

# *Flo-Pac*

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## **Table of Contents**

Automatic Balancing Valves

Automatic Balancing Drawings

Manual Balancing Valves

Manual Balancing Drawings

Hook-Up Components

Flow Meter Fittings

Accessories

Specifications & O & M's

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Flo-Pac LLC  
10545 Guilford Road Unit 103  
Jessup, Maryland 20794  
[www.flo-pacllc.com](http://www.flo-pacllc.com)

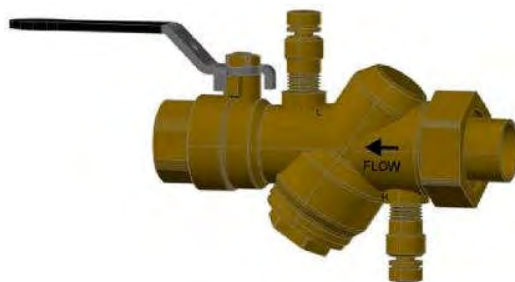


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*Want ACCURATE balancing?*

**call FLO-PAC LLC 888-412-1059 .**



# *Flo-Pac, LLC.*

10545 Guilford Road Unit 103  
Jessup, Maryland 20794

Hydronic Balancing Valves and  
System Components

Tel: 301-595-4380  
Fax: 301-595-4383  
Website: Flo-Pacllc.com

## Flo-Pac Automatic AFL Flow Control Valve Specification

Body: Brass rated at 600 WOG

Maximum Operating Temperature: -4°F (-20°C) to 250°F (121°C)

Cartridge: Stainless Steel

Piston: Stainless Steel

Spring: Stainless Steel

O-Ring: EPDM

Diaphragm: EPDM

Control Range: 2 psig-75 psig

- (1) Factory set to automatically control flow rates within  $\pm 5\%$  design accuracy over a differential range of  $60 \pm$  psi with a start up at 2 psig or less.
- (2) The stainless steel cartridge shall be a non-clog type that will allow debris to be flushed through the body and eliminate particle accumulation and blockage at the outlet orifices. Cartridges manufactured with composite, plastic or rubber materials will not be allowed.
- (3) Automatic flow control valves will have the capability to verify flow by taking the differential pressure across the valve using pressure temperature ports.
- (4) In lieu of the combination flow verification/measurement capability, an independent flow venturi device separately installed maybe used to provide flow measurement in addition to each automatic flow control valve.

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Jessup, Maryland 20794

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## Automatic Flow Control Valve Designs; Static Orifice Versus Variable Orifice.

### There is No Secret: It is the Physics! The Benefit of the Flo-Pac Pressure Independent Automatic Flow Limiting Products.

For non-electronic Automatic Flow Limiting, there are essentially 2 styles of Physics with minor variations for direct Flow Limiting: Variable Orifice, and Static Orifice Pressure Independent. There are various other methods that are more expensive which are electronics based using modulating or on/off control valves.

The **Variable Orifice** design has been around for decades. This style essentially operates by allowing the differential pressure across the entire device to increase or decrease an orifice based on the differential pressure. The amount of orifice is non-linear and is variable against flow with different CVs at various positions. Less pressure has a higher CV orifice varying to higher pressure with a lower CV.

Two prominent manufactures use a stainless steel piston with various openings to correlate to the desired CV curve targeted for the desired flow. Another uses what is easily described as a curved cone with a plunger that moves in correlation to the variable CV. Both essentially vary the orifice size dependent upon the pressure differential across the device.

The big problem with the Physics of this design is matching the variable orifice precisely against the positioning of the piston/plunger to maintain flow. There are many variables that must be maintained during manufacturing and assembly to achieve performance. Anyone ever trying to maintain flow in a constantly changing differential situation with a ball valve will understand how the slightest of movement of the handle (correlation to varying the orifice) changes the flow.

The **Static Orifice Pressure Independent Flow Limiting** concept takes advantage of the Physics in their operation. While costing slightly more to produce due to more parts, the tolerances are less critical on most of the dimensions resulting in a higher dependability rate during production and in service. Pressure across the orifice is maintained by modulating the exhaust ports of the cartridge against the differential across the cartridge.

Why has this technology not been used steadily before? It has. The static orifice pressure independent flow limiting physics have been used since the 1980s and in HVAC application since the 1990s. The cost of the physics is higher due to more parts being required than the variable Orifice Design which has resulted in the technology being ignored for the less expensive technology.

*Why are the Physics of a Static Orifice Pressure Independent Design better?* A static orifice gives a more consistent result than a variable orifice or a modulating orifice. There is no “setting” or “guessing” of position. The orifice size is known. It is set and established.

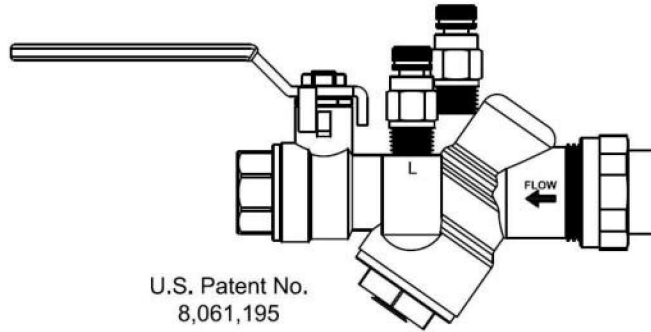
**Summary:** The Automatic Flow Limiting Physics of the Static Orifice Pressure Independent Design are clearly superior to a Variable Orifice Design. When breaking it down to just the pure physics, it is doubtful even suppliers of other products can argue there is an advantage of a variable orifice over a fixed orifice. Rely on the Physics. Trust the Physics.

*Then the question is which suppliers provide static orifice pressure independent automatic flow limiting physics?* Flo-Pac is one who does. Assembled and Flow Tested using preferred materials specified by the engineering community, the choice is simple. Trust the Physics if accuracy, performance, and energy savings are important.

# Flo-Pac,

## AFLI Series Specifications Automatic Flow Limiter w/ Integral Ball Valve

A: AFLI- 1/2"- 1" L



**PRODUCT DESCRIPTION:** The AFLI is an Automatic Flow Limiting device, union end by fixed end, with an integral full port ball valve, rated at 600 WOG @ 250°F. The AFLI is supplied with a stainless steel flow limiting cartridge that can be removed for cleaning, inspection, and cartridge exchange, if necessary. The AFLI comes standard with two pressure/temperature ports and a hanging ID tag for easy identification. The fixed end system or, pipe run-out side, is available in SWT or FNPT. The union side connections available include MNPT, FNPT, SWT, and a variety of reductions.

STADARD MATERIAL SPECIFICATIONS		STANDARD OPERATING SPECIFICATIONS	
Body	Forged Brass ASTM B283-06		
O-Ring	EPDM	Control Range:	2 psi - 60+ psi
Tail Piece	Brass ASTM B124-09, B228-06, or B763-08A	Accuracy:	±5%
Flow Cartridge	ASTM A582 Type 303 Stainless Steel	Max Working Pressure:	600 WOG
Diaphragm	EPDM	Max Operating Temperature:	40°F to 250°F
Spring	Stainless Steel	Start-Up Head Loss:	5 Feet of H <sub>2</sub> O
PT Port	EPDM Dual Durometer Core		
Ball Valve	Forged Brass ASTM B283-06		
Stem	Brass ASTM B124-09 - Explosion Proof		
Ball	Chrome Plated Brass - Full Port		
Ball Seat	Teflon		
Handle	Chrome Plated Steel		

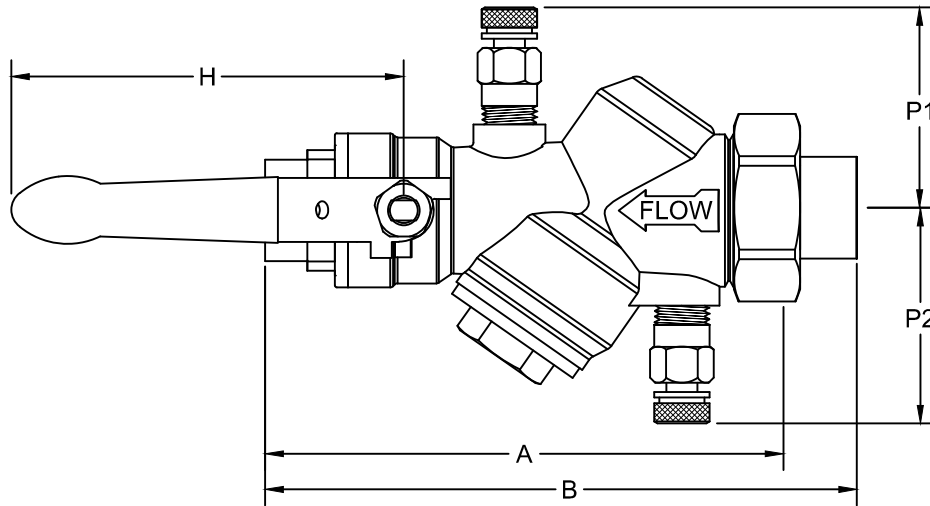
Valve Size	Flow Rates (GPM)*												Control Range 2 - 60+ PSID													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2"-1"L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12

\* Custom flow rates can be calibrated at the factory for an additional charge.

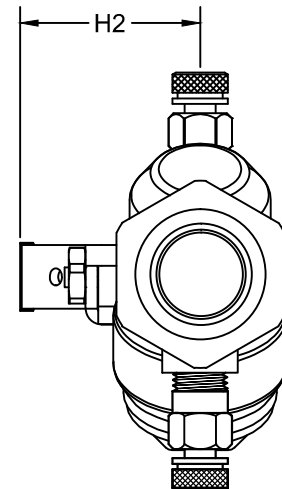
The information presented on this submittal is correct at the time of publication. Flo-Pac LLC,  
reserves the right to change design, and/or material specifications without notice.

# Flo-Pac

## DIMENSIONS Automatic Flow Limiter w/ Integral Ball Valve A: AFLI - 1/2" - 1" L



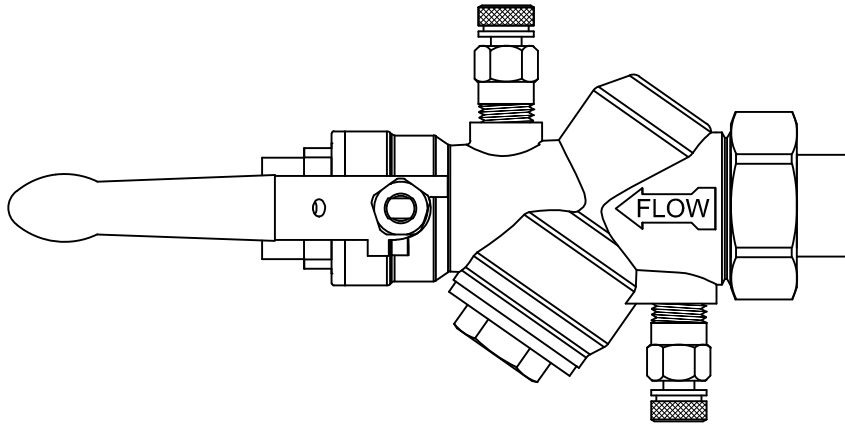
AFLI SIZE AND TYPE	A	TAIL PIECE	B	P1	P2	H	H2
1/2" SWT	4.66	1/2" - M	6.22	2.09	2.24	3.60	1.85
		- F	5.31				
		- S	5.31				
3/4" SWT	4.90	1/2" - M	6.46	2.09	2.24	3.60	1.85
		- F	6.00				
		- S	5.65				
		3/4" - M	6.66				
		- F	5.70				
		- S	5.69				
1" SWT	5.06	1/2" - M	7.06	2.09	2.24	3.60	1.85
		3/4" - M	7.06				
		- S	5.91				
		1" - M	7.06				
		- F	5.96				
		- S	6.07				



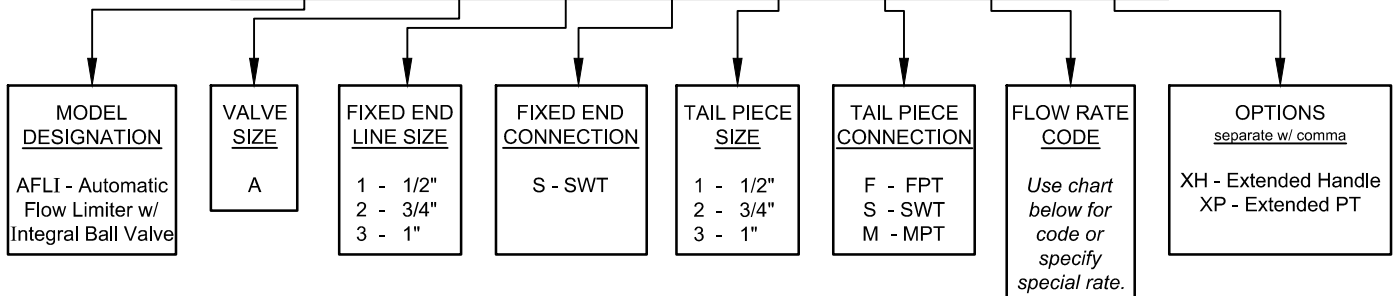
*Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications. Sweat size listed is nominal and will differ from the actual, measurable size.*

# Flo-Pac

## SUBMITTAL Automatic Flow Limiter w/ Integral Ball Valve A: AFLI - 1/2" - 1" L



**AFLI - X - X - X - X - X - X - XX,**



Valve Size	Flow Rates (GPM)*																				Control Range 2 - 60+ PSID											
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z						
A 1/2" - 1"L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12						

\* Custom flow rates can be calibrated at the factory for an additional charge.  
 Unless confirmed as special, flow rates will default to standard flow rate.

JOB NAME:	CUSTOMER:
ENGINEER:	REF/PO#:
CONTRACTOR:	SUBMITTED BY:
	DATE:
	DATE:

PART # ( See table above)	TAGGING/JOB INFORMATION	GPM	QUANTITY

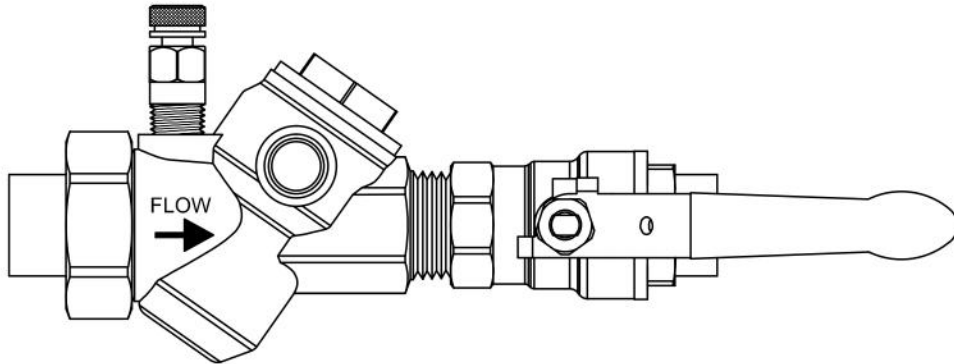


# Flo-Pac

## SPECIFICATIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

- A: AFLB - 1/2" - 1" L
- B: AFLB - 1" H - 1 1/2" L
- C: AFLB - 1/2"H-2y2"



**PRODUCT DESCRIPTION:** The Flo-Pac AFLB is an Automatic Flow Limiting device, male ended by union with a full port ball valve attached, rated at 600 WOG @ 250° F. The AFLB is supplied with a stainless steel flow limiting cartridge that can be removed for cleaning, inspection, and, if necessary, cartridge exchange. The AFLB comes standard with two pressure/temperature ports and a hanging ID tag for easy identification. The ball valve end, or run-out side, is available in NPTF or SWT. The union side connections available include NPTM, NPTF, SWT, and a variety of reductions.

STANDARD MATERIAL SPECIFICATIONS		STANDARD OPERATING SPECIFICATIONS	
Body	Forged Brass ASTM B283-06		
O-Ring	EPDM	Control Range:	2 psi - 60+ psi
Tail Piece	Brass ASTM B124-09, B228-06, or B763-08A	Accuracy:	±5%
Flow Cartridge	ASTM A582 Type 303 Stainless Steel	Max Working Pressure:	600 WOG
Diaphragm	EPDM	Max Operating Temperature:	40°F to 250°F
Spring	Stainless Steel	Start-Up Head Loss:	5 Feet of H <sub>2</sub> O
PT Port	EPDM Dual Durometer Core		
Ball Valve	Forged Brass ASTM B283-06		
Stem	Brass ASTM B124-09 - Explosion Proof		
Ball	Chrome Plated Brass - Full Port		
Ball Seat	Teflon		
Handle	Chrome Plated Steel		

Valve Size	FLOW RATES (GPM)* CONTROL RANGE 2 - 60+ PSID																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2"-1" L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12
B 1"H-1 1/2" L	5	5.5	6	6.5	7	8	9	10	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
C 1/2" h - 2" L	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	160	170	180

\* Custom flow rates can be calibrated at the factory for an additional charge.

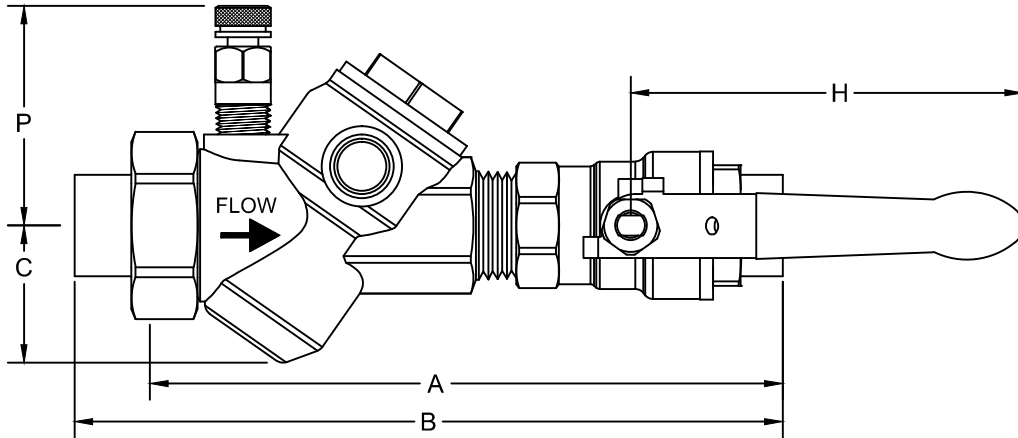
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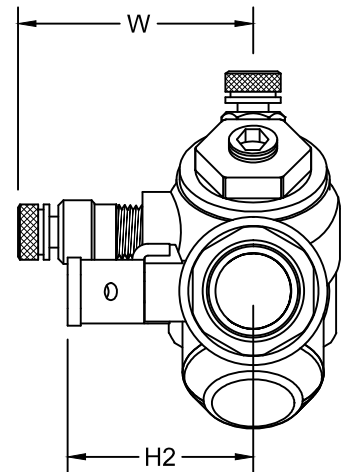
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

A: AFLB - 1/2" - 1" L



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H	H2	P	W
1/2" SWT	6.52	- M	8.09	2.29	1.30	3.54	2.05	2.25	0.85
		- F	7.62	2.29					
		- S	7.27	2.17					
1/2" FPT	6.15	- M	7.72	2.28	1.30	3.54	2.05	2.25	0.85
		- F	7.25	2.28					
		- S	6.90	2.16					
3/4" SWT	6.09	- M	7.66	2.45	1.30	3.74	2.06	2.25	0.85
		- F	7.19	2.45					
		- S	6.84	2.33					
		- M	7.85	2.48					
		- F	6.89	2.37					
		- S	6.88	2.33					
3/4" FPT	5.80	- M	7.36	2.44	1.30	3.74	2.06	2.25	0.85
		- F	6.90	2.44					
		- S	6.55	2.32					
		- M	7.56	2.47					
		- F	6.60	2.36					
		- S	6.55	2.32					
1" SWT	7.50	1/2" - M	9.06	2.77	1.30	4.53	2.31	2.25	0.85
		3/4" - M	9.26	2.80					
		- S	8.29	2.65					
		- M	10.25	2.98					
		- F	9.82	2.83					
		- S	9.90	2.74					
1" FPT	7.22	1/2" - M	8.79	2.79	1.30	4.53	2.31	2.25	0.85
		3/4" - M	8.79	2.82					
		- S	8.01	2.67					
		- M	10.17	3.01					
		- F	9.57	2.86					
		- S	9.66	2.77					



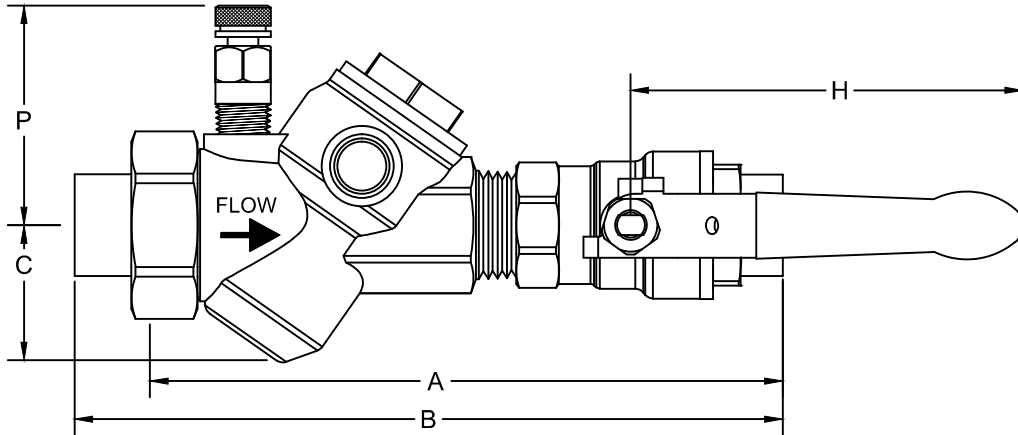
Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications. Sweat size listed is nominal and will differ from the actual, measurable size.

# Flo-Pac

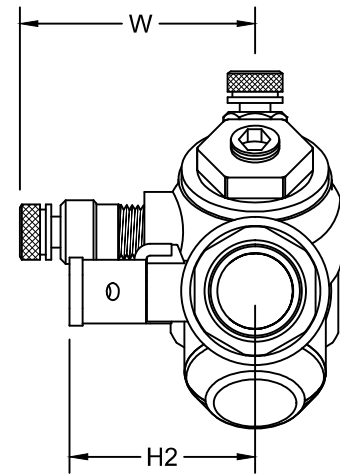
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

B: AFLB - 1" H - 1½" L



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H	H2	P	W
1" SWT	9.66	- M	11.66	6.60	1.43	4.16	2.31	2.30	2.62
		- F	10.56	6.25					
		- S	10.67	6.23					
1" FPT	9.38	- M	11.38	6.62	1.43	4.16	2.31	2.30	2.62
		- F	10.28	6.27					
		- S	10.39	6.25					
1¼" SWT	8.44	- M	10.44	6.21	1.43	4.64	3.00	2.30	2.62
		- F	9.77	5.86					
		- S	10.44	5.84					
		- M	10.44	6.28					
		- F	9.44	6.15					
		- S	9.54	5.85					
1¼" FPT	8.09	- M	10.09	6.17	1.43	4.64	3.00	2.30	2.62
		- F	9.42	5.82					
		- S	10.09	5.80					
		- M	10.09	6.24					
		- F	9.09	6.11					
		- S	9.19	5.81					
1½" SWT	9.13	- M	11.63	7.74	1.43	5.45	3.15	2.30	2.62
		- F	11.63	7.80					
		- S	10.59	7.15					
		- M	11.63	7.67					
		- F	10.38	7.33					
		- S	10.36	7.13					
1½" FPT	8.87	- M	11.37	7.78	1.43	5.45	3.15	2.30	2.62
		- F	11.37	7.84					
		- S	10.33	7.19					
		- M	11.37	7.71					
		- F	10.12	7.37					
		- S	10.10	7.17					



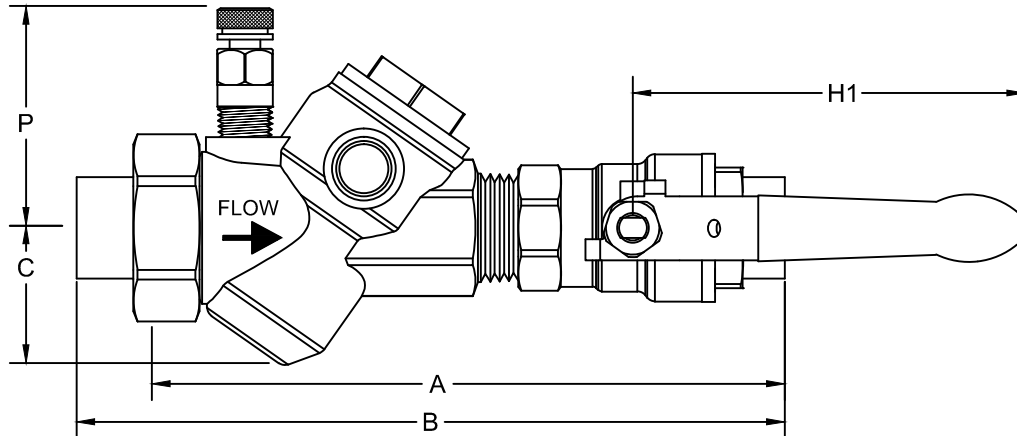
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Sweat size listed is nominal and will differ from the actual, measurable size.

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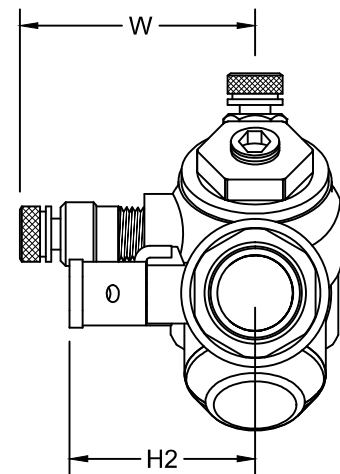
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

C: AFLB - 1½" H - 2½"



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H1	H2	P	W
1½" SWT	13.7	- M	16.2	18.4	2.5	3.5	2.1	3.0	3.7
		1¼" - F	16.2	18.5					
		- S	15.2	17.9					
		- M	16.2	18.4					
		1½" - F	15.0	18.0					
		- S	15.0	17.8					
1½" FPT	13.4	- M	15.9	18.5	2.5	3.5	2.1	3.0	3.7
		1¼" - F	15.9	18.6					
		- S	14.9	17.9					
		- M	15.9	18.4					
		1½" - F	14.7	18.0					
		- S	14.7	17.8					
2" SWT	12.5	- M	15.5	19.7	2.5	3.5	2.1	3.0	3.7
		1½" - F	15.5	19.6					
		- S	14.1	18.7					
		- M	15.5	19.7					
		2" - F	13.7	19.0					
		- S	14.0	18.7					
2" FPT	12.0	- M	15.0	19.6	2.5	3.5	2.1	3.0	3.7
		1½" - F	15.0	19.5					
		- S	13.6	18.6					
		- M	15.0	19.6					
		2" - F	13.2	18.9					
		- S	13.5	18.6					
2½" FPT	14.5	- M	18.6	23.6	2.5	8.5	4.5	3.0	3.7
		2½" - F	20.2	24.2					
		- S	18.5	16.5					



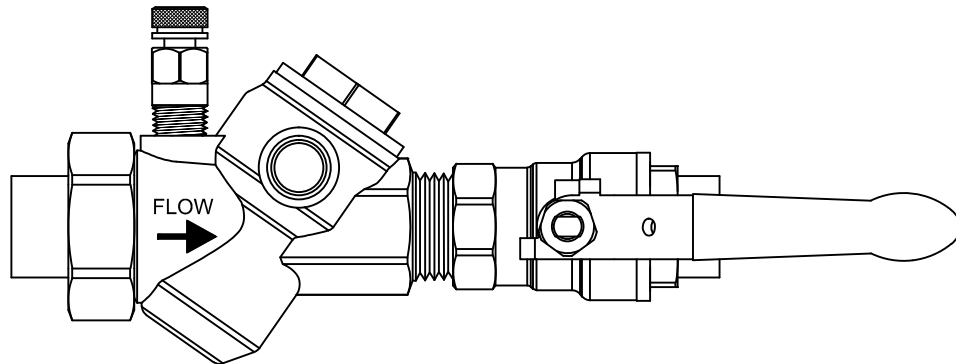
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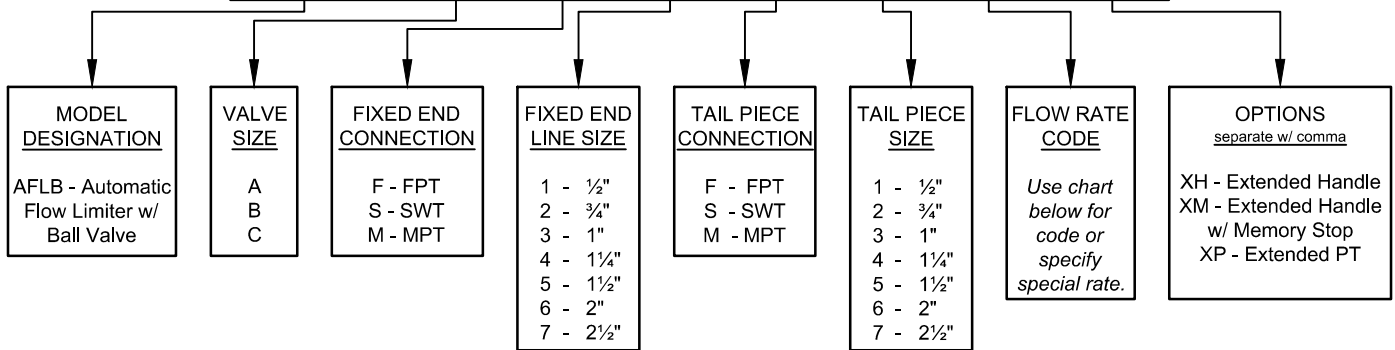
## SUBMITTAL

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

- A: AFLB - 1/2" - 1" L
- B: AFLB - 1" H - 1 1/2" L
- C: AFLB - 1 1/2" H - 2 1/2"



**AFLB - X - X - X - X - X - X - XX,**



Valve Size	FLOW RATES (GPM)* CONTROL RANGE 2 - 60+ PSID																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2" - 1" L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12
B 1" H - 1 1/2" L	5	5.5	6	6.5	7	8	9	10	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
C 1 1/2" H - 2 1/2"	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	160	170	180

\* Custom flow rates can be calibrated at the factory for an additional charge. Unless confirmed as special, flow rates will default to standard flow rate.

