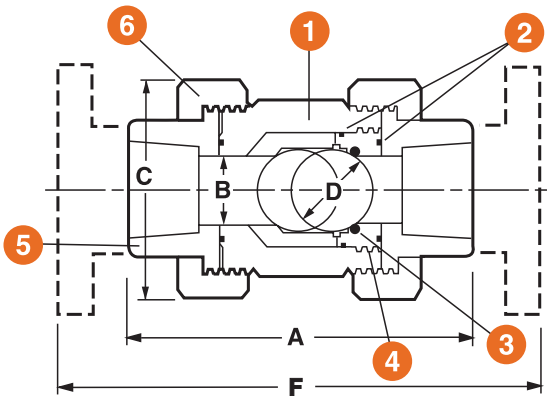
AR Series Air Release Valves

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



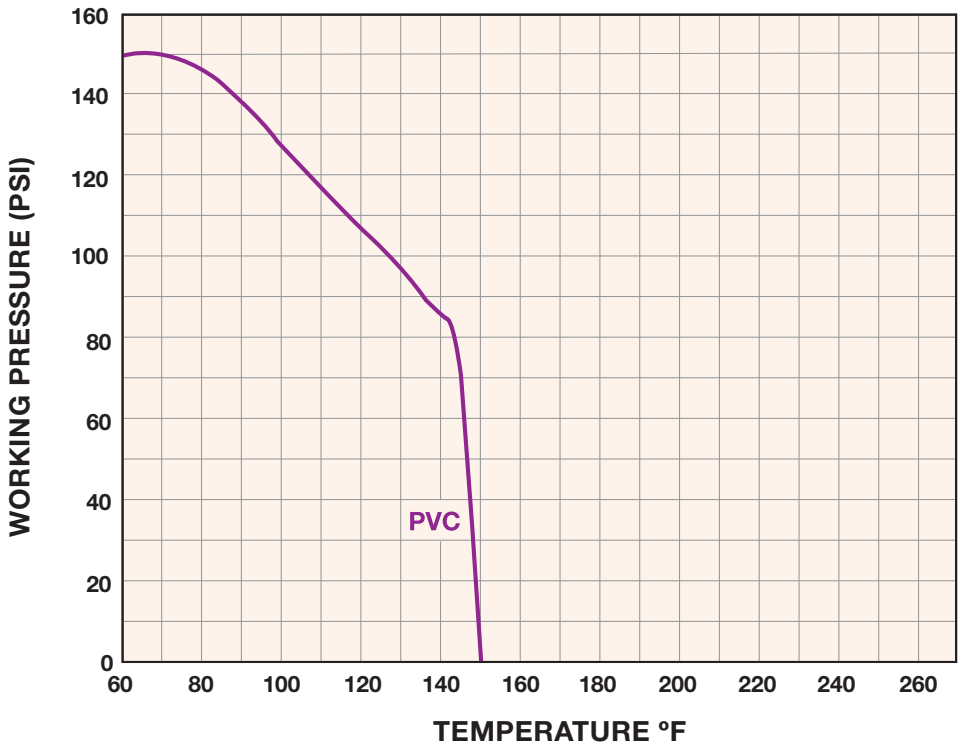
Screen installed

DIMENSIONS – INCHES / MILLIMETERS

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



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 on 3/4" NPT 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.

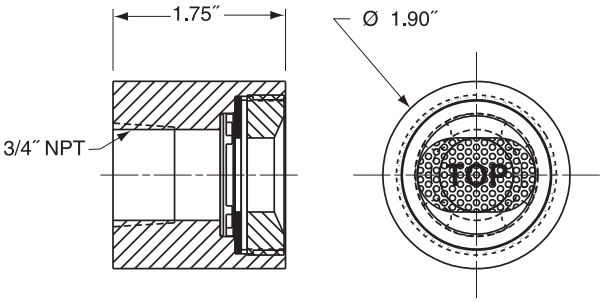
VB Series
Vacuum Breakers
3/4" PVC

TECHNICAL INFORMATION, *CONTINUED*

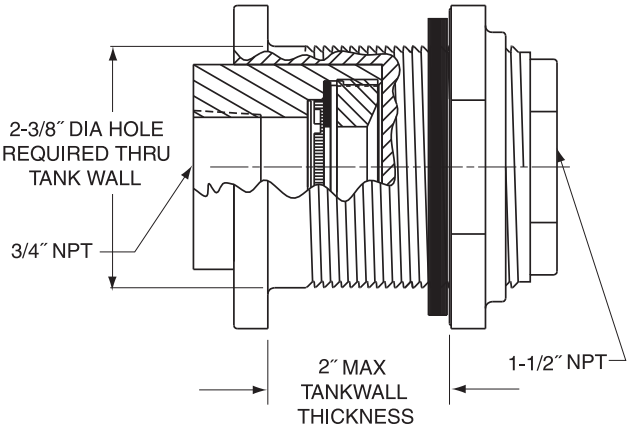
SPECIFICATIONS

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

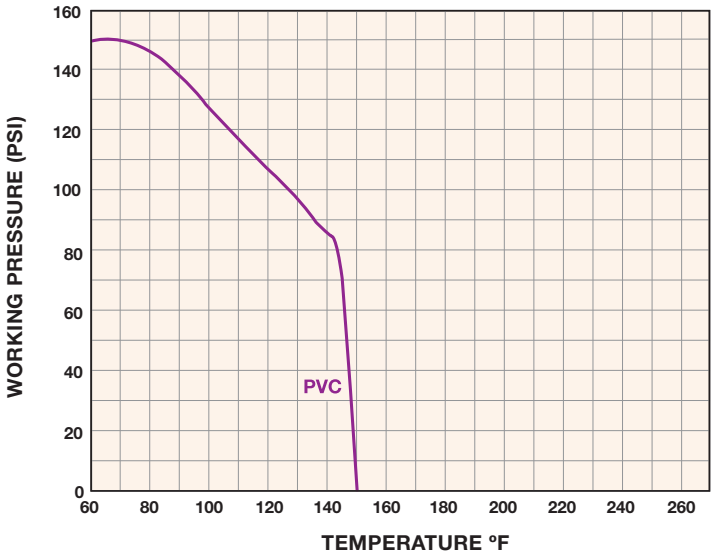
DIMENSIONS



VACUUM BREAKER INSTALLED IN BULKHEAD



OPERATING TEMPERATURE / PRESSURE



Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

BVX Series Ready Flanges

1" TO 4" PVC, CPVC AND GFPP

KEY FEATURES

- PVC, CPVC and GFPP
- One-Piece Construction
- Integral Molded Nipple
- Eliminates the Need for an Extra Fabricated Joint – Preventing a Possible Leak Path
- Easily Converts Socket Valves to Flanged
- ANSI Class 150 Bolt Pattern

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

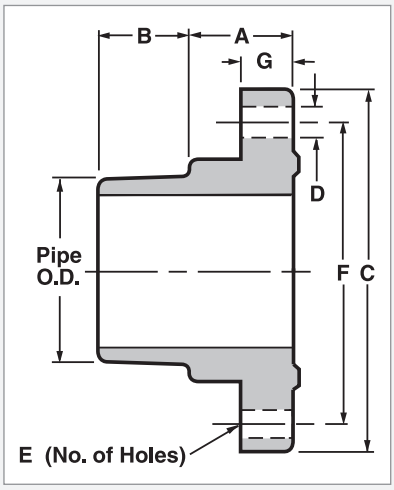
SELECTION CHART

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	

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



GG Series Gauge Guards

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

KEY FEATURES

- 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
- Large Volume Gauge Guard Available
- Dual Faced PSI and kg/cm^2

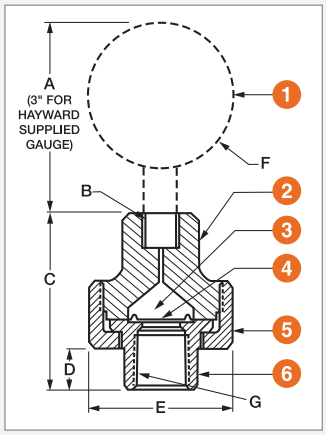
OPTIONS

- 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

PARTS LIST

1. Gauge/Instrument
2. Body
3. Oil-Filled Upper Chamber with Installed Gauge
4. FPM Membrane
5. Union Nut
6. End Connector



SELECTION CHART

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

DIMENSIONS

SIZE in / DN	1 in / mm	2 in / mm	3 in / mm	4 in / mm	5 in / mm	6 in / mm	7 in / mm
1/4 x 1/4 / 8 x 8	3.0 / 76	1/4" NPT	2.69 / 68	.61 / 15	2.25 / 57	2.3 / 58	.25 / 6
1/4 x 1/2 / 8 x 15	3.0 / 76	1/4" NPT	2.69 / 68	.61 / 15	2.25 / 57	2.3 / 58	.50 / 13

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

NSF
PVC and CPVC only

SB Series Simplex Basket Strainers

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

KEY FEATURES

- PVC, CPVC, GFPP and Eastar
- Ergonomic Hand-Removable Cover
- In-Line or Loop Connections
- External Cover Threads
- Integral Flat Mounting Bases
- NSF / ANSI 61 Listed

OPTIONS

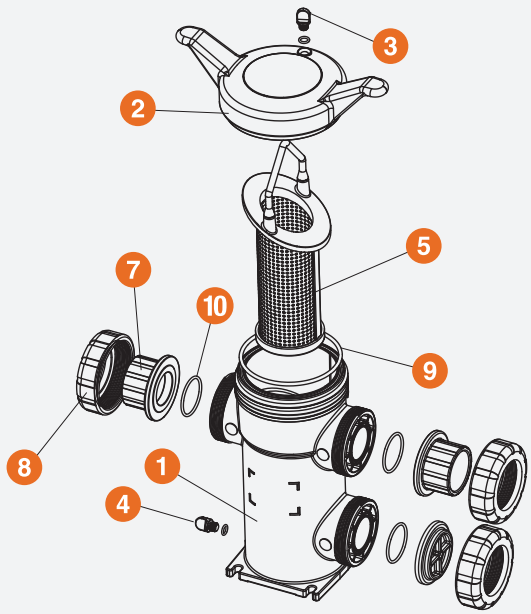
- Stainless Steel, Monel®, Hastelloy®, and Titanium Strainer Baskets
- Pressure Differential Gauge and Switch
- Baskets Available with Perforated or Mesh Liners

