

BLACOH™

FLUID CONTROL

"Don't Pump Without Us"



BLACOH CAPABILITIES GUIDE

SENTRY • SENTINEL • SPILLSTOP • SERVICES

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PUMPING SYSTEM DIAGRAM



SPILLSTOP™ LEAK CONTAINMENT

Stops spills caused by pump diaphragm failure

SENTRY™ INLET STABILIZER

Extends life of all inlet system components

SENTINEL™ PRESSURE RELIEF VALVES

Protect system from over-pressure damage

SENTRY™ SURGE SUPPRESSOR

Eliminates hydraulic surge & water hammer

SENTINEL™ DIAPHRAGM SEALS

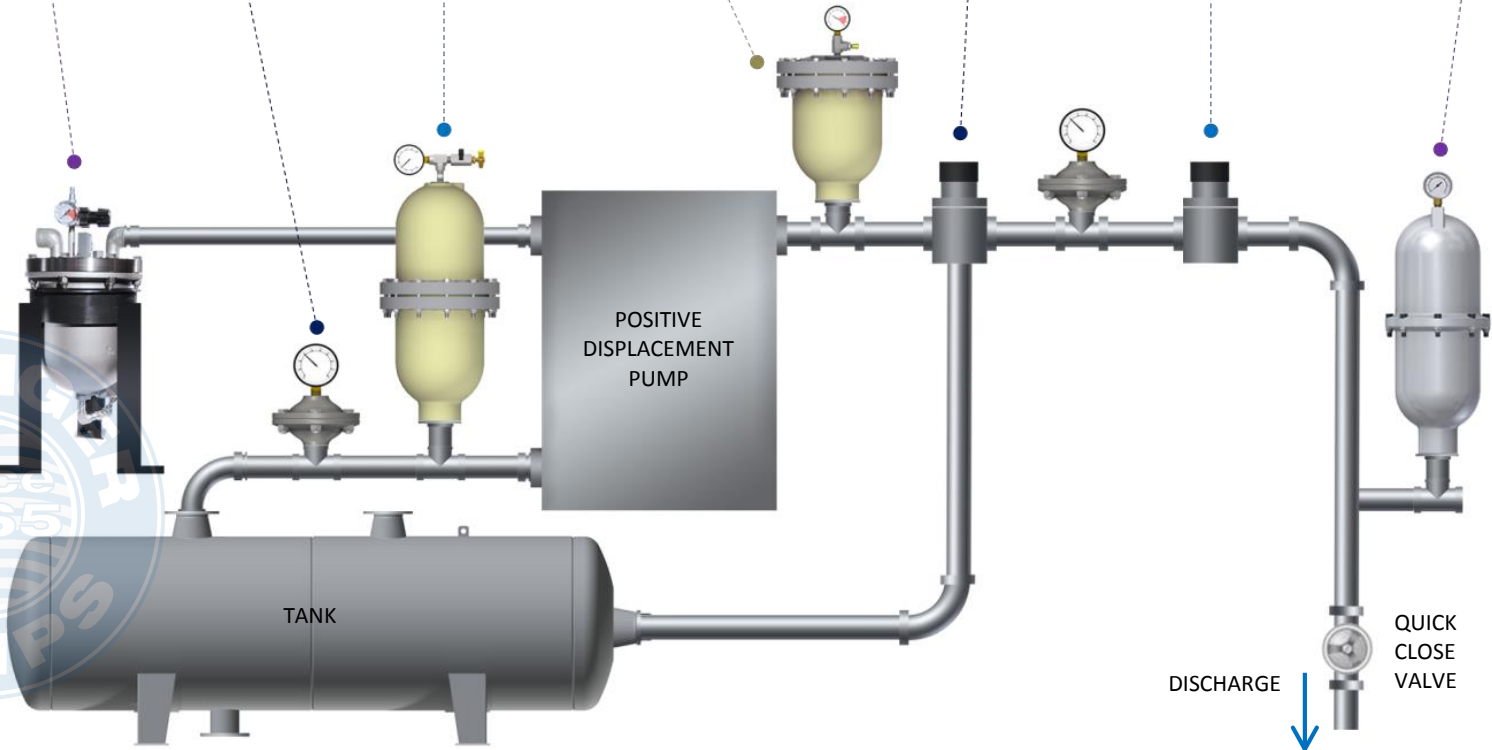
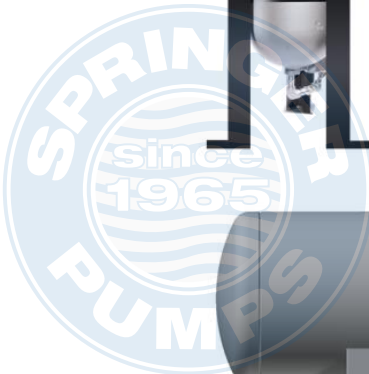
Protect & isolate system instrumentation

