

# SB10/11 Series Back Pressure/Relief Valves



SERIES: SB10 & SB11

SIZES: 3/8" – 2"

ENDS: True Union Socket, Threaded or ChemFlare™<sup>1</sup> Spigot<sup>2</sup> Bodies with Plain, Socket, Threaded or Flanged ends

DIAPHRAGM: PTFE Bonded EPDM

SEALS: EPDM, FKM (Viton®)

**CRN**  
Registered  
as Category C Fittings  
Consult Chemline



The Chemline SB Series Back Pressure/Relief Valve has two functions. As a **back pressure valve**, installed in-line downstream of a pump, the back pressure below the metering pump is maintained. When installed in the branch of a tee it is a **pressure relief valve**. The valve stays closed until inlet pressure reaches the set pressure which is adjusted by turning the spring tensioning bolt. Inlet pressure acts on the PTFE control diaphragm opening the valve, allowing excess pressure to flow downwards through the orifice.

The SB10/11 Series is very sensitive to pressure changes and requires low overpressure to fully open. It is designed for **clean fluids only**.

## features

### True Union Ends

- Easy installation and maintenance
- Eliminate chemical leakage problems common with old fashioned threaded connections

### Long Cycling Life

- Dynamic seal is PTFE bonded EPDM for high chemical resistance
- This moulded diaphragm is designed for superior sealing and flex life

### Designed for Superior Performance

- Valves are hydraulically designed for low hysteresis ("backlash") and to eliminate chatter
- Low overpressure to fully open
- Sensitive to pressure changes

## technical

### Set Pressure Ranges

- SB10 – 3 to 60 psi
- SB11 – 7 to 150 psi
- The only difference between SB10 and SB11 is the strength of spring

### Maximum Viscosity

- 120cP is maximum recommended service viscosity

<sup>1</sup> For ChemFlare™ end connectors, consult Chemline.

<sup>2</sup> PP and PVDF spigot ends have DIN dimensions and will butt fuse directly to Chemline PP and PVDF piping systems.

# SB10/11 Series Back Pressure/Relief Valves



## working pressures vs. flow rate

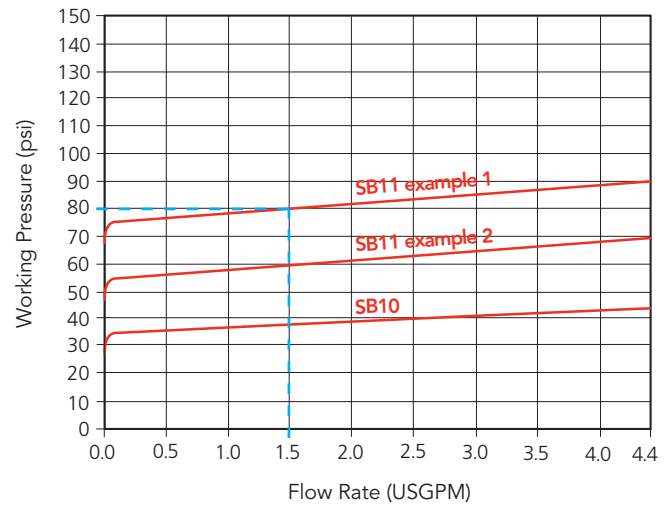
The curves show the relationship between the working pressure and the approximate flow rate through the valve for water at 20°C (68°F). These values vary depending on:

- the configuration of the piping and the pressure losses associated with it
- the fluid if not water at 20°C (68°F)
- whether the pressure is rising or falling. Hysteresis is approximately 4 psi.
- the profile of the flow curves will be the same for any set pressure