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, CPVC and GFPP	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F Non-Shock
	Eastar*			100 PSI @ 70°F Non-Shock

* End connections and assembly nuts are PVC

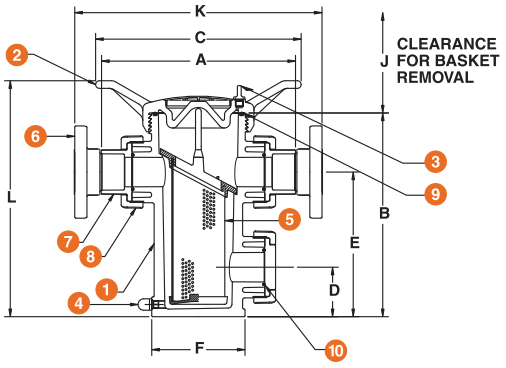
SB Series Simplex Basket Strainers

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

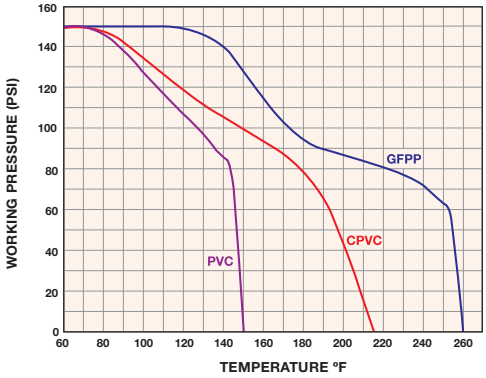
TECHNICAL INFORMATION, *CONTINUED*

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



DIMENSIONS – INCHES / MILLIMETERS

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 SOC / THD	WEIGHT lbs / kg FLANGED	VOLUME gal / LT
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 / 63	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	20 Mesh	.79
1/16"	1.00	1/16"	.74	40 Mesh	1.01
1/8"	.58	1/8"	.58	60 Mesh	1.20
3/16"	.46	5/32"	.37	80 Mesh	1.16
		3/16"	.46	100 Mesh	1.20
		1/4"	.58	200 Mesh	1.09
		3/8"	.45	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:

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

ΔP = Pressure Drop

Q = Flow in GPM

Cv = Flow Coefficient

Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	15	2 / 50	60
3/4 / 20	18	2-1/2 / 63	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.

SB Series Simplex Basket Strainers

6" TO 8" PVC AND CPVC

KEY FEATURES

- PVC and CPVC
- External Cover Threads
- In-Line or Loop Connections
- Ergonomic Hand-Removable Cover
- Integral Flat Mounting Base
- Hand Removable Vent on Cover
- Hand Removable Drain on Body
- Liquid Displacing Cover
- PVC or CPVC Perforated Baskets Standard

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 Non-Shock

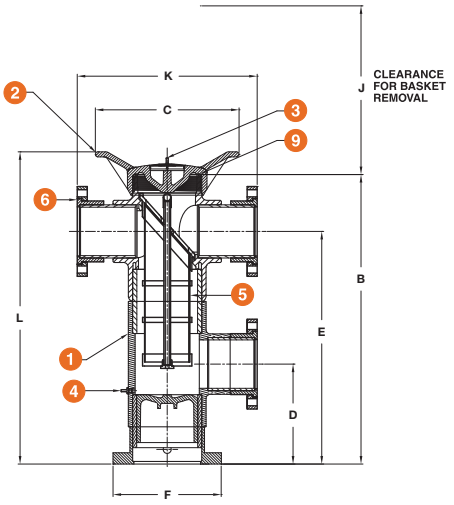
SB Series Simplex Basket Strainers

6" TO 8" PVC AND CPVC

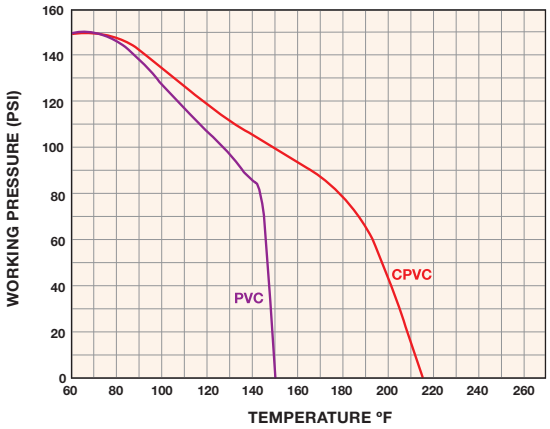
TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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



OPERATING TEMPERATURE / PRESSURE



DIMENSIONS – INCHES / MILLIMETERS

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 SOC / THD	WEIGHT lbs / kg FLANGED	VOLUME gal / LT
6 / 150	N/A	34.28 / 871	18.00 / 457	10.66 / 271	27.19 / 691	11.75 / 298	21.80 / 554	22.42 / 569	39.90 / 1013	N/A	60.00 / 27.21	6.80 / 25.74
8 / 200	N/A	34.28 / 871	18.00 / 457	10.66 / 271	27.19 / 691	11.75 / 298	28.75 / 730	25.19 / 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:

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

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

Cv VALUES

SIZE in / DN	Cv VALUES GPM
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.

DB Series Duplex Basket Strainers

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

KEY FEATURES

- PVC, CPVC, GFPP and Eastar
- No System Shutdown for Basket Cleaning
- Ergonomic Hand-Removable Cover
- In-Line or Loop Connections
- Integral Flat Mounting Bases
- External Cover Threads
- Hand Removable Vents on Covers
- Hand Removable Drains on Bodies

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
- GFPP Cell Class 85580 per ASTM D4101
- 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	
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, CPVC and GFPP	Socket, Threaded or Flanged	FPM or EPDM	150 PSI @ 70°F Non-Shock
	Eastar*			100 PSI @ 70°F Non-Shock

* End connections and assembly nuts are PVC

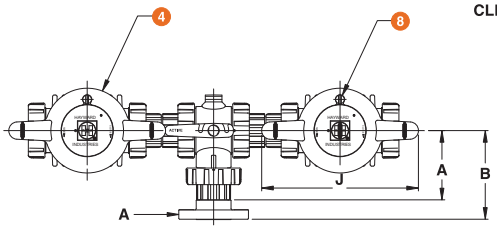
DB Series Duplex Basket Strainers

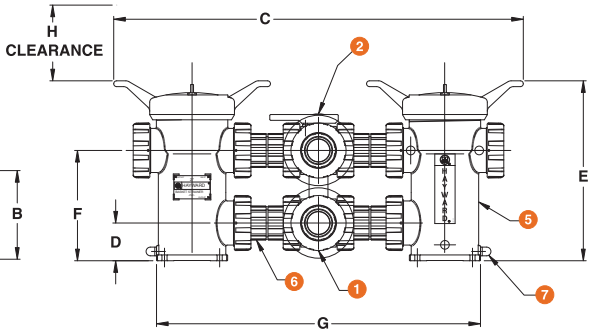
1/2" TO 4" PVC, CPVC, GFPP AND EASTAR®

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 – INCHES / MILLIMETERS

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	WEIGHT lbs / kg 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 / 63	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	20 Mesh	.79
1/16"	1.00	1/16"	.74	40 Mesh	1.01
1/8"	.58	1/8"	.58	60 Mesh	1.20
3/16"	.46	5/32"	.37	80 Mesh	1.16
		3/16"	.46	100 Mesh	1.20
		1/4"	.58	200 Mesh	1.09
		3/8"	.45	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:

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

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

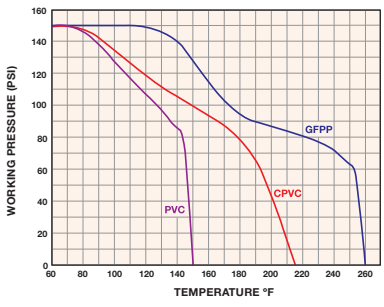
Cv VALUES

SIZE in / DN	Cv VALUES GPM	SIZE in / DN	Cv VALUES GPM
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

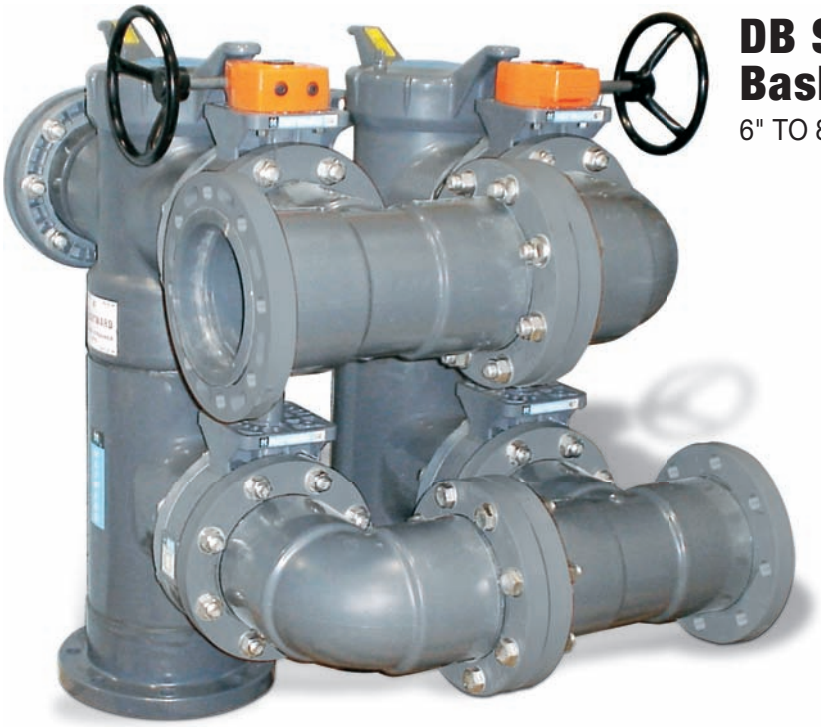
The above Cv Values were determined using a 1/16" perforated plastic basket in 1/2" through 4" strainers.

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.

OPERATING TEMPERATURE / PRESSURE



– Eastar is a registered trademark of Eastman.
– Hastelloy is a registered trademark of Haynes International Inc.
– Monel is a registered trademark of Special Metals Corporation.