JOB NAME:	CUSTOMER:
ENGINEER:	REF/PO#:
CONTRACTOR:	SUBMITTED BY:
	DATE:
	DATE:

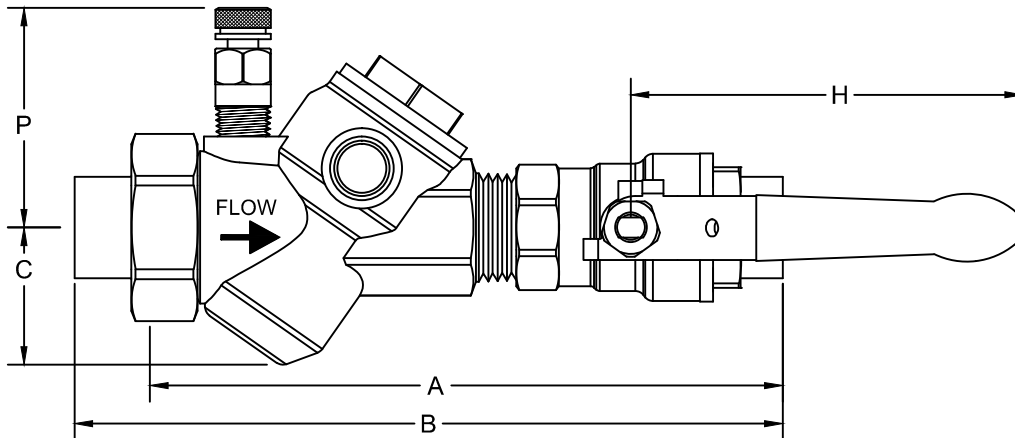
PART # ( See table above)	TAGGING/JOB INFORMATION	GPM	QUANTITY

# Flo-Pac

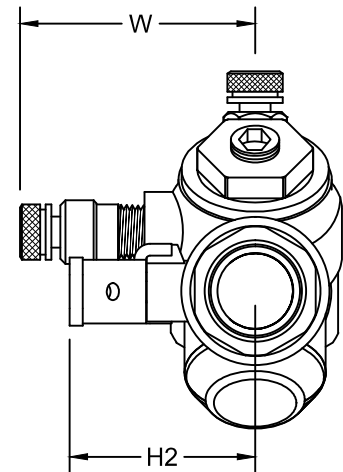
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

A: AFLB - 1/2" - 1" L



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H	H2	P	W
1/2" SWT	6.52	- M	8.09	2.29	1.30	3.54	2.05	2.25	0.85
		- F	7.62	2.29					
		- S	7.27	2.17					
1/2" FPT	6.15	- M	7.72	2.28	1.30	3.54	2.05	2.25	0.85
		- F	7.25	2.28					
		- S	6.90	2.16					
3/4" SWT	6.09	- M	7.66	2.45	1.30	3.74	2.06	2.25	0.85
		- F	7.19	2.45					
		- S	6.84	2.33					
		- M	7.85	2.48					
		- F	6.89	2.37					
		- S	6.88	2.33					
3/4" FPT	5.80	- M	7.36	2.44	1.30	3.74	2.06	2.25	0.85
		- F	6.90	2.44					
		- S	6.55	2.32					
		- M	7.56	2.47					
		- F	6.60	2.36					
		- S	6.55	2.32					
1" SWT	7.50	1/2" - M	9.06	2.77	1.30	4.53	2.31	2.25	0.85
		3/4" - M	9.26	2.80					
		- S	8.29	2.65					
		- M	10.25	2.98					
		- F	9.82	2.83					
		- S	9.90	2.74					
1" FPT	7.22	1/2" - M	8.79	2.79	1.30	4.53	2.31	2.25	0.85
		3/4" - M	8.79	2.82					
		- S	8.01	2.67					
		- M	10.17	3.01					
		- F	9.57	2.86					
		- S	9.66	2.77					



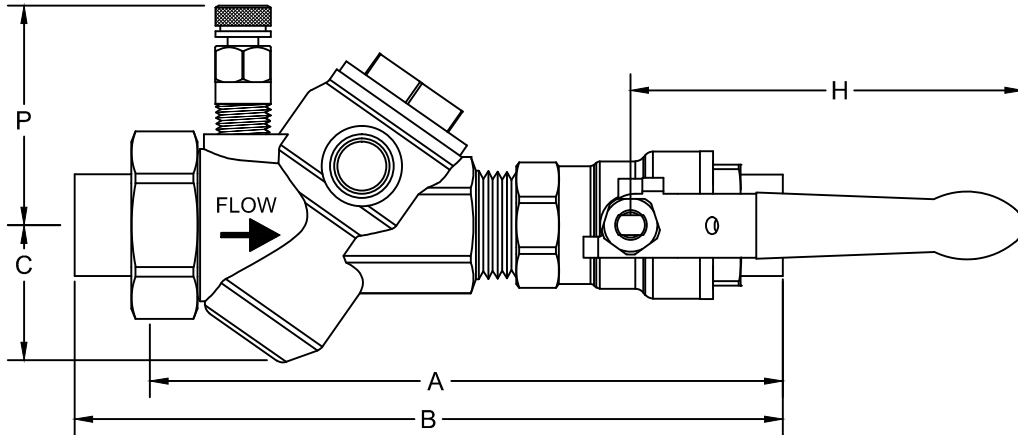
Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications. Sweat size listed is nominal and will differ from the actual, measurable size.

# Flo-Pac

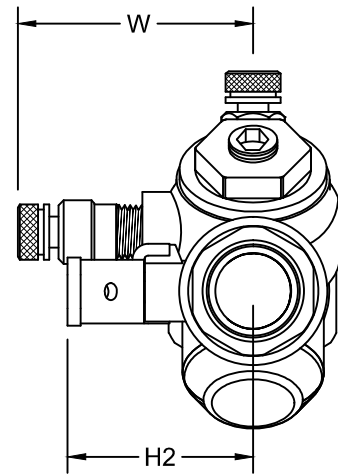
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

B: AFLB - 1" H - 1½" L



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H	H2	P	W
1" SWT	9.66	- M	11.66	6.60	1.43	4.16	2.31	2.30	2.62
		- F	10.56	6.25					
		- S	10.67	6.23					
1" FPT	9.38	- M	11.38	6.62	1.43	4.16	2.31	2.30	2.62
		- F	10.28	6.27					
		- S	10.39	6.25					
1¼" SWT	8.44	- M	10.44	6.21	1.43	4.64	3.00	2.30	2.62
		- F	9.77	5.86					
		- S	10.44	5.84					
		- M	10.44	6.28					
		- F	9.44	6.15					
		- S	9.54	5.85					
1¼" FPT	8.09	- M	10.09	6.17	1.43	4.64	3.00	2.30	2.62
		- F	9.42	5.82					
		- S	10.09	5.80					
		- M	10.09	6.24					
		- F	9.09	6.11					
		- S	9.19	5.81					
1½" SWT	9.13	- M	11.63	7.74	1.43	5.45	3.15	2.30	2.62
		- F	11.63	7.80					
		- S	10.59	7.15					
		- M	11.63	7.67					
		- F	10.38	7.33					
		- S	10.36	7.13					
1½" FPT	8.87	- M	11.37	7.78	1.43	5.45	3.15	2.30	2.62
		- F	11.37	7.84					
		- S	10.33	7.19					
		- M	11.37	7.71					
		- F	10.12	7.37					
		- S	10.10	7.17					



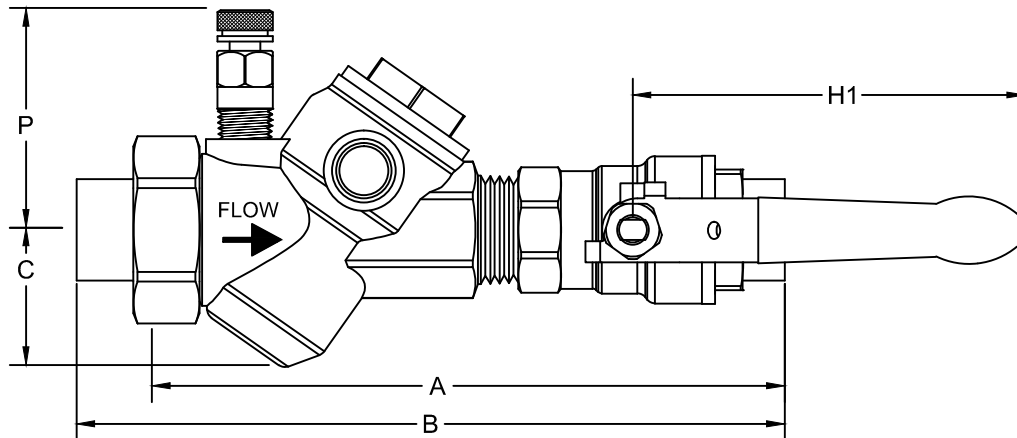
Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications.  
Sweat size listed is nominal and will differ from the actual, measurable size.

# Flo-Pac

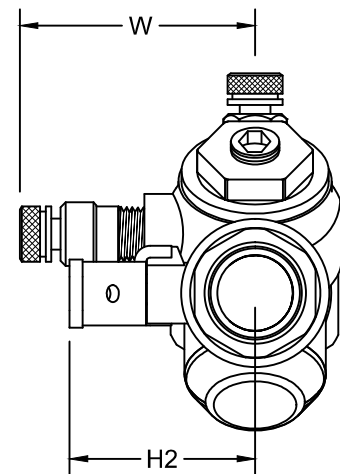
## DIMENSIONS

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

C: AFLB - 1½" H - 2½"



BALL VALVE SIZE AND TYPE	A	TAIL PIECE	B	WEIGHT (lbs)	C	H1	H2	P	W
1½" SWT	13.7	- M	16.2	18.4	2.5	3.5	2.1	3.0	3.7
		1¼" - F	16.2	18.5					
		- S	15.2	17.9					
		- M	16.2	18.4					
		1½" - F	15.0	18.0					
		- S	15.0	17.8					
1½" FPT	13.4	- M	15.9	18.5	2.5	3.5	2.1	3.0	3.7
		1¼" - F	15.9	18.6					
		- S	14.9	17.9					
		- M	15.9	18.4					
		1½" - F	14.7	18.0					
		- S	14.7	17.8					
2" SWT	12.5	- M	15.5	19.7	2.5	3.5	2.1	3.0	3.7
		1½" - F	15.5	19.6					
		- S	14.1	18.7					
		- M	15.5	19.7					
		2" - F	13.7	19.0					
		- S	14.0	18.7					
2" FPT	12.0	- M	15.0	19.6	2.5	3.5	2.1	3.0	3.7
		1½" - F	15.0	19.5					
		- S	13.6	18.6					
		- M	15.0	19.6					
		2" - F	13.2	18.9					
		- S	13.5	18.6					
2½" FPT	14.5	- M	18.6	23.6	2.5	8.5	4.5	3.0	3.7
		2½" - F	20.2	24.2					
		- S	18.5	16.5					



Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications.

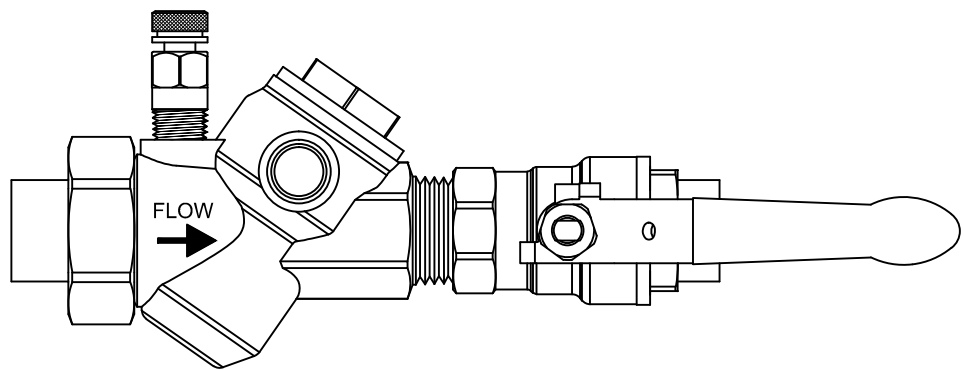


# Flo-Pac

## SUBMITTAL

### Automatic Flow Limiter w/ Ball Valve - AFLB Series

- A: AFLB - 1/2" - 1" L
- B: AFLB - 1" H - 1 1/2" L
- C: AFLB - 1 1/2" H - 2 1/2"



**AFLB - X - X - X - X - X - X - XX,**

<b>MODEL DESIGNATION</b> AFLB - Automatic Flow Limiter w/ Ball Valve	<b>VALVE SIZE</b> A B C	<b>FIXED END CONNECTION</b> F - FPT S - SWT M - MPT	<b>FIXED END LINE SIZE</b> 1 - 1/2" 2 - 3/4" 3 - 1" 4 - 1 1/4" 5 - 1 1/2" 6 - 2" 7 - 2 1/2"	<b>TAIL PIECE CONNECTION</b> F - FPT S - SWT M - MPT	<b>TAIL PIECE SIZE</b> 1 - 1/2" 2 - 3/4" 3 - 1" 4 - 1 1/4" 5 - 1 1/2" 6 - 2" 7 - 2 1/2"	<b>FLOW RATE CODE</b> <i>Use chart below for code or specify special rate.</i>	<b>OPTIONS</b> <i>separate w/ comma</i> XH - Extended Handle XM - Extended Handle w/ Memory Stop XP - Extended PT
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Valve Size	FLOW RATES (GPM)* CONTROL RANGE 2 - 60+ PSID																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2" - 1" L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12
B 1" H - 1 1/2" L	5	5.5	6	6.5	7	8	9	10	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
C 1 1/2" H - 2 1/2"	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	160	170	180

\* Custom flow rates can be calibrated at the factory for an additional charge. Unless confirmed as special, flow rates will default to standard flow rate.

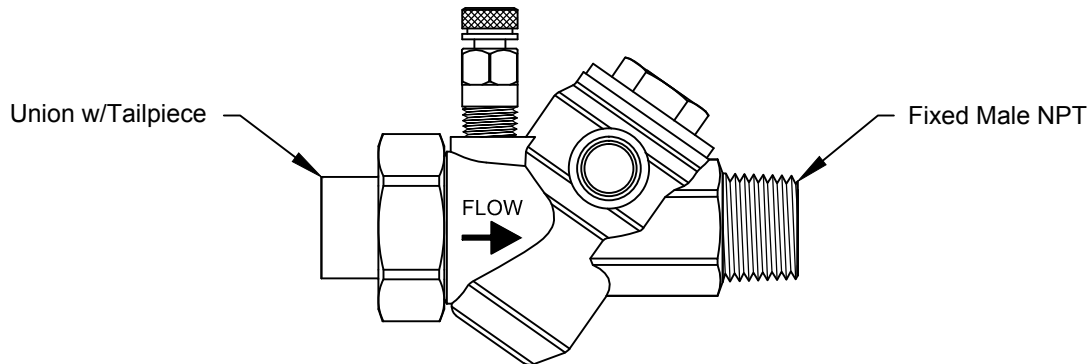
JOB NAME:	CUSTOMER:
ENGINEER:	REF/PO#: DATE:
CONTRACTOR:	SUBMITTED BY: DATE:

PART # ( See table above)	TAGGING/JOB INFORMATION	GPM	QUANTITY

# Flo-Pac

## AFLD Series Specifications Automatic Pressure Independent Flow Limiter Device

Size A: AFLD - 1/2" - 1" Low  
 Size B: AFLD - 1" High - 1 1/2" Low  
 Size C: AFLD - 1 1/2" High - 2"



**U.S. Patent No. 8,061,195**

**PRODUCT DESCRIPTION:** The AFLD is an Automatic Pressure Independent Flow Limiting Device, male ended ball union, rated at 600 WOG / CWP. The AFLD is supplied with a stainless steel flow limiting cartridge that can be removed for cartridge exchange, if necessary. The AFLD comes standard with two pressure/temperature ports, tailpiece, union nut, o-ring and hanging identification tag. Union side connections available in MNPT, FNPT, SWT, and a variety of reductions.

STANDARD MATERIAL SPECIFICATIONS		STANDARD OPERATING SPECIFICATIONS	
Bod	Forged Brass ASTM B283-06 or Cast Brass ASTM B763-08A	Control range:	2 psi - 60+ psi
O-Ring	EPDM	Accuracy:	±5%
Tail Piece	Brass ASTM B124-09, B228-06, or B763-08A	Max Working Pressure:	600 WOG / CWP
Union Nut	Brass ASTM B455	Max Operating Temperature:	40°F to 250°F
Flow Cartridge	ASTM A582 Type 303 Stainless Steel	Start-Up Head Loss:	5 Feet of H <sub>2</sub> O
Diaphragm	EPDM	Specification information is provided to assist and is given without obligation or warranty. The Company reserves the right to make changes in design, materials, and/or specifications without notice or liability.	
Spring	302 Stainless Steel		
PT Port	EPDM Dual Durometer Core		

Valve Size	FLOW RATES (GPM)* CONTROL RANGE 2 - 60+ PSID **																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2" - 1" L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12
B 1" H - 1 1/2" L	5	5.5	6	6.5	7	8	9	10	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
C 1 1/2" H - 2"	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	160	170	180

\* Custom flow rates can be calibrated at the factory for an additional charge. \*\* Upper flow range can be limited for an additional charge. Unless confirmed as special, flow rates will default to standard flow rate.

# Flo-Pac

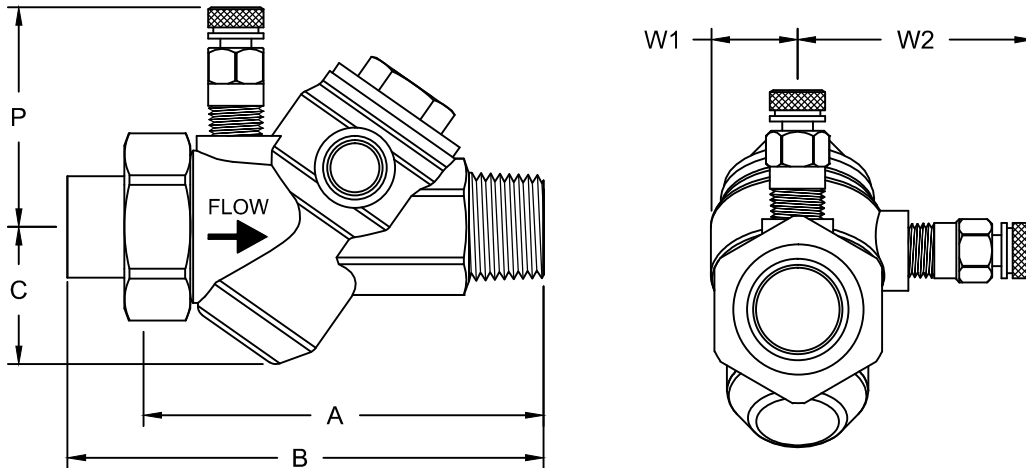
## AFLD Series Dimensions

### Automatic Pressure Independent Flow Limiter Device

Size A: AFLD - 1/2" - 1" Low

Size B: AFLD - 1" High - 1 1/2" Low

Size C: AFLD - 1 1/2" High - 2"



SIZE	A	TAIL PIECE	B	WEIGHT (lbs)	C	P	W1	W2	
A: 1/2" - 1" L	3.9	1/2"	- M	5.5	1.8	1.3	2.3	0.9	2.3
			- F	5.0	1.8				
			- S	4.7	1.7				
		3/4"	- M	5.5	1.8				
			- F	5.0	1.7				
			- S	4.7	1.7				
		1"	- M	7.0	2.0				
			- F	6.0	1.9				
			- S	6.1	1.8				
B: 1" H - 1 1/2" L	5.5	1/2"	- M	7.5	4.7	1.4	2.4	1.3	2.7
			- M	7.5	4.9				
			- F	7.5	4.8				
		1"	- M	7.5	4.5				
			- F	7.5	4.5				
			- S	6.8	4.9				
		1 1/4"	- M	7.5	4.8				
			- F	6.5	4.5				
			- S	6.5	4.8				
C: 1 1/2" H - 2"	7.9	1 1/4"	- M	10.9	16.7	2.5	3.0	2.1	3.5
			- F	10.9	16.3				
			- S	9.4	15.5				
		1 1/2"	- M	10.9	16.5				
			- F	10.9	16.4				
			- S	9.5	15.5				
		2"	- M	10.9	16.5				
			- F	9.1	15.8				
			- S	9.0	15.5				

Note: Dimensions listed above do not include process or any other special fittings or adapters. All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions and material specifications. Weight size listed is nominal and will differ from the actual measurable size.

# Flo-Pac

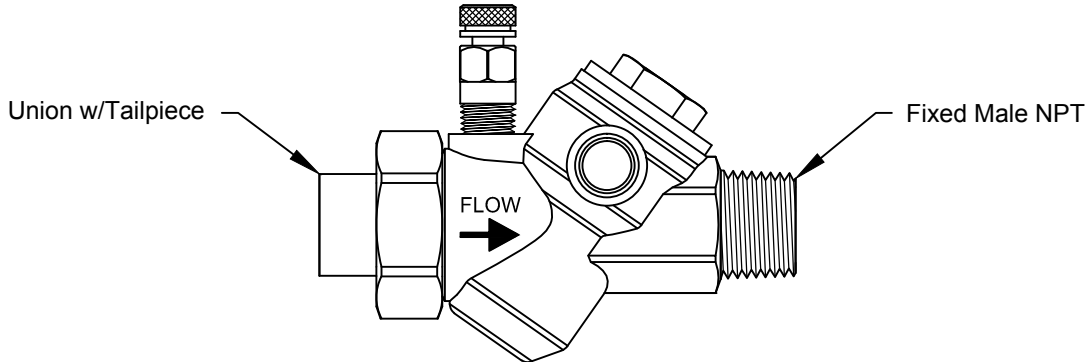
## AFLD Series Submittal

### Automatic Pressure Independent Flow Limiter Device

Size A: AFLD - 1/2" - 1" Low

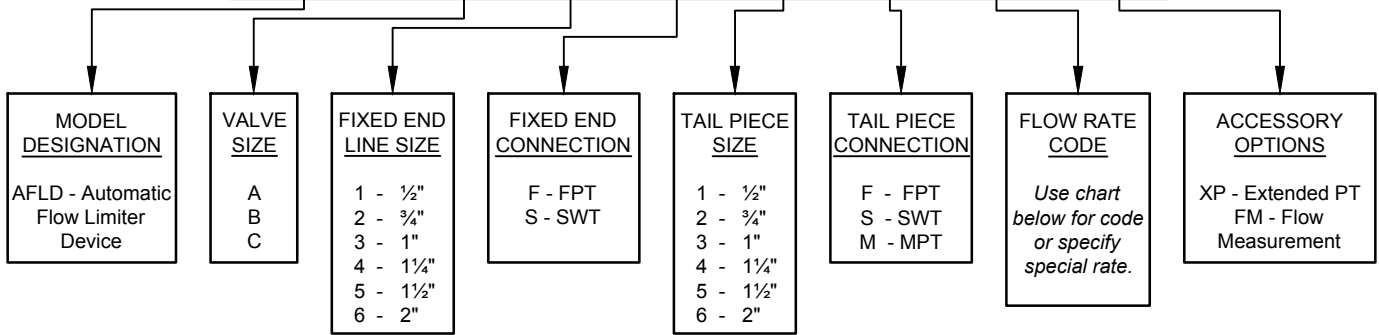
Size B: AFLD - 1" High - 1 1/2" Low

Size C: AFLD - 1 1/2" High - 2"



U.S. Patent No. 8,061,195

**AFLD - X - X - X - X - X - X - XX**



Valve Size	FLOW RATE CODES (GPM)* CONTROL RANGE 2 - 60+ PSID **																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A 1/2" - 1" L	.33	.50	.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	11	12
B 1" H - 1 1/2" L	5	5.5	6	6.5	7	8	9	10	12	13	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42
C 1 1/2" H - 2"	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	160	170	180

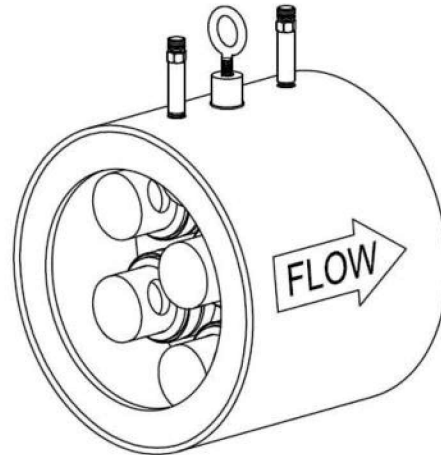
\* Custom flow rates can be calibrated at the factory for an additional charge. \*\* Upper flow range can be limited for an additional charge. Unless confirmed as special, flow rates will default to standard flow rate.