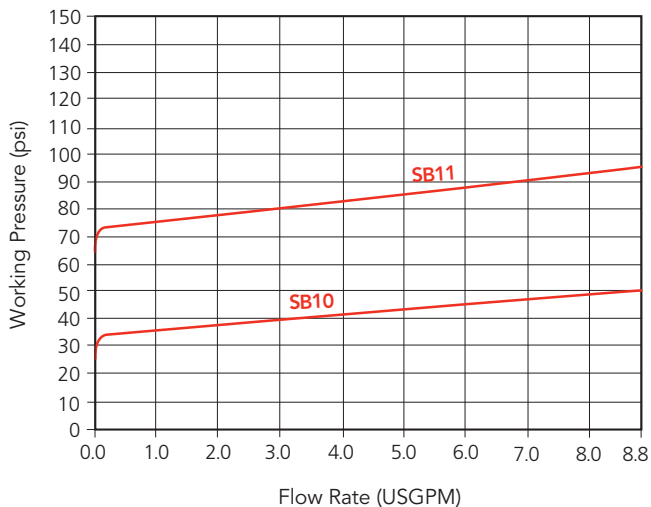
## operation examples

1. The SB11 valve is set closed at 70 psi. At a pressure increase of 10 psi, a flow of approximately 1.5 USGPM will be reached.
  - set pressure = 70 psi
  - working pressure = 80 psi
  - opening pressure = approximately 74 psi
2. The SB11 valve is set closed at 50 psi. At a pressure increase of 10 psi, a flow of approximately 1.5 USGPM will be reached.
  - set pressure = 50 psi
  - working pressure = 60 psi
  - opening pressure = approximately 54 psi