DB Series Duplex Basket Strainers

6" TO 8" PVC AND CPVC

KEY FEATURES

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

OPTIONS

- Pneumatic or Electric Valve Automation
- 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

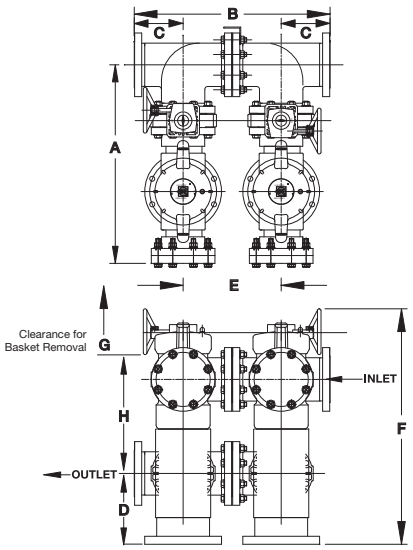
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
6" – 8" (DN150 – DN200)	PVC or CPVC	Flanged	FPM or EPDM	150 PSI @ 70°F Non-Shock

DB Series Duplex Basket Strainers

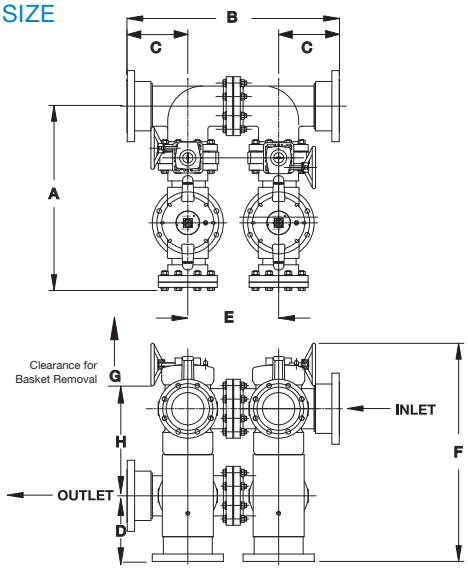
6" AND 8" PVC AND CPVC

TECHNICAL INFORMATION, *CONTINUED*

6" SIZE



8" SIZE



DIMENSIONS – INCHES / MILLIMETERS

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

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

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

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

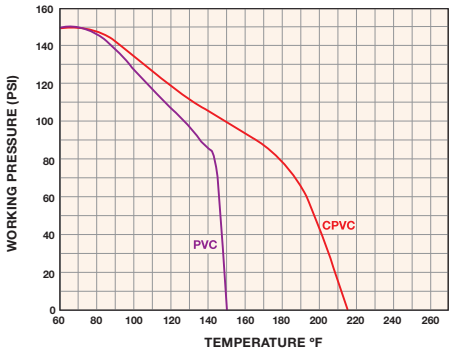
Cv VALUES

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

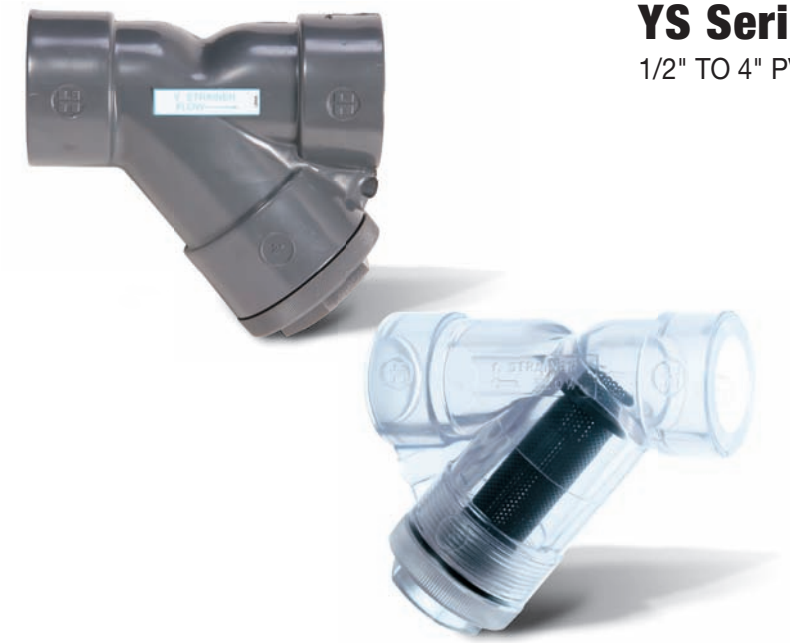
The above Cv Values were determined using a 5/32" perforated plastic basket in 6" and 8" strainers.

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.

OPERATING TEMPERATURE / PRESSURE



– Hastelloy is a registered trademark of Haynes International Inc.
– Monel is a registered trademark of Special Metals Corporation.



YS Series Y-Strainers

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

KEY FEATURES

- PVC, Clear PVC and CPVC
- Horizontal or Vertical Installation
- FPM or EPDM 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
- True Union Connection

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

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	
1/32"	N/A	PVC, CPVC and PP
1/16"		
1/8"		
3/16"		

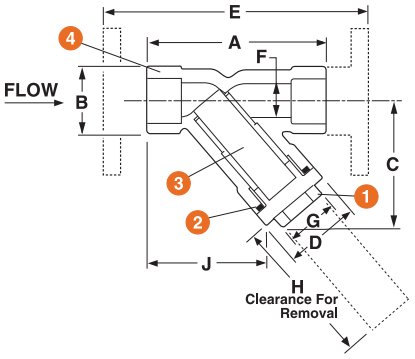
SELECTION CHART

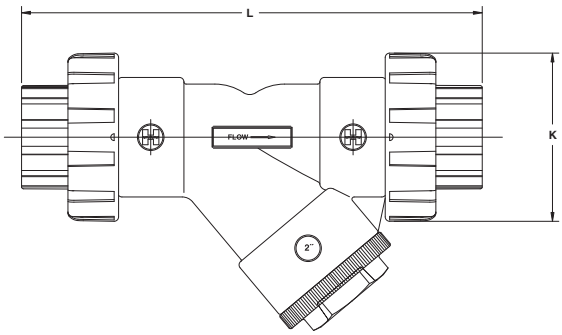
SIZE	MATERIAL	END CONNECTION	SEALS	PRESSURE RATING
1/2" – 4" (DN15 – DN100)	PVC or CPVC	Socket, Threaded, Flanged or True Union	FPM and EPDM	150 PSI @ 70°F Non-Shock
1/2" – 2" (DN15 – DN50)	Clear PVC			

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

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





DIMENSIONS – INCHES / MILLIMETERS

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	WEIGHT lbs / kg 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	2.25 / 57	6.64 / 167	.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	2.63 / 67	7.42 / 188	.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	3.00 / 76	8.97 / 228	.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	4.75 / 121	13.01 / 330	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	4.75 / 121	12.07 / 307	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	4.75 / 121	13.05 / 331	3.00 / 1.36	5.00 / 2.27
2-1/2 / 63	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	6.40 / 163	16.77 / 426	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	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 GPM	SIZE in / DN	Cv VALUES GPM
1/2 / 15	4.0	2 / 50	28
3/4 / 20	6.8	2-1/2 / 63	40
1 / 25	9.0	3 / 80	65
1-1/4 / 32	12	4 / 100	100
1-1/2 / 40	28		

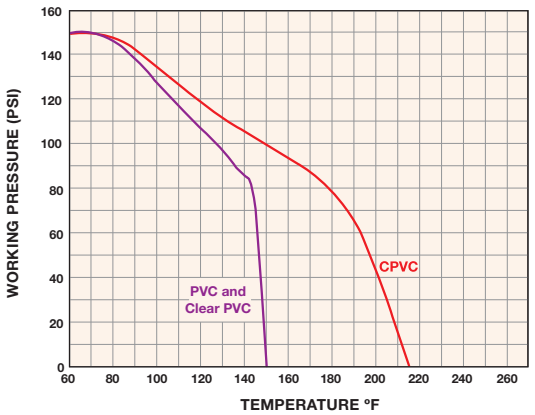
* With 1/32" plastic screen

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



PP / PVDF

PVC / CPVC

FLT Series
Simplex Bag Filters

SINGLE AND DOUBLE LENGTH

KEY FEATURES

- PVC, CPVC, GFPP or PVDF
- Single and Double Length
- Hand-Removable Cover
- In-Line or Loop Flow
- Integral Mounting Base
- Vent Valve on Cover

OPTIONS

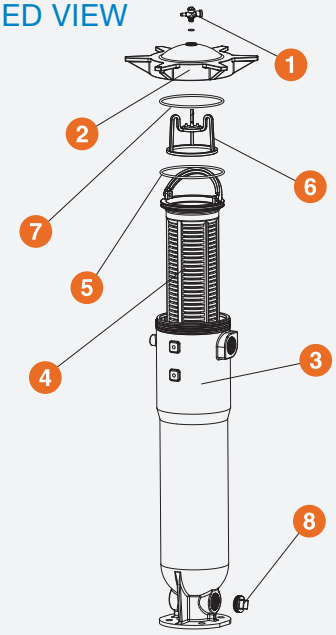
- Vent Gauge with Gauge Guard
- Pressure Differential Gauge and Switch
- Flanged Connections

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

EXPLODED VIEW



SELECTION CHART

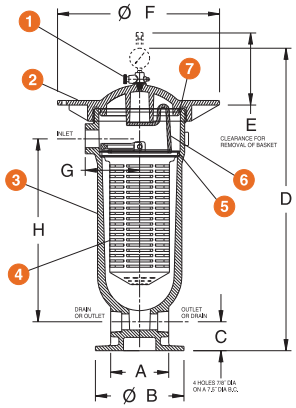
SIZE	MATERIAL	PIPING CONNECTION	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16" 2.5 sq ft	PVC	2" True Union	FPM or EPDM	50 GPM (clean bag)	150 PSI @ 70°F Non-Shock
	CPVC				
	GFPP	2" Threaded or Flanged			
Double Length 7" x 32" 4.4 sq ft	PVC	2" True Union		100 GPM (clean bag)	150 PSI @ 70°F Non-Shock
	CPVC				
	GFPP	2" Threaded or Flanged			
	PVDF				100 PSI @ 70°F Non-Shock

FLT Series
Simplex Bag Filters
SINGLE AND DOUBLE LENGTH

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

1. Vent Valve with Optional Gauge (PP Vessels Only)
2. Cover
3. Body (PP Double and Single Length, PVDF Double Length Only)
4. Basket
5. Basket O-Ring
6. Bag Retainer
7. Cover O-Ring
8. Drain Plug and O-Ring