JOB NAME:		REPRESENTATIVE:	
ENGINEER:		REF/PO#:	
CONTRACTOR:		SUBMITTED BY:	
		DATE:	
		DATE:	
PART # (See table above)	TAGGING/JOB INFORMATION	GPM	QUANTITY

# Flo~Pac

## AFLW Series Specifications

### Automatic Pressure Independent Flow Limiter Wafer Style



**U.S. Patent No. 8,061,195**

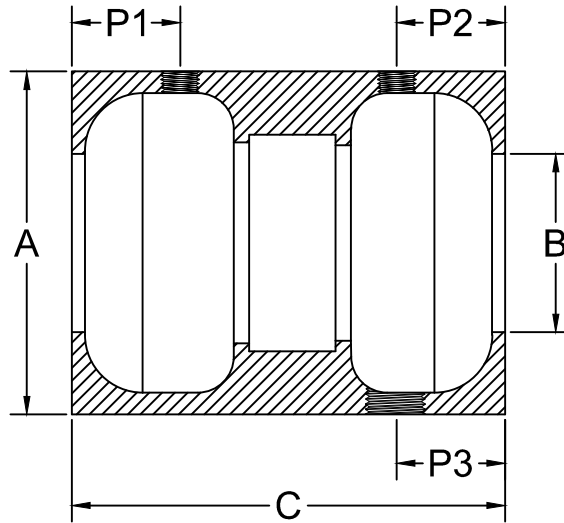
**PRODUCT DESCRIPTION:** The AFLW is a wafer type Automatic Pressure Independent Flow Limiting Device with a full flange face. The AFLW is designed to fit between two ANSI Class 150# flanges. The AFLW is supplied with one or more stainless steel flow limiting cartridges that can be removed for cleaning, inspection, and, if necessary, cartridge exchange. The AFLW has two predrilled openings for pressure/ temperature ports, a drain plug, and a lifting lug for ease in installation. The AFLW also comes standard with a metal identification tags, threaded rods, and hex nuts.

STANDARD MATERIAL SPECIFICATIONS		STANDARD OPERATING SPECIFICATIONS	
Wafer	ASTM A536 Ductile Iron	Control range:	2 psi - 60+ psi
O-Ring	EPDM	Accuracy:	±5%
Flow Cartridge	ASTM A582 Type 303 Stainless Steel	Max Working Pressure:	600 WOG / CWP
Diaphragm	EPDM	Max Operating Temperature:	40°F to 250°F
Spring	Stainless Steel	Start-Up Head Loss:	5 Feet of H <sub>2</sub> O
PT Port	EPDM Dual Durometer Core	Specification information is provided to assist and is given without obligation or warranty. The Company reserves the right to make changes in design, materials, and/or specifications without notice or liability.	
Lifting Lug	ASTM F541 Steel		

*NOTE: The specific ASTM standard may vary and should be confirmed at time of order.*

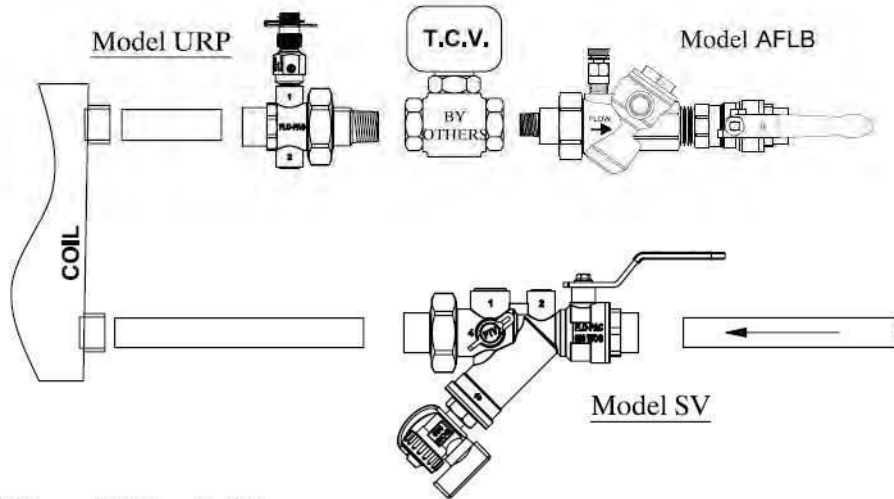
# Flo-Pac

## DIMENSIONS Automatic Flow Limiter Wafer Style AFLW Series



SIZE	MODEL	A	B	C	P1	P2	P3	WEIGHT (lbs)	# OF AFL CARTRIDGES	MAX GPM FLOW
2½"	AFLW250	4.5	2.47	8.0	1.51	1.25	1.25	14	1	180
3"	AFLW300	5.2	3.07	8.0	1.51	1.25	1.25	16	1	180
4"	AFLW400	6.7	4.15	9.0	2.20	2.20	2.20	25	2	360
6"	AFLW600	8.6	6.07	9.0	2.00	2.00	2.00	35	4	720
8"	AFLW800	10.8	7.98	9.0	2.03	1.97	1.97	55	7	1260
10"	AFLW1000	13.3	10.5	12.0	2.90	2.90	2.90	74	12	2160
12"	AFLW1200	15.5	12.0	12.0	3.00	3.00	3.00	100	15	2700
14"	AFLW1400	17.7	13.46	12.0	3.20	3.20	3.20	131	19	3420

*Note: All dimensions, weights, and materials are subject to minor variations.  
Consult with factory for confirmation of dimensions, weights, and material specifications.*



\*Pipe and Fittings By Others

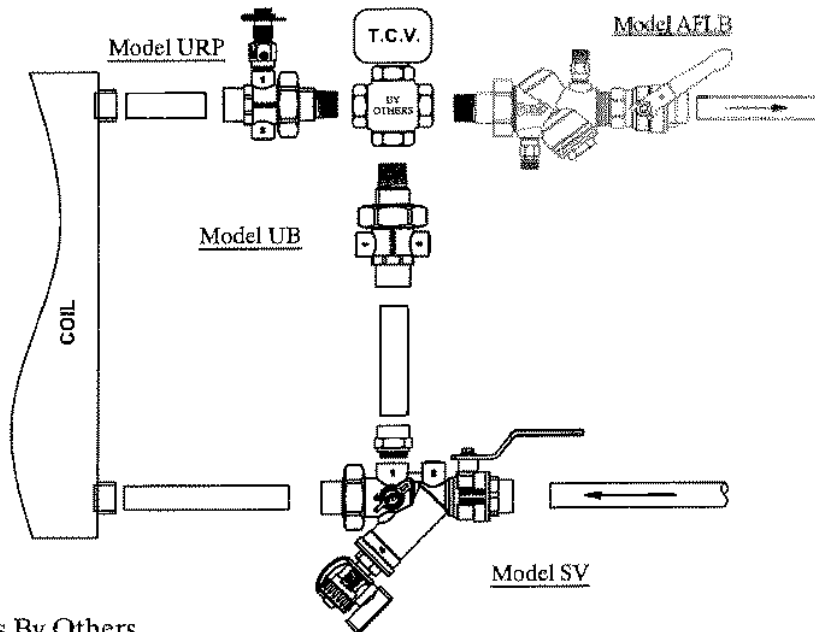
<p><u>Model AFLB</u> Automatic flow control valve with factory set flow, 5% accuracy, full port ball valve and union with o-ring seal, and dual Pressure/Temperature test ports.</p>	<p><u>Model SV</u> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>																												
<p><u>Model URP</u> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p>Project Name: _____ Contractor: _____ Engineer: _____ Date: _____</p>																												
<table border="1"> <thead> <tr> <th><u>Quantity</u></th> <th><u>Size</u></th> <th><u>GPM</u></th> <th><u>Tag</u></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>																									
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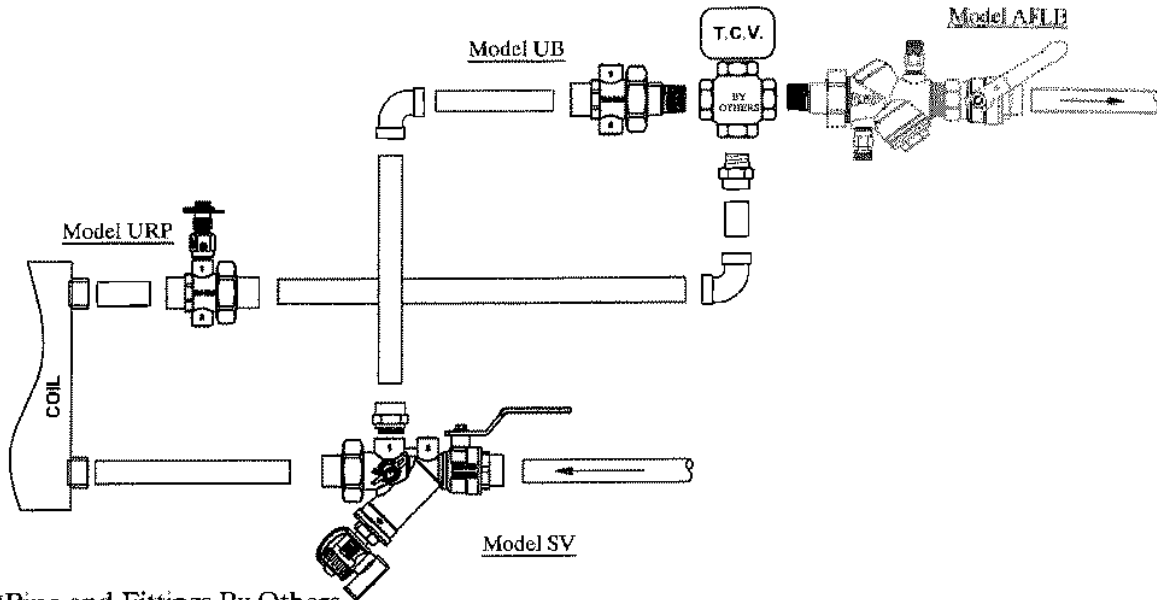
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## 3RAS-TYPE C



\*Pipe and Fittings By Others

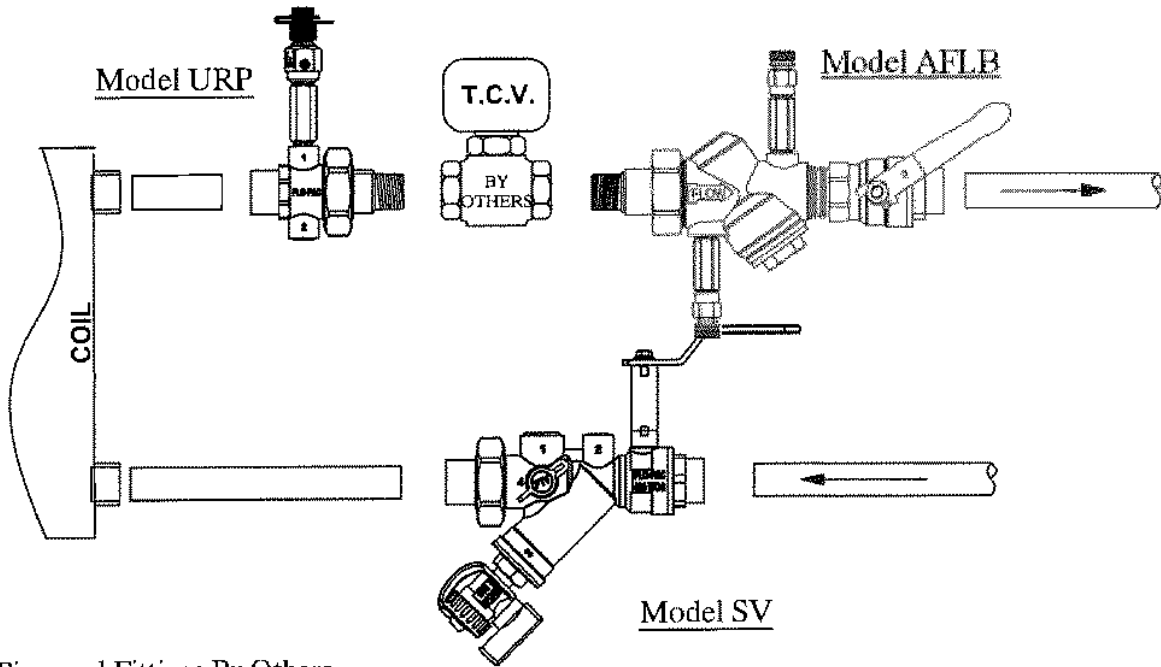
<p><b>Model AFLB</b></p> <p>Automatic flow control valve with factory-set flow, 5% accuracy, full-port ball valve and union, stainless steel flow limiting cartridge and dual P/T ports.</p>	<p><b>Model SV</b></p> <p>Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b>Model URP</b></p> <p>Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model UB</b></p> <p>Full port union with o-ring seal and plugged accessory ports.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>



\*Pipe and Fittings By Others

<p><b>Model AFLB</b> Automatic flow control valve with factory-set flow, 5% accuracy, full-port ball valve and union, stainless steel flow limiting cartridge and dual P/T ports.</p>	<p><b>Model SV</b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model UB</b> Full port union with o-ring seal and plugged accessory ports.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>

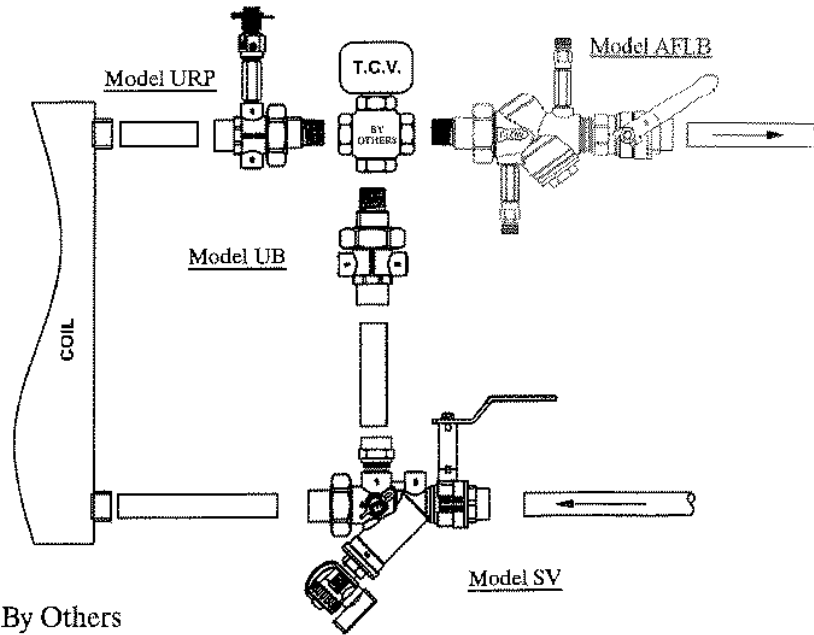




\*Pipe and Fittings By Others

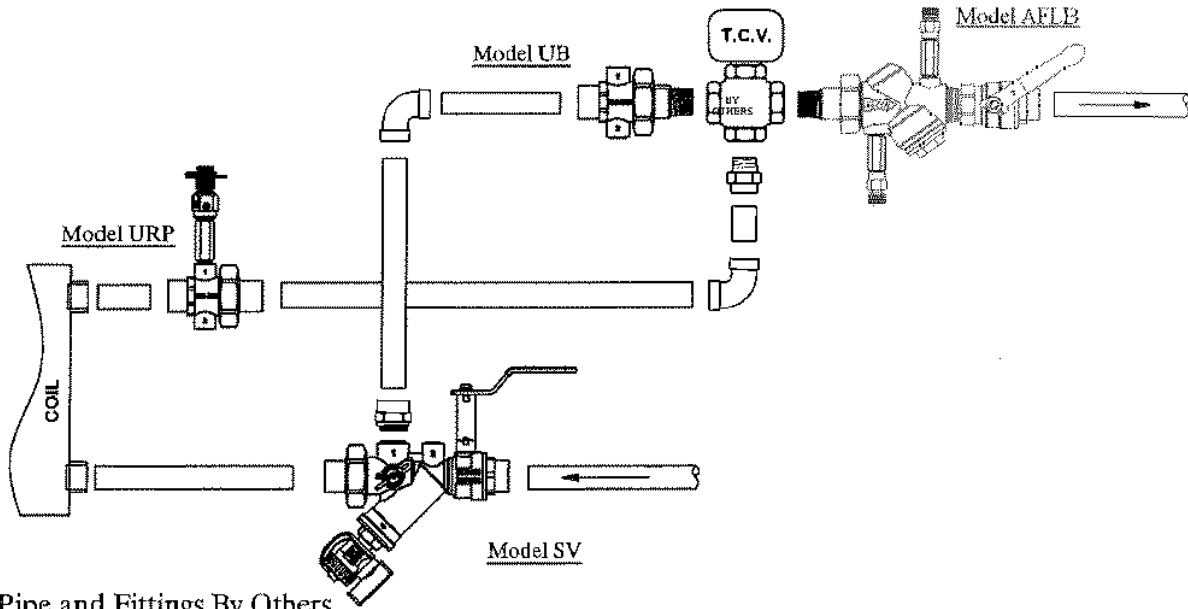
<p><u>Model AFLB</u> Automatic flow control valve with factory-set flow, 5% accuracy, full-port ball valve and union, stainless steel flow limiting cartridge and dual P/T ports.</p>		<p><u>Model SV</u> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>	
<p><u>Model URP</u> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>		<p>Project Name: _____ Contractor: _____ Engineer: _____ Date: _____</p>	
<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>





\*Pipe and Fittings By Others

<p><b>Model AFLB</b> Automatic flow control valve with factory-set flow, 5% accuracy, full-port ball valve and union, stainless steel flow limiting cartridge and dual P/T ports.</p>	<p><b>Model SV</b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model UB</b> Full port union with o-ring seal and plugged accessory ports.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>



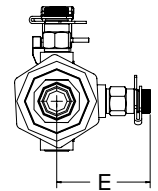
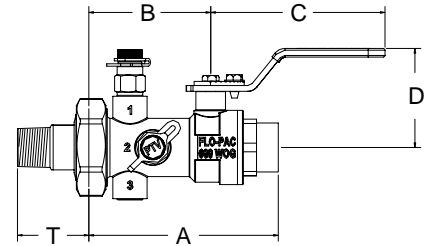
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<p><b>Model AFLB</b> Automatic flow control valve with factory-set flow, 5% accuracy, full-port ball valve and union, stainless steel flow limiting cartridge and dual P/T ports.</p>	<p><b>Model SV</b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model UB</b> Full port union with o-ring seal and plugged accessory ports.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>





**Model MB is a venturi style manual balancing valve with 100% positive shut-off full port plated ball. Permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature readout ports, adjustable memory stop with position indicator, and union end with o-ring seal. Available with multiple combinations of end connection types and sizes.**



### SPECIFICATIONS

Pressure Ratings:	600 PSI (4140 kPa)
Temperature Ratings:	250F (120C)
Flow Element:	Brass Venturi, Permanently mounted
Accuracy:	± 3% of rate
Body Material:	Forged Brass
End Connections:	Brass – Fixed End:SWT, FNPT; Union End: SWT, FNPT,& MNPT
Seals:	EPDM
Ball:	Chrome Plated Brass, full port, 100% positive shut-off
Handle:	Full size Zinc Plated lever with Vinyl Grip
Memory Stop	Zinc Plated Steel
Available Options:	“PTV” combination PT & air vent, hose end drain valve, & extensions

### NOMINAL DIMENSIONS & WEIGHTS

Size		Flow Range GPM (10”-100”)	A		B	C	D	E	*T MPT	Cv	Wgt		
in	mm		FNPT	SWT							lbs	kg	
1/2"	15	(L) 0.4 - 1.3 (H) 1.3 - 4.0	in	3.46	3.55	2.30	3.66	1.99	1.82	1.50	(L) .750 (H) 2.25	1.45	0.66
			mm	87.78	90.25								
3/4"R	20	(L) 0.4 - 1.3 (H) 1.3 - 4.0	in	3.60	3.67	2.30	3.66	1.99	1.82	1.50	(L) .750 (H) 2.25	1.45	0.66
			mm	91.47	93.27								
3/4"	20	(L) 1.6 - 5.0 (H) 4.0 - 13.0	in	3.86	3.98	2.56	3.66	2.08	2.05	1.56	(L) 2.70 (H) 7.00	1.94	0.88
			mm	98.07	101.12								
1"	25	3.2 - 10.0	in	4.30	4.43	2.78	5.03	2.22	2.05	1.80	5.20	3.33	1.06
			mm	109.22	112.62								
1-1/4"	32	7.25 - 23.0	in	5.39	5.56	3.70	5.03	2.44	2.43	1.80	13.00	4.84	2.20
			mm	136.83	141.25								
1-1/2"	40	9.5 - 30.0	in	6.08	6.36	4.14	5.65	2.83	2.43	1.80	16.00	6.29	2.86
			mm	154.40	161.62								
2"	50	15.0 - 50	in	7.03	7.71	4.93	5.65	3.09	2.74	1.98	30.00	10.08	4.58
			mm	178.66	195.76								

\* Please reference the tailpiece data sheet (From # FP-TP) for other sizes and connections.  
**Dimensions not for construction purposes unless certified by factory.**

### STANDARD COMPONENTS



Pressure/Temperature test port with brass body, dual durometer EPDM core, brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 500 PSI (3450 kPa) and 275°F (135°C).



Memory stop with position indicator, zinc coated steel.

Please reference Flo-Pac data sheet (Form # FP-ACC) for optional accessories.

### ORDER DESIGNATIONS

<p>MB - 075 - L - S - 050 - M - XX</p> <p>Model ————          Body Size ————          Venturi-High / Low ————          Conn. Type ————</p>		<p>Accessories          Tailpiece Conn. Type          Tailpiece Conn. Size</p>
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Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

Flo-Pac, LLC.  
 10545 Guilford Road, Unit 103  
 Jessup, Maryland 20794  
 www.flo-pacllc.com



Model # MB  
Venturi Type Balancing Valve

File # FPFC-1  
7/18/05

<i>Differential Pressure: Inches W.C</i>											
<i>Flow</i> <b>GPM</b>	<i>Models</i>							<i>Flow</i> <b>GPM</b>	<i>Models</i>		
	050L 075RL	050H 075RH	075L	075H	100	125	150		125	150	200
0.10	1							18.00	<b>62</b>	<b>36</b>	<b>14</b>
0.20	2							19.00	<b>69</b>	<b>41</b>	<b>15</b>
0.30	5							20.00	<b>76</b>	<b>45</b>	<b>17</b>
0.42	<b>10</b>							21.00	<b>84</b>	<b>50</b>	<b>19</b>
0.50	<b>14</b>	1	1					22.00	<b>92</b>	<b>54</b>	<b>21</b>
0.75	<b>31</b>	3	2					23.00	<b>101</b>	<b>60</b>	<b>23</b>
1.00	<b>55</b>	6	4					24.00	110	<b>65</b>	<b>25</b>
1.25	<b>86</b>	9	6					25.00	119	<b>70</b>	<b>27</b>
1.35	<b>101</b>	<b>11</b>	7					26.00	129	<b>76</b>	<b>29</b>
1.50	124	<b>13</b>	<b>9</b>	1	2			27.00	139	<b>82</b>	<b>31</b>
2.00	221	<b>23</b>	<b>16</b>	2	4			28.00	149	<b>88</b>	<b>34</b>
2.25		<b>29</b>	<b>21</b>	3	5			29.00	160	<b>95</b>	<b>36</b>
2.50		<b>36</b>	<b>25</b>	4	6			30.00	171	<b>101</b>	<b>39</b>
3.00		<b>52</b>	<b>36</b>	6	9			31.00	183	108	<b>41</b>
3.50		<b>71</b>	<b>50</b>	8	<b>13</b>			32.00	195	115	<b>44</b>
4.00		<b>92</b>	<b>65</b>	<b>10</b>	<b>16</b>			33.00	207	122	<b>47</b>
4.50		117	<b>82</b>	<b>13</b>	<b>21</b>			34.00	220	130	<b>50</b>
5.00		144	<b>101</b>	<b>15</b>	<b>26</b>			35.00		138	<b>53</b>
5.50		175	123	<b>19</b>	<b>31</b>			36.00		146	<b>56</b>
6.00		208	146	<b>22</b>	<b>37</b>			37.00		154	<b>59</b>
6.50			171	<b>26</b>	<b>43</b>	8		39.00		171	<b>65</b>
7.25			213	<b>33</b>	<b>54</b>	<b>10</b>		40.00		180	<b>69</b>
7.50				<b>35</b>	<b>58</b>	<b>11</b>		41.00		189	<b>72</b>
8.00				<b>40</b>	<b>65</b>	<b>12</b>		42.00		198	<b>76</b>
8.50				<b>45</b>	<b>74</b>	<b>14</b>		43.00		208	<b>79</b>
9.00				<b>50</b>	<b>83</b>	<b>15</b>		44.00		218	<b>83</b>
9.50				<b>56</b>	<b>92</b>	<b>17</b>	<b>10</b>	45.00			<b>87</b>
10.00				<b>62</b>	<b>102</b>	<b>19</b>	<b>11</b>	48.50			<b>101</b>
10.50				<b>68</b>	113	<b>21</b>	<b>12</b>	55.00			130
11.00				<b>75</b>	124	<b>23</b>	<b>14</b>	60.00			154
11.50				<b>82</b>	135	<b>25</b>	<b>15</b>	65.00			181
12.00				<b>89</b>	147	<b>27</b>	<b>16</b>	70.00			210
12.50				<b>97</b>	160	<b>30</b>	<b>18</b>				
13.00				105	173	<b>32</b>	<b>19</b>				
14.00				121	200	<b>37</b>	<b>22</b>				
15.00				139		<b>43</b>	<b>25</b>				
16.00				159		<b>49</b>	<b>29</b>				
17.00				179		<b>55</b>	<b>33</b>				
<b>SIZE</b>	1/2"L&3/4"RL	1/2"H-3/4"RH	3/4"L	3/4"H	1"	1-1/4"	1-1/2"		1-1/4"	1-1/2"	2"
<b>FF</b>	0.1346	0.4163	0.4967	1.2704	0.9889	2.2921	2.9816		2.2921	2.9816	4.8274
<b>C<sub>V</sub></b>	0.75	2.25	2.70	7.00	5.20	13.00	16.00		13.00	16.00	30.00

**Flow Formulas**

GPM = FF x (√DP)  
 DP = (GPM/FF)<sup>2</sup>  
 PSID = (GPM/C<sub>V</sub>)<sup>2</sup>  
 PPL= DP\*0.12

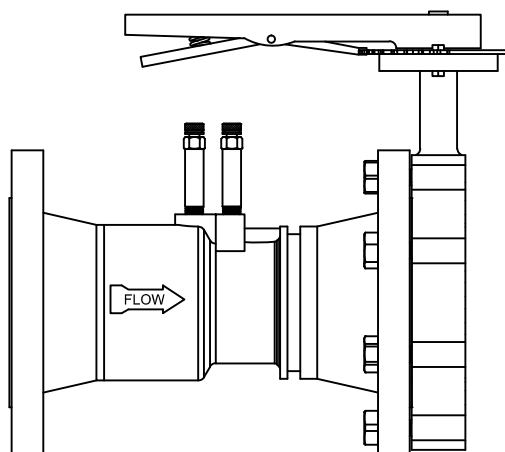
**Notes**

- 1 Accuracy +/- 3% of actual rate as tested by independent flow laboratory
- 2 Repeatability +/- 0.25% of rate
- 3 Values in **BOLD** type represents traditional 10" to 100" sizing range
- 4 All valves will function above and below ranges shown
- 5 C<sub>V</sub> is for complete valve pressure drop calculations only

# Flo-Pac

## SPECIFICATIONS

### Combination Butterfly/Venturi w/ Flange MBF & VF Series



**PRODUCT DESCRIPTION:** The Flo-Pac MBF is a combination butterfly valve and flanged style venturi. The carbon steel venturi connects to standard ANSI Class 150 pound flanges, and is combined with a lug type butterfly valve for throttling. The cast iron butterfly valve has a combination infinite/10 position memory stop plate, a one piece disc/shaft, a triple shaft bearing, an aluminum-bronze disc for sizes 2½" - 8", a nickel plated disc for the 10" and 12" sizes, and an EPDM standard liner. The CBVF comes standard with two pressure/temperature ports.