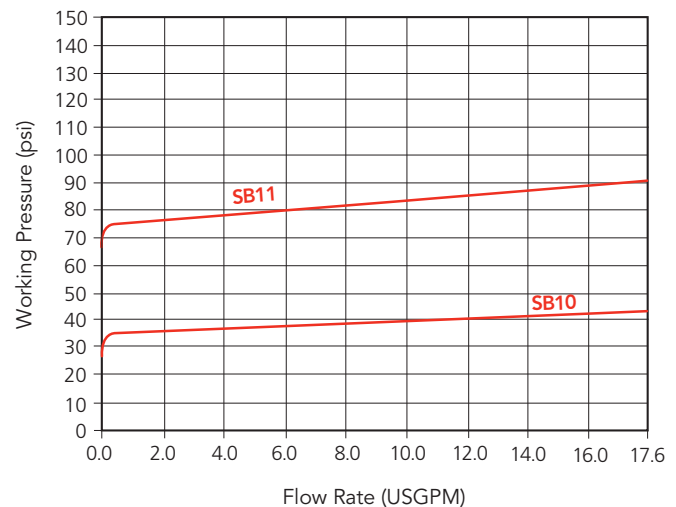
## 3/8" Valves



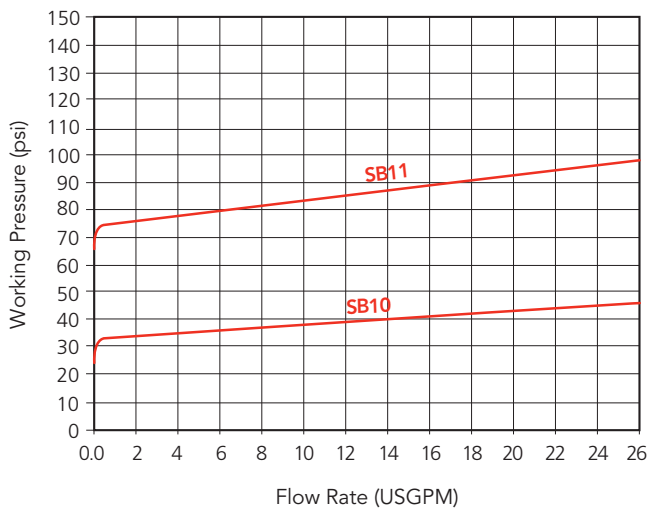
## 1/2" Valves



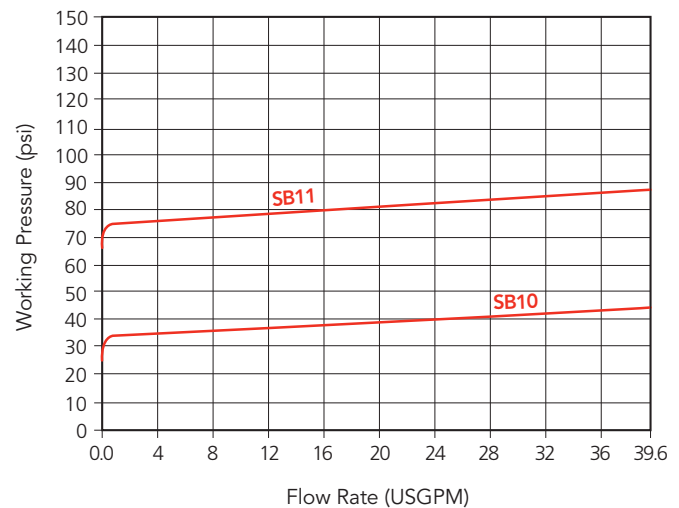
## 3/4" Valves



## 1" Valves



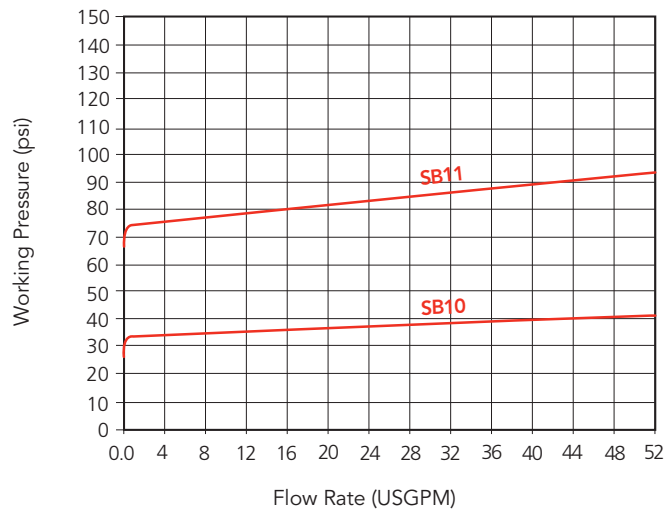
## 1-1/4" Valves



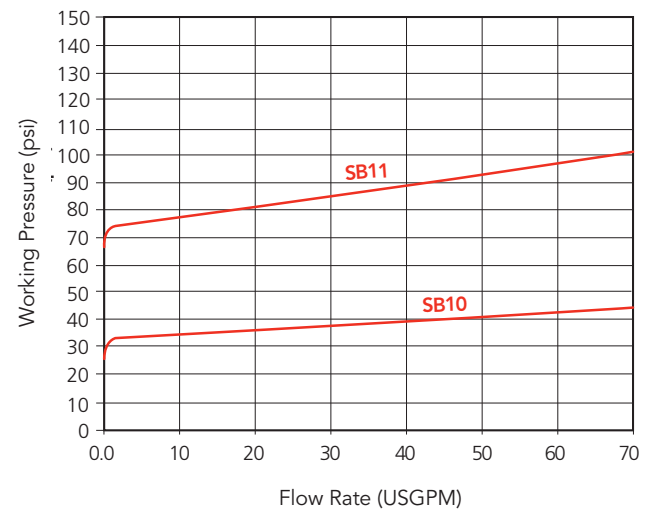
# SB10/11 Series Back Pressure/Relief Valves