SPECIFICATIONS

Material of Construction: Glass-reinforced polypropylene – single and double length; PVDF – double length only

Piping Connections: PP: 2" NPT threaded or 150# ANSI flange. PVDF: 2" flange

Drain Connections: PP: 2" NPT threaded or 150# ANSI flange. PVDF: 2" flange

Bag Size: Single length – 7" x 16", 2.0 square feet (Size 1)
Double length – 7" x 32", 4.1 square feet, PP fabric and ring (Size 2)

Pressure Rating: PP 150 PSI, PVDF 100 PSI

Seals: FPM or EPDM

Nominal Bag Ratings: 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 microns. Universal seat accepts most standard 7" diameter bags

Flow Rate: Single length, 50 GPM with clean bag; double length, 100 GPM with clean bag

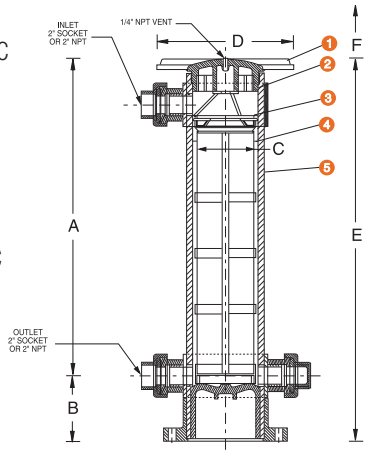
DIMENSIONS – INCHES / MILLIMETERS

VESSEL SIZE	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	WEIGHT lbs / kg
Single	6.50 / 165	10.00 / 254	3.25 / 83	34.10 / 866	20.00 / 508	18.30 / 465	6.13 / 156	20.75 / 527	11.5 / 292	8.75 / 222	60.00 / 27.22
Double	6.50 / 165	10.00 / 254	3.25 / 83	50.10 / 1273	36.00 / 914	18.30 / 465	6.13 / 156	36.75 / 933	11.5 / 292	8.75 / 222	80.00 / 36.29

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

PARTS LIST

1. Cover – PVC or CPVC
2. Cover O-Ring
3. Bag Retainer – PVC or CPVC
4. Filter Basket – PVC or CPVC
5. Body – PVC or CPVC



SPECIFICATIONS

Material of Construction: PVC or CPVC

Piping Connections: True Union 2" Socket, NPT Threaded or Optional 150# ANSI Flanged

Drain Connections: True Union 2" Socket, NPT Threaded or Optional 150# ANSI Flanged

Bag Size: Single Length – Size 1, 7" x 16"
Double Length – Size 2, 7" x 32"

Pressure Rating: 150 PSI at 70°F Non-Shock

Seals: FPM or EPDM

Nominal Bag Ratings: PP bags, 1, 5, 10, 25, 100, 150, 200, 400, 600, and 800 microns. Universal seat accepts most standard single and double length bags

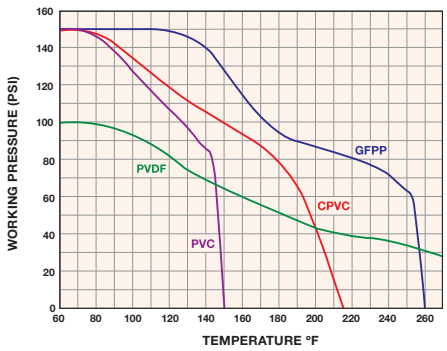
Flow Rate: With clean bag, double length 100 GPM, single length 50 GPM

DIMENSIONS – INCHES / MILLIMETERS

VESSEL SIZE	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	WEIGHT lbs / kg
Single	13.75 / 349	7.87 / 200	6.13 / 156	15.00 / 381	26.63 / 676	16.00 / 406	50.00 / 22.68
Double	29.75 / 756	7.87 / 200	6.13 / 156	15.00 / 381	42.63 / 1083	32.00 / 813	75.00 / 34.02

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

OPERATING TEMPERATURE / PRESSURE



PP / PVDF

FLT Series Duplex Bag Filters

SINGLE AND DOUBLE LENGTH

KEY FEATURES

- PVC, CPVC or GFPP Housing with PVC or CPVC Valve Assembly
- No Line Shutdown for Bag Changeout
- Hand-Removable Cover
- In-Line or Loop Connections
- Built-In Mounting Platform
- Vent Valve on Cover

OPTIONS

- Pneumatic or Electric Actuation Valve Operation
- Vent Gauge with Gauge Guard
- Pressure Differential Gauges and Switches
- Flanged Connections

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

PVC/CPVC

SELECTION CHART

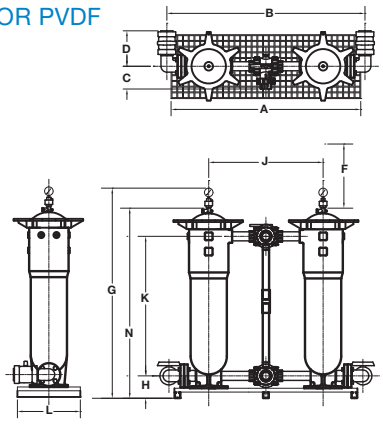
SIZE	MATERIAL	PIPING CONNECTION	SEALS	FLOW RATE	PRESSURE RATING
Single Length 7" x 16" 2.5 sq ft	PVC	2" True Union	FPM or EPDM	50 GPM (clean bag)	150 PSI @ 70°F Non-Shock
	CPVC				
	GFPP	2" Threaded or Flanged			
Double Length 7" x 32" 4.4 sq ft	PVC	2" True Union		100 GPM (clean bag)	150 PSI @ 70°F Non-Shock
	CPVC				
	GFPP	2" Threaded or Flanged			
	PVDF				100 PSI @ 70°F Non-Shock

FLT Series
Duplex Bag Filters
SINGLE AND DOUBLE LENGTH

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST – GFPP OR PVDF

1. Vent Valve with Optional Gauge
2. Inlet Connection
3. Valve Assembly – CPVC
4. Lever Handle
5. Filter Housing
6. Linkage Assembly
7. Outlet Connection
8. Base Assembly
9. Support Stand
10. Drain Valve
11. Differential Gauge Mounting Bracket – Optional



SPECIFICATIONS

Bag Size:	Single length – 7" x 16", 2.0 square feet (Size 1); Double length – 7" x 32", 4.1 square feet, PP fabric and ring (Size 2)
Basket Open Area Ratio:	Single length 28:1; Double length 60:1
Piping Connections:	2" 150# class flange
Drain Connections:	2" NPT
Material of Construction:	GFPP and PVDF
Seals:	FPM or EPDM
Pressure Rating:	150 PSI @ 70°F
Nominal Bag Ratings:	1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 microns. Universal seat accepts most standard 7" diameter bags
Maximum Flow Rate:	100 GPM clean bag
Mounting Base:	Fiberglass
Hardware:	Stainless steel

DIMENSIONS – INCHES / MILLIMETERS

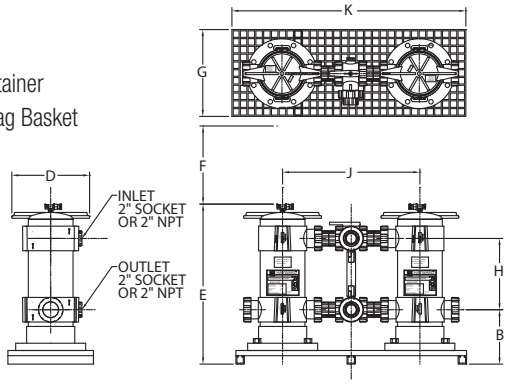
VESSEL SIZE	A in / mm	B in / mm	C in / mm	D in / mm	F* in / mm	G in / mm	H in / mm	J in / mm	K in / mm	L in / mm	N in / mm
Single	49.75 / 1264	51.96 / 1320	5.97 / 152	9.29 / 236	17.00 / 432	39.11 / 993	5.88 / 149	30.00 / 762	20.60 / 523	16.50 / 419	33.86 / 860
Double	49.75 / 1264	51.96 / 1320	5.97 / 152	9.29 / 236	33.00 / 838	55.11 / 1400	5.88 / 149	30.00 / 762	36.60 / 930	16.50 / 419	49.86 / 1266

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

* Clearance from top for basket removal

PARTS LIST – PVC OR CPVC

1. Cover
2. O-Ring
3. Bag Retainer
4. Filter Bag Basket
5. Body



SPECIFICATIONS

Material of Construction:	PVC or CPVC
Piping Connections:	True Union 2" Socket, NPT Threaded or Optional 150# ANSI Flanged
Drain Connections:	True Union 2" Socket, NPT Threaded or Optional 150# ANSI Flanged
Bag Size:	Single Length – Size 1, 7" x 16" Double Length – Size 2, 7" x 32"
Pressure Rating:	150 PSI at 70°F Non-Shock
Seals:	FPM or EPDM
Nominal Bag Ratings:	PP Bags, 1, 5, 10, 25, 50, 100, 150, 200, 400, 600 and 800 microns. Universal seat accepts most standard single and double length bags
Flow Rate:	With clean bag, double length 100 GPM, single length 50 GPM

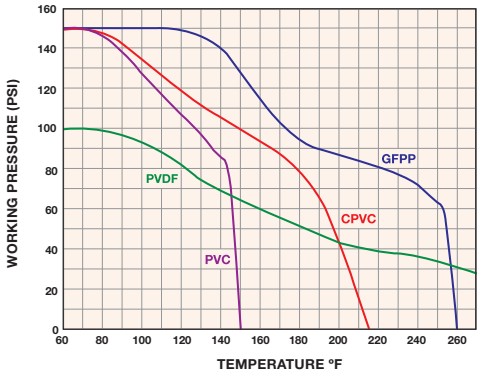
DIMENSIONS – INCHES / MILLIMETERS

VESSEL SIZE	B in / mm	D in / mm	E in / mm	F in / mm
Single	10.50 / 267	15.00 / 381	30.86 / 784	16.00 / 406
Double	10.50 / 267	15.00 / 381	46.86 / 1190	32.00 / 813

VESSEL SIZE	G in / mm	H in / mm	J in / mm	K in / mm
Single	16.75 / 425	13.75 / 349	26.50 / 673	45.13 / 1146
Double	16.75 / 425	29.75 / 756	26.50 / 673	45.13 / 1146