Nominal Line Size	Model	Lower Flow Range (GPM)	Upper Flow Range (GPM)	Flow Factor (FF)	Weight
2½"	Low	30	100	147	35
	High	40	220	319	35
3"	Low	30	160	227	43
	High	80	400	578	41
4"	Low	80	430	611	60
	High	130	720	1029	56
5"		160	880	1267	76
6"		200	1100	1551	101
8"		520	2800	2824	172
10"		580	2000	4164	281
12"		1250	6700	9670	422

STANDARD MATERIAL SPECIFICATIONS	
Venturi	Steel Casting, Carbon ASTM A216 Grade WCB
Flange	Forged Carbon Steel ASTM A105
Butterfly Valve	Nodular Cast Iron ASTM A536 60-4-18
Seat	EPDM Rubber
Disc (2½" - 8")	Aluminum-Bronze Sand Casting, ASTM B148 C95800
Disc (10 & 12")	Nickel Plated Aluminum-Bronze Sand Casting, ASTM B148 C95800
Shaft	Stainless Steel AISI 410
O-Ring	EPDM Rubber
Bearing	Copper ASTM B45
Bearing Bush	PTFE
Hand Lever	Nodular Cast Iron ASTM A536 60-4-18
CONNECTIONS:	Inlet - Raised-Face Flange Outlet - Lug Butterfly Valve
CALCULATIONS:	D.P. = $(\text{GPM} \cdot 17.3 / \text{FF})^2$ GPM = $\sqrt{\text{FF} \cdot 17.3 \cdot (\text{D.P.})}$

#### PRODUCT SPECIFICATIONS:

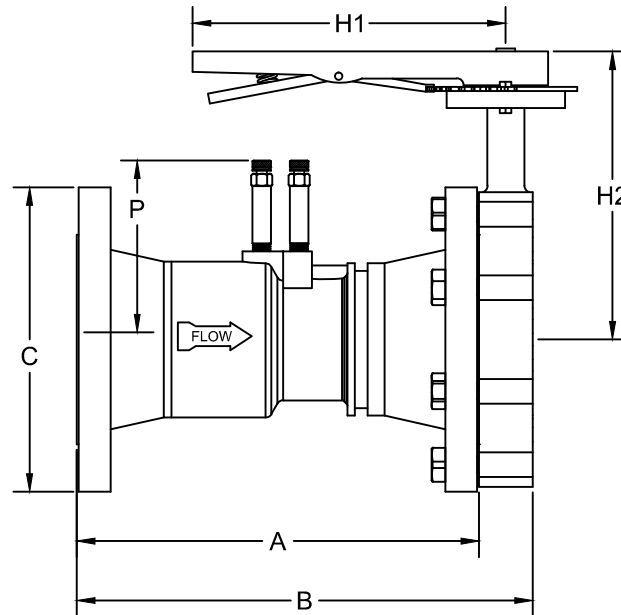
- Butterfly valve is rated at 150 PSIG and is suitable for dead-end service
- Maximum pressure loss 6% of differential pressure
- The carbon steel Venturi accuracy rating: ±1% Between 10" w.c. and 70" w.c. based on Coefficient of Discharge  
±3% Between 5" w.c. and 150" w.c.

The information presented on this submittal is correct at the time of publication. Flo-Pac, L.L.C. reserves the right to change design, and/or material specifications without notice.

# Flo-Pac

## DIMENSIONS

### Combination Butterfly/Venturi w/ Flange MBF & VF Series



SIZE	A	B	C	H1	H2	P
2½" L & H	10.71	12.51	7.0	10.5	8.06	5.32
3" L & H	11.00	12.80	7.5	10.5	8.15	5.52
4" L & H	12.20	14.20	9.0	10.5	9.00	6.00
5"	13.25	15.35	10.0	10.5	9.35	6.57
6"	14.25	16.45	11.0	10.5	10.20	7.20
8"	16.65	19.05	13.5	*	*	8.36
10"	20.30	22.90	16.0	*	*	8.52
12"	26.00	29.00	19.0	*	*	12.37

*Note: All dimensions and materials are subject to minor variations. Consult with factory for confirmation of dimensions and material specifications at the time of order. Sweat size listed is nominal and will differ from the actual, measurable size.*

\* Denotes a gear operated valve.

**Flo-Pac L.L.C.**  
**STEEL VALVES 2 1/2" - 12"**



Pressure Loss 6% of Differential Pressure

Flow Rates For Models

MBF, VF, VG, VW

Accuracy Statement: +/- 1% Between 10" W.C. and 70" W.C.

+/- 3% Between 5" W.C. and 150" W.C.

+/- 5% Less than 5" W.C. and Over 150" W.C.

**DIFFERENTIAL PRESSURE: INCHES W.C.**

GPM	2 1/2"		3"		4"		5"	6"	GPM	3" High	4"		5"	6"
	Low	High	Low	High	Low	High					Low	High		
30	12.5	2.6	5.2						430	166	148	52.3	34.5	23.0
40	22.2	4.7	9.3						440	173	155	54.7	36.1	24.1
50	34.6	7.4	14.5	2.2					450	181	162	57.2	37.8	25.2
60	49.9	10.6	20.9	3.2	2.9				460	190	170	59.8	39.5	26.3
70	67.9	14.4	28.5	4.4	3.9				470	198	177	62.4	41.2	27.5
80	88.6	18.8	37.2	5.7	5.1				480	206	185	65.1	43.0	28.7
90	112	23.8	47.0	7.3	6.5	2.3			490	215	192	67.9	44.8	29.9
100	139	29.4	58.1	9.0	8.0	2.8			500	224	200	70.7	46.6	31.1
110	168	35.6	70.3	10.8	9.7	3.4	2.3		510	233	209	73.5	48.5	32.4
120	199	42.4	83.6	12.9	11.5	4.1	2.7		520	242	217	76.4	50.4	33.6
130	234	49.7	98.2	15.1	13.5	4.8	3.2	2.1	540	261	234	82.4	54.4	36.3
140	271	57.6	114	17.6	15.7	5.5	3.7	2.4	560	281	251	88.6	58.5	39.0
150		66.2	131	20.2	18.0	6.4	4.2	2.8	580	301	270	95.1	62.7	41.9
160		75.3	149	22.9	20.5	7.2	4.8	3.2	600		289	101.8	67.1	44.8
170		85.0	168	25.9	23.2	8.2	5.4	3.6	620			109	72	47.8
180		95.3	188	29.0	26.0	9.2	6.0	4.0	640			116	76	51.0
190		106	210	32.3	28.9	10.2	6.7	4.5	660			123	81	54.2
200		118	232	35.8	32.1	11.3	7.5	5.0	680			131	86	57.5
210		130	256	39.5	35.4	12.5	8.2	5.5	700			139	91	61.0
220		142	281	43.4	38.8	13.7	9.0	6.0	720			147	97	64.5
230		156		47.4	42.4	15.0	9.9	6.6	740			155	102	68.1
240		169		51.6	46.2	16.3	10.7	7.2	760			163	108	71.9
250		184		56.0	50.1	17.7	11.7	7.8	780			172	113	75.7
260		199		60.6	54.2	19.1	12.6	8.4	800			181	119	79.6
270		214		65.3	58.4	20.6	13.6	9.1	820			190	125	83.7
280		231		70.2	62.9	22.2	14.6	9.8	840			199	132	87.8
290		247		75.3	67.4	23.8	15.7	10.5	860			209	138	92.0
300		265		80.6	72.2	25.4	16.8	11.2	880			219	144	96.3
310		283		86.1	77.0	27.2	17.9	12.0	900			229	151	101
320		301		91.7	82.1	28.9	19.1	12.7	950			255	168	112
330				97.6	87.3	30.8	20.3	13.5	1000			283	186	124
340				104	92.7	32.7	21.6	14.4	1050				206	137
350				110	98	34.6	22.8	15.2	1100				226	151
360				116	104	36.6	24.2	16.1	1150				247	165
370				123	110	38.7	25.5	17.0	1200				268	179
380				129	116	40.8	26.9	18.0	1250				291	194
390				136	122	43.0	28.4	18.9	1300					210
400				143	128	45.2	29.8	19.9	1350					227
410				151	135	47.5	31.3	20.9	1400					244
420				158	141	49.9	32.9	21.9	1500					280

**Flow Factors for calculating Delta Pressure**

2 1/2"		3"		4"		5"	6"	8"	10"	12"
Low	High	Low	High	Low	High					
147	319	227	578	611	1029	1267	1551	2824	4164	9670

**D.P. = (GPM\*17.3/FF)^2**

Revision: 2 October 1st, 2003

# Flo-Pac, L.L.C.

## DIFFERENTIAL PRESSURE: INCHES W.C.

GPM	8"	10"	12"	GPM	8"	10"	12"	GPM	12"
520	10.1	4.7		2500	234.6	107.9	20.0	5050	81.6
540	10.9	5.0		2550	244.0	112.2	20.8	5100	83.2
560	11.8	5.4		2600	253.7	116.7	21.6	5150	84.9
580	12.6	5.8		2650	263.5	121.2	22.5	5200	86.5
600	13.5	6.2		2700	273.6	125.8	23.3	5250	88.2
620	14.4	6.6		2750	283.8	130.5	24.2	5300	89.9
640	15.4	7.1		2800	294.2	135.3	25.1	5350	91.6
660	16.3	7.5		2850	304.8	140.2	26.0	5400	93.3
680	17.4	8.0		2900	315.6	145.2	26.9	5500	96.8
700	18.4	8.5		2950	326.6	150.2	27.9	5700	104.0
720	19.5	8.9		3000		155.4	28.8	5900	111.4
740	20.6	9.5		3050		160.6	29.8	6100	119.1
760	21.7	10.0		3100		165.9	30.8	6300	127.0
780	22.8	10.5		3150		171.3	31.8	6500	135.2
800	24.0	11.0		3200		176.8	32.8	6700	143.7
820	25.2	11.6		3250		182.3	33.8	6900	152.4
840	26.5	12.2		3300		188.0	34.9	7100	161.3
860	27.8	12.8		3350		193.7	35.9	7300	170.6
880	29.1	13.4		3400		199.5	37.0	7500	180.0
900	30.4	14.0		3450		205.5	38.1	7700	189.8
950	33.9	15.6	2.9	3500		211.4	39.2	7900	199.8
1000	37.5	17.3	3.2	3550		217.5	40.3	8100	210.0
1050	41.4	19.0	3.5	3600		223.7	41.5	8300	220.5
1100	45.4	20.9	3.9	3650		230.0	42.6	8500	231.2
1150	49.6	22.8	4.2	3700		236.3	43.8	8700	242.3
1200	54.0	24.9	4.6	3750		242.7	45.0	8900	253.5
1250	58.6	27.0	5.0	3800		249.3	46.2	9100	265.0
1300	63.4	29.2	5.4	3850		255.9	47.4	9300	276.8
1350	68.4	31.5	5.8	3900		262.5	48.7	9500	288.9
1400	73.6	33.8	6.3	3950		269.3	49.9	9700	301.1
1450	78.9	36.3	6.7	4000		276.2	51.2	9900	313.7
1500	84.4	38.8	7.2	4050		283.1	52.5	10100	326.5
1550	90.2	41.5	7.7	4100		290.2	53.8	10300	339.6
1600	96.1	44.2	8.2	4150		297.3	55.1	10500	352.9
1650	102.2	47.0	8.7	4200			56.5	10700	366.4
1700	108.5	49.9	9.2	4250			57.8	10900	380.3
1750	114.9	52.9	9.8	4300			59.2	11100	394.4
1800	121.6	55.9	10.4	4350			60.6	11300	408.7
1850	128.4	59.1	11.0	4400			62.0	11500	423.3
1900	135.5	62.3	11.6	4450			63.4	11700	438.1
1950	142.7	65.6	12.2	4500			64.8	11900	453.2
2000	150.1	69.0	12.8	4550			66.3	12100	468.6
2050	157.7	72.5	13.5	4600			67.7	12300	484.2
2100	165.5	76.1	14.1	4650			69.2		
2150	173.5	79.8	14.8	4700			70.7		
2200	181.6	83.5	15.5	4750			72.2		
2250	190.0	87.4	16.2	4800			73.7		
2300	198.5	91.3	16.9	4850			75.3		
2350	207.3	95.3	17.7	4900			76.8		
2400	216.2	99.4	18.4	4950			78.4		
2450	225.3	103.6	19.2	5000			80.0		

**Accuracy Statement:**

- +/- 1% Between 10" W.C. and 70" W.C.
- +/- 3% Between 5" W.C. and 150" W.C.
- +/- 5% Less than 5" W.C. and Over 150" W.C.



## **FLO-PAC, LLC**

### **TESTS AND CALIBRATION OF BALANCING / METERING VALVES**

#### **1 DESCRIPTION:**

Flo-Pac valves are fabricated with Venturi inlet and manual ball valve at the outlet discharge section.

Memory stops and threaded ends are standard features.

Unions and sweat adapters are also available as required by the project specifications.

Sizes offered are from ½” to 2” in Brass for (Hi and Low flows).

From 2- ½” to 10” are offered in carbon steel with butterfly valves at the discharge side.

#### **2 CALIBRATION LAB AND FLOW TESTS:**

The specially designed Venturi throat areas have achieved a very stable discharge coefficient (Cd), as tested at ABB Flow Calibration Laboratory. The fully equipped facility devoted to the calibration and testing of Flowmeters is one of the biggest Flow Calibration Laboratories of its kind in North America.

Calibrations of the balancing and metering (Flo-Pac) valves were performed on water using transfer standards certified in-place against a primary standard, which is certified and traceable to the National Institute of Standards & Technology (NIST).

ABB's calibration tests of all sizes (1/2” to 2”) has achieved an accuracy of  $\pm 3\%$  of flow rates, and very low pressure loss coefficients (Reduced operating costs in the overall system costs).

#### **3 PERFORMANCE ACCURACY AND REPEATABILITY:**

Accuracy verification suitable for ISO 9000 certification requirements has provided an outstanding certified calibration accuracy for each valve/size to  $\pm 3\%$  of flow rates and a repeatability of  $\pm 0.25\%$  of readings.

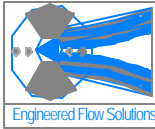
Each tested valve was set at full open position as well as modulated ½ and ¼ turn positions. Accuracy in all positions was the same with a standard deviation of  $\pm 1.5\%$ .

Testing equipments and reference metes (Mag Type) were guaranteed to  $\pm 0.25\%$  of flow rate or better.

Accuracy and repeatability are certified and traceable to NIST and in accordance to ISO 9001.

Test data reports are computer generated data checked and certified.

All tested flow valves were threaded type with flanged adapters ANSI class 150#.



**EXPERFLOW**  
**MEASUREMENTS, INC.**

Automation & Flow Measurement Consultants  
PO BOX 1155, Montreal - CANADA

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December 15, 2004

Flo-Pac LLC

Reference: Manual Balancing and Metering Valves

Gentlemen:

This letter is to confirm the outstanding performance of the Flo-Pac manual balancing valves that were tested at ABB, the flow calibration laboratory.

The performance of all tested prototypes (1/2" to 2") was to +/-3% of flow rates, and repeatability of +/- 0.25% of rates.

The low pressure loss coefficient, high recovery, and stable flow discharge coefficient are the main features of this new balancing and metering flow device.

The overall performance will meet and surpass ASHRAE systems recommendations.

Flow test loops and equipment are guaranteed to +/-0.25% of flow rates or better.

All test equipment and instruments are traceable to the National Institute of Standards & Technology (NIST).

Sam TAHA, P.Eng  
Managing Director  
Experflow Measurements, Inc.



Flo-Pac  
December 15, 2004

## **Tests and Calibration of Balancing/Metering Valves (Flo-Pac)**

### **1 - Description:**

Flo-Pac valves are fabricated with Venturi inlet and manual ball valve at the outlet discharge section. Memory stops and threaded ends are standard features.

Unions and sweat adapters are also available as required by the project specifications.

Sizes offered are from ½" to 2" in Brass for (Hi and Low flows).

From 2-1/2" to 10" are offered in carbon steel with butterfly valves at the discharge side.

### **2 - Calibration Lab, and Flow Tests:**

The specially designed Venturi throat areas have achieved a very stable discharge coefficient (Cd), as tested at ABB Flow Calibration Laboratory. The fully equipped facility devoted to the calibration and testing of Flowmeters is one of the biggest Flow Calibration Laboratory of its kind in North America. Calibrations of the balancing and metering (Flo-Pac) valves were performed on water using transfer standards certified in-place against a primary standard, which is certified and traceable to The National Institute of Standards & Technology (NIST).

ABB's calibration tests of all sizes (½" to 2") has achieved an accuracy of +/- 3% of flow rates, and very low pressure loss coefficients (Reduced operating costs in the overall system costs).

### **3 - Performance Accuracy and Repeatability:**

Accuracy verification suitable for ISO 9000 certification requirements has provided an outstanding certified calibration accuracy for each valve/size to +/- 3% of flow rates and a repeatability of +/- 0.25% of readings.

Each tested valve was set at full open position as well as modulated ½ and 1/4 turn positions. Accuracy in all positions was the same with a standard deviation of +/- 1.5%.

Testing equipments and reference meters (Mag Type) were guaranteed to +/- 0.25% of flow rate or better.

Accuracy and repeatability are certified and traceable to NIST and in accordance to ISO 9001.

Test data reports are computer generated data checked and certified.

All tested flow valves were threaded type with flanged adapters ANSI class 150#.

Size	Model	Flow GPM @ 4 ft/s (ASHRAE)	Cv	Meter Km	DP=1"		DP=5"		DP=100"		DP=200"		Meter Flow Factor (MF)
					GPM	GPM	GPM	GPM	GPM	GPM			
1/2"	Low	3.8	0.75	0.0614	0.1346	0.30	1.35	1.90	0.1346	0.4163	5.89	0.4163	
	High				0.4163	0.93	4.16	7.02					
3/4"	Low	6.65	2.7	0.1291	0.4967	1.11	4.97	7.02	0.4967	1.2704	17.97	1.2704	
	High				1.2704	2.84	12.70	17.97					
1"		10.8	5.2	0.1586	0.9889	2.21	9.89	13.99	0.9889				
1-1/4"		18.65	13	0.2124	2.2921	5.13	22.92	32.42	2.2921				
1-1/2"		25.4	16	0.203	2.9816	6.67	29.82	42.17	2.9816				
2"		41.9	30	0.1994	4.8274	10.79	48.27	68.27	4.8274				

Km is determined from lab. Calibration

CV's are used only to determine permanent pressure drops,  $PSID=(Flow/Cv)^2$   
 MF's are used to calculate flow rates  $[GPM=MF \times \sqrt{DP}]$   
 $DP=(GPM/MF)^2$   
 Permanent Pressure Loss=12% of dp generated

$MF=5.6664 \times (ID^2) \times Km$   
 ID in inches

Example 1: GPM=15  
 Size=1-1/4"  
 $DP=(GPM/MF)^2$   
 $DP=(15/2.2921)^2$   
 DP=42.83"H2O  
 Pressure Loss: 12% of dp=5.2"H2O

For the same valve:  
 $(GPM1/GPM2)=\sqrt{DP1/DP2}$

Example 2: DP=10"H2O  
 Size=3/4"  
 Model=High  
 $GPM=MF \times \sqrt{DP}$   
 $GPM=1.2704 \times \sqrt{10}$   
 GPM=4.02

For the same valve:  
 $DP1=DP2 \times (GPM1/GPM2)^2$

**ABB Inc.**

DATE: 21 APRIL-2004  
Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 1/2"-Low REF.: FLO-PAC  
**SIZE: 1/2 in. - NPT (Brass)**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 2.42 US GAL PER MINUTE & 30 FT/SEC.  
 MASTER METER: ABB-MAG  
 METER SIZE: 1/2 in. Serial# **1/2"-Low** Pipe Size: 1/2" Sch.40 ID: 0.622 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 24 FT/SEC.**  
 TEST FLOW RATE: 0 TO 1.70 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-2.42 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.25**  
**THROAT SIZE: 0.156 in.**

**TEST RESULTS**

RUN #	MASTER METER				USGPM	DP-"H2O	K-METER	TEST VALVE			% ACC.
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	TRANS OUT.				Cd (COEF)	RE #		
1	1.79	20	74	19.87	1.7	158	0.0613	19.87	0.9786	8637	-0.20
2	1.01	20	74	9.01	0.96	50.3	0.0613	9.01	0.9794	4877	-0.12
3	0.41	20	74	5	0.39	Laminar	0.0573	5	0.9155	1981	0.00
4	0.99	20	74	8.78	0.94	1/2-open	0.0616	8.78	0.9837	4776	0.32

Note: Laminar Flow Point #3 Not Included in Accuracy

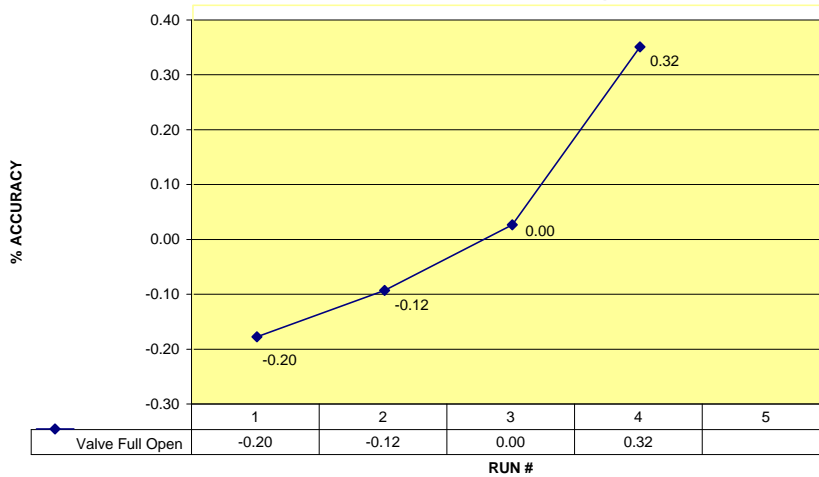
**AVERAGE COEFFICIENTS:**  
Cd: 0.9806 K-METER: 0.0614

Cv of combined valve (Venturi+Valve)  
Valve Coefficient at 1 PSI (27.73"H2O)

Cv=0.75

Pressure Loss: 12% Of DP (Permanent)

Test Point #4: Valve 1/2 Open



**ABB Inc.**

DATE: 05 MAY-2004

Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 1/2"-High REF.: FLO-PAC  
**SIZE: 1/2 in. - NPT (Brass)**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 2.42 US GAL PER MINUTE & 30 FT/SEC.  
 MASTER METER: ABB-MAG  
 METER SIZE: 1/2 in. Serial# **1/2"-HIGH** Pipe Size: 1/2" Sch.40 ID: 0.622 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 8 FT/SEC.**  
 TEST FLOW RATE: 0 TO 4 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-7.246 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.43**  
**THROAT SIZE: 0.270 in.**

**TEST RESULTS**

RUN #	MASTER METER				TEST VALVE						
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	USGPM	DP-"H2O	K-METER	TRANS OUT.	Cd (COEF)	RE #	% ACC.	
1	4.11	20	74	3.90	88.00	0.1860	12.80 mA	0.9888	19814	-0.92	
2	3.16	20	74	3.00	51.52	0.1870	9.14 mA	0.9941	15241	-0.39	
3	2.09	20	74	1.98	22	0.1889	6.20 mA	1.0041	10059	0.61	
4	1.10	20	74	1.04	6.2	0.1869	4.64 mA	0.9934	5284	-0.46	
5	2.11	20	74	2.00	1/2 open 22.2	0.1900	6.24 mA	1.0096	10161	1.16	

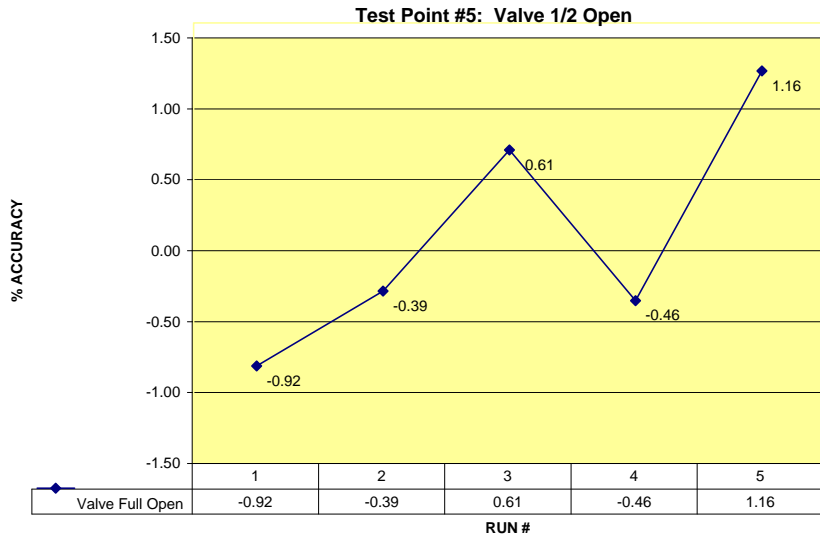
**AVERAGE COEFFICIENTS:**

Cd: 0.9980	K-METER: 0.1878
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Cv of combined valve (Venturi+Valve)  
 Valve Coefficient at 1 PSI (27.73"H2O)

Cv=2.25

Pressure Loss: 12% Of DP  
 (Permanent)



**ABB Inc.**

DATE: 21 APRIL-2004  
Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 3/4"-Low REF.: FLO-PAC  
**SIZE: 3/4 in. - NPT (Brass)**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 8.05 US GAL PER MINUTE & 10 FT/SEC.  
 MASTER METER: ABB-MAG  
 METER SIZE: 3/4 in. Serial# **3/4"-LOW** Pipe Size: 3/4" Sch.40 ID: 0.824 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 8 FT/SEC.**  
 TEST FLOW RATE: 0 TO 6.35 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-8.05 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.40**  
**THROAT SIZE: 0.330 in.**

**TEST RESULTS**

RUN #	MASTER METER				DP-"H2O	K-METER	TEST VALVE		RE #	% ACC.
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	USGPM			TRANS OUT.	Cd (COEF)		
1	3.82	20	74	6.35	155.75	0.1319	19.60 mA	0.8137	32260	2.17
2	2.40	20	74	4.00	65	0.1286	10.51 mA	0.7935	20322	-0.37
3	1.12	20	74	1.87	14.68	0.1265	5.470 mA	0.7805	9500	-2.00
4	2.35	20	74	3.91	61.4	0.1293	10.13 mA	0.7980	19864	0.20

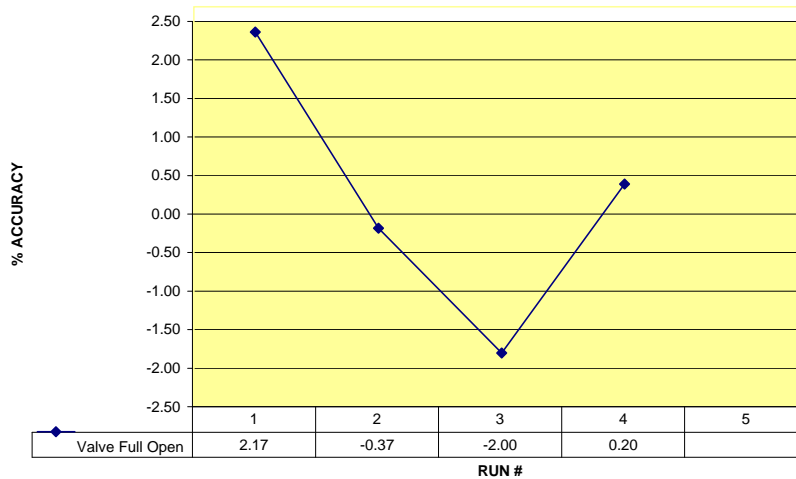
**AVERAGE COEFFICIENTS:**  
Cd: 0.7964 K-METER: 0.1291

Cv of combined valve (Venturi+Valve)  
Valve Coefficient at 1 PSI (27.73"H2O)

Cv=2.70

Pressure Loss: 12% Of DP  
(Permanent)

Test Point #4: Valve 1/2 Open



**ABB Inc.**

DATE: 21 APRIL-2004  
Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 3/4"-High REF.: FLO-PAC  
**SIZE: 3/4 in. - NPT (Brass)**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 8.05 US GAL PER MINUTE & 10 FT/SEC.  
 MASTER METER: ABB-MAG  
 METER SIZE: 3/4 in. Serial# **3/4"-HIGH** Pipe Size: 3/4" Sch.40 ID: 0.824 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 8 FT/SEC.**  
 TEST FLOW RATE: 0 TO 8 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-8.05 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.55**  
**THROAT SIZE: 0.4532 in.**

**TEST RESULTS**

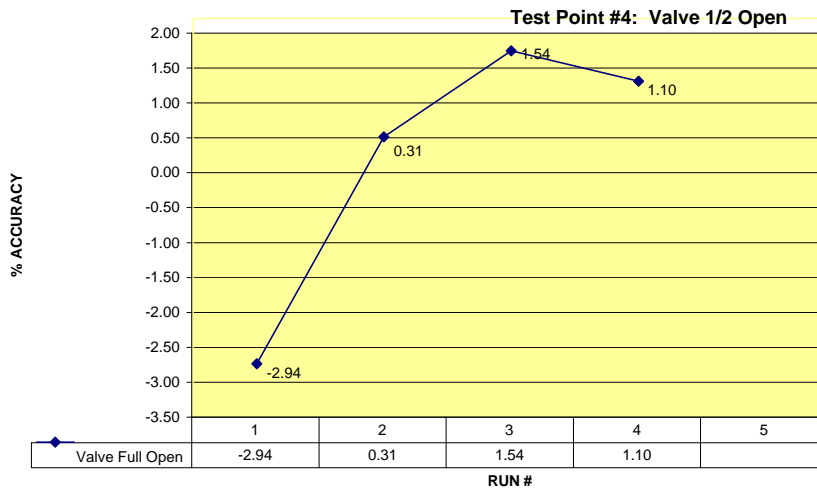
RUN #	MASTER METER				USGPM	DP-"H2O	K-METER	TEST VALVE		RE #	% ACC.
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	TRANS OUT.				Cd (COEF)			
1	4.80	20	74	7.98	41.88	0.3204	18.80 mA	1.0096	30603	-2.94	
2	2.46	20	74	4.09	10.3	0.3312	10.51 mA	1.0435	15685	0.31	
3	1.85	20	74	3.08	5.7	0.3352	5.570 mA	1.0563	11812	1.54	
4	2.51	20	74	4.18	10.59	0.3338	10.13 mA	1.0517	16030	1.10	

**AVERAGE COEFFICIENTS:**  
Cd: 1.0403 K-METER: 0.3302

Cv of combined valve (Venturi+Valve)  
Valve Coefficient at 1 PSI (27.73"H2O)

**CV=7.00**

Pressure Loss: 12% Of DP  
(Permanent)



**ABB - INC.**

DATE: 20 AUG. 2003  
 CALBRATOR: RON TEAL

SERIAL NUMBER: BALANCING VALVE 1"  
 SIZE: 1" - NPT-Brass

REF.: FLO-PAC

CAL FACTOR: 26.84 US GAL PER MINUTE & 33.33 FT/SEC.