SENTRY™ PULSATION DAMPENER

Removes up to 99% of system shock

SENTINEL™ BACK PRESSURE VALVES

Apply continuous back pressure to the pump



DISCHARGE

QUICK CLOSE VALVE



4 in³ (0.06 L)

SENTRY III

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
<p>Plastic</p>	CPVC Polypropylene (PP) PTFE PVC PVDF	Aflas Buna-N Buna-N (Food Grade) EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	0.375" to 0.5" (10 to 15 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	150 psi (10.3 bar)	Adjustable Chargeable	2 to 4 lbs (0.91 to 1.81 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
	Alloy 20 (A20) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)		0.375" to 0.75" (10 to 20 mm)		1000 psi (68.9 bar)		4 to 6 lbs (1.81 to 2.72 kg)	

Plastic Series	Wetted / Non- Wetted
04PP	PP / PP
04PVC	PVC / PVC
04X	CPVC / CPVC
10K	PVDF / PVDF
T1010	PTFE / PTFE
T1050	PTFE / PTFE

Metal Series	Wetted / Non- Wetted
1120	SS / SS
1170	A20 / A20
1175	A20 / SS
1185	HAST / SS
7325	SS / SS
8325	SSP / SSP

Accessories
Charging Kits
Bladder Replacement Kits
Hardware Replacement Kits
Pressure Relief Valves
Back Pressure Valves
Gauge Guards
Gauge Upgrades
Spill Containment for AODD

10 in³ (0.16 L)

SENTRY III

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
 Plastic	Acetal Acetal - Conductive CPVC Polypropylene (PP) PTFE PVC PVDF	Aflas Buna-N Buna-N (Food Grade) EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	0.375" to 0.5" (10 to 15 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	150 psi (10.3 bar)	Adjustable Chargeable Inlet Stabilizer	6 to 10 lbs (2.72 to 4.54 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
	 Metal	Alloy 20 (A20) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)			0.375" to 0.75" (10 to 20 mm)		1000 psi (68.9 bar)	



Plastic Series	Wetted / Non-Wetted
10PP	PP / PP
10PVC	PVC / PVC
10X	CPVC / CPVC
DC1005	Acetal-Cond / Acetal-Cond
10K	PVDF / PVDF
T1000	PTFE / PTFE
T1012	PTFE / PTFE

Metal Series	Wetted / Non-Wetted
1020	SS / SS
1070	A20 / A20
1075	A20 / SS
1080	HAST / HAST
1085	HAST / SS
7320	SS / SS
8320	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

8, 12, 24 in³ (0.13, 0.20, 0.39 L)

SENTRY XPA, XPX, XPH

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
XPA/XPX 	Stainless Steel (SS) Duplex Stainless Steel (DSS)	Buna-N EPDM PTFE Viton	0.5" (15 mm)	Autoclave FNPT BSP ANSI Flange DN Flange RTJ Flange Socket Weld	XPA: 7500 psi (517.1 bar) XPX: 15000 psi (1034.2 bar)	Chargeable Gauge Adaptor	XPA: 10-13 lbs (4.54 to 6.90 kg) XPX: 44 lbs (20.0 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
XPH 				HP Flow-Through	XPH: 7500 psi (517.1 bar)		XPH: 10-13 lbs (4.54 to 6.90 kg)	


Series	Size	Wetted / Non-Wetted
XPA_-08 / XPH_-08	8 in ³ / 0.13 L	SS / SS
XPX10-12	12 in ³ / 0.20 L	SS / SS
XPA_-12 / XPH_-12	12 in ³ / 0.20 L	SS / SS
XPA_-24 / XPH_-24	24 in ³ / 0.39 L	SS / SS

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

About
The XPH model's unique design allows it to effectively remove both hydraulic pulses and acoustic pulses. The flow-through inlet is specifically designed to remove high frequency pulses greater than 15 Hz. Residual pulsations of less than 1% can be achieved with the flow-through design versus a single inlet/outlet dampener. (See performance chart on p. 24)

12 in³ (0.20 L)

SENTRY Tef-Guard



Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
<p>Metal</p> 	Stainless Steel (SS)	PTFE	0.5" (15 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld	2,000 psi (137.8 bar)	Chargeable	12 lbs (5.44 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing