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

OPERATING TEMPERATURE / PRESSURE



CFLT Series 4200 Simplex Cartridge Filters

GFPP OR PVDF (SERIES 5200)

KEY FEATURES

- GFPP or PVDF Housing
- Simplex or Duplex Designs
- Hand-Removable Cover
- In-Line or Loop Connections
- Built-In Mounting Platform
- Vent Valve on Cover

CARTRIDGE TYPES

- Hayward® HC 16" cellulose nominally rated 5 and 25 microns
- Hayward PF 20" and 30" PP absolutely rated at 1, 5 or 10 microns

MATERIALS

- GFPP Cell Class 85580 per ASTM D4101
- PVDF
- FPM and EPDM O-Ring Seals

TECHNICAL INFORMATION

ALTERNATE VIEW

SELECTION CHART

MATERIAL	HARDWARE	PIPING CONNECTION	SEALS	FLOW RATE*	PRESSURE RATING
PVC or CPVC with PVC or CPVC valve assembly	Stainless Steel	2" Threaded, Socket or Flanged	FPM	Up to 50 GPM (single length) Up to 100 GPM (double length)	150 PSI @ 70°F
GFPP or PVDF with CPVC valve assembly	Stainless Steel	2" Threaded or Flanged	FPM	Up to 50 GPM (single length) Up to 100 GPM (double length)	150 PSI @ 70°F

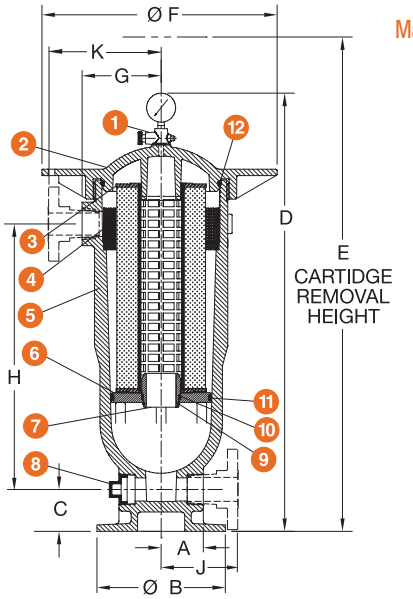
* Flow Rate is based on clean bag

CFLT Series 4200
Simplex Cartridge Filters
GFPP OR PVDF (SERIES 5200)

TECHNICAL INFORMATION, *CONTINUED*

PARTS LIST

1. PP Vent Valve (With Optional Gauge)
2. Cover
3. HC Cartridge
4. Flow Diffuser (HC Only)
5. Body
6. Support
7. Connector
8. Drain Plug
9. Bottom Connector O-Ring
10. Bottom Connector O-Ring
11. Plate O-Ring
12. Cover O-Ring



SPECIFICATIONS

Material of Construction: GFPP or PVDF (Model CFLT4202 only)

Piping Connections: PP – 2" NPT threaded or optional 150# ANSI flanged.
PVDF – 2" flanged

Pressure Rating: PP – 150 PSI
PVDF – 100 PSI
Non-Shock at 70°F

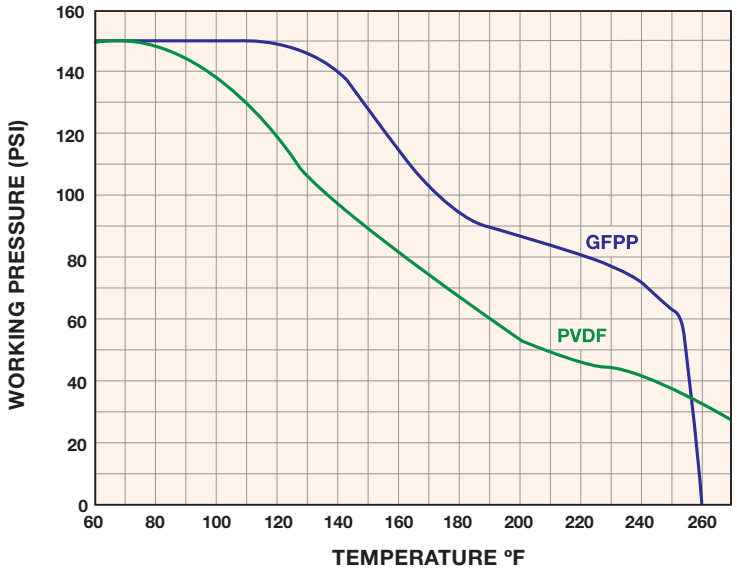
Seals: FPM or EPDM

DIMENSIONS – INCHES / MILLIMETERS

MODEL	A in / mm	B in / mm	C in / mm	D in / mm	E (HC CART.) in / mm	E (PF CART.) in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	WEIGHT lbs / kg
CFLT4201	6.50 / 165	10.00 / 254	3.25 / 83	34.10 / 866	45.00 / 1143	N/A	18.38 / 467	6.21 / 158	20.75 / 527	5.75 / 146	8.75 / 222	50.00 / 22.68
CFLT4202	6.50 / 165	10.00 / 254	3.25 / 83	50.20 / 1275	61.00 / 1549	75.00 / 1905	18.38 / 467	6.21 / 158	36.75 / 933	5.75 / 146	8.75 / 222	65.00 / 29.48
CFLT4203	6.50 / 165	10.00 / 254	3.25 / 83	38.10 / 968	N/A	49.00 / 1245	18.38 / 467	6.21 / 158	24.75 / 629	5.75 / 146	8.75 / 222	58.00 / 26.31

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

OPERATING TEMPERATURE / PRESSURE



Heavy-Duty Filter Bags

PP FELT OR MESH

1 TO 800 MICRON RATINGS

Your filtration process is only as effective as your filter bag. Don't compromise it with anything less than a Hayward® precision quality filter bag that's guaranteed to fit your Hayward filter vessel.

KEY FEATURES

- Thermoplastic Ring Seal
- Heavy Duty Sewn or Welded Construction
- Silicone-Free

TECHNICAL INFORMATION

BAG SELECTION CHART

MATERIAL	CONSTRUCTION	SEAL MATERIAL/ TYPE	MICRON RATINGS
PP Needle Felt	Welded	PP SENTINEL®	1, 5, 10, 25, 50, 100, 200
PP Needle Felt	Sewn	PP SNAP-RING™	1, 5, 10, 25, 50, 100, 200
PP Mesh	Sewn	PP SNAP-RING	400, 600, 800

CARTRIDGE SELECTION CHART

HOUSING	HC CARTRIDGE	MAX FLOW RATE	PF CARTRIDGE	MAX FLOW RATE
CFLT4201	One 16"	50 GPM	N/A	N/A
CFLT4202	Two 16"	100 GPM	Five 30"	100 GPM
CFLT4203	N/A	N/A	Five 20"	50 GPM

Webster In-Tank Filtration Systems

COMPATIBLE WITH D AND S SERIES IMMERSIBLE PUMPS

KEY FEATURES

- CPVC Corrosion-Resistant Construction
- Compact and Easy to Install
- Seal-Less, Bearing-Free Pump
- Fast Filter Change
- 1/15 HP Model Features a Built-in Power Cord

OPTIONS

- Double Filter

MATERIALS

- CPVC Cell Class 23447 per ASTM D1784

FLT Series Cartridge Filters 10", 20" and 30"

PVC OR CPVC

KEY FEATURES

- PVC or CPVC Construction
- FPM O-Ring Cover Seals
- Hand-Removable Cover
- Choice of Pleated or Wound Filter Cartridges
- Integral, Plugged Tap on Cover for Easy Bleeding of the Filter
- Optional Base for Mounting to Floor or Work Surface

APPLICATIONS

For 1 to 100 Micron Filtration in the Following Industries:

- Water Treatment
- Plating
- Electronics
- Photo Processing
- Pollution Control
- Chemical Processing

MATERIALS

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

Webster C Series Centrifugal Pumps

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

KEY FEATURES

- Rugged Design for Demanding Continuous Duty Service
- No Metal in Contact with Process Fluid
- FPM Elastomers
- Carbon / Ceramic Seals

OPTIONS

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

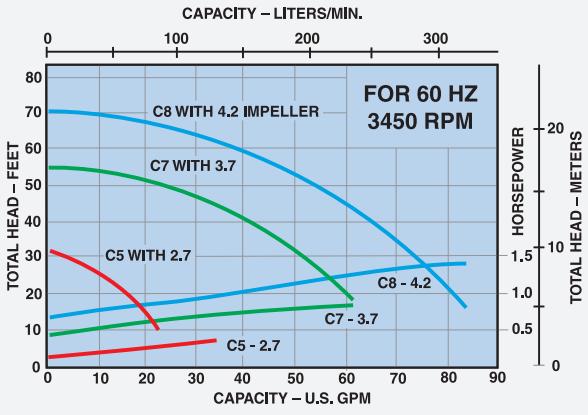
MATERIALS

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

TECHNICAL INFORMATION

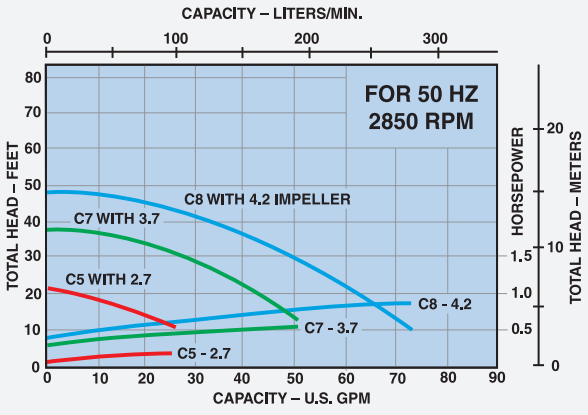
PERFORMANCE CURVES

60Hz



C5, C7, C8

50Hz



C5, C7, C8

Webster C Series Centrifugal Pumps

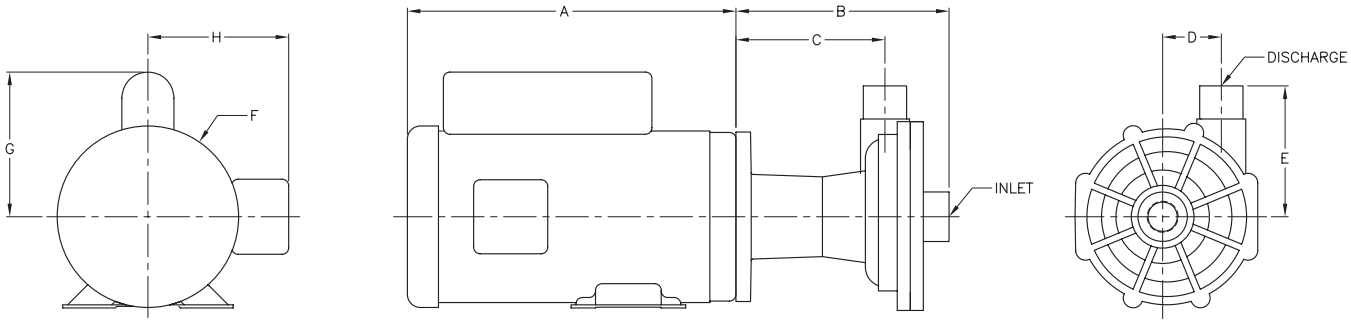
1/3, 1 AND 1-1/2 HP

TECHNICAL INFORMATION, *CONTINUED*

C-SERIES PUMP SPECIFICATIONS

PUMP	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	Models for 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 HP, C7 1 HP, C8 1-1/2 HP