METER SIZE: 1"-NPT

METER FACTOR: 0.5735

TEST FREQUENCY: 1000 Hz  
 TEST FLOW RATE: 0 TO 16.10 US GAL PER MINUTE  
 CONVERTER:

TEST VELOCITY: 20 FT/SEC.  
 REFERENCE METER: MAG

**TEST RESULTS**

RUN #	FREQ	MASTER METER			USGPM	TEST METER					
		K-CYC/GAL	TEMP-F			DP-"H2O	K-METER	TRANS OUT.	Cd (COEF)	RE #	% ACC.
1	709	3724	74		11.421	145	0.1672	19.36 mA	0.9987	38954	1.98
2	624	3724.4	74		10.048	113	0.1667	16 mA	0.9982	34271	1.93
3	492	3725.6	74		7.917	75	0.1612	11.9 mA	0.9951	27003	1.63
4	320	3727.6	74		5.143	37	0.1491	7.9 mA	0.9515	17541	-2.88
5	203	3728.5	74		3.263	15	0.1486	5.44 mA	0.9510	11129	-2.93
6	632	3724.4	74		10.188	114	0.1669	16.07 mA	0.9966	34749	1.77

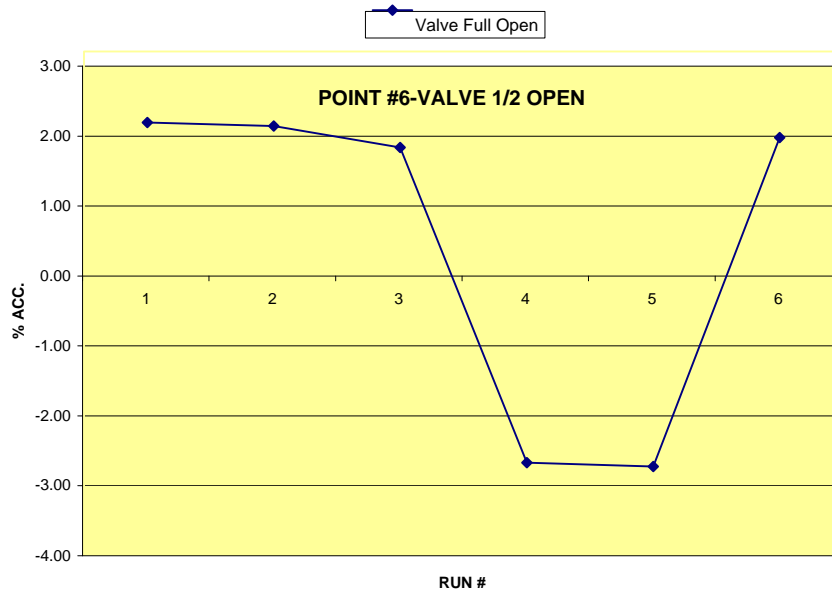
AVERAGE COEFFICIENTS:  
 Cd: 0.9789 K-METER: 0.1586

ACCURACY RANGE (%):  
 +/-1.5 % TO 3%

Cv of combined valve (Venturi+Valve)  
 Valve Coefficient at 1 PSI (27.73"H2O)

Cv=5.20

Pressure Loss: 12% Of DP



**ABB Inc.**

DATE: 21 APRIL-2004  
Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 1-1/4" REF.: FLO-PAC  
**SIZE: 1-1/4 in. - NPT Brass**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 24.20 US GAL PER MINUTE & 30 FT/SEC. @ 100%  
 MASTER METER: ABB-MAG  
 METER SIZE: 1-1/4 in. Serial# **1-1/4 in.** Pipe Size: 1-1/4" Sch.40 ID: 1.38 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 24 FT/SEC.**  
 TEST FLOW RATE: 0 TO 20 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-24.20 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.45**  
**THROAT SIZE: 0.620 in.**

**TEST RESULTS**

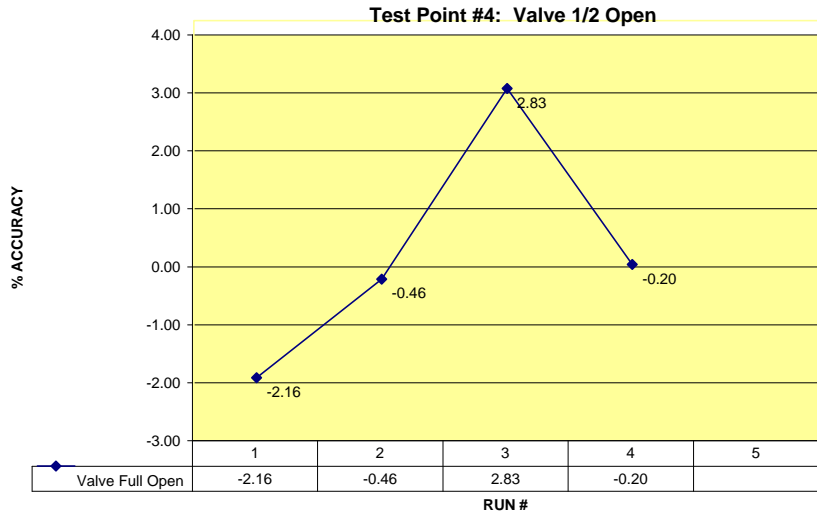
RUN #	MASTER METER				USGPM	DP-"H2O	K-METER	TEST VALVE		RE #	% ACC.
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	TRANS OUT.				Cd (COEF)			
1	4.30	20	74	20.06	80.50	0.2078	12 mA	1.0049	45934	-2.16	
2	2.26	20	74	10.55	21.51	0.2114	6.15 mA	1.0224	24158	-0.46	
3	0.97	20	74	4.52	3.7	0.2184	4.37 mA	1.0562	10350	2.83	
4	2.26	20	74	10.54	1/2-open 21.36	0.2120	6.12 mA	1.0251	24135	-0.20	

**AVERAGE COEFFICIENTS:**  
Cd: 1.0272 K-METER: 0.2124

Cv of combined valve (Venturi+Valve)  
Valve Coefficient at 1 PSI (27.73"H2O)

CV=13

Pressure Loss: 12% Of DP  
(Permanent)





**ABB Inc.**

DATE: 21 APRIL-2004  
Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 1-1/2" REF.: FLO-PAC  
**SIZE: 1-1/2 in. - NPT Brass**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 24.20 US GAL PER MINUTE & 30 FT/SEC. @ 100%  
 MASTER METER: ABB-MAG  
 METER SIZE: 1-1/2 in. Serial# **1-1/2 in.** Pipe Size: 1-1/2" Sch.40 ID: 1.61 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 24 FT/SEC.**  
 TEST FLOW RATE: 0 TO 23 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-24.20 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.45**  
**THROAT SIZE: 0.7245 in.**

**TEST RESULTS**

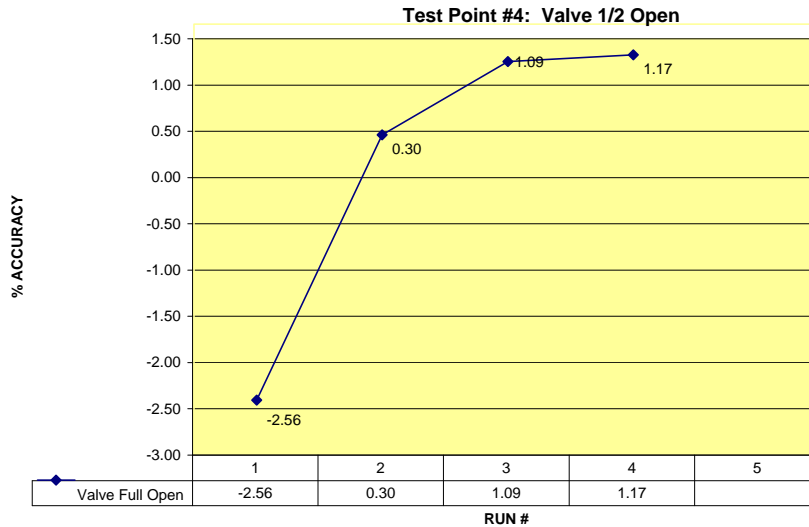
RUN #	MASTER METER				1/2-open	TEST VALVE		Cd (COEF)	RE #	% ACC.	
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	USGPM		DP-"H2O	K-METER				TRANS OUT.
1	3.51	20	74	22.28		58.80	0.1978	9.90 mA	0.9564	43730	-2.56
2	1.79	20	74	11.37		14.45	0.2036	5.45 mA	0.9845	22316	0.30
3	0.89	20	74	5.68		3.55	0.2052	4.36 mA	0.9923	11148	1.09
4	1.78	20	74	11.3		14.03	0.2053	5.40 mA	0.9930	22179	1.17

**AVERAGE COEFFICIENTS:**  
Cd: 0.9815 K-METER: 0.2030

Cv of combined valve (Venturi+Valve)  
Valve Coefficient at 1 PSI (27.73"H2O)

CV=16

Pressure Loss: 12% Of DP  
(Permanent)



**ABB Inc.**

DATE: 21 APRIL-2004  
 Calibration By: Ron Teal

SERIAL NUMBER: Balancing Valve: 2" REF.: FLO-PAC  
**SIZE: 2 in. - NPT Brass**  
 Test Valve Connection: Flanged 150# (Adapters)  
 CAL FACTOR: 120.80 US GAL PER MINUTE & 5 FT/SEC. @ 100%  
 MASTER METER: ABB-MAG  
 METER SIZE: 2 in. Serial# **2 in.** Pipe Size: 2" Sch.40 ID: 2.067 in.  
 TEST FREQUENCY: 1000 Hz **TEST VELOCITY: 80% @Max.= 24 FT/SEC.**  
 TEST FLOW RATE: 0 TO 60 US GAL PER MINUTE  
 CONVERTER: ABB DP Cell: Series 600T-C **REFERENCE METER: MAG-120.8 USGPM**  
 Range: 160"H2O (4-20 mA)

**BETA RATIO: 0.45**  
**THROAT SIZE: 0.930 in.**

**TEST RESULTS**

RUN #	MASTER METER				1/2-open	TEST VALVE		Cd (COEFF.)	RE #	% ACC.	
	Vel. (Ft/Sec)	P(PSIG)	TEMP-F	USGPM		DP-"H2O	K-METER				TRANS OUT.
1	5.73	20	74	60		159	0.1966	19.70 mA	0.9506	91727	-1.41
2	4.77	20	74	50		111	0.1960	15.0 mA	0.9481	76439	-1.67
3	2.93	20	74	30.7		40	0.2005	8.0 mA	0.9697	46934	0.57
4	1.43	20	74	15		9.12	0.2052	4.91 mA	0.9922	22932	2.91
5	2.87	20	74	30.1		39.2	0.1986	7.83 mA	0.9604	46016	-0.39

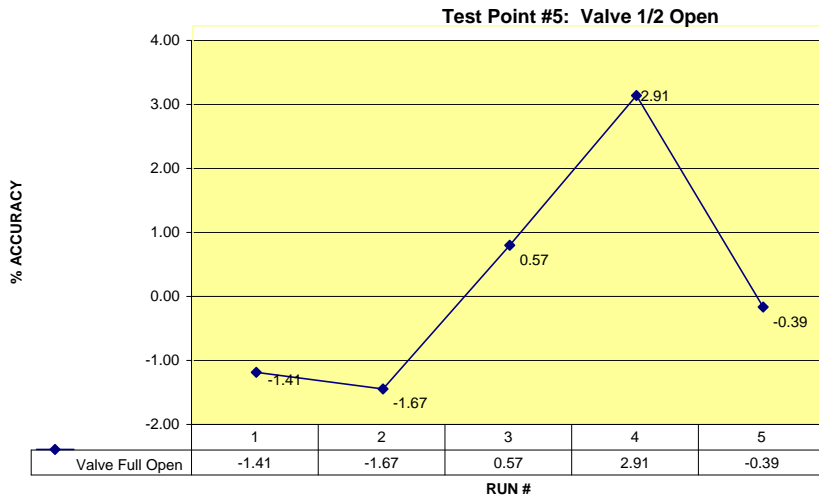
**AVERAGE COEFFICIENTS:**

Cd: 0.9642	K-METER: 0.1994
------------	-----------------

Cv of combined valve (Venturi+Valve)  
 Valve Coefficient at 1 PSI (27.73"H2O)

**CV=30**

Pressure Loss: 12% Of DP  
 (Permanent)

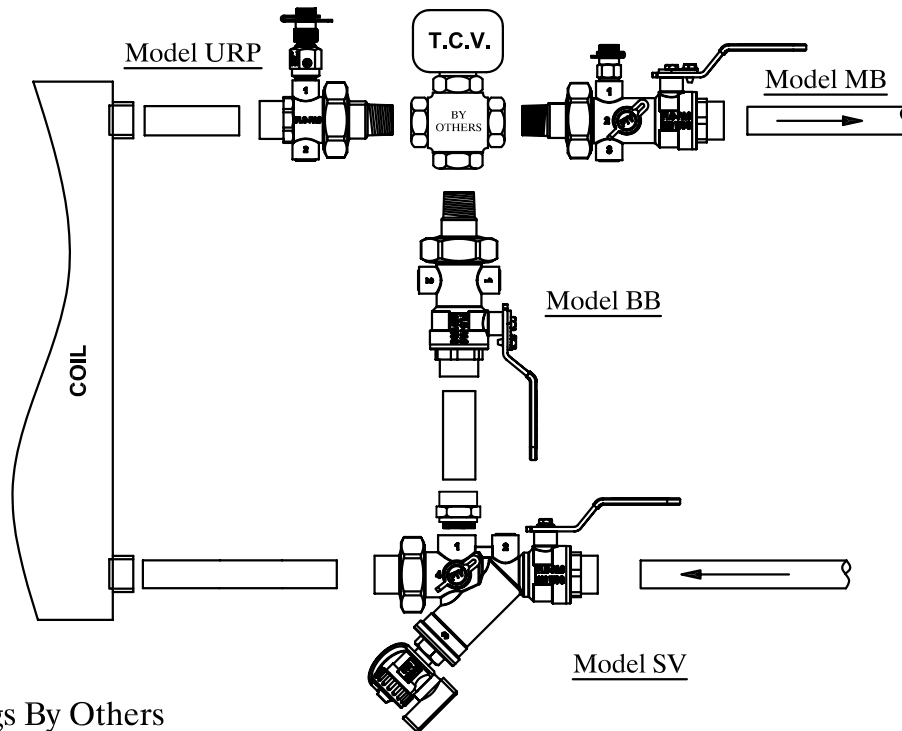






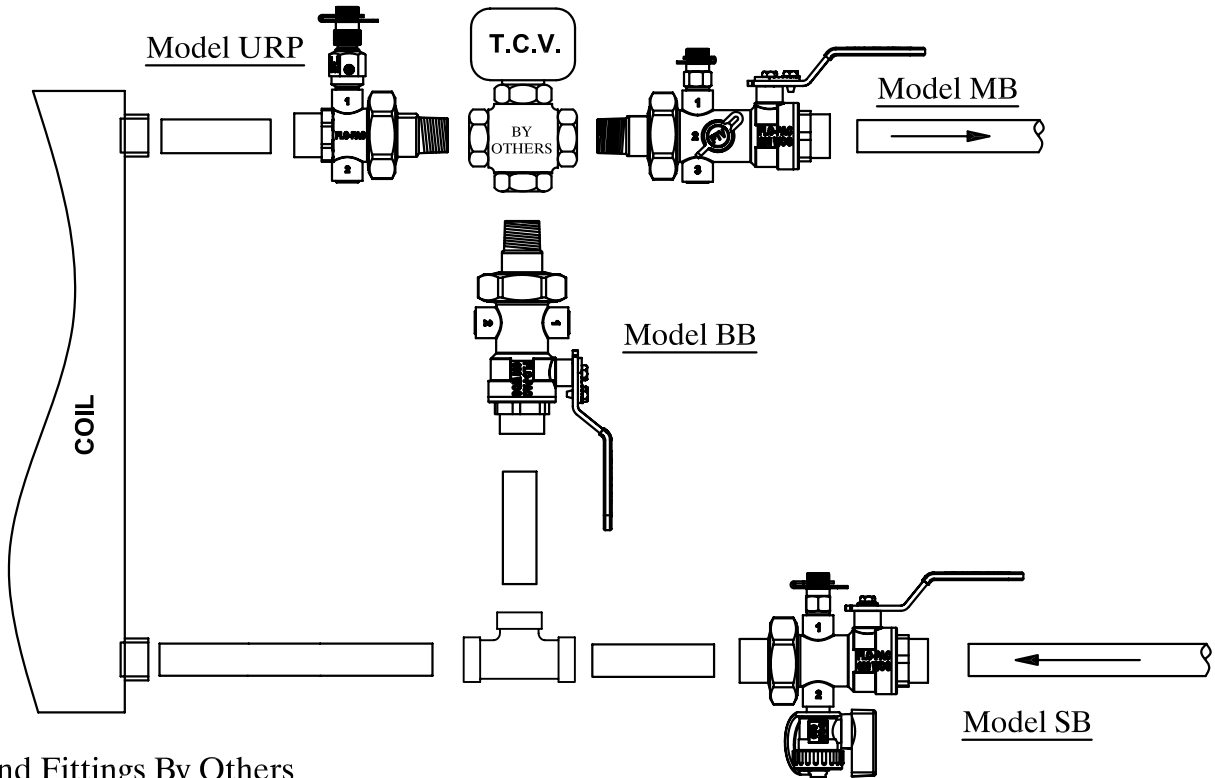






\*Pipe and Fittings By Others

<p><b><u>Model MB</u></b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b><u>Model SV</u></b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b><u>Model URP</u></b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b><u>Model BB</u></b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>



\*Pipe and Fittings By Others

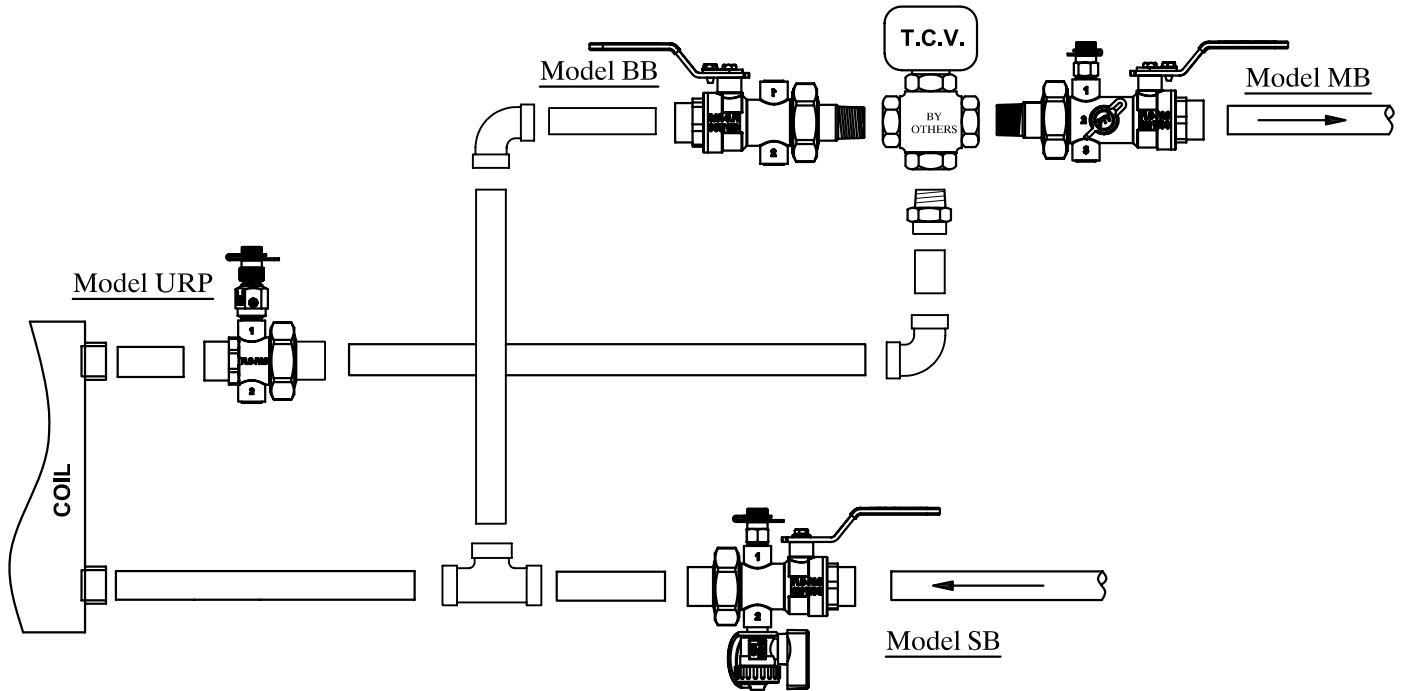
<p><b>Model MB</b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b>Model SB</b> Full port ball valve with chrome plated ball, 100% positive shut-off, Teflon seats, double o-ring shaft seals, union end with o-ring seal, Pressure/Temperature test port, and hose end drain valve with cap &amp; strap.</p>
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model BB</b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_

<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>





\*Pipe and Fittings By Others

<p><b>Model MB</b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b>Model SB</b> Full port ball valve with chrome plated ball, 100% positive shut-off, Teflon seats, double o-ring shaft seals, union end with o-ring seal, Pressure/Temperature test port, and hose end drain valve with cap &amp; strap.</p>
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model BB</b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_

<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>



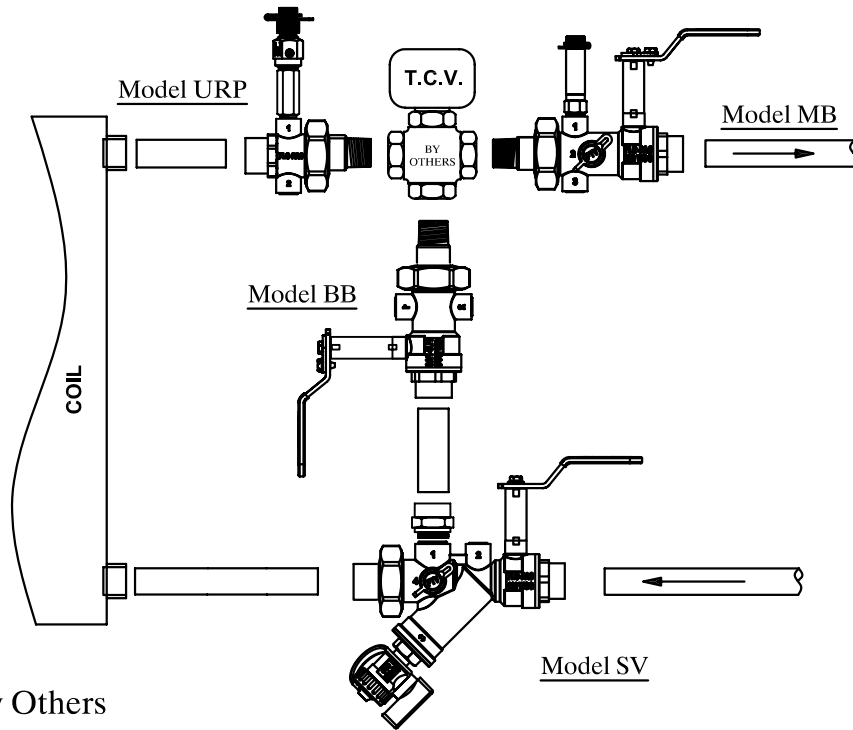












\*Pipe and Fittings By Others

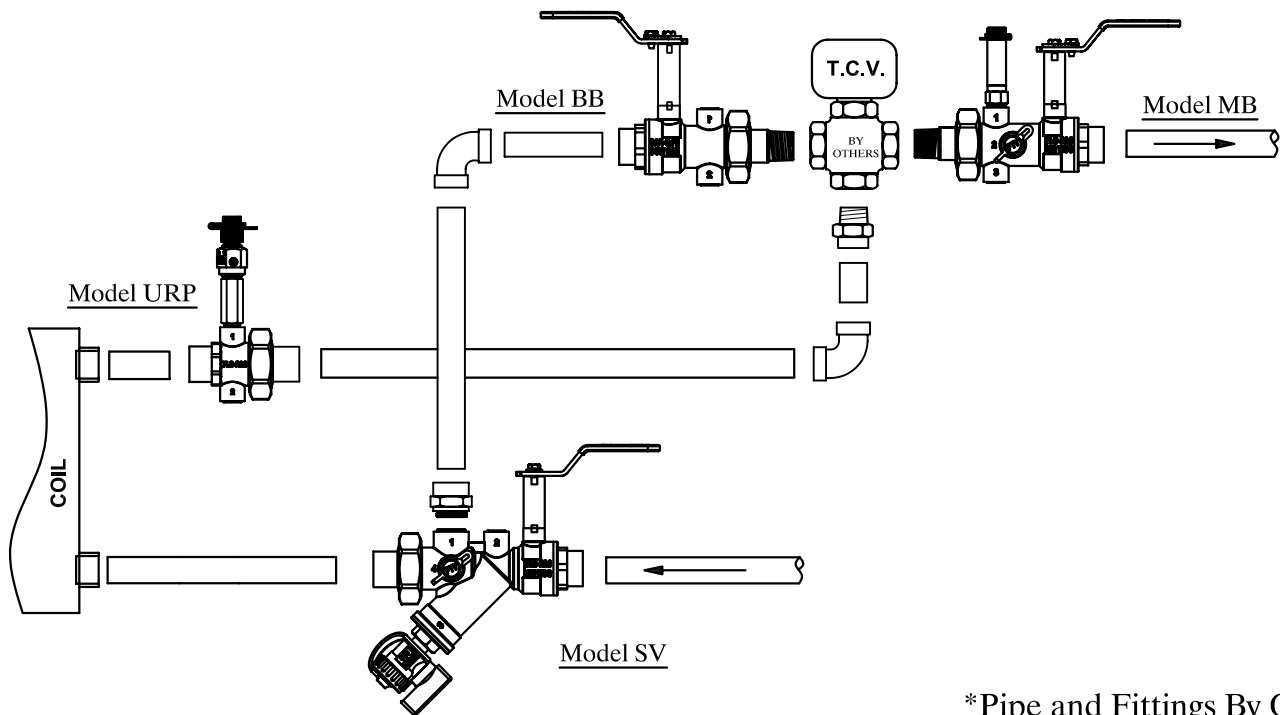
<p><b>Model MB</b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b>Model SV</b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model BB</b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_