Metal Series	Wetted / Non- Wetted
TG12SS	SS / SS

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

36 in³ (0.59 L)

SENTRY II

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
 Plastic	Acetal CPVC Polypropylene (PP) PTFE PVC PVDF	Aflas Buna-N Buna-N (Food Grade) EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	0.5" to 1" (15 to 25 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	150 psi (10.3 bar)	Adjustable Automatic Chargeable	6 to 10 lbs (2.72 to 4.54 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
	 Metal		Alloy 20 (A20) Carbon Steel (CS) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)					

Plastic Series	Wetted / Non- Wetted
601	PTFE / PTFE
1301	PP / PP
1305	PP / PP
1311	PVC / PVC
1315	PVC / PVC
1341	CPVC / PVC
1401	PVDF / PP
1801	Acetal / PP

Metal Series	Wetted / Non- Wetted
3120	SS / SS
3124	SS / CS
3140	CS / CS
3174	A20 / CS
3175	A20 / SS
3185	HAST / SS
7225	SS / SS
8225	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

85 in³ (1.40 L)

SENTRY II

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
<p>Plastic</p>	Acetal CPVC Polypropylene (PP) Polypropylene - Conductive PTFE PVC PVDF (to 250 psi)	Aflas Buna-N Buna-N (FoodGrade) EPDM Hypalon Neoprene PTFE Santoprene Silicone (FoodGrade) Viton	0.5" to 1" (15 to 25 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	250 psi (17.2 bar)	Adjustable Automatic Chargeable Inlet Stabilizer	7 to 9 lbs (3.18 to 4.08 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
	Alloy 20 (A20) Carbon Steel (CS) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)		0.75" to 1.5" (20 to 40 mm)					



Plastic Series	Wetted / Non- Wetted
301	PP / PP
305	PP / PP
311	PVC / PVC
321	PP- Cond / PP- Cond
331	CPVC / CPVC
401	PVDF / PP
421	PVDF / PVDF
651	PTFE / PTFE
661	PTFE / PTFE
801	Acetal / PP

Metal Series	Wetted / Non- Wetted
3020	SS / SS
3024	SS / CS
3040	CS / CS
3075	A20 / SS
3085	HAST / SS
7220	SS / SS
8220	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

175 in³ (2.87 L)

SENTRY I

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
Plastic 	Noryl (non-wetted only) Polypropylene (PP) PTFE PVC PVDF	Aflas Buna-N EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	1.5" to 2" (40 to 50 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	150 psi (10.3 bar)	Adjustable Automatic Chargeable	18 to 22 lbs (8.16 to 9.98 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
Metal 	Alloy 20 (A20) Carbon Steel (CS) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)		1.5" to 2.5" (40 to 70 mm)		1000 psi (68.9 bar)		34 to 37 lbs (15.42 to 16.78 kg)	



Plastic Series	Wetted / Non- Wetted
501	PTFE / PTFE
901	PP / Noryl
905	PP / Noryl
911	PVC / Noryl
915	PVC / Noryl
1201	PVDF / Noryl
1221	PVDF / PVDF

Metal Series	Wetted / Non- Wetted
2175	A20 / SS
2185	HAST / SS
2500	SS / Noryl
2520	SS / SS
2700	CS / Noryl
2720	CS / CS
7125	SS / SS
8125	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

370 in³ (6.06 L)

SENTRY I


Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
Plastic 	Polypropylene (PP) PTFE PVC PVDF	Aflas Buna-N EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	1.5" to 2" (40 to 50 mm)	FNPT BSP ANSI Flange DN Flange Socket Weld Tri-Clamp Union Fitting	200 psi (13.7 bar)	Adjustable Automatic Chargeable Inlet Stabilizer	24 to 27 lbs (10.80 to 12.25 kg)	ATEX ISO 9001:2008 NAFTA CRN PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
Metal 	Alloy 20 (A20) Carbon Steel (CS) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP)	Aflas Buna-N EPDM Hypalon Neoprene PTFE Santoprene Silicone (Food Grade) Viton	2" to 2.5" (50 to 70 mm)		1000 psi (68.9 bar)		42 to 50 lbs (19.05 to 22.68 kg)	

Plastic Series	Wetted / Non- Wetted
101	PP / PP
105	PP / PP
111	PVC / PVC
115	PVC / PVC
201	PVDF / PP
221	PVDF / PVDF
551	PTFE / PTFE