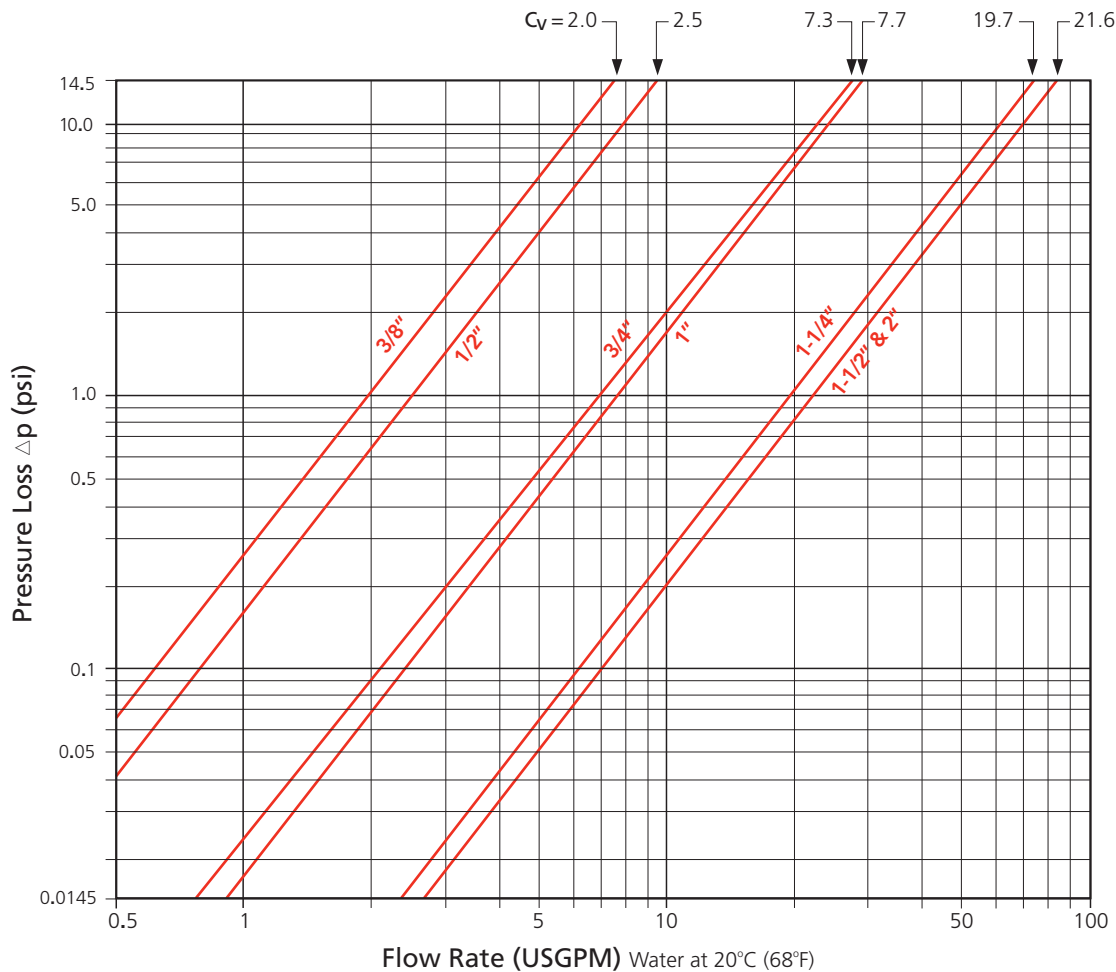
1-1/2" Valves



2" Valves



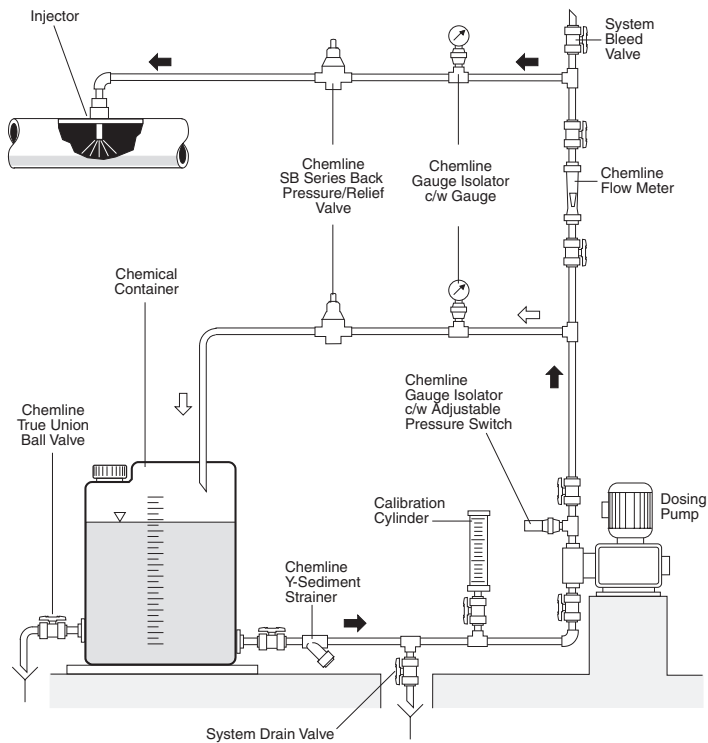
pressure loss nomogram for SB10 & SB11 valves



# SB10/11 Series Back Pressure/Relief Valves

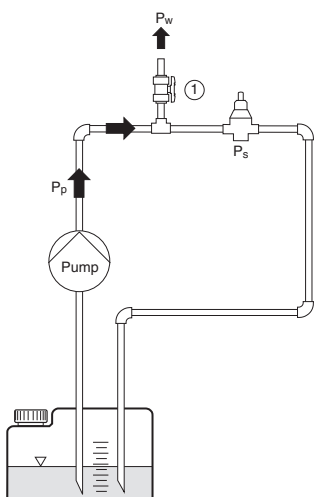


## typical dosing system schematic



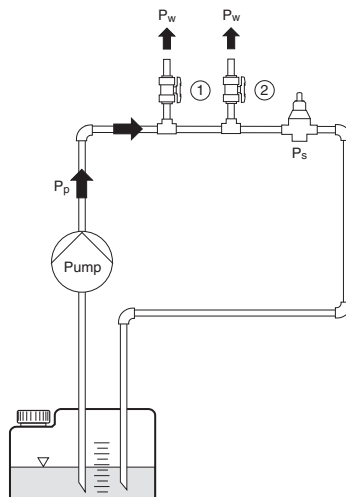
## application of pressure relief valves