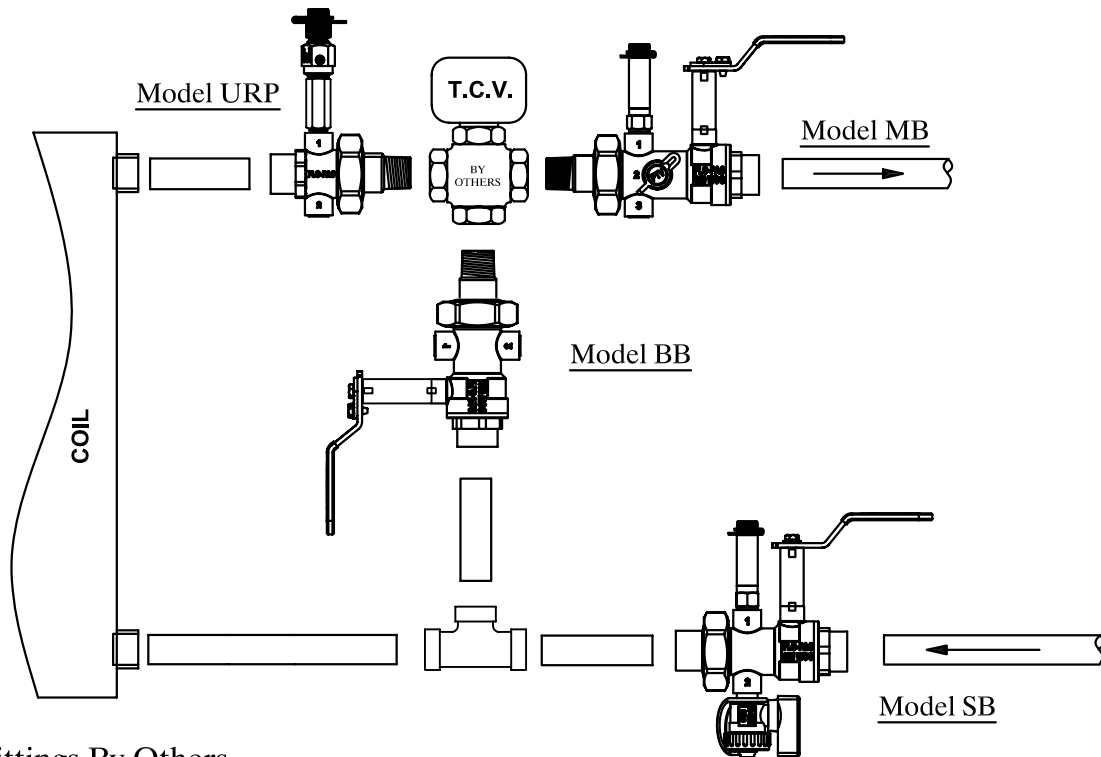
<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>





\*Pipe and Fittings By Others

<p><b><u>Model MB</u></b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b><u>Model SV</u></b> Combination ball valve, wye strainer, and union. The ball valve has a full port chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Union end has o-ring seal.</p>		
<p><b><u>Model URP</u></b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b><u>Model BB</u></b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>



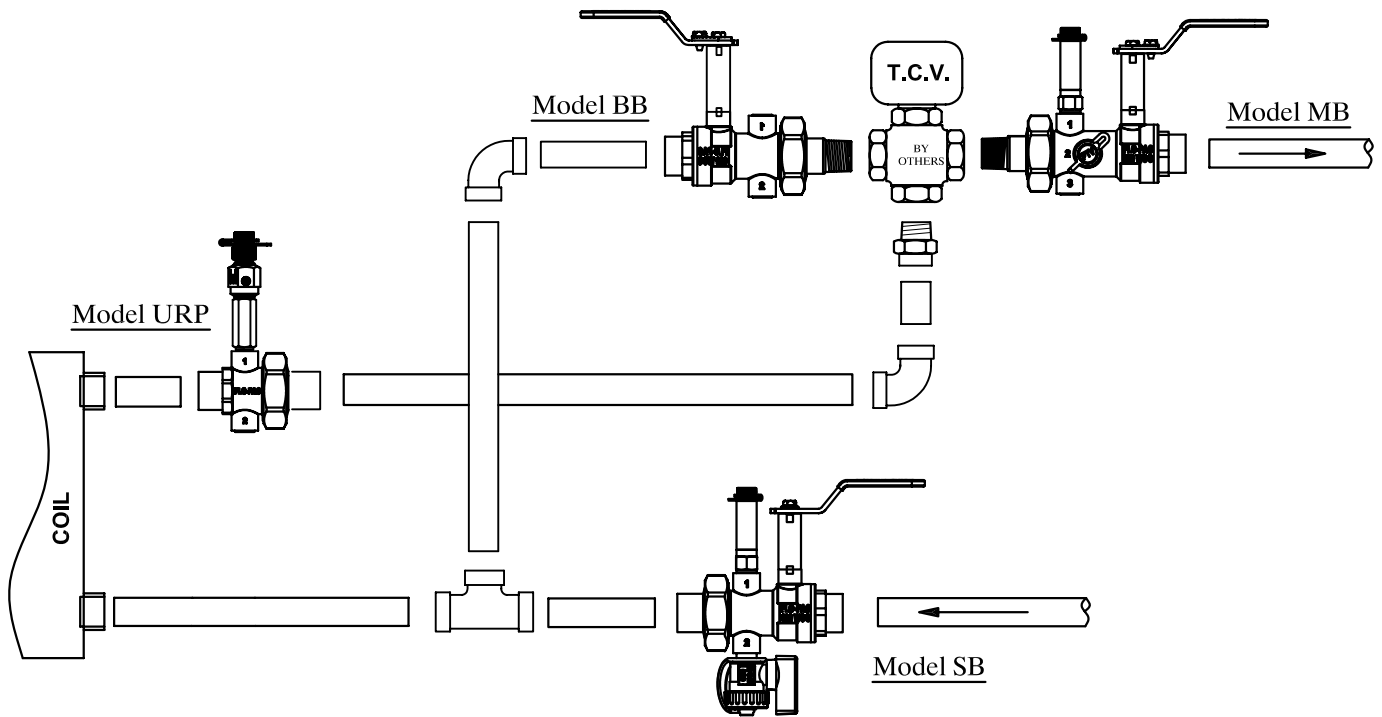
\*Pipe and Fittings By Others

<p><b>Model MB</b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b>Model SB</b> Full port ball valve with chrome plated ball, 100% positive shut-off, Teflon seats, double o-ring shaft seals, union end with o-ring seal, Pressure/Temperature test port, and hose end drain valve with cap &amp; strap.</p>
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model BB</b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_

<u>Quantity</u>	<u>Size</u>	<u>GPM</u>	<u>Tag</u>



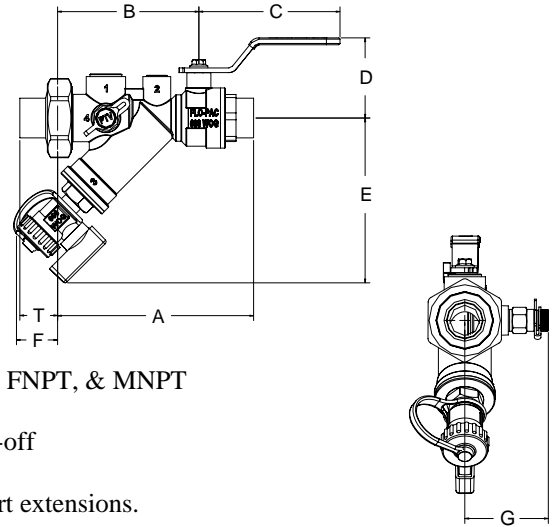
\*Pipe and Fittings By Others

<p><b>Model MB</b> Venturi style manual balancing valve with 100% positive shut-off full port chrome plated ball, permanently installed venturi section, Teflon seats, double o-ring shaft seals, Pressure/Temperature test ports, adjustable memory stop with position indicator, Union end with o-ring seal.</p>	<p><b>Model SB</b> Full port ball valve with chrome plated ball, 100% positive shut-off, Teflon seats, double o-ring shaft seals, union end with o-ring seal, Pressure/Temperature test port, and hose end drain valve with cap &amp; strap.</p>		
<p><b>Model URP</b> Full port union supplied with a "PTV" combination manual air vent &amp; Pressure/Temperature test port and Union end with o-ring seal.</p>	<p><b>Model BB</b> Union end ball valve with position indicating memory stop for system balancing where flow measurement is not required such as in the bypass of a three way control valve.</p>		
<p>Project Name: _____ Date: _____</p>			
<p>Engineer: _____ Contractor: _____</p>			
<p><u>Quantity</u></p>	<p><u>Size</u></p>	<p><u>GPM</u></p>	<p><u>Tag</u></p>





**Model SV is a combination ball valve, wye strainer, and union. The ball valve has a chrome plated ball, Teflon seats, and double o-ring shaft seals. The strainer section includes a 20 mesh stainless steel strainer screen. Standard features include Pressure/Temperature port, hose end drain valve, and plugged bypass port. Union end has o-ring seal. Available with many combinations of end connection types and sizes.**



### SPECIFICATIONS

Pressure Ratings: 600 PSI (4140 kPa)  
 Temperature Ratings: 250F (120C)  
 Body Material: Forged Brass  
 End Connections: Brass - Fixed End: SWT, FNPT; Union End: SWT, FNPT, & MNPT  
 Seals: EPDM  
 Ball: Chrome Plated Brass, full port, 100% positive shut-off  
 Handle: Full size Zinc Plated lever with Vinyl Grip  
 Available Options: "PTV" combination PT & air vent, & Handle & port extensions.

### NOMINAL DIMENSIONS & WEIGHTS

Size		A		B	C	D	E	F	G	*T SWT	Bypass Port	Wgt		
in	mm	FNPT	SWT									lbs	kg	
1/2"	15	in	4.16	4.25	3.00	3.66	1.99	3.40	0.56	1.83	0.83	1/2"	1.91	0.87
		mm	105.56	108.03	76.20	93.01	50.50	86.48	14.14	46.45	21.00			
3/4" R	20 R	in	4.30	4.37	3.00	3.66	1.99	3.40	0.56	1.83	0.99	1/2"	1.91	0.87
		mm	109.25	111.05	76.20	93.01	50.50	86.48	14.14	46.45	25.02			
3/4"	20	in	4.97	5.09	3.67	3.66	2.08	4.25	1.04	2.06	0.99	1/2"	2.62	1.19
		mm	126.16	129.21	93.14	93.01	52.74	107.85	26.30	52.34	25.02			
1"	25	in	5.11	5.25	3.67	3.66	2.08	4.25	1.04	2.06	1.00	1/2"	2.62	1.19
		mm	129.87	133.27	93.14	93.01	52.74	107.85	26.30	52.34	25.40			
1-1/4"	32	in	6.63	6.80	4.94	5.03	2.44	5.63	1.51	2.43	1.43	3/4"	5.90	2.68
		mm	168.30	172.72	125.43	127.76	61.90	142.98	58.24	61.74	36.32			
1-1/2"	40	in	6.63	6.93	4.94	5.03	2.44	5.63	1.51	2.43	1.17	3/4"	5.90	2.68
		mm	168.30	176.02	125.43	127.76	61.90	142.98	58.24	61.74	29.77			
2"	50	in	9.14	9.81	7.03	5.65	3.09	6.50	1.37	2.74	1.50	1-1/4"	11.53	5.24
		mm	232.13	249.22	178.59	143.63	78.56	165.05	34.86	69.54	38.10			

\* Please reference the tailpiece data sheet (Form # FP-TP) for other sizes and connections.

**Dimensions not for construction purposes unless certified by factory.**

### STANDARD COMPONENTS



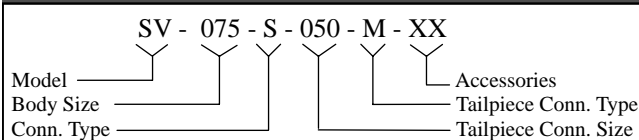
Pressure/Temperature test port with brass body, dual durometer EPDM core, brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 500 PSI (3450 kPa) and 275°F (135°C).



Drain valve with forged brass body, chrome plated ball, Teflon seats, double EPDM O-ring stem seals, aluminum handle, 3/4" hose connection with cap and plastic retainer strap. Rated to 600 PSI (4140 kPa) WOG and 250°F (120°C).

Please reference Flo-Pac data sheet (Form # FP-ACC) for optional accessories.

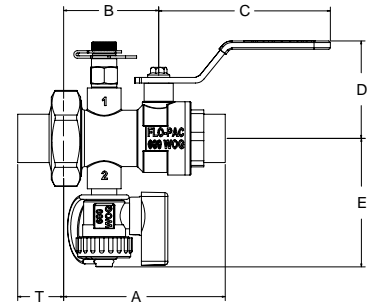
### ORDER DESIGNATIONS



Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

Flo-Pac, LLC.  
 10545 Guilford Road, Unit 103  
 Jessup, Maryland 20794  
 www.flo-pacllc.com

Model SB is a union end ball valve with full port chrome plated ball, Teflon seats, double o-ring shaft seals, and union end with o-ring seal. Standard features include Pressure/Temperature test port and hose end drain valve. Available with multiple combinations of end connection types and sizes.



## SPECIFICATIONS

Pressure Ratings: 600 PSI (4140 kPa)  
 Temperature Ratings: 250F (120C)  
 Body Material: Forged Brass  
 End Connections: Brass - Fixed End: SWT, FNPT; Union End: SWT, FNPT, & MNPT  
 Seals: EPDM  
 Ball: Chrome Plated Brass, full port, 100% positive shut-off  
 Handle: Full size Zinc Plated lever with Vinyl Grip  
 Available Options: "PTV" combination PT & air vent, hose end drain valve, handle & port extensions.

## NOMINAL DIMENSIONS & WEIGHTS

Size		A			B	C	D	E	*T	Wgt	
in	mm	FNPT	SWT	SWT						lbs	kg
1/2"	15	in	3.19	3.29	2.03	3.66	1.99	2.51	0.827	1.45	0.66
		mm	81	83.49	51.64	93.01	50.5	63.70	21		
3/4"R	20 R	in	3.34	3.41	2.03	3.66	1.99	2.51	0.985	1.45	0.66
		mm	84.7	86.51	51.64	93.02	50.5	63.70	25.02		
3/4"	20	in	3.33	3.45	2.03	3.66	2.08	2.74	0.98	1.94	0.88
		mm	84.56	87.61	51.64	93.01	52.83	69.50	24.89		
1"	25	in	3.64	3.78	2.12	5.03	2.22	2.74	1	3.33	1.06
		mm	92.51	95.91	53.85	127.76	56.31	69.50	25.4		
1-1/4"	32	in	4.02	4.19	2.33	5.03	2.44	3.12	1.43	4.84	2.2
		mm	102.06	106.48	59.18	127.76	61.9	79.25	36.2		
1-1/2"	40	in	4.44	4.74	2.52	5.65	2.83	3.12	1.17	6.29	2.86
		mm	112.78	120.5	64.01	143.59	71.81	79.25	29.77		
2"	50	in	4.76	5.43	2.65	5.65	3.09	3.43	1.5	10.08	4.58
		mm	120.93	138.02	67.39	143.59	78.56	87.02	38.1		

\* Please reference the tailpiece data sheet (Form # FP-TP) for other sizes and connections.

*Dimensions not for construction purposes unless certified by factory.*

## STANDARD COMPONENTS



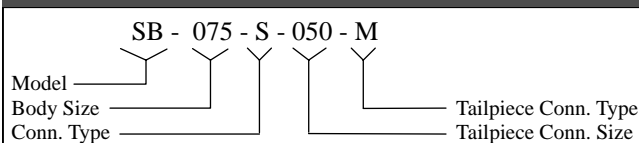
Pressure/Temperature test port with brass body, dual durometer EPDM core, brass cap with o-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 500 PSI (3450 kPa) and 275°F (135°C).



Drain valve with forged brass body, chrome plated ball, Teflon seats, double EPDM O-ring stem seals, aluminum handle, 3/4" hose connection with cap and plastic retainer strap. Rated to 600 PSI (4140 kPa) WOG and 250°F (120°C).

Please reference Flo-Pac data sheet (Form # FP-ACC ) for optional accessories.

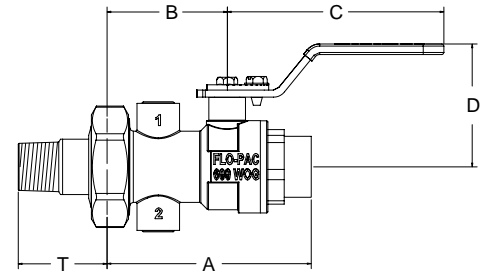
## ORDER DESIGNATIONS



Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

Flo-Pac, LLC.  
 10545 Guilford Road, Unit 103  
 Jessup, Maryland 20794  
 www.flo-pacllc.com

Model BB is a union end ball valve with position indicating memory stop for System balancing where flow measurement is not required such as in the bypass of a three way control valve. Standard features include a full port plated ball, Teflon seats, double o-ring shaft seals, union end with o-ring seal and two plugged accessory ports. Available with multiple combinations of end connection types and sizes.



## SPECIFICATIONS

Pressure Ratings:	600 PSI (4140 kPa)
Temperature Ratings:	250F (120C)
Body Material:	Forged Brass
End Connections:	Brass - Fixed End: SWT, FNPT; Union End: SWT, FNPT, & MNPT
Seals:	EPDM
Ball:	Chrome Plated Brass, full port, 100% positive shut-off
Handle:	Full size Zinc Plated lever with Vinyl Grip
Memory Stop:	Zinc Plated Steel with position indicator
Available Options:	“PTV” combination PT & air vent, hose end drain valve, handle & port extensions.

## NOMINAL DIMENSIONS & WEIGHTS

Size		A		B	C	D	*T MPT	Wgt	
in	mm	FNPT	SWT					lbs	kg
1/2"	15	in	3.19	3.29	2.03	3.66	1.99	1.45	0.66
		mm	81.00	83.49	51.64	93.01	50.50		
3/4"R	20 R	in	3.19	3.55	2.30	3.66	1.99	1.45	0.66
		mm	81.00	90.25	58.42	93.02	50.50		
3/4"	20	in	3.86	3.98	2.56	3.66	2.08	1.94	0.88
		mm	98.07	101.12	65.05	93.01	52.83		
1"	25	in	4.30	4.43	2.78	5.03	2.22	3.33	1.06
		mm	109.22	112.62	70.56	127.76	56.31		
1-1/4"	32	in	5.39	5.56	3.70	5.03	2.44	4.84	2.20
		mm	136.83	141.25	93.95	127.76	61.90		
1-1/2"	40	in	6.08	6.36	4.14	5.65	2.83	6.29	2.86
		mm	154.40	161.62	105.13	143.59	71.81		
2"	50	in	7.03	7.71	4.93	5.65	3.09	10.08	4.58
		mm	178.66	195.76	125.12	143.59	78.56		

\* Please reference the tailpiece data sheet (Form # FP-TP) for other sizes and connections.  
**Dimensions not for construction purposes unless certified by factory.**

## STANDARD COMPONENTS



Memory stop with position indicator, zinc coated steel.

Please reference Flo-Pac data sheet (Form # FP-ACC) for optional accessories.

## ORDER DESIGNATIONS

BB - 075 - S - 050 - M	
Model	Body Size
Conn. Type	Tailpiece Conn. Type
	Tailpiece Conn. Size

Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

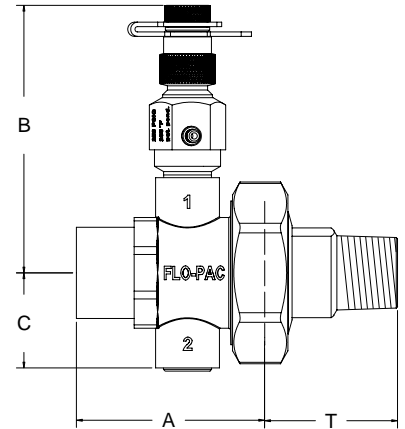
Flo-Pac, LLC.  
10545 Guilford Road, Unit 103  
Jessup, Maryland 20794  
www.flo-pacllc.com



Model URP is a full port union supplied with a "PTV" combination manual air vent & Pressure/Temperature test port. Available with multiple combinations of end connection types and sizes.

## SPECIFICATIONS

Pressure Ratings:	600 PSI (4140 kPa)
Temperature Ratings:	250F (120C)
Body Material:	Forged Brass
End Connections:	Brass - Fixed End: SWT, FNPT Union End: SWT, FNPT, & MNPT
Seals:	EPDM
Available Options:	Hose end drain valve, port extensions.



## NOMINAL DIMENSIONS & WEIGHTS

Size		A				B	C	*T	Wgt	
in	mm	FNPT	MNPT	SWT			MPT	lbs	kg	
1/2"	15	in	1.99	2.25	1.88	2.77	0.84	1.50	0.79	0.36
		mm	50.47	57.23	47.68	70.25	21.44	38.10		
3/4"	20	in	2.04	2.19	2.12	3.02	1.08	1.56	1.08	0.49
		mm	51.82	55.65	53.90	76.65	27.31	39.70		
1"	25	in	2.15	2.38	2.28	3.02	1.08	1.80	1.10	0.50
		mm	54.56	60.40	57.85	76.65	27.31	45.72		
1-1/4"	32	in	2.39	2.82	2.56	3.39	1.46	1.80	2.22	1.01
		mm	60.63	71.53	65.05	86.18	36.98	45.72		
1-1/2"	40	in	2.39	2.84	2.69	3.39	1.46	1.80	2.33	1.06
		mm	60.63	72.16	68.35	86.18	36.98	45.72		
2"	50	in	2.49	2.96	3.03	3.70	1.76	1.98	3.21	1.46
		mm	63.30	75.26	76.96	94.08	44.75	50.17		

\* Please reference the tailpiece data sheet (Form # FP-TP) for other sizes and connections.  
**Dimensions not for construction purposes unless certified by factory.**

## STANDARD COMPONENTS



Combination manual air vent and pressure/temperature test port with brass body, dual durometer EPDM core, blowout-proof stem, side discharge vent with 1/8" (4mm) hose barb, threaded brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 250 PSI (1725 kPa) and 250°F (120°

Please reference Flo-Pac data sheet (Form # FP-ACC) for optional accessories.

## ORDER DESIGNATIONS

URP - 075 - S - 050 - M - XX		
Model	Body Size	Accessories
Conn. Type		Tailpiece Conn. Type
		Tailpiece Conn. Size

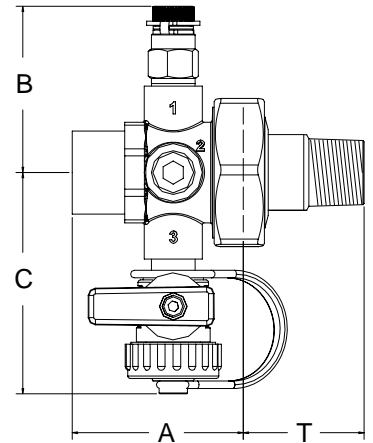
Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

Flo-Pac, LLC.  
10545 Guilford Road, Unit 103  
Jessup, Maryland 20794  
www.flo-pacllc.com

*Model US is a full port union supplied with a Pressure/Temperature test port and hose end drain valve. Available with multiple combinations of end connection types and sizes.*

## SPECIFICATIONS

Pressure Ratings:	600 PSI (4140 kPa)
Temperature Ratings:	250F (120C)
Body Material:	Forged Brass
End Connections:	Brass - Fixed End: SWT, FNPT; Union End: SWT, FNPT, & MNPT
Seals:	EPDM
Available Options:	“PTV” combination PT & air vent, port extensions.



## NOMINAL DIMENSIONS & WEIGHTS

Size		A			B	C	*T MPT	Wgt		
in	mm	FNPT	MNPT	SWT				lbs	kg	
1/2"	15	in	1.99	2.25	1.88	1.83	2.52	1.50	1.08	0.49
		mm	50.47	57.23	47.68	46.45	63.96	38.10		
3/4"	20	in	2.04	2.19	2.12	2.06	2.74	1.56	1.39	0.63
		mm	51.82	55.65	53.90	52.32	69.57	39.70		
1"	25	in	2.15	2.38	2.28	2.06	2.74	1.80	1.52	0.69
		mm	54.56	60.40	57.85	52.32	69.57	45.72		
1-1/4"	32	in	2.39	2.82	2.56	2.44	3.13	1.80	2.60	1.18
		mm	60.63	71.53	65.05	62.00	79.50	45.72		
1-1/2"	40	in	2.39	2.84	2.69	2.44	3.13	1.80	2.93	1.33
		mm	60.63	72.16	68.35	62.00	79.50	45.72		
2"	50	in	2.49	2.96	3.03	2.75	3.43	1.98	4.00	1.82
		mm	63.30	75.26	76.96	69.77	87.02	50.17		

\* Please reference the tailpiece data sheet (Form # FP-TP) for other sizes and connections.  
**Dimensions not for construction purposes unless certified by factory.**

## STANDARD COMPONENTS



Pressure/Temperature test port with brass body, dual durometer EPDM core, brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 500 PSI (3450 kPa) and 275°F (135°C).



Drain valve with forged brass body, chrome plated ball, Teflon seats, double EPDM O-ring stem seals, aluminum handle, 3/4" hose connection with cap and plastic retainer strap. Rated to 600 PSI (4140 kPa) WOG and 250°F (120°C).

Please reference Flo-Pac data sheet (Form # FP-ACC) for optional accessories.

## ORDER DESIGNATIONS

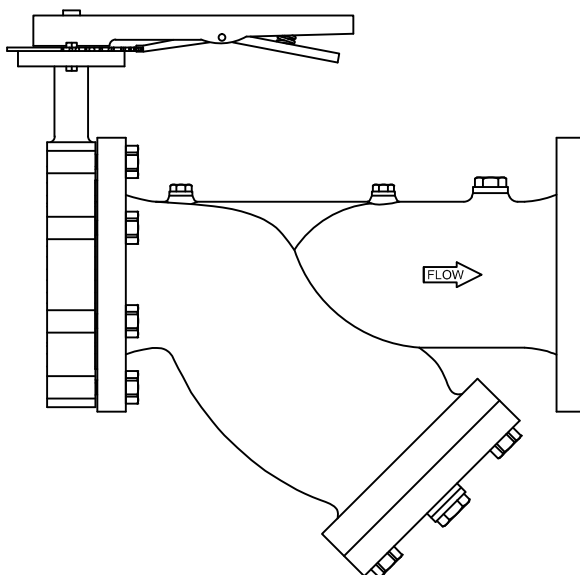
Model	US	-	075	-	S	-	050	-	M	-	XX	Accessories
Body Size												Tailpiece Conn. Type
Conn. Type												Tailpiece Conn. Size

Please reference the Ordering Guide (Form # FP-OG) for a complete list of designations

Flo-Pac, LLC.  
10545 Guilford Road, Unit 103  
Jessup, Maryland 20794  
www.flo-pacllc.com

# Flo-Pac

## CBYS Series Specifications Combination Butterfly Valve & Wye Strainer



**PRODUCT DESCRIPTION:** The CBYS is a combination butterfly valve and flange x flange end wye strainer. The cast iron wye strainer has standard ANSI Class 150 pound flange ends that connect to a lug type butterfly valve for throttling/isolation. The cast iron butterfly valve has a combination infinite/10 position memory stop plate, a one piece disc/shaft, a triple shaft bearing, an aluminum-bronze disc for sizes 2½" - 8", a nickel plated disc for the 10" and 12" sizes, and an EPDM liner. The strainer comes with a stainless steel filter element, a two ¼" plugs, a ½" plug, a ¾" blow-off connection, and a flanged blow-off cover with an EPDM o-ring. Accessories are available for an additional charge.