Metal Series	Wetted / Non- Wetted
2075	A20 / SS
2085	HAST / SS
2400	SS / PP
2420	SS / SS
2425	SS / CS
2600	CS / PP
2620	CS / CS
7120	SS / SS
8121	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

275 in³ (4.50 L)


Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
<p>Metal</p> 	Stainless Steel – 30 RA Polished (SSP)	EPDM (Food Grade) Silicone (Pharma Grade)	2.5" (70 mm)	Tri-Clamp	150 psi (10.3 bar)	Adjustable Chargeable	8 to 10 lbs (3.63 to 4.54 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing

Metal Series	Non- Wetted
275	SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

577 in³ (9.46 L)

SENTRY 2" AL

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
Metal 	Aluminum (AL)	Buna-N EPDM Neoprene Viton	2" (50 mm)	FNPT BSP ANSI Flange DN Flange	150 psi (10.3 bar)	Adjustable Automatic Chargeable Inlet Stabilizer	32 to 38 lbs (14.51 to 17.24 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing



Metal Series	Non- Wetted
577	AL / AL

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

1155 in³ (18.9 L; 5 gallon)



SENTRY IV

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
Plastic 	Polypropylene (PP)	Buna-N EPDM Hypalon Neoprene PTFE Silicone (Food Grade) Viton	3" (80 mm)	ANSI Flange DN Flange Hammer Union Tri-Clamp NPTF	90 psi (6.2 bar)	Adjustable Automatic Chargeable Inlet Stabilizer	33 to 36 lbs (14.97 to 16.33 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing
Metal 	Aluminum (AL) Alloy 20 (A20) Epoxy Coated Aluminum (ECAL) Carbon Steel (CS) Epoxy Coated Carbon Steel (ECCS) Hastelloy C (HAST) Stainless Steel (SS) Stainless Steel - 30 RA Polished (SSP) Duplex Stainless Steel (DSS)		3" to 6" (80 to 150 mm)					


Plastic Series	Wetted / Non- Wetted
P4000	PP / PP

Metal Series	Wetted / Non- Wetted
4000	AL / AL
4015	ECAL/ ECAL
4020	SS / SS
4030	CS / AL
4040	CS / CS
4045	ECCS/ ECCS
4046	ECCS/ AL
4050	SS / AL
4060	SS / CS
4065	SS / ECCS
4070	A20 / A20
4075	A20 / SS
4080	HAST / HAST
4085	HAST / SS
7420	SS / SS
8420	SSP / SSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

2310 in³ (37.9 L; 10 gallon)


SENTRY V

Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
 <p>Metal</p>	Carbon Steel (CS) Epoxy Coated Carbon Steel (ECCS) 316 Stainless Steel (SS) Duplex Stainless Steel (DSS)	Buna-N EPDM Hypalon Neoprene Silicone (Food Grade) Viton	3" to 6" (80 to 150 mm)	ANSI Flange DN Flange	275 psi (18.9 bar)	Adjustable Automatic Chargeable Inlet Stabilizer	145 to 155 lbs (65.77 to 70.31 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Hydrostatic Testing Dye Penetrant Test X-Ray/Radiography PMI Testing Bolt Tensile Testing Customer Specified Testing

Metal Series	Wetted / Non-Wetted
5040	CS / CS
5045	ECCS / ECCS
5420	SS / SS
5440	CS / CS
5445	ECCS / ECCS
5620	SS / SS

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

AODDampener



Series	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Air Control Type	Est. Shipping Weight	Certifications & Testing
	316 Stainless Steel (SS)	PTFE back Buna	1.0" (25 mm) 1.5" (40 mm) 2.5" (50 mm)	FNPT BSP	150psi (10.3 bar)	Fully Automatic	18 lbs (8.16 kg)	ATEX ISO 9001:2008 Material Cert. Cert. of Origin Hydrostatic Testing

Series	Size & Inlet
AOD-10-NPT	1.0" NPT
AOD-10-BSP	1.0" BSP
AOD-15-NPT	1.5" NPT
AOD-15-BSP	1.5" BSP
AOD-20-NPT	2.0" NPT
AOD-20-BSP	2.0" BSP

Accessories
Charging Kits Bladder Replacement Kits Hardware Replacement Kits Pressure Relief Valves Back Pressure Valves Gauge Guards Gauge Upgrades Spill Containment for AODD

About
The Blacoh AODDampener is specifically designed for AODD pumps and constructed of 316L Stainless Steel with a PTFE back diaphragm. The single configuration will allow the unit to handle most AODD applications and is great of off-the-shelf capabilities.