C-SERIES DIAGRAM



C-SERIES 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

Webster D Series Vertical Seal-Less Immersible Pumps

1/8 HP

KEY FEATURES

- CPVC, PP, GFPP and PVDF
- Small Capacity Pumps Built for Years of Trouble-Free Service
- No Metal in Contact with the Process Fluid
- No Seals to Leak or Replace
- PTFE Fume Barrier
- FPM Elastomer

MATERIALS

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

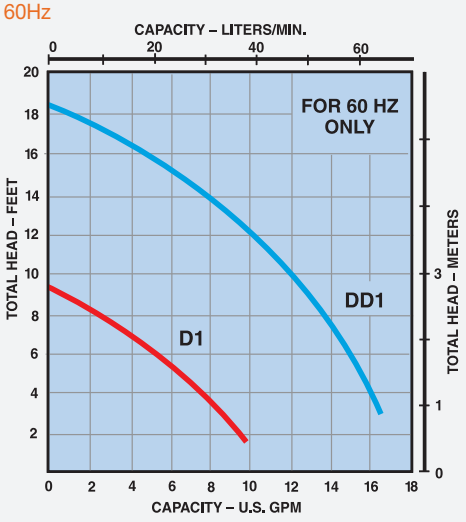
OPTIONS

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

TECHNICAL INFORMATION

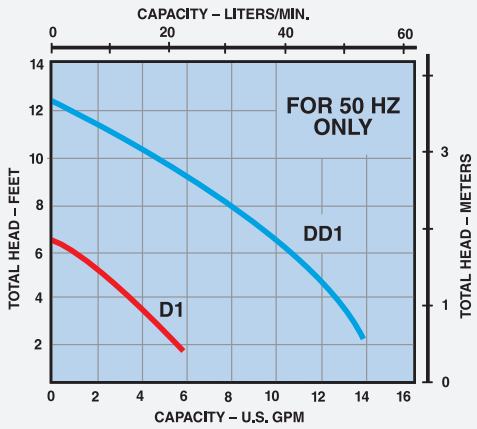
PERFORMANCE CURVES

60Hz



D1, DD1

50Hz



D1, DD1

Webster D Series Vertical Seal-Less Immersible Pumps

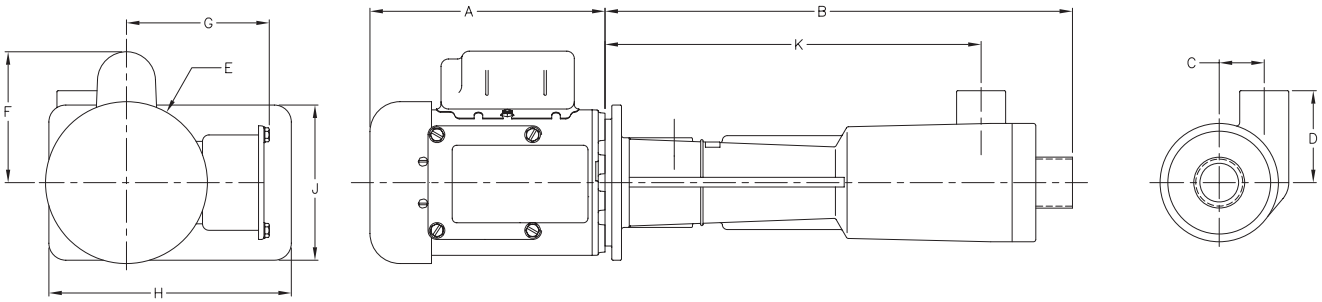
1/8 HP

TECHNICAL INFORMATION, *CONTINUED*

D-SERIES PUMP SPECIFICATIONS

PUMP	CPVC 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	For 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 DIAGRAM



D-SERIES DIMENSIONS

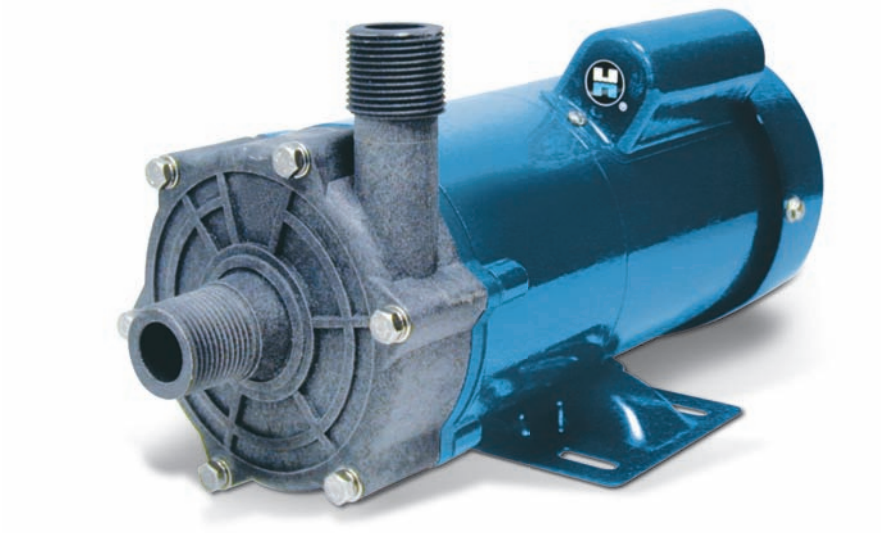
	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	INLET	DISCHARGE
D1	6.06 / 154	12.05 / 306	1.16 / 29	2.37 / 60	4.17 / 106	3.37 / 86	3.68 / 93	6.25 / 159	4.00 / 102	9.67 / 246	1" MNPT	1/2" FNPT
DD1	6.06 / 154	12.05 / 306	1.16 / 29	2.37 / 60	4.17 / 106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

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

Webster R Series Magnetic Drive Pumps

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



KEY FEATURES

- 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

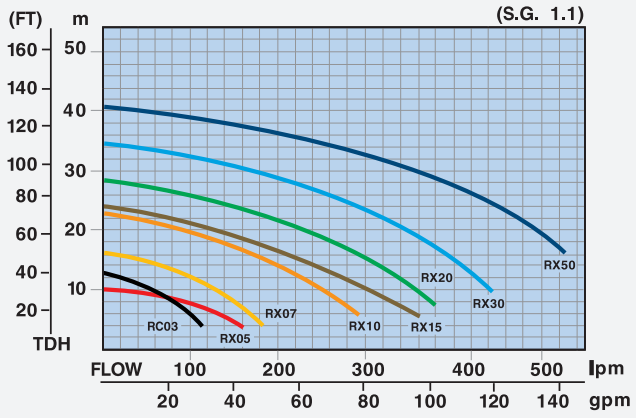
MATERIALS

- GFPP Cell Class 85580 per ASTM D4101
- ETFE

TECHNICAL INFORMATION

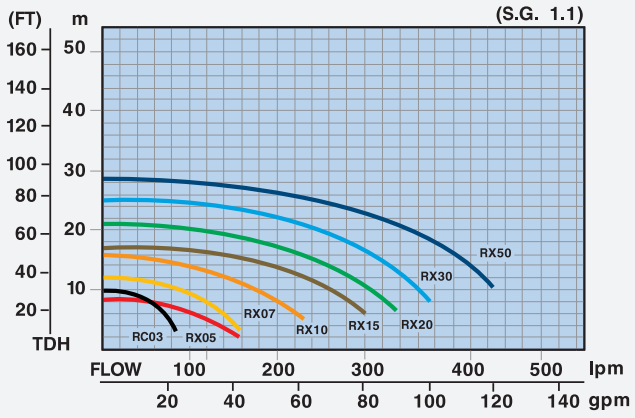
PERFORMANCE CURVES

60Hz



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

50Hz



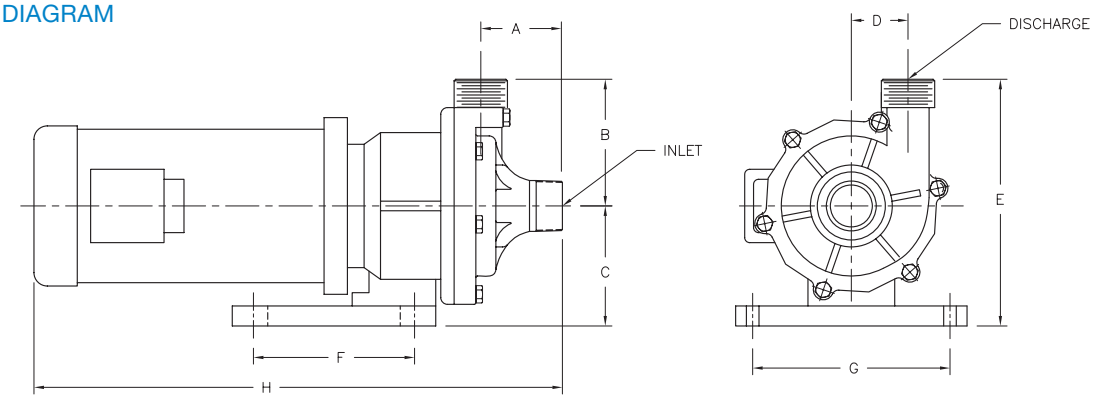
RC03, RX05, RX07, RX10, RX15, RX20, RX30, RX50