STANDARD MATERIAL SPECIFICATIONS			
WYE STRAINER		BUTTERFLY VALVE	
Body	Gray Iron Casting ASTM A126 Class B	Body	Nodular Cast Iron ASTM A536 60-4-18
Cap	Gray Iron Casting ASTM A126 Class B	Seat	EPDM Rubber
Filter	Stainless Steel A276	Disc (2½" - 8")	Aluminum-Bronze Sand Casting, ASTM B148 C95800
O-Rings	EPDM Rubber	Disc (10 & 12")	Nickel Plated Aluminum-Bronze Sand Casting, ASTM B148 C95800
¼" Plug	Ductile Iron Casting ASTM A536 60-40-18	Shaft	Stainless Steel AISI 410
½" Plug	Ductile Iron Casting ASTM A536 60-40-18	O-Ring	EPDM Rubber
¾" Plug	Ductile Iron Casting ASTM A536 60-40-18	Bearing	Copper ASTM B45
Bolt	Carbon Steel ASTM A307	Bearing Bush	PTFE
Nut	Carbon Steel ASTM A307	Hand Lever	Nodular Cast Iron ASTM A536 60-4-18

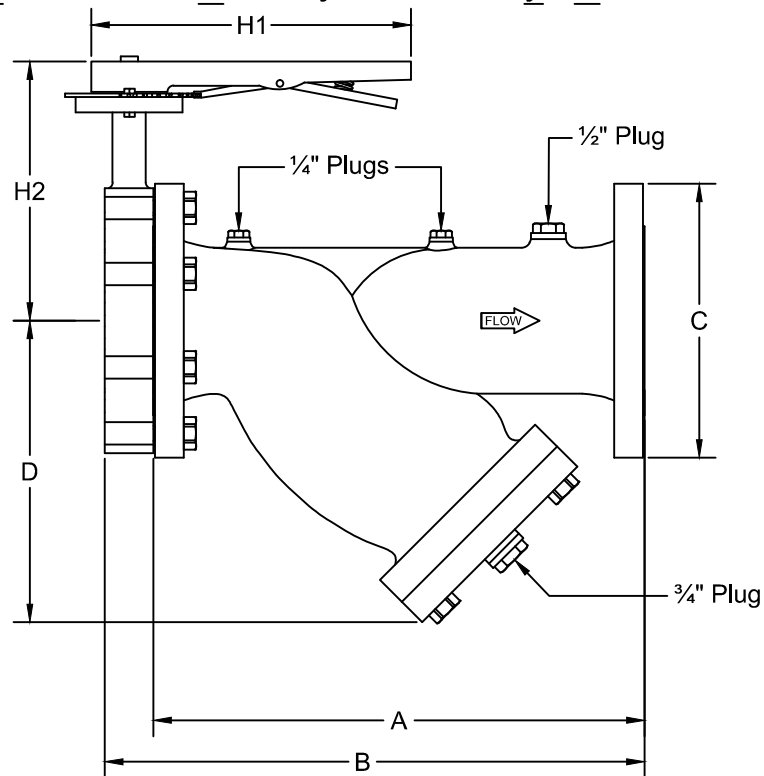
Specification information is provided to assist and is given without obligation or warranty. The Company reserves the right to make changes in design, materials, and/or specifications without notice or liability.

### PRODUCT SPECIFICATIONS:

- Butterfly valve is rated at 150 PSIG and is suitable for dead-end service
- Stainless steel screen aids in filtering dirt, rust, and debris in the piping system and may be removed for cleaning

# Flo-Pac

## CBYS Series Dimensions Combination Butterfly Valve & Wye Strainer



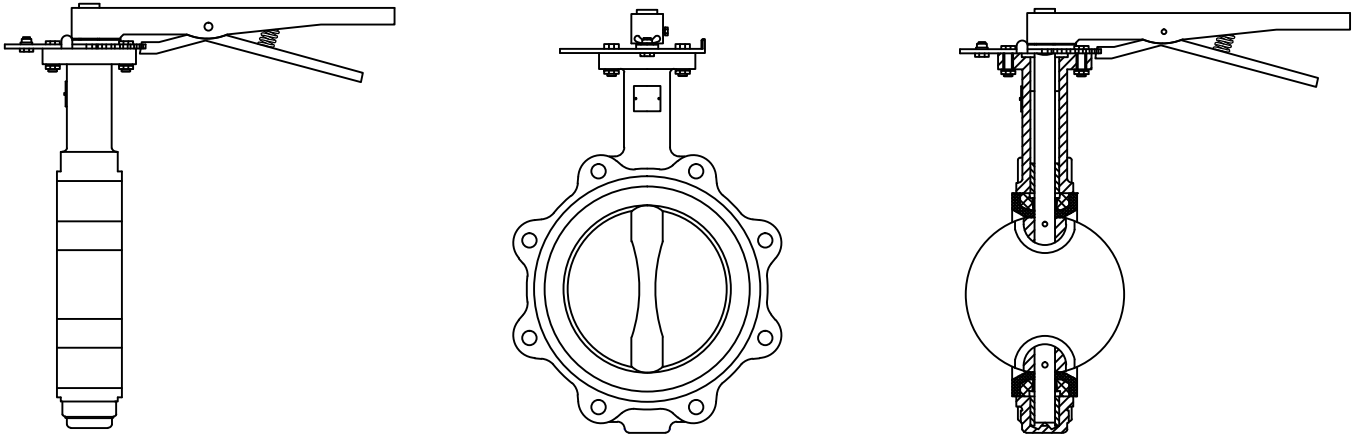
SIZE	MODEL	A	B	C	D	H1	H2	Weight
2½"	CBYS250	11.0	12.8	7.0	7.0	10.5	8.1	33
3"	CBYS300	12.0	13.8	8.0	7.5	10.5	8.2	43
4"	CBYS400	14.0	16.0	9.5	9.0	10.5	9.0	69
6"	CBYS600	18.5	20.7	13.0	11.0	10.5	10.2	163
8"	CBYS800	21.7	24.1	15.0	13.5	*	*	203

\* Denotes a gear operated valve.

Note: All dimensions and materials are subject to minor variations. Consult with factory for confirmation of dimensions and material specifications at the time of order.

# Flo-Pac

## SPECIFICATIONS Butterfly Valve BFV Series



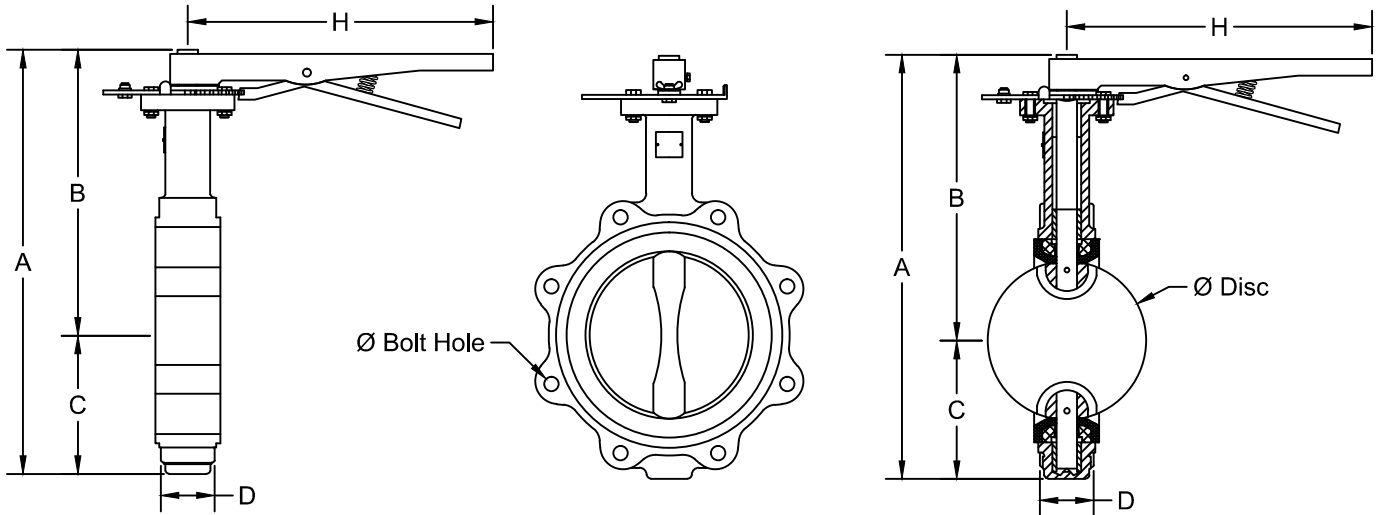
**PRODUCT DESCRIPTION:** The Flo-Pac Model BFV is a lug type butterfly valve used for throttling. The cast iron butterfly valve is designed to be installed between standard ANSI Class 150 pound flanges. The BFV has a combination infinite/10 position memory stop plate, a one piece disc/shaft, a triple shaft bearing, an aluminum-bronze disc for sizes 2½" - 8", a nickel plated disc for the 10" and 12" sizes, and an EPDM liner. Cap set screws are available upon request for an additional charge.

STANDARD MATERIAL SPECIFICATIONS	
Body	Nodular Cast Iron ASTM A536 60-4-18
Seat	EPDM Rubber
Disc (2½" - 8")	Aluminum-Bronze Sand Casting, ASTM B148 C95800
Disc (10" & 12")	Nickel Plated Aluminum-Bronze Sand Casting, ASTM B148 C95800
Shaft	Stainless Steel AISI 410
O-Ring	EPDM Rubber
Bearing	Copper ASTM B45
Bearing Bush	PTFE
Hand Lever	Nodular Cast Iron ASTM A536 60-4-18
PRODUCT SPECIFICATIONS	
Ratings	Seat: -22°F to 212°F Pressure: Full - 232 PSI    Dead End - 150 PSI

The information presented on this submittal is correct at the time of publication. Flo-Pac, L.L.C. reserves the right to change design, and/or material specifications without notice.

# Flo-Pac

## DIMENSIONS Butterfly Valve BFV Series



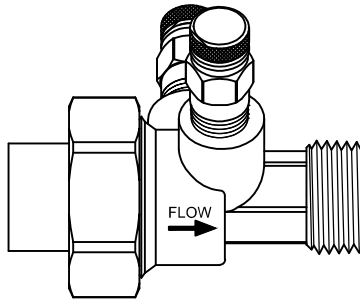
Model	Size		A	B	C	D	H	Ø Disc	Ø Bolt Hole	# of Bolts	Weight	
	Nominal	Metric									Lbs	Kgs
BFV250	2½"	DN65	10.4	6.9	3.5	1.8	10.5	2.5	5/8"	4	11	5.0
BFV300	3"	DN80	10.9	7.1	3.8	1.8	10.5	3.1	5/8"	4	12	5.4
BFV400	4"	DN100	12.4	7.9	4.5	2.0	10.5	4.0	5/8"	8	17	7.7
BFV500	5"	DN125	13.4	8.4	5.0	2.1	10.5	4.8	3/4"	8	22	10.0
BFV600	6"	DN150	14.4	8.9	5.5	2.2	10.5	6.1	3/4"	8	30	13.6
BFV800	8"	DN200	17.1	10.2	6.9	2.4	*	8.0	3/4"	8	54	24.5
BFV1000	10"	DN250	19.5	11.5	8.0	2.6	*	9.8	7/8"	12	84	38.1
BFV1200	12"	DN300	22.8	13.3	9.5	3.0	*	12.2	7/8"	12	116	52.6

\* Denotes a gear operated valve.

Note: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications at the time of order.

# Flo-Pac

## VU Series Specifications Venturi w/ Integral Union x MPT



**Product Description:** The VU flow balancing brass venturi provides highly accurate flow measurement capabilities rated at 600 WOG @ 250° F. The venturi includes an integral union of the inlet side with standard male pipe thread on the run-out side. Union side incorporates an o-ring for maximum sealing protection. The venturi comes standard with two pressure/temperature ports for instrument readings. The efficient low loss venturi design provides effective flow balancing with minimal system pressure loss. Union connection options include NPTM, NPTF, and SWT, and a variety of reductions.

Model	Size	Recommended Flow Ranges (GPM)		
		Minimum	@ 100"	@ 200"
VU050L	½	0.3	1.1	1.5
VU050H	½	0.9	3.0	4.2
VU075L	¾	0.9	3.0	4.2
VU075H	¾	1.8	6.0	8.5
VU100	1	2.8	9.5	14.0
VU125	1¼	5.4	17.0	24.0
VU150	1½	9.0	26.0	36.0
VU200	2	16.0	46.0	66.0

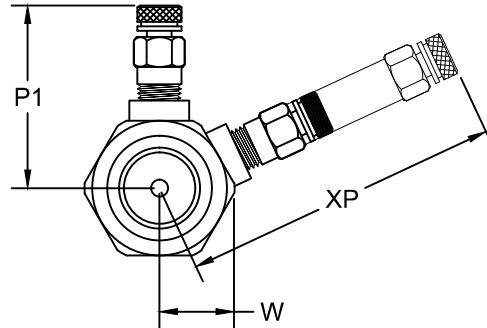
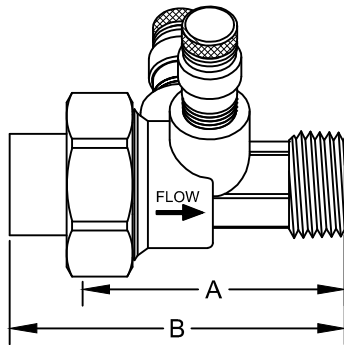
STANDARD MATERIAL SPECIFICATIONS	
Venturi	Cast Copper Alloy B763-08a
O-Ring	EPDM
Tail Piece	Brass ASTM B124-09, B228-06, or B763-08a
PT Port	EDPM Dual Durometer Core
<p>Specification information is provided to assist and is given without obligation or warranty. The Company reserves the right to make changes in design, materials, and/or specifications without notice or liability.</p>	

### PRODUCT SPECIFICATIONS:

- Devices shall have a 15° regain chamber for optimal pressure regain and minimal permanent pressure drop
- Venturi tube shall be independent of the throttling valve
- Venturi tube shall include proper pipe diameters for optimal accuracy
- The Model VU shall have an accuracy rating of:
  - ±1% between 10" W.C. and 70" W.C.
  - ±3% between 5" W.C. and 150" W.C.
  - ±5% less than 5" W.C. and over 150" W.C.

# Flo-Pac

## VU Series Dimensions Venturi w/ Integral Union x MPT



Model	Size	A	P1	W	Option
					XP
CBV050L	1/2"	2.7	2.1	0.8	3.6
CBV050H	1/2"	2.7	2.1	0.8	3.6
CBV075L	3/4"	2.7	2.1	1.0	3.6
CBV075H	3/4"	2.7	2.1	1.0	3.6
CBV100	1"	2.6	2.3	1.1	3.8
CBV125	1 1/4"	2.8	2.4	1.4	3.9
CBV150	1 1/2"	3.7	2.8	1.7	4.3
CBV200	2"	3.8	2.9	2.0	4.4

NOTE: All dimensions, weights, and materials are subject to minor variations. Consult with factory for confirmation of dimensions, weights, and material specifications.

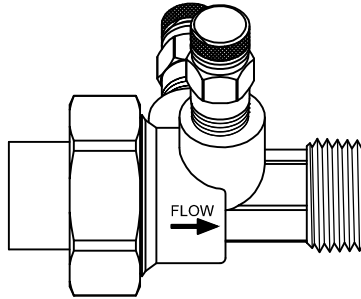
Tail Piece	Size	B	Weight
1/2"	- M	L & H	4.2
	- F		3.3
	- S		3.3
1/2"	- M	3/4"	4.2
	- F		3.8
	- S		3.4
3/4"	- M	L & H	4.4
	- F		3.5
	- S		3.5
1/2"	- M	1"	4.5
	- M		4.6
	- S		3.4
1"	- M	1"	4.6
	- F		3.5
	- S		3.6
1/2"	- M	1 1/4"	4.6
	- M		4.8
	- M		4.8
1 1/4"	- M	1 1/4"	4.8
	- F		3.8
	- S		3.9
3/4"	- M	1 1/2"	5.5
	- M		6.2
	- M		6.2
1 1/2"	- M	1 1/2"	6.2
	- F		4.9
	- S		4.9
1"	- M	2"	5.8
	- M		6.8
	- M		6.8
2"	- M	2"	6.8
	- F		5.0
	- S		5.2

Note: Sweat size listed is nominal and will differ from the actual, measurable size.

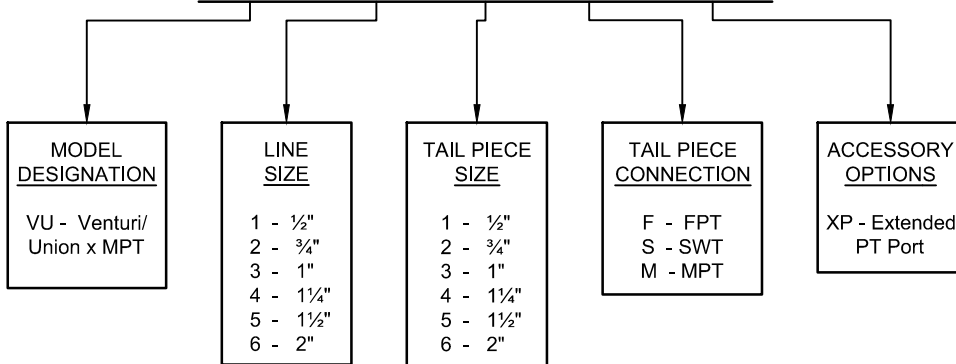


# Flo-Pac

## VU Series Submittal Venturi w/ Integral Union x MPT



VU - X - X - X - XX

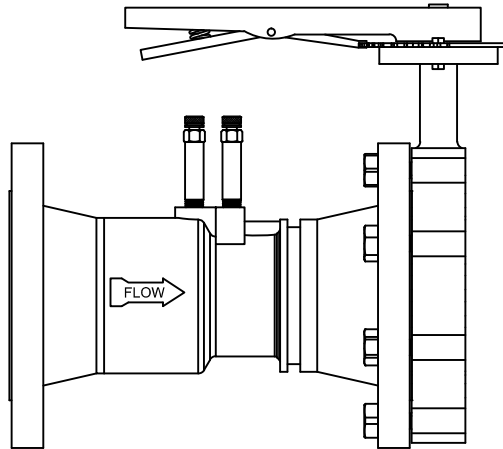


JOB NAME:		CUSTOMER:	
ENGINEER:		REF/PO#:	DATE:
CONTRACTOR:		SUBMITTED BY:	DATE:
PART # ( See table above)	TAGGING/JOB INFORMATION	GPM	QUANTITY

# Flo-Pac

## SPECIFICATIONS

### Combination Butterfly/Venturi w/ Flange MBF & VF Series



**PRODUCT DESCRIPTION:** The Flo-Pac MBF is a combination butterfly valve and flanged style venturi. The carbon steel venturi connects to standard ANSI Class 150 pound flanges, and is combined with a lug type butterfly valve for throttling. The cast iron butterfly valve has a combination infinite/10 position memory stop plate, a one piece disc/shaft, a triple shaft bearing, an aluminum-bronze disc for sizes 2½" - 8", a nickel plated disc for the 10" and 12" sizes, and an EPDM standard liner. The CBVF comes standard with two pressure/temperature ports.

Nominal Line Size	Model	Lower Flow Range (GPM)	Upper Flow Range (GPM)	Flow Factor (FF)	Weight
2½"	Low	30	100	147	35
	High	40	220	319	35
3"	Low	30	160	227	43
	High	80	400	578	41
4"	Low	80	430	611	60
	High	130	720	1029	56
5"		160	880	1267	76
6"		200	1100	1551	101
8"		520	2800	2824	172
10"		580	2000	4164	281
12"		1250	6700	9670	422

STANDARD MATERIAL SPECIFICATIONS	
Venturi	Steel Casting, Carbon ASTM A216 Grade WCB
Flange	Forged Carbon Steel ASTM A105
Butterfly Valve	Nodular Cast Iron ASTM A536 60-4-18
Seat	EPDM Rubber
Disc (2½" - 8")	Aluminum-Bronze Sand Casting, ASTM B148 C95800
Disc (10 & 12")	Nickel Plated Aluminum-Bronze Sand Casting, ASTM B148 C95800
Shaft	Stainless Steel AISI 410
O-Ring	EPDM Rubber
Bearing	Copper ASTM B45
Bearing Bush	PTFE
Hand Lever	Nodular Cast Iron ASTM A536 60-4-18
CONNECTIONS:	Inlet - Raised-Face Flange Outlet - Lug Butterfly Valve
CALCULATIONS:	D.P. = $(\text{GPM} \cdot 17.3 / \text{FF})^2$ GPM = $\sqrt{\text{FF} \cdot 17.3 \cdot (\text{D.P.})}$

#### PRODUCT SPECIFICATIONS:

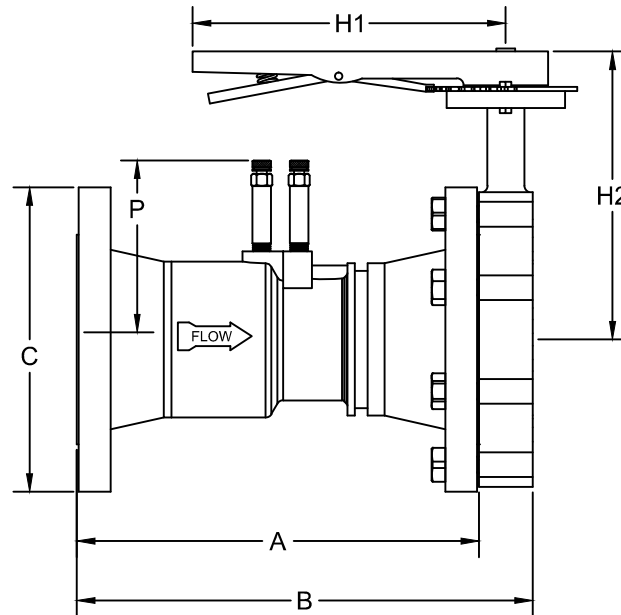
- Butterfly valve is rated at 150 PSIG and is suitable for dead-end service
- Maximum pressure loss 6% of differential pressure
- The carbon steel Venturi accuracy rating: ±1% Between 10" w.c. and 70" w.c. based on Coefficient of Discharge  
±3% Between 5" w.c. and 150" w.c.

The information presented on this submittal is correct at the time of publication. Flo-Pac, L.L.C. reserves the right to change design, and/or material specifications without notice.

# Flo-Pac

## DIMENSIONS

### Combination Butterfly/Venturi w/ Flange MBF & VF Series



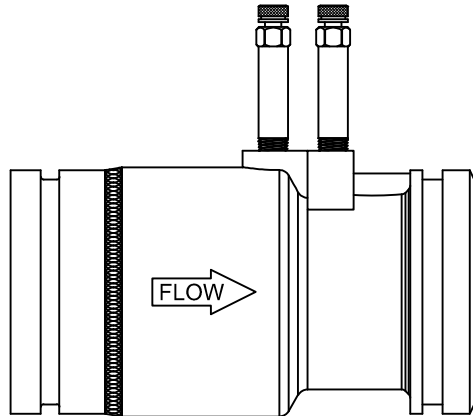
SIZE	A	B	C	H1	H2	P
2½" L & H	10.71	12.51	7.0	10.5	8.06	5.32
3" L & H	11.00	12.80	7.5	10.5	8.15	5.52
4" L & H	12.20	14.20	9.0	10.5	9.00	6.00
5"	13.25	15.35	10.0	10.5	9.35	6.57
6"	14.25	16.45	11.0	10.5	10.20	7.20
8"	16.65	19.05	13.5	*	*	8.36
10"	20.30	22.90	16.0	*	*	8.52
12"	26.00	29.00	19.0	*	*	12.37

*Note: All dimensions and materials are subject to minor variations. Consult with factory for confirmation of dimensions and material specifications at the time of order. Sweat size listed is nominal and will differ from the actual, measurable size.*

\* Denotes a gear operated valve.

# Flo-Pac

## SPECIFICATIONS Steel Grooved End Venturi SGV Series



**PRODUCT DESCRIPTION:** The Flo-Pac SGV is a steel Venturi with grooved ends that is designed for highly accurate flow measurement with low pressure loss. High and low flow ranges are available in the 2½", 3", and 4" sizes. The SGV comes standard with two pressure/temperature ports.

Nominal Line Size	Model #	Weight (lbs)	Lower Flow Range (GPM)	Upper Flow Range (GPM)	Flow Factor (FF)	Connection
2½"	SGV250L	5	30	100	47	Grooved
	SGV250H	5	40	220	319	
3"	SGV300L	9	30	160	227	Grooved
	SGV300H	7	80	400	578	
4"	SGV400L	13	80	430	611	Grooved
	SGV400H	9	130	720	1029	
5"	SGV500	17	160	880	1267	Grooved
6"	SGV600	23	200	1100	1551	Grooved
8"	SGV800	40	520	2000	2824	Grooved
10"	SGV1000	98	580	2950	4164	Grooved
12"	SGV1200	155	1250	6700	9670	Grooved
STANDARD MATERIAL Venturi - Steel Casting, Carbon ASTM A216 Grade WCB Grooved End Adapter - ASTM Schedule 40				CALCULATIONS: D.P. = $(\text{GPM} \cdot 17.3 / \text{FF})^2$ GPM = $\sqrt{\text{FF} / 17.3 \cdot (\text{D.P.})}$		

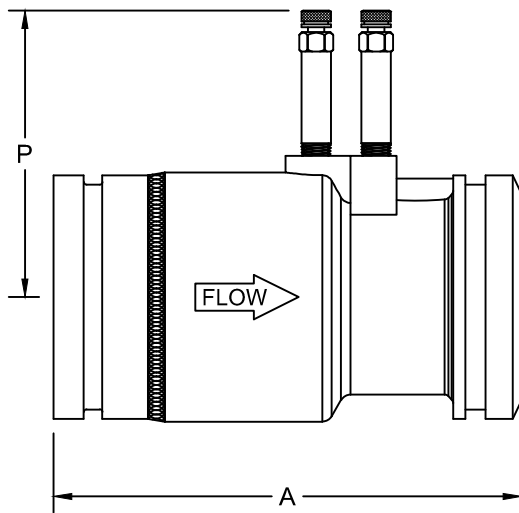
### PRODUCT SPECIFICATIONS:

- Maximum pressure loss 6% of differential pressure
- The carbon steel Venturi accuracy rating: ±1% Between 10" w.c. and 70" w.c. based on Coefficient of Discharge  
±3% Between 5" w.c. and 150" w.c.

The information presented on this submittal is correct at the time of publication. Flo-Pac, L.L.C. reserves the right to change design, and/or material specifications without notice.

# Flo-Pac

## DIMENSIONS Steel Grooved End Venturi SGV Series



SIZE	A	P
2½" L & H	7.2	7.0
3" L & H	7.5	7.5
4" L & H	8.2	9.0
5"	8.2	10.0
6"	9.2	11.0
8"	11.6	13.5
10"	16.4	16.0
12"	22.0	19.0

*Note: All dimensions and materials are subject to minor variations. Consult with factory for confirmation of dimensions and material specifications at the time of order.*

**Flo-Pac L.L.C.**  
**STEEL VALVES 2 1/2" - 12"**



Pressure Loss 6% of Differential Pressure

Flow Rates For Models

MBF, VF, VG, VW

Accuracy Statement: +/- 1% Between 10" W.C. and 70" W.C.

+/- 3% Between 5" W.C. and 150" W.C.

+/- 5% Less than 5" W.C. and Over 150" W.C.