SENTINEL Gauge Guard / Diaphragm Seal


Series Material	Body Material	Bladder Material	Inlet Size	Inlet Type	Max Pressure	Est. Shipping Weight	Certifications & Testing
Plastic 	CPVC Polypropylene (PP) PVC PVDF	EPDM PTFE Viton	1/2" (12.7 mm)	FNPT BSP Socket Weld Union Fitting	200 psi (13.7 bar)	1-2 lbs (0.5 to 0.9 kg)	ATEX ISO 9001:2008 NAFTA PED ARRA 3.1 Cert. Material Cert. Cert. of Origin Customer Specified Testing
Metal 	Alloy 20 (A20) Stainless Steel (SS)		1/2" (12.7 mm)		1000 psi (68.9 bar)	2-3 lbs (0.9 to 1.4 kg)	

Plastic Series	Wetted / Non- Wetted
PVDF CPVC PVC PP	PVDF / PVDF CPVC / CPVC PVC / PVC PP / PP

Metal Series	Wetted / Non- Wetted
A20 SS	A20 / A20 SS / SS

About
SENTINEL Diaphragm Seals employ a chemically resistant diaphragm to effectively isolate process fluids from gauges and other process instrumentation. This durable diaphragm allows SENTINEL to accurately transfer process pressure without direct contact with hazardous or corrosive fluids.

SPILLSTOP Leak Containment

Series Material	Body Material	Lid Material	Inlet Size	Inlet Type	Add On	Air Inlet	Est. Shipping Weight	Certifications & Testing
	Hastelloy C (HAST) Polypropylene (PP) PVC PVDF Stainless Steel (SS)	Noryl PVDF Stainless Steel	3/4-1" (19-25 mm)	FNPT BSP	Whistle Electronic Switch	1/4" (6.4 mm)	25-55 lbs (11.3 to 25.0 kg)	ATEX ISO 9001:2008 NAFTA ARRA 3.1 Cert. Material Cert. Cert. of Origin

Series	Housing/Lid
SPS-10	PP / NORYL
SPS-11	PVC / NORYL
SPS-20	SS / NORYL
SPS-21	SS / SS
SPS-30	PVDF / NORYL
SPS-31	PVDF / PVDF
SPS-33	PVDF / PVDF
SPS-39	PVDF / NORYL
SPS-80	HAST / NORYL

About

The SPILLSTOP Leak Containment System attaches directly to the exhaust of an air operated diaphragm pump. When pump diaphragms fail, SPILLSTOP captures dangerous and/or expensive process fluid in an internal receptacle while raising a float switch to automatically shut down the pump. SPILLSTOP can also be configured to sound a warning alarm and/or initiate a backup pump switchover.

SENTINEL™ Pressure Relief Valve

SENTINEL Pressure Relief Valves protect pumping systems from over-pressure damage caused by defective equipment or a blockage in the system line. They consist of a spring and diaphragm that is pushed down on a seat to a preset adjustable pressure setting. Once the pressure is exceeded, the seat is lifted off the relief port and the excess fluid pressure flows back to a holding tank or the suction side of the pump. When the pressure is reduced, the spring pushes the seat back over the discharge port.



SENTINEL™ Back Pressure Valve

SENTINEL Back Pressure Valves enhance system performance by applying a continuous back pressure to the pump. The diaphragm is held against the valve seat by an internal ring. When the valve's present pressure is exceeded, the diaphragm is forced up and system fluid flows through the valves to the injection point.



SENTINEL™ Check Valve & Poppet Valve

By preventing reverse flow, SENTINEL Ball Check Valves and Poppet Valves can be used as one-way valves, injection valves, or to prevent backflow. The internal ball or poppet functions as a positive shutoff to ensure process fluid does not go back up the line.



SENTINEL™ Calibration Column

Calibration columns or cylinders give accurate calibration of chemical metering pumps and enhance feed systems by verifying the fluid flow rate. They are offered in clear PVC or Borosilicate glass.







Charging Kit

Charging Hose Kit for Blacoh CT, H, TG or XP models. Includes an 8' (2.4 m) length of hose with a 1/4" (6mm) NPT male fitting at one end for connection to a regulator at the Nitrogen source and a charging fitting and gauge on the opposite end.