### Constant System Pressure



$$\begin{aligned} P_p &\geq P_w \\ P_p &\geq P_s \rightarrow \text{valve opens} \\ P_p &\leq P_s \rightarrow \text{valve closed} \end{aligned}$$

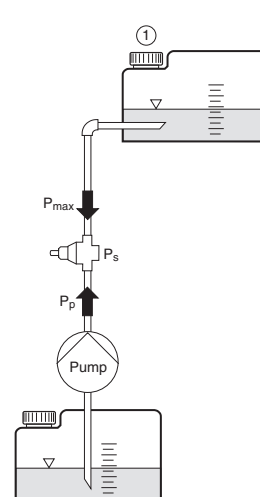
### Consumer 1 and/or 2 Open, Valve Closes



$$\begin{aligned} P_p &\geq P_s \rightarrow \text{valve opens} \\ P_p &\leq P_s \rightarrow \text{valve closed} \end{aligned}$$

### Non-Return Valve

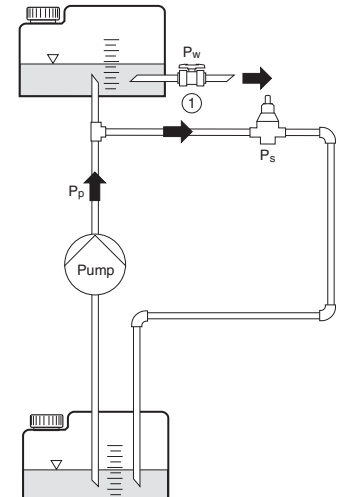
Container 1 is located above the pump



$$\begin{aligned} P_s &\geq P_{max} \\ P_p &\geq P_s \rightarrow \text{valve opens} \\ P_p &\leq P_s \rightarrow \text{valve closed} \end{aligned}$$

### Overflow Valve

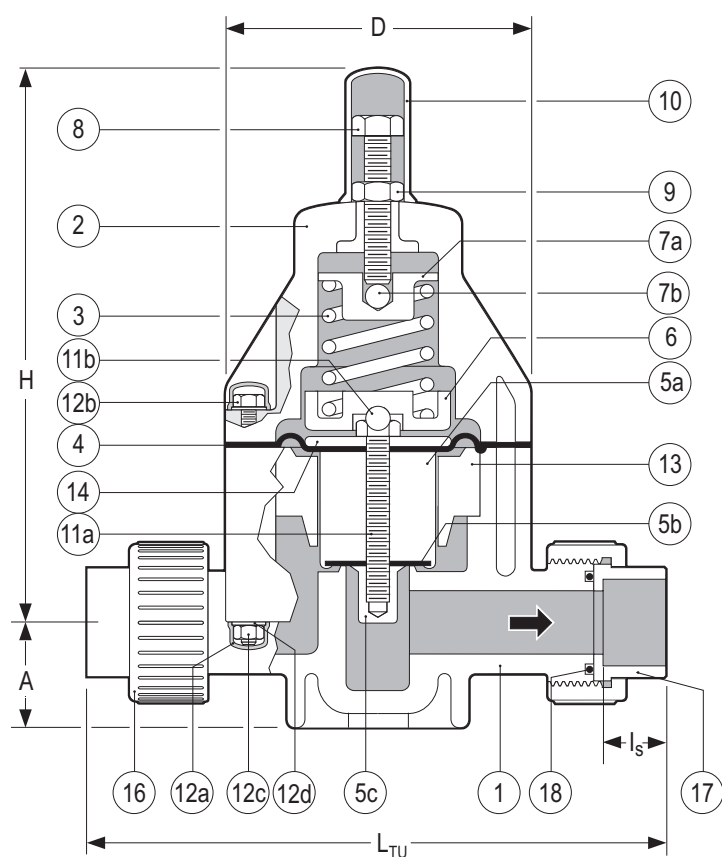
Pressure of container or application system should not exceed the maximum pressure value



$$\begin{aligned} P_s &\leq P_w \\ P_p &\geq P_s \rightarrow \text{valve opens} \\ P_p &\leq P_s \rightarrow \text{valve closed} \end{aligned}$$