TECHNICAL INFORMATION, *CONTINUED*

MAG DRIVE PUMP SPECIFICATIONS

PUMP	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 DIAGRAM



R-SERIES 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

Webster 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
- 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

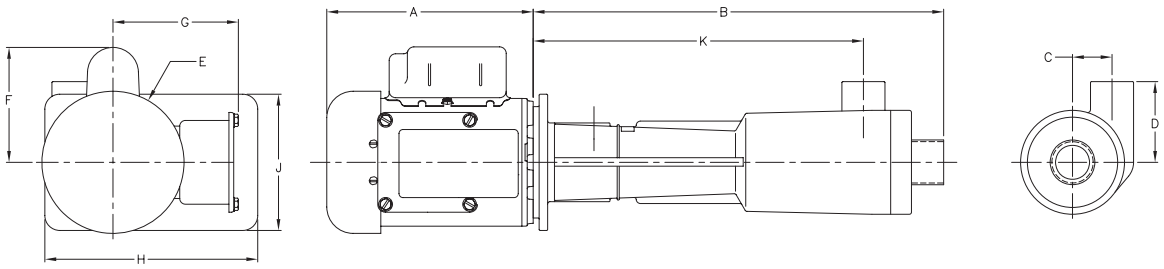
TECHNICAL INFORMATION

SPECIFICATIONS

PUMP:	CPVC (1/8 – 5 HP) Natural PP (1/8 HP Only) GFPP (1/3 – 1-1/2 HP) PVDF (1/8 – 1-1/2 HP)
PIPE CONNECTIONS:	Threaded NPT
FUME BARRIER:	PTFE, Protects Motor and Bearings from Corrosion Damage
O-RINGS:	FPM
PERFORMANCE:	Models for 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:	Single or Three Phase Motors are Available with 1/8, 1/3, 1/2, 1, 1-1/2, 3 and 5 Horsepower Ratings, 115/230 VAC 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 RATINGS:	S1 1/15 HP, S2 1/3 HP, S4 1/2 HP, S5 3/4 HP, SS6 3/4 HP, SS7 1 HP, S8 1-1/2 HP, SS8 1-1/2 HP, S12 3 HP, S16 5 HP

TECHNICAL INFORMATION, *CONTINUED*

S-SERIES DIAGRAM



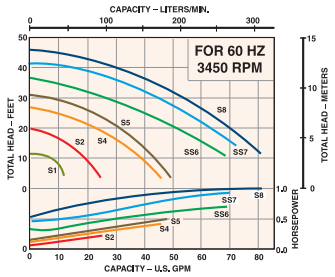
S-SERIES DIMENSIONS

	A in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm	J in / mm	K in / mm	INLET	DISCHARGE
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	N/A	N/A	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	N/A	N/A	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	N/A	N/A	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	N/A	N/A	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	N/A	N/A	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	N/A	N/A	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

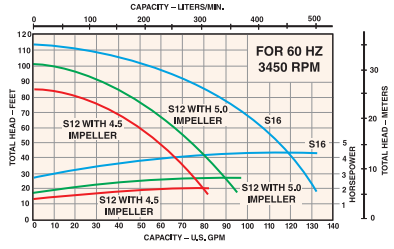
Dimensions are subject to change without notice – consult factory for installation information

PERFORMANCE CURVES

60Hz

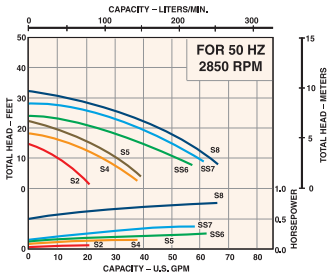


S2, S4, S5, SS6, SS7, S8, SS8

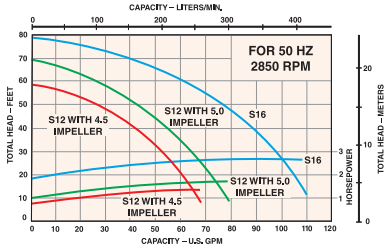


S12, S16

50Hz



S2, S4, S5, SS6, SS7, S8, SS8



S12, S16

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 D-1784. 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 D-1784-23447B. The maximum working temperature for Hayward products made of CPVC is 190°F at 60 PSI. 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.

GLASS FIBER-REINFORCED PP (POLYPROPYLENE)

Polypropylene (PP) is a lightweight material with generally high resistance to chemical attack. The glass fiber-reinforced PP 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, chemical drainage, DWV piping and irrigation systems. PP is generally inert to most mineral acids, bases, salts and hydrocarbon solutions. The PP used in Hayward products conforms to ASTM D-4101. The maximum recommended working temperature of PP is 250°F. PP products can be installed using threaded or flanged end connections.

PP (POLYPROPYLENE)

PP (PolyPropylene) is a member of the polyolefin family of pure hydrocarbon plastics. Even though PP has half the strength of PVC and CPVC, with a design stress of 1,000 psi at 73° F, it has the most versatile chemical resistance of the thermoplastic materials. 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 D-4101. The maximum recommended working temperature of PP is 200°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, chemical resistance and high clarity. It is used in a variety of applications such as chemical processing and ultra-pure industries.

PVDF

Polyvinylidene Fluoride 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. PVDF 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 rubber is an elastomer prepared from ethylene and propylene compounds. EPDM has been used continuously to a temperature of 300°F. EPDM is recommended for water, steam, dilute acids, dilute alkalis and alcohols. EPDM is not recommended for petroleum oils or di-ester lubricants.

FPM OR FKM (FLUOROCARBON RUBBER)

The fluorocarbon elastomers have a maximum service temperature of 400°F. Fluorocarbon materials are recommended for petroleum oils, di-ester 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. Nitrile is recommended for petroleum oils and fluids, cold water, silicone greases and oils, di-ester 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. PTFE 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 is a fluorocarbon based polymer. It has a very good resistance to solvents and chemicals as well as outdoor weathering. ETFE has a maximum service temperature of 300°F. It is widely used in the electronics, chemical processing and laboratory testing equipment industries.

?``pctg_rgmlq

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BS	British Standards Institute
CPVC	Chlorinated Polyvinyl Chloride
CRN	Canadian Registration Number
CSA	Canadian Standards Association
DPDT	Double Pole, Double Throw
EPDM	Ethylene Propylene Diene Monomer
ETFE	Ethylene-Tetrafluoroethylene
FM	Factory Mutual
FPM	Fluoro Polymer
GPM	Gallons per Minute
GFPP	Glass Filled Polypropylene
IAPMO	International Association of Plumbing and Mechanical Officials
I/P	Instrument Signal to Pressure
ISO	International Standards Organization
LED	Light Emitting Diode
NEMA	National Electrical Manufacturers Association
NPT	American National Standard Taper Pipe Thread
NSF	National Sanitation Foundation
PP	Polypropylene
PSI	Pounds per Square Inch
PSIG	Pounds per Square Inch Gauge Pressure
PTFE	Polytetrafluoroethylene
PVC	Polyvinyl Chloride
PVDF	Polyvinylidene Fluoride
SPDT	Single Pole, Double Throw
SPST	Single Pole Single Throw
UL	Underwriters Laboratories, Inc.

Conversion Factors

LIQUID MEASURE AND WEIGHT

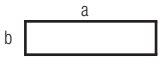
TO OBTAIN MULTIPLY BY	U.S. GALLON	IMPERIAL GALLON	U.S. POUND WATER	U.S. CUBIC FOOT	U.S. CUBIC INCH	LITER	CUBIC METER
U.S. GALLON	1	0.8327	8.337	0.13368	231.0	3.785	0.003785
IMPERIAL GALLON	1.2009	1	10.0	0.16054	277.78	4.546	0.004546
U.S. POUND WATER	0.11995	0.1	1	0.016035	27.708	0.45404	0.000454
U.S. CUBIC FOOT	7.4805	6.2288	62.365	1	1728.0	28.316	0.028314
U.S. CUBIC INCH	0.004329	0.00360	0.3609	0.000578	1	0.016387	0.0000164
LITER	0.26418	0.21997	2.202	0.035315	61.025	1	0.0010
CUBIC METER	264.2	219.99	2202.6	35.3183	61030.0	999.97	1

PRESSURE AND HEAD

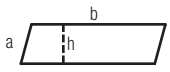
TO OBTAIN MULTIPLY BY	LB / SQ IN	LB / SQ FT	ATMO-SPHERE	KG / SQ CM	IN WATER	FT WATER	IN MERCURY	MM MERCURY	BAR
LB / SQ IN	1	144.0	0.068046	0.070307	27.7276	2.3106	2.0360	51.7150	0.06895
LB / SQ FT	0.006945	1	0.000473	0.000488	0.1926	0.01605	0.014139	0.35913	0.000479
ATMOSPHERE	14.696	2116.22	1	1.0332	407.484	33.9570	29.921	760.0	1.01325
KG / SQ CM	14.2233	2048.16	0.96784	1	394.27	32.864	28.959	735.558	0.9807
IN WATER	0.03607	5.194	0.002454	0.00254	1	0.08333	0.0734	1.865	0.00249
FT WATER	0.43278	62.3205	0.029449	0.03043	12.0	1	0.8811	22.381	0.02984
IN MERCURY	0.49115	70.726	0.033421	0.03453	13.617	1.1349	1	25.40	0.03386
MM MERCURY	0.019337	2.7845	0.0013158	0.0013595	0.5361	0.04468	0.03937	1	0.001333
BAR	14.5038	2088.55	0.98692	1.0197	402.1	33.51	29.53	750.0	1

PRESSURE AND HEAD

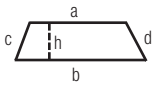
A = Area, S = Surface Area of Solid, V = Volume, C = Circumference, R = Radius of Circumscribed Circle



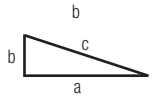
Rectangle
A = ab
C = 2 (a + b)



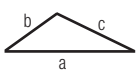
Parallelogram
A = bh
C = 2 (a +b)



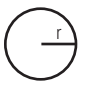
Trapezoid
A = 0.5 (a +b) h
C = a + b + c + d



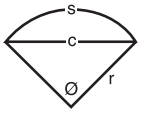
Right Triangle
A = 0.5 ab
R = 0.5 c



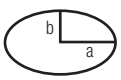
General Triangle
$A = \sqrt{s\,(s-a)\,(s-b)\,(s-c)}$
R = abc/(0.25A)



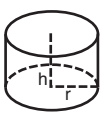
Circle
$A = 3.142\,r^2$
C = 6.283 r



Sector of Circle
S = r Ø
C = 2 r sin (Ø/2)
A (sector) = 0.5 r s
$A\ (segment) = 0.5\,r^2(Ø - \sin Ø)$



Ellipse
A = 3.142ab
$C = 6.284\sqrt{[a(a+b)b]/2}$



Cylinder
$C = 3.142\,r^2h$
S = 6.284 r h

Cone
$V = 1.047\,r^2h$
$S = 3.142\,r\sqrt{r\,(r+h)\,h}$

Sphere
$A = 4.189\,r^3$
$S = 12.57\,r^2$

Frustrum of Right Circular Cone
$V = 1.047\,h\,[a\,(a + b)(b + a)b]$
$S = 3.142(a+b)\sqrt{(a-b)}$

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.