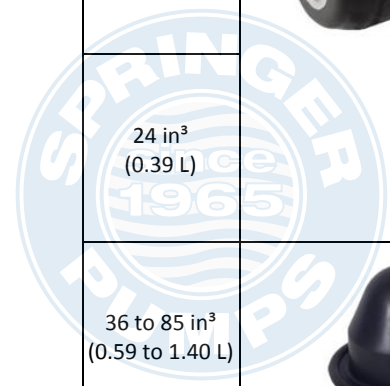
Air Control Types

TYPE	DESCRIPTION	MAX PRESSURE	INSTALLATION
ADJUSTABLE 	<ul style="list-style-type: none"> -Mounted on single port -Self relieving regulator -Gauge and one-way check valve -Compressed air line must be permanently attached to the regulator 	150 psi (10.3 bar)	<ul style="list-style-type: none"> -Within 10 pipe diameters of pump discharge -Connect to a constant source of air -Do NOT use oxygen -Charge dampener to 80% of operating pressure -Adjust dampener PSI to minimize pulse level
AUTOMATIC 	<ul style="list-style-type: none"> -Mounted on single port -Automatic valve assembly on center port -Gauge and one-way check valve -Automatically self adjusts as system pressure increases/decreases and resets when system restarts 	150 psi (10.3 bar)	<ul style="list-style-type: none"> -Within 10 pipe diameters of pump discharge -Connect to a constant source of air -Do NOT use oxygen -Dampener gauge will read system pressure -No further adjustments are needed
CHARGEABLE 	<ul style="list-style-type: none"> -Gauge and charging valve -Leak-proof operation in corrosive environments -No permanent source of compressed gas -Manually bled or charged to required pressure 	10,000 psi (689.5 bar)	<ul style="list-style-type: none"> -Within 10 pipe diameters of pump discharge -Charge to recommended percentage of system operating pressure with compressed air or clean dry nitrogen -Do NOT use oxygen
INLET STABILIZER 	<ul style="list-style-type: none"> -Adjustable for suction lift or positive inlet conditions -Consists of compound pressure gauge, a pressure/vacuum tight ball valve and a Venturi valve 	30 inHg (30 psi) (2.1 bar)	<ul style="list-style-type: none"> -Within 10 pipe diameters of pump discharge -Use compressed air line and air chuck to pressurize or create a vacuum -Do NOT use oxygen -Vacuum charge to 5-7 inHg for suction lift or charge to 50% of static inlet pump pressure for flooded suction

Bladders & Bellows

CAPACITY	BLADDERS	PTFE BELLOWS
4 to 10 in ³ (0.06 to .16 L)		
8 in ³ (0.13 L)		
12 in ³ (0.20 L)		
24 in ³ (0.39 L)		
36 to 85 in ³ (0.59 to 1.40 L)		

CAPACITY	BLADDERS	PTFE BELLOWS
175 to 370 in ³ (2.87 to 6.06 L)		
275 in ³ (4.50 L)		
577 in ³ (9.46 L)		
1155 in ³ (5 gal) (18.93 L)		
2310 in ³ (10 gal) (37.85 L)		
AODDampener 1.0, 1.5, 2.0" Inlet (25, 40, 50 mm)		
PTFE Back Diaphragm		



Bladders & Bellows

ELASTOMER MATERIALS	TEMPERATURE LIMITS	APPLICATIONS
Aflas	0°F to +400°F (-18°C to +204°C)	High temperature, petroleum based chemicals, strong acids and bases.
Buna	+10°F to +180°F (-12°C to +82°C)	Good flex life; use with petroleum, solvents and oil-based fluids.
FDA Buna	+10°F to +180°F (-12°C to +82°C)	FDA-approved food grade; similar characteristics of regular Buna.
EPDM	-60°F to +280°F (-51°C to +138°C)	Use in extreme cold; good chemical resistance with ketones, caustics.
Hypalon	-20°F to +275°F (-29°C to +135°C)	Excellent abrasion resistance; good in aggressive acid applications.
Neoprene	0°F to +200°F (-18°C to +93°C)	Good abrasion resistance and flex; use with moderate chemicals.
PTFE	-20°F to +220°F (-29°C to +104°C)	Bellows design; excellent flex life; use with highly aggressive fluids.
Santoprene	-20°F to +225°F (-29°C to +107°C)	Excellent choice as a low cost alternative for PTFE in many applications.
FDA Silicone	-20°F to +300°F (-29°C to +149°C)	FDA-approved food grade material; for use in food and pharmaceutical processing.
USP Class VI Silicone	-20°F to +300°F (-29°C to +149°C)	Pharmaceutical grade material; for use in food and pharmaceutical processing.
Viton®	-10°F to +350°F (-23°C to +177°C)	Use in hot and aggressive fluids; good with aromatics, solvents, acids and oils.