**DIFFERENTIAL PRESSURE: INCHES W.C.**

GPM	2 1/2"		3"		4"		5"	6"	GPM	3" High	4"		5"	6"
	Low	High	Low	High	Low	High					Low	High		
30	12.5	2.6	5.2						430	166	148	52.3	34.5	23.0
40	22.2	4.7	9.3						440	173	155	54.7	36.1	24.1
50	34.6	7.4	14.5	2.2					450	181	162	57.2	37.8	25.2
60	49.9	10.6	20.9	3.2	2.9				460	190	170	59.8	39.5	26.3
70	67.9	14.4	28.5	4.4	3.9				470	198	177	62.4	41.2	27.5
80	88.6	18.8	37.2	5.7	5.1				480	206	185	65.1	43.0	28.7
90	112	23.8	47.0	7.3	6.5	2.3			490	215	192	67.9	44.8	29.9
100	139	29.4	58.1	9.0	8.0	2.8			500	224	200	70.7	46.6	31.1
110	168	35.6	70.3	10.8	9.7	3.4	2.3		510	233	209	73.5	48.5	32.4
120	199	42.4	83.6	12.9	11.5	4.1	2.7		520	242	217	76.4	50.4	33.6
130	234	49.7	98.2	15.1	13.5	4.8	3.2	2.1	540	261	234	82.4	54.4	36.3
140	271	57.6	114	17.6	15.7	5.5	3.7	2.4	560	281	251	88.6	58.5	39.0
150		66.2	131	20.2	18.0	6.4	4.2	2.8	580	301	270	95.1	62.7	41.9
160		75.3	149	22.9	20.5	7.2	4.8	3.2	600		289	101.8	67.1	44.8
170		85.0	168	25.9	23.2	8.2	5.4	3.6	620			109	72	47.8
180		95.3	188	29.0	26.0	9.2	6.0	4.0	640			116	76	51.0
190		106	210	32.3	28.9	10.2	6.7	4.5	660			123	81	54.2
200		118	232	35.8	32.1	11.3	7.5	5.0	680			131	86	57.5
210		130	256	39.5	35.4	12.5	8.2	5.5	700			139	91	61.0
220		142	281	43.4	38.8	13.7	9.0	6.0	720			147	97	64.5
230		156		47.4	42.4	15.0	9.9	6.6	740			155	102	68.1
240		169		51.6	46.2	16.3	10.7	7.2	760			163	108	71.9
250		184		56.0	50.1	17.7	11.7	7.8	780			172	113	75.7
260		199		60.6	54.2	19.1	12.6	8.4	800			181	119	79.6
270		214		65.3	58.4	20.6	13.6	9.1	820			190	125	83.7
280		231		70.2	62.9	22.2	14.6	9.8	840			199	132	87.8
290		247		75.3	67.4	23.8	15.7	10.5	860			209	138	92.0
300		265		80.6	72.2	25.4	16.8	11.2	880			219	144	96.3
310		283		86.1	77.0	27.2	17.9	12.0	900			229	151	101
320		301		91.7	82.1	28.9	19.1	12.7	950			255	168	112
330				97.6	87.3	30.8	20.3	13.5	1000			283	186	124
340				104	92.7	32.7	21.6	14.4	1050				206	137
350				110	98	34.6	22.8	15.2	1100				226	151
360				116	104	36.6	24.2	16.1	1150				247	165
370				123	110	38.7	25.5	17.0	1200				268	179
380				129	116	40.8	26.9	18.0	1250				291	194
390				136	122	43.0	28.4	18.9	1300					210
400				143	128	45.2	29.8	19.9	1350					227
410				151	135	47.5	31.3	20.9	1400					244
420				158	141	49.9	32.9	21.9	1500					280

**Flow Factors for calculating Delta Pressure**

2 1/2"		3"		4"		5"	6"	8"	10"	12"
Low	High	Low	High	Low	High					
147	319	227	578	611	1029	1267	1551	2824	4164	9670

**D.P. = (GPM\*17.3/FF)^2**

Revision: 2 October 1st, 2003

# Flo-Pac, L.L.C.

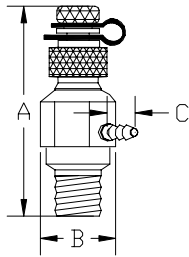
## DIFFERENTIAL PRESSURE: INCHES W.C.

GPM	8"	10"	12"	GPM	8"	10"	12"	GPM	12"
520	10.1	4.7		2500	234.6	107.9	20.0	5050	81.6
540	10.9	5.0		2550	244.0	112.2	20.8	5100	83.2
560	11.8	5.4		2600	253.7	116.7	21.6	5150	84.9
580	12.6	5.8		2650	263.5	121.2	22.5	5200	86.5
600	13.5	6.2		2700	273.6	125.8	23.3	5250	88.2
620	14.4	6.6		2750	283.8	130.5	24.2	5300	89.9
640	15.4	7.1		2800	294.2	135.3	25.1	5350	91.6
660	16.3	7.5		2850	304.8	140.2	26.0	5400	93.3
680	17.4	8.0		2900	315.6	145.2	26.9	5500	96.8
700	18.4	8.5		2950	326.6	150.2	27.9	5700	104.0
720	19.5	8.9		3000		155.4	28.8	5900	111.4
740	20.6	9.5		3050		160.6	29.8	6100	119.1
760	21.7	10.0		3100		165.9	30.8	6300	127.0
780	22.8	10.5		3150		171.3	31.8	6500	135.2
800	24.0	11.0		3200		176.8	32.8	6700	143.7
820	25.2	11.6		3250		182.3	33.8	6900	152.4
840	26.5	12.2		3300		188.0	34.9	7100	161.3
860	27.8	12.8		3350		193.7	35.9	7300	170.6
880	29.1	13.4		3400		199.5	37.0	7500	180.0
900	30.4	14.0		3450		205.5	38.1	7700	189.8
950	33.9	15.6	2.9	3500		211.4	39.2	7900	199.8
1000	37.5	17.3	3.2	3550		217.5	40.3	8100	210.0
1050	41.4	19.0	3.5	3600		223.7	41.5	8300	220.5
1100	45.4	20.9	3.9	3650		230.0	42.6	8500	231.2
1150	49.6	22.8	4.2	3700		236.3	43.8	8700	242.3
1200	54.0	24.9	4.6	3750		242.7	45.0	8900	253.5
1250	58.6	27.0	5.0	3800		249.3	46.2	9100	265.0
1300	63.4	29.2	5.4	3850		255.9	47.4	9300	276.8
1350	68.4	31.5	5.8	3900		262.5	48.7	9500	288.9
1400	73.6	33.8	6.3	3950		269.3	49.9	9700	301.1
1450	78.9	36.3	6.7	4000		276.2	51.2	9900	313.7
1500	84.4	38.8	7.2	4050		283.1	52.5	10100	326.5
1550	90.2	41.5	7.7	4100		290.2	53.8	10300	339.6
1600	96.1	44.2	8.2	4150		297.3	55.1	10500	352.9
1650	102.2	47.0	8.7	4200			56.5	10700	366.4
1700	108.5	49.9	9.2	4250			57.8	10900	380.3
1750	114.9	52.9	9.8	4300			59.2	11100	394.4
1800	121.6	55.9	10.4	4350			60.6	11300	408.7
1850	128.4	59.1	11.0	4400			62.0	11500	423.3
1900	135.5	62.3	11.6	4450			63.4	11700	438.1
1950	142.7	65.6	12.2	4500			64.8	11900	453.2
2000	150.1	69.0	12.8	4550			66.3	12100	468.6
2050	157.7	72.5	13.5	4600			67.7	12300	484.2
2100	165.5	76.1	14.1	4650			69.2		
2150	173.5	79.8	14.8	4700			70.7		
2200	181.6	83.5	15.5	4750			72.2		
2250	190.0	87.4	16.2	4800			73.7		
2300	198.5	91.3	16.9	4850			75.3		
2350	207.3	95.3	17.7	4900			76.8		
2400	216.2	99.4	18.4	4950			78.4		
2450	225.3	103.6	19.2	5000			80.0		

**Accuracy Statement:**

- +/- 1% Between 10" W.C. and 70" W.C.
- +/- 3% Between 5" W.C. and 150" W.C.
- +/- 5% Less than 5" W.C. and Over 150" W.C.

## PTV—PRESSURE / TEMPERATURE VENT

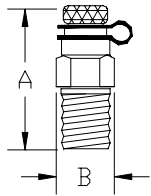


PATENT #6899317

Combination manual air vent and pressure/temperature test port with brass body, dual durometer EPDM core, blowout-proof stem, side discharge vent with 1/8" (4mm) hose barb, threaded brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 250 PSI (1725 kPa) and 250°F (120°C).

MODEL	NPT CONN	A		B		C		WRENCH SIZE	WEIGHT	
		in	mm	in	mm	in	mm		lbs	kg
PTV-025	1/4"	1.50	40	0.84	21	0.32	9	3/4"	0.154	0.07
PTV-050	1/2"	1.50	40	0.98	25	0.32	9	3/4"	0.225	0.10

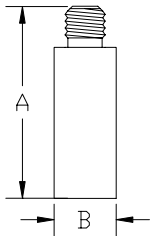
## PT—PRESSURE / TEMPERATURE PORT



Pressure/Temperature test port with brass body, dual durometer EPDM core, brass cap with O-ring seal and neoprene retainer strap. Accepts standard 1/8" (4mm) gauge adapter or thermometer stem. Rated to 500 PSI (3450 kPa) and 275°F (135°C).

MODEL	NPT CONN	A		B		WRENCH SIZE	WEIGHT	
		in	mm	in	mm		lbs	kg
PT-025	1/4"	1.29	33	0.62	16	9/16"	0.06	0.03
PT-050	1/2"	1.29	33	1.00	25	7/8"	0.18	0.08

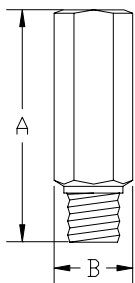
## PTE—PTV/PT EXTENDER



Extender for PTV and PT models, used on insulated piping systems or where extended length is desired. The PTE is installed above the PTV or PT core with an O-ring seal. The PTE can be installed in the field without removing the PTV or PT from the piping system. Brass body with EPDM O-ring seal. Rated to 500 PSI (3450 kPa) and 250°F (120°C).

MODEL	A		B		WEIGHT	
	in	mm	in	mm	lbs	kg
PTE	1.59	41	0.54	14	0.90	0.04

## AE—ACCESSORY EXTENSION

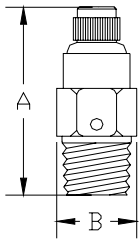


Accessory Extension installs below any accessory where extended length is required, such as insulated piping systems. Brass body, MNPTxFNPT. Rated to 500 PSI (3450 kPa) and 250°F (120°C).

MODEL	NPT CONN	A		B		C		WRENCH SIZE	WEIGHT	
		in	mm	in	mm	in	mm		lbs	kg
AE-025	1/4"	1.94	49	0.72	19	1.50	40	5/8"	0.11	0.05
AE-050	1/2"	2.19	55	1.16	29	1.50	40	1"	0.32	0.14



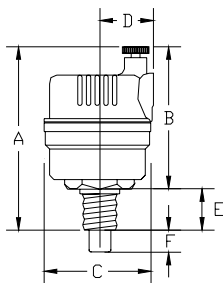
### MAV—MANUAL AIR VENT



Manual air vent with brass body, knurled operator with screwdriver slot, blowout-proof stem, and side discharge vent. Rated to 400 PSI (2760 kPa) and 250°F (120°C).

MODEL	NPT CONN	A		B		WRENCH SIZE	WEIGHT	
		in	mm	in	mm		lbs	kg
MAV-025	1/4"	1.75	44	0.625	16	9/16"	0.80	0.04

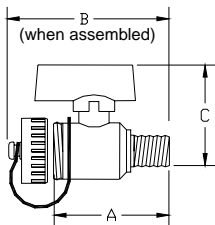
### AAV—AUTOMATIC AIR VENT



Automatic air vent with brass body, plastic float, brass seat, and EPDM seal. Rated to 150 PSI (1035 kPa) and 240°F (115°C).

MODEL	NPT CONN		A	B	C	D	E	F	WEIGHT	
									lbs	kg
AAV-025	1/4"	in	3.125	2.625	1.625	0.81	0.125	0.50	0.30	0.14
		mm	80	67	42	21	4	15		

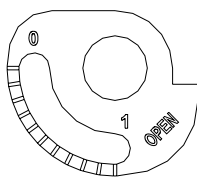
### DV—DRAIN VALVE



Drain valve with forged brass body, chrome plated ball, Teflon seats, double EPDM O-ring stem seals, aluminum handle, 3/4" hose connection with cap and plastic retainer strap. Rated to 600 PSI (4140 kPa) WOG and 250°F (120°C).

MODEL	NPT CONN	A		B		C		WEIGHT	
		in	mm	in	mm	in	mm	lbs	kg
DV-025	1/4"	1.88	48	2.10	53	1.35	34	0.30	0.13
DV-050	1/2"	2.40	61	2.73	69	1.54	39	0.44	0.20

### MS—MEMORY STOP



Memory stop, Zinc plated steel with position indicator

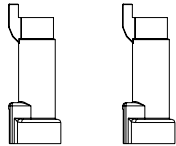
### EH-EXTENDED HANDLE



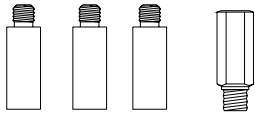
Handle Extension, forged brass stem & collar, for extending existing handle 1-1/2"

MODEL	FITS
EH-1	1/2" & 3/4" BB,MB,SB,SV, 1" model SV
EH-2	1" & 1-1/4" BB,MB,SB, 1-1/4" & 1-1/2" SV
EH-3	1-1/2" & 2" BB,MB,SB, 2" SV

### EK-EXTENSION KIT

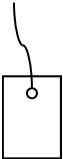


Extension Kit for 2-way Coil Pacs consisting of (2) handle extensions, (3) PTE extenders, & (1) AE accessory extension



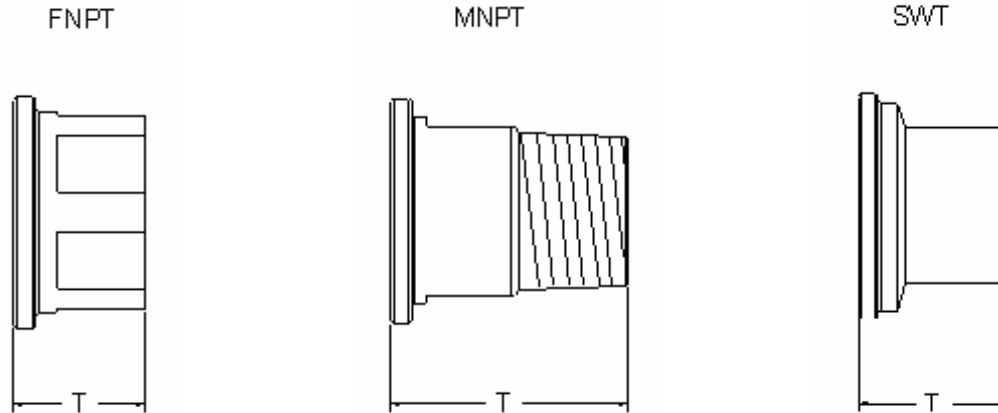
MODEL	FITS
EK-1	All 1/2" & 3/4" 2-way Coil Pacs
EK-1.5	1" 2-way Coil Pacs w/ strainer
EK-2	1" 2-way Coil Pacs w/o strainer, All 1-1/4" 2-way Coil Pacs
EK-2.5	1-1/2" Coil Pacs w/ strainer
EK-3	1-1/2" Coil Pacs w/o strainer, All 2" Coil Pacs

### HT-HANGING TAG



Hanging Tag, plastic with chain for valve identification

Flo-Pac, LLC.  
10545 Guilford Road, Unit 103  
Jessup, Maryland 20794  
www.flo-pacllc.com



## NOMINAL DIMENSIONS

Model Number	Conn. Size		FNPT		MNPT		SWT		Fits Valve Size
			"T"		"T"		"T"		
	in	mm	in	mm	in	mm	in	mm	
TP1-050(*)	1/2"	15	0.8	21.1	1.5	40.0	0.8	21.0	1/2", 3/4" R
TP2-050(*)	1/2"	15	0.8	21.1	1.5	40.0	0.9	22.2	3/4", 1"
TP2-075(*)	3/4"	20	0.8	21.1	1.6	40.7	1.0	25.0	3/4", 1"
TP3-075(*)	3/4"	20	0.8	21.1	1.8	45.7	1.3	32.6	1-1/4", 1-1/2"
TP2-100(*)	1"	25	NA		1.8	45.7	1.0	25.0	3/4", 1"
TP3-100(*)	1"	25	1.0	25.0	1.8	45.7	1.4	36.3	1-1/4", 1-1/2"
TP3-125(*)	1-1/4"	32	1.0	25.0	1.8	45.7	1.4	36.3	1-1/4", 1-1/2"
TP4-125(*)	1-1/4"	32	2.0	50.0	2.0	50.0	1.5	40.0	2"
TP3-150(*)	1-1/2"	40	NA		1.8	45.7	1.2	29.8	1-1/4", 1-1/2"
TP4-150(*)	1-1/2"	40	2.0	50.0	2.0	50.0	1.6	40.3	2"
TP4-200(*)	2"	50	NA		2.0	50.0	1.5	40.0	2"

\* Indicate end connection type.

*Not for construction purposes unless certified by factory.*

Flo-Pac, LLC.  
10545 Guilford Road, Unit 103  
Jessup, Maryland 20794  
www.flo-pacllc.com

# IMPORTANT ! ! !

## FLO-PAC LLC -- INSTALLATION INSTRUCTIONS

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### SOLDER CONNECTIONS

If the *Flo-Pac* component is provided with a union tailpiece, remove from the component as well as the O-ring. Use accepted industry standards to clean the copper tubing and sweat fittings. Apply flux evenly to both surfaces. If the component is a ball valve, place in the closed position. Do not apply heat to the valve body or access ports. Do not exceed the temperature rating of the component. Use soft solder only. Overheating the valve can damage O-rings, seals, and Teflon seats and result in leaks. Use of a heat sink is required. After the pipe and components have cooled, replace the O-ring and hand tighten the union nut. Holding the component securely, tighten the union approximately an additional quarter turn. **Do not over tighten\***.

### THREADED CONNECTIONS

Threaded connections should be made according to accepted industry standards using approved pipe sealant (pipe dope or tape). *Flo-Pac* threaded components are tapered NPT type. If the *Flo-Pac* component is provided with a union tailpiece, remove from the component. Thread the tailpiece with union nut to the pipe and the component to the other end of the pipe. Tighten up both the tailpiece and the component with a socket wrench making sure that the accessories (P/T ports, vents, drain valves, etc.) are in the proper position. Next, hand tighten the union if so equipped. Holding the component securely, tighten approximately an additional quarter turn. When installing a threaded valve body, place a wrench on the flats of the fixed end (not the body) while tightening to the pipe. Failure to follow this procedure can result in a leak between the fixed end and the valve body. **Do not over tighten\***.

### UNION NUT CONNECTION

All *Flo-Pac* union bodies and tailpieces have tool flats for tightening. If the union end(s) are to be soldered, removed the O-ring from the groove prior to heating. After the connections have been made to the pipe, replace the O-ring and hand tighten the union. Holding the union to the tailpiece, securely tighten the union nut approximately a quarter of a turn. **Do not over tighten\***.

\*Excessive use of jointing material combined with high tightening forces can generate high hoop stresses in female thread components.

If the components and accessories (including union nuts and tail pieces) are insulated a tight vapor barrier must be maintained. This should help minimize the infiltration of moisture from external areas and condensation from forming on the surfaces

### PTV / PT PORT

Seals are made of EPDM (Nordel). EPDM may be used with hot or cold water. EPDM is resistant to glycol, alcohol, phosphates, esters, ketones, and detergents. Do not use with petroleum products, hydrocarbon solvents and/or oils, chlorinated hydrocarbons or turpentine. Always wear eye protection when using PTV or PT ports. Attach drain hose to hose barb connection for collecting water or water vapor from the PTV. Always use a pressure gauge with a rating greater than the pressure in system. Recommended for use in hydronic systems only. Not recommended for use on gas, steam or high temperature hot water systems.

### OPERATION

#### **Venting**

Rotate valve body 1/2 turn or until you hear air escape. Close valve when venting is completed.

**CAUTION:** Because water and water vapor can vent with system air, and may cause damage or personal injury, it is a good practice to use a drain hose to direct the flow from the vent hole into a suitable container. – See Warning Below

#### **Temperature/Pressure Reading**

Hold valve body in place to prevent rotation. Remove cap slowly and look and listen for leaks. – See Warning Below

Remove any foreign material from entrance hole. Select either the pressure or temperature device to be used. Examine probe and remove any burrs. Apply silicone grease to probe especially for first time use. Insert probe slowly with twisting motion. As soon as the necessary readings and adjustments are made, remove probe and replace cap.

Note: If probe is left inserted in valve for any extended period of time and then removed, the valve seal will leak until seal regains its “memory”. This is especially true of low pressures and temperatures applications.

Always replace cap after use.

#### **Maintenance**

If device leaks persistently, replace it. Keep debris out of plugs and keep caps on.

**WARNING:** If piping system contains hot liquids under pressure, caution must be used to avoid contact with face, eyes or skin. If these instructions are not adhered to, serious injuries or death may result.

Rev. 04/08/15



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## **Operation**

### **Venting**

1. Rotate valve body ½ turn or until you hear air escape.  
Caution: Because water and water vapor can vent with system air, and may cause damage or personal injury, it is a good practice to use a drain hose to direct the flow from the vent hole into a suitable container. – See Warning Below
2. Close Valve when venting is completed.

### **Temperature/Pressure Reading**

1. Hold valve body in place to prevent rotation.
2. Remove cap slowly and look and listen for leaks. – See Warning Below
3. Remove any foreign material from entrance hole.
4. Select either the pressure or temperature device to be used. Examine probe and remove any burrs. Apply silicone grease to probe especially for first time use. Insert probe slowly with twisting motion. As soon as the necessary readings and adjustments are made, remove probe and replace cap. Note: If probe is left inserted in valve for any extended period of time and then removed, the valve seal will leak until seal regains its “memory”. This is especially true of low pressures and temperatures applications.
5. Always replace cap after use.

### **Maintenance**

1. If device leaks persistently, replace it.
2. Keep debris out of plugs and keep caps on.

**WARNING:** If piping system contains hot liquids under pressure, caution must be used to avoid contact with face, eyes or skin. If these instructions are not adhered to, serious injuries or death may result.

Rev. 5-26-05



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## **FLO-PAC, LLC**

### **LIMITED WARRANTY**

Flo-Pac LLC warrants all material manufactured by it to be free from defects in material and workmanship for 12 months from date of shipment. Written notice must be provided to Flo-Pac LLC forthwith. After the defects have been discovered, during the warranty period, Flo-Pac LLC will repair or replace at its option any material found to be defective. The material must be returned to Flo-Pac LLC by and at the expense of the original purchaser.

This warranty shall not apply to any material which has been subject to misuse, negligence, modification, temperature or pressure in excess of the limits recommended by Flo-Pac LLC. Charges for repairing defects to the product by others will not be allowed.

This warranty does not cover any component parts or material not manufactured by Flo-Pac LLC.

Flo-Pac LLC makes no other warranties either expressed or implied, including the warranties of mechanical ability or fitness for a particular purpose. The Company neither assumes nor authorizes any other persons to assume for it any liability in connection with the sales of its parts and materials except under the conditions of this warranty.

The purchaser agrees the liability of Flo-Pac LLC is limited to replacement or repair of the defective part or material. Flo-Pac LLC is not liable for incidental or consequential damages including, but not limited to, damage or delay, loss of profit or expense incurred by the purchaser. In no event will Flo-Pac LLC total liability exceed the original contract price.

## GUIDE SPECIFICATIONS

### **Combination Balancing Shut Off and Metering Valve**

Balancing valve shall be a venturi style manual valve with forged brass body, 100% positive shut off, full port plated ball, union end, permanently mounted low loss venturi section, flow calibration independently tested for  $\pm 3\%$  of actual flow, teflon seats, double O-ring shaft seals, pressure / temperature read out ports, adjustable memory stop with position indicator.

Rated 600 PSIG / 4140 kPa. @ 250°F / 120c. As part of the submittal, test data from an independent flow laboratory will be provided confirming the accuracy of each size valve supplied to be  $\pm 3\%$  of rate.

The test shall be certified in place against a primary standard, certified and traceable to the National Institute of Standards and Technology (NIST). The test shall be witnessed and the accuracy confirmed by the venturi design engineer.

The valve shall be a FLO-PAC MODEL MB or equal.

### **Combination Ball Valve Strainer**

The combination ball valve wye strainer shall have a union end, forged brass body, a full port chrome plated brass ball, teflon seats, double O-ring shaft seals and 100% positive shut off. The strainer shall be provided with a 20 mesh stainless steel screen. Standard features include a pressure / temperature read out port, hose end drain valve with cap and plugged by pass port. Union end has O-ring seal. Rated at 600 PSI / 4140 kPa, 250°F / 120c.

The ball valve wye strainer shall be a FLO-PAC SV or equal.

### **Ball Valve – Shut Off and Balancing**

Ball valve shall have a union end, a forged brass body, a full port chrome plated brass ball, teflon seat, double O-ring shaft seals, 100% positive shut off with position indicating memory stop for system balancing where flow measurement is required. The union end will have an O-ring seal and two plugged accessory ports. Rated at 600 PSI / 140 kPa, 250°F / 120c.

The ball valve shall be a FLO-PAC MODEL BB or equal

## **GUIDE SPECIFICATIONS**

### **Ball Valve – Shut Off with Drain**

Ball valve shall have a union end, a forged brass body, a full port chrome plated brass ball, teflon seats, double O-ring shaft seals, 100% positive shut off. The union end shall have a O-ring seal. Standard features include pressure / temperature read out ports and hose end drain valve with cap. Rated 600 PSI / 4140 kPa, 250°F / 120c.

The ball valve shall be a FLO-PAC MODEL SB or equal.

### **Unions**

Union shall be a full port union, forged brass body supplied with pressure / temperature test ports and hose end drain valve. Rated at 600 PSIG / 4140 kPa, 250°F / 120c.

The union shall be a FLO-PAC MODEL US or equal.

### **Unions**

Union shall be a full port union, forged brass body supplied with a P.T.V. combination manual air vent and pressure / temperature test ports. Rated at 600 PSIG / 4140 kPa, 250°F / 120c.

The union shall be a FLO-PAC MODEL URP or equal.

### **Unions**

Union shall be a full port union, forged brass body supplied with a manual air vent and pressure / temperature test ports. Rated at 600 PSIG / 4140 kPa, 250°F / 120c.

The union shall be a FLO-PAC MODEL URM or equal



**GUIDE SPECIFICATIONS**

**Manual Air Vents:**

Manual air vents shall have a ¼” brass body, knurled operator with screw driver slot, blow out proof stem. Rated at 400 PSI 2760 kPa, 250°F / 120c.

PTV ENTERPRISES MAV or equal

**Automatic Air Vents:**

Automatic air vents shall have a ¼” brass body, plastic float, brass seat EPDM seal. Rated 150 PSI 1035 kPa, 240°F / 115c.

PTV ENTERPRISES AAV or equal

**Drain Valve**

Drain valve shall have a ¼” or ½” brass body with chrome plated ball 100% positive shut off, Teflon seat, MPTX HED end connections with cap. Rated 600 PSI 4140 kPa, 250°F / 120c

PTV ENTERPRISES DV or equal

**GUIDE SPECIFICATIONS  
(ACCESSORIES)**

**PTV / PT Extender:**

The PTV / PT Extender shall have a ¼” or ½” brass body EPDM O-ring. Rated at 500 PSI 3450 kPa, 250°F / 120c.

PTV ENTERPRISES P.T.E. or equal

**Accessory Extension:**

The Accessory Extension shall have a ¼” or ½” brass body MNPT X FNPT. Rated at 500 PSI 3450 kPa, 250°F / 120c.

PTV ENTERPRISES AE