$P_w$  = Working Pressure  
 $P_p$  = Pump Pressure  
 $P_s$  = Set Pressure

# SB10/11 Series Back Pressure/Relief Valves



True Union Body

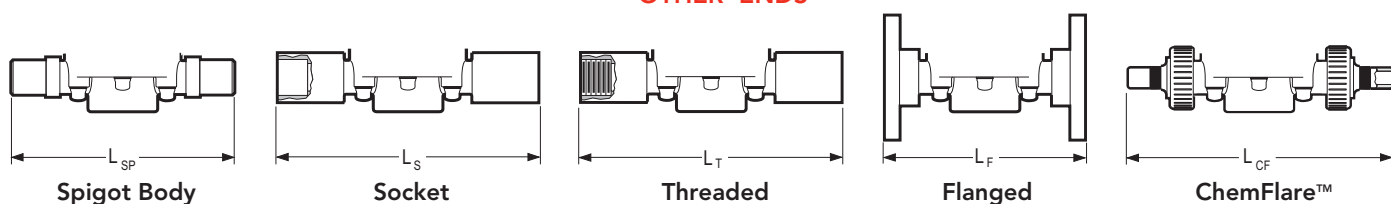
## PARTS

▲ Recommended Spare Parts

No.	Part	Pcs.	Materials
1	Body	1	PVC, PP, PVDF
2	Bonnet	1	PPG
3	Spring	1	Galvanized Steel
4▲	Control Diaphragm	1	PTFE bonded EPDM
5a▲	Piston	1	PVC, PP, PVDF
5b▲	Seat	1	EPDM, FPM(Viton®)
5c▲	Seat Retainer	1	PVC, PP, PVDF
6	Lower Spring Retainer	1	Cad. Plated Steel
7a	Upper Spring Retainer	1	Cad. Plated Steel
7b	Ball	1	304 SS
8	Spring Tensioning Bolt	1	304 SS
9	Lock Nut	1	304 SS
10	Spring Bolt Cap	1	PE
11a▲	Piston Bolt	1	304 SS
11b	Ball	1	304 SS
12a	Bolt/Nut Cap	8/12 <sup>1</sup>	PE
12b	Hex Bolt	4/6 <sup>1</sup>	304 SS
12c	Hex Nut	4/6 <sup>1</sup>	304 SS
12d	Washer	8/12 <sup>1</sup>	304 SS
13	Spacer Disc	1	PVC, PP, PVDF
14	Pressure Plate	1	Cad. Plated Steel
16	Union Nut	2	PVC, PP, PVDF
17	End Connector	2	PVC, PP, PVDF
18▲	Face O-Ring	2	EPDM, FPM(Viton®)

<sup>1</sup> 1/2" size / 3/4" to 2" sizes

## OTHER ENDS



## DIMENSIONS INCHES

## WEIGHTS LB. Cv VALUES

Size	D	H	PVC								PP and PVDF			PVC PP PVDF			USGPM Flow at 1 psi ΔP
			A	I <sub>S</sub>	L <sub>TU</sub> <sup>2</sup>	L <sub>SP</sub>	L <sub>S</sub>	L <sub>T</sub>	L <sub>F</sub>	L <sub>CF</sub>	A	L <sub>SP</sub> <sup>3</sup>	L <sub>TU</sub> <sup>2</sup>				
3/8"	3.2	6.9	1.0	0.6	6.5	5.7	7.4	7.2	4.5	8.2	0.9	5.7	**	1.8	1.5	2.2	2.0
1/2"	3.2	6.9	1.0	0.6	6.8	5.7	8.0	7.8	6.3	8.3 <sup>4</sup>	0.9	5.7	7.1	1.9	1.6	2.4	2.5
3/4"	4.2	8.0	1.5	0.7	8.3	6.9	9.3	8.9	7.4	9.7	1.4	6.9	8.4	4.1	3.5	4.6	7.3
1"	4.2	8.0	1.5	0.9	8.5	6.9	9.6	9.3	7.4	10.2	1.4	6.9	8.7	4.2	3.5	4.7	7.7
1-1/4"	5.8	10.3	2.2	1.0	10.9	8.8	11.6	11.2	9.2	13.5	2.1	8.8	10.9	11.0	9.0	12.0	19.7
1-1/2"	5.8	10.3	2.2	1.2	11.1	8.8	12.2	11.5	9.5	-	2.1	8.8	11.2	11.2	9.2	12.2	21.6
2"	5.8	10.3	2.2	1.5	11.3	9.6	12.9	12.0	10.0	-	2.1	9.6	13.2	11.4	9.4	12.4	21.6