Variable: ΔP = Pressure drop across flow passage (PSI)
Q = Volume flow rate of fluid through passage (GPM)
Cv = Flow coefficient [GPM/PSI$^{1/2}$]

The flow coefficient Cv 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:

$$Cv = \sqrt{\frac{1}{\Delta P}}$$

A standardized test procedure for finding Cv factors is presented in ISA S75.02. A form of the equation is:

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

Example 1:
A Hayward 1/2" True Union Ball Valve has an experimentally-determined Cv 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 2:
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:

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

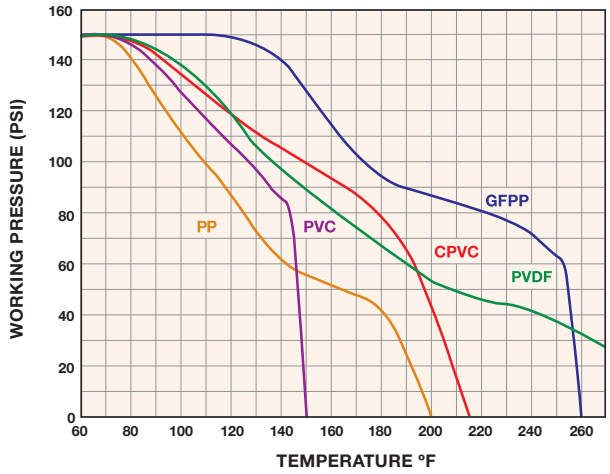
A Hayward 4" True Union Ball Valve has an experimentally-determined Cv rating of 600 for water. The approximate flow rate at a 0.5 PSI pressure drop is calculated by:

$$Q = 600 \sqrt{0.5} = 420 \text{ GPM}$$

How to Select a Bag Filter

1. CHECK THE CHART BELOW

To make sure that the temperature/pressure of the application falls within the OK range



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 100 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, using two manifolded filters would reduce the flow to a manageable 75 GPM through each.

3. SELECT THE BAG

Hayward bags are available in 1, 5, 10, 25, 50, 100 and 200 micron ratings. The bags are made from non-woven PP felt material. They are double stitched and heat treated to minimize fiber migration. All bags are individually plastic wrapped and sealed to prevent contamination in shipping and handling. A single length bag has a surface area of 2.0 sq ft and a double length 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. Remember that in most applications filtration efficiency falls off at about 8 to 10 PSI loss and bag change out should take place before a 20 PSI loss is reached. When in doubt select the filter with the lowest pressure loss. 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 Number One. Multiply the pressure drop by this factor.

Chart 1 – Vessel Pressure Loss

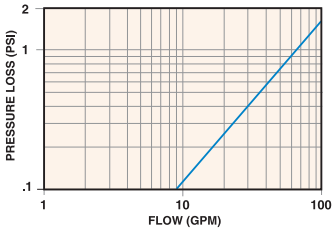


Table 1 – Vessel Viscosity Correction

VISCOSITY IN CPS	200	400	600	800	1,000	2,000
CORRECTION FACTOR	1.10	1.20	1.40	1.50	1.60	1.80

Second: Single and double length filter bags have different pressure losses. Use Chart 2 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 ÷ 2.0) and 0.05 for a double length bag (0.2 ÷ 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 x 50.0).

Chart 2 – Bag Pressure Loss

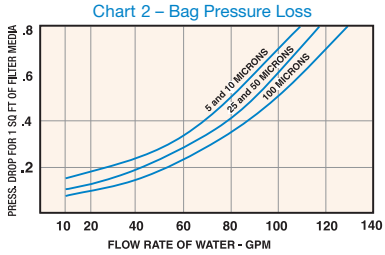


Table 2 – Bag Viscosity Correction

VISCOSITY IN CPS	Water 1	50	100	200	400	600	800	1,000	2,000
CORRECTION FACTOR	1.00	4.50	8.50	16.60	27.70	38.90	50.00	56.20	113.60

Last: Add the pressure loss of the vessel and the bag together to get the pressure loss across the filter with the bag installed.

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

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		

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.

Comparative Particle Size

MESH	INCHES	MICRONS	MESH	INCHES	MICRONS	MESH	INCHES	MICRONS
3,250	0.0002	6	130	0.0043	110	24	0.028	718
1,600	0.0005	14	120	0.0046	118	20	0.034	872
750	0.0010	25	110	0.0051	131	18	0.039	1,000
325	0.0016	40	100	0.0055	149	16	0.045	1,154
250	0.0024	62	90	0.0061	156	14	0.051	1,308
200	0.0029	74	80	0.0070	179	12	0.060	1,538
180	0.0033	85	70	0.0078	200	10	0.075	1,923
170	0.0035	90	60	0.0092	238	8	0.097	2,488
160	0.0038	97	50	0.0117	300	6	0.132	3,385
150	0.0041	100	40	0.015	385	5	0.159	4,077
140	0.0042	108	30	0.020	513	4	0.203	5,205

Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com

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.

FRICTION 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.

Engineering Terminology, *continued*

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.

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.

Engineering Terminology, *continued*

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.

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.

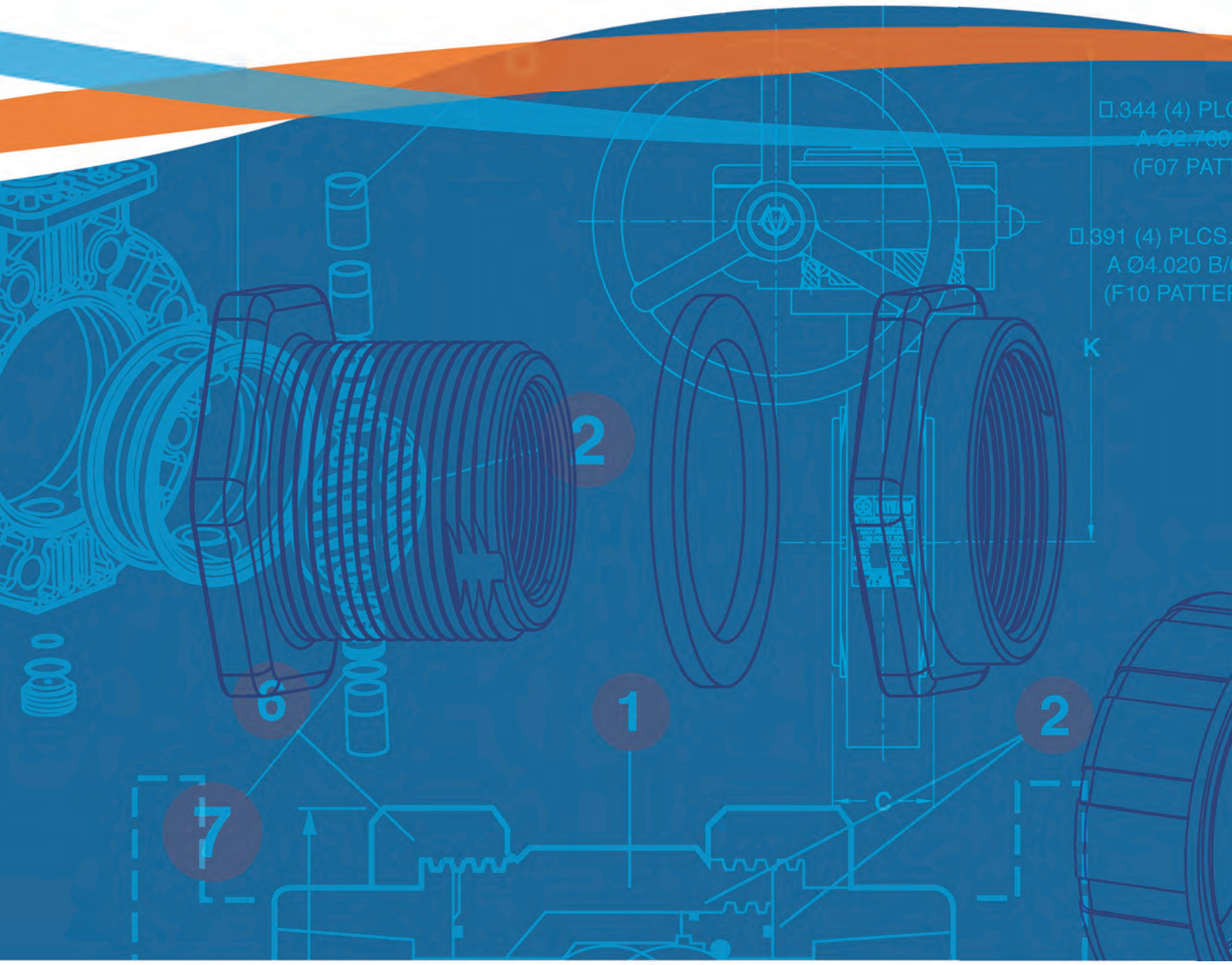
START / STALL TORQUE:
(Electric) The torque in inch pounds, as measured at the actuator output shaft at the instant of the start of rotation, and at maximum stall when the motor is restricted from rotation while energized.

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.



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Contact Hayward Flow Control with questions: 1-888-429-4635 • Fax: 1-888-778-8410 • One Hayward Industrial Drive • Clemmons, NC 27012 • USA
Visit us at: www.haywardflowcontrol.com • E-mail: hflow@haywardnet.com