TESTING & CERTIFICATIONS



TESTING & ENGINEERING	PARTS	PART NUMBER	NOTES
STANDARD UNIT TEST CERTIFICATION	ALL UNITS	DOC-TEST CERT	STANDARD BFC TEST PERFORMED ON ALL UNITS NO MODIFICATIONS TO TESTING PROCEDURE
HYDROSTATIC TEST & CERTIFICATE	ALL UNITS	DOC-HYDRO	STANDARD BFC FORMAT DOCUMENT
HYDROSTATIC TEST & CERTIFICATE – WITNESSED	ALL UNITS	DOC-HYDRO TEST- WITNESSED	CONSULT FACTORY FOR DETAILS
XRAY EXAM & DYE PENETRANT TEST	METAL UNITS	DOC-XRAYDYE	CONSULT FACTORY FOR DETAILS
DYE PENETRANT TEST	METAL UNITS	DOC-DYE	CONSULT FACTORY FOR DETAILS
XRAY/RADIOGRAPHY	METAL UNITS	DOC-XRAY	CONSULT FACTORY FOR DETAILS
POSITIVE MATERIAL IDENTIFICATION	ALL METAL HOUSINGS	DOC-PMI	CONSULT FACTORY FOR DETAILS
BOLT TENSILE TEST REPORT	BOLTS	DOC-BOLT	STANDARD BFC FORMAT DOCUMENT
GAUGE TESTING	GAUGES	DOC-GAUGE	STANDARD BFC FORMAT DOCUMENT
SPILLSTOP UNIT TESTING	SPILLSTOP	DOC-TEST-SS	STANDARD BFC FORMAT DOCUMENT
CUSTOMER OR THIRD PARTY INSPECTION		CONTACT FACTORY	CONSULT FACTORY FOR DETAILS
ASME CALCULATIONS		ASME CALC	CONSULT FACTORY FOR DETAILS

MATERIAL CERTIFICATION	PARTS	PART NUMBER	NOTES
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	SENTRY PRODUCT (NO LOT NUMBERS)	DOC-MC-SENTRY	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	SPILL STOP PRODUCT (NO LOT NUMBERS)	DOC-MC-SS	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	GAUGE GUARD PRODUCT (NO LOT NUMBERS)	DOC-MC-GG	STANDARD BFC FORMAT DOCUMENT
CERTIFICATE OF CONFORMANCE TO PO	ALL ORDERS	DOC-COC	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	BLADDER	DOC-MCB	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	WETTED & NONWETTED HOUSING	DOC-MCWN	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	WETTED HOUSING & BLADDER	DOC-MCWB	STANDARD BFC FORMAT DOCUMENT
MATERIAL CERTIFICATION & CERTIFICATE OF CONFORMANCE	WETTED & NONWETTED HOUSING, BLADDER	DOC-MCWNB	STANDARD BFC FORMAT DOCUMENT
CERTIFICATION OF OIL FREE WETTED ASSEMBLY	WETTED HOUSING OF UNIT	DOC-OIL	STANDARD BFC FORMAT DOCUMENT
MILL TEST REPORT (MTR) CHEMICAL COMPOSITION & HEAT NUMBER	WETTED HOUSING - METAL ONLY	DOC-MTR-METAL-W	CHEMISTRY REPORT FROM FOUNDRY (NOT AVAILABLE ON ALL PRODUCT)
MILL TEST REPORT (MTR) CHEMICAL COMPOSITION & HEAT NUMBER	WETTED, NONWETTED HOUSING – METAL ONLY	DOC-MTR-METAL-WN	CHEMISTRY REPORT FROM FOUNDRY (NOT AVAILABLE ON ALL PRODUCT)
3.1 (EN10204) CERTIFICATION	WETTED HOUSING - METAL ONLY	DOC-CERT 3.1-W	CHEMISTRY REPORT FROM FOUNDRY (NOT AVAILABLE ON ALL PRODUCT)
3.1 (EN10204) CERTIFICATION	WETTED, NONWETTED HOUSING – METAL ONLY	DOC-CERT 3.1-WN	CHEMISTRY REPORT FROM FOUNDRY (NOT AVAILABLE ON ALL PRODUCT)
3.1 (EN10204) CERTIFICATION & HYDRO TESTING	SENTRY PRODUCTS	DOC-CERT 3.1H	CHEMISTRY REPORT FROM FOUNDRY & HYDRO TEST (NOT AVAILABLE ON ALL PRODUCT)
CE STATEMENT	VARIOUS	DOC-CE1	COMPLIANCE WITH PED CAT 1, GROUP 1 (NOT AVAILABLE ON ALL PRODUCT)
SILICONE FREE STATEMENT	ALL PRODUCTS	DOC-SILICONE	STANDARD BFC FORMAT DOCUMENT