<sup>2</sup> True Union Bodies come standard with socket ends. Threaded union ends are available. \*\* Consult Chemline.

<sup>3</sup> Spigot bodies are used for non union socket, threaded or flanged ends. All spigot ends have metric dimensions and the PP and PVDF spigots butt fuse directly to Chemline PP and PVDF piping. <sup>4</sup> Tube size can be reduced to 1/4" tube, LCF = 7.74" for 1/4", 8.26" for 3/8".

# SB10/11 Series Back Pressure/Relief Valves



## MAXIMUM PRESSURES PSI

Size	PVC				PP					PVDF					
	20°C 68°F	30°C 86°F	40°C 104°F	50°C 122°F	30°C 86°F	40°C 104°F	50°C 122°F	60°C 140°F	70°C 158°F	30°C 86°F	50°C 122°F	70°C 158°F	80°C 176°F	90°C 194°F	100°C 212°F
3/8"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1/2"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
3/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1-1/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1-1/2"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
2"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15

Temperature Ranges: PVC 0 to 50°C (32 to 122°F), PP 10 to 70°C (50 to 158°F), PVDF -30 to 100°C (-22 to 212°F).

## SAMPLE SPECIFICATION

- All Back Pressure/Relief Valves in PVC, PP or PVDF shall be Chemline SB10 or SB11 Series or equal in sizes 1/2" to 2". SB10 shall have inlet set pressure range of 3 to 60 psi and SB11 shall have an inlet set pressure range of 7 to 150 psi. All valves shall have a maximum inlet pressure rating of 150 psi. Valves shall be suitable for aggressive clean non scaling chemicals.
- All exposed external metal parts including spring tensioning bolt and body bolts shall be 304 stainless steel covered with polyethylene caps.
- All valves shall have a large PTFE coated control diaphragm to fully open at no more than 10-15% over pressure.
- Static seals shall be EPDM or FPM (Viton®).
- Socket ends 1/2" to 2" shall be Schedule 80 and conform to ASTM D-2467.
- Threaded ends 1/2" to 2" shall conform to ASTM D-2464.
- Butt fusion ends in PP and PVDF shall be compatible with Chemline metric polypropylene and PVDF piping systems.
- Flanged ends shall be ANSI Class 150.
- PVC compound shall have an ASTM cell classification 11564 as per ASTM D-1784 and a chemical resistance of 1 as per ASTM D-5260.
- All polypropylene material shall conform to ASTM D-4101 PP 0211B67272 material requirements.
- All PVDF material shall be unpigmented conforming to ASTM D-3222 Type 2 suspension resin material requirements and also with USDA Title 21, Chapter I, Part 177.2510 requirements for contact with food.
- All valves shall have chemical resistant labels permanently marked with manufacturing number to provide production level traceability.

## ORDERING EXAMPLE

Chemline Back Pressure/Relief Valves		SB11	A	005	V	U
Pressure Range	SB10 – 3 to 60 psi SB11 – 7 to 150 psi					
Body Material	A – PVC	B – PP	K – PVDF			
Size	003 – 3/8" 005 – 1/2" 007 – 3/4" 010 – 1"		012 – 1-1/4" 015 – 1-1/2" 020 – 2"			
Elastomers	E – EPDM		V – FPM (Viton®)			
Ends	S – Socket T – Threaded		F – Flanged U – Union Socket			
	CFx – ChemFlare™		Blank – Spigot (Butt)			

Example: Chemline SB 11 Series, PVC, 1/2" diameter, FPM (Viton®) seals, Union socket ends.  
x = 4 for 1/4", 6 for 3/8", 8 for 1/2", 12 for 1" ID tube connections.

## OPTION

- Integral Pressure Gauge – for inlet and/or outlet