TESTING & CERTIFICATIONS



ORDER DOCUMENTATION	PARTS	PART NUMBER	NOTES
NAFTA CERTIFICATION	NORTH AMERICA ORDERS	DOC-NAFTA	
CERTIFICATION OF ORIGIN	ANY ITEM	DOC-COO	STANDARD BFC FORMAT DOCUMENT
CERT OF CONFORMANCE FOR ORDER	ANY ORDER	COC	STANDARD BFC FORMAT DOCUMENT
EC ATEX DECLARATION OF CONFORMITY	ALL ATEX UNITS	DOC-EC	STANDARD BFC FORMAT DOCUMENT
EC ATEX DECLARATION OF CONFORMITY IN GERMAN	ALL ATEX UNITS	DOC-EC-GR	STANDARD BFC FORMAT DOCUMENT
EC PED DECLARATION OF CONFORMITY	ALL PED UNITS	DOC-EC-PED	STANDARD BFC FORMAT DOCUMENT
EC WORK TEST CERTIFICATE	ALL PED UNITS	DOC-EC-WORK	STANDARD BFC FORMAT DOCUMENT
DOCUMENTATION-NON STANDARD-CUSTOMER SPECIFIED		DOC-CS	THIS IS A MINIMUM FEE. MAY VARY BY ORDER. CONSULT FACTORY.

CERTIFICATES OF ORIGIN	PARTS	PART NUMBER	NOTES
CERTIFICATE OF ARRA BUY AMERICAN ACT	ALL	DOC-ARRA	STANDARD BFC FORMAT DOCUMENT
CERTIFICATE OF PRODUCTS MADE IN USA	ALL	DOC-COO-USA	STANDARD BFC FORMAT DOCUMENT
CERTIFICATE OF PRODUCTS MADE IN USA (FOR KOREA)	ALL - USE FOR KOREA ONLY	DOC-COO-USA-K	COMPLIANCE TO KOREA-USA FREE TRADE AGREEMENT-STANDARD BFC DOCUMENT
CERTIFICATE OF PRODUCTS MADE IN USA (FOR NIKKISO KOREA)	ALL - USE FOR NIKKISO KOREA ONLY	DOC-COO-USA-NIK	COMPLIANCE TO KOREA-USA FREE TRADE AGREEMENT-STANDARD BFC DOCUMENT

DRAWINGS	PARTS	PART NUMBER	NOTES
STANDARD PRODUCT OUTLINE DRAWING	ALL UNITS	N/A	AVAILABLE AT WWW.BLACOH.COM
STANDARD CERTIFIED PRODUCT OUTLINE DRAWING	ALL UNITS	N/A	SIGNED & DATED BY BLACOH ENGINEERING DEPT
SPECIAL CERTIFIED PRODUCT OUTLINE DRAWING	ALL UNITS	N/A	SIGNED & DATED BY BLACOH ENGINEERING DEPT

FEES	PARTS	PART NUMBER	NOTES
CUSTOMER SUPPLIED GAUGE MOUNTED ON PRODUCT		CSG	
FILLING OF GAUGE GUARD - 2" AND UNDER	GAUGE GUARDS	FILL	CAN BE ANY TYPE OF INSTRUMENTATION
FILLING OF GAUGE GUARD - 3" AND OVER	GAUGE GUARDS	FILL-3	CAN BE ANY TYPE OF INSTRUMENTATION
FILL, MINERAL OIL, 2" INSTRUMENTS AND UNDER	GAUGE GUARDS	FILL-M	CAN BE ANY TYPE OF INSTRUMENTATION
FILL, MINERAL OIL, 3" INSTRUMENTS AND OVER	GAUGE GUARDS	FILL-M	CAN BE ANY TYPE OF INSTRUMENTATION
LABOR		LABOR	PER HOUR
FILL FOR SPECIAL INSTRUMENTATION		FILL-SPECIAL	VARIES BY TYPE
PMT BY WIRE TRANSFER UNDER \$1,000		BANK	BANK FEE CHARGED FOR SMALL WIRES
DROP SHIP OUTSIDE THE UNITED STATES	ANY ORDER	DROP SHIP	THIS IS A MINIMUM FEE. MAY VARY BY ORDER. CONSULT FACTORY.
CANCELLATION FEE	ANY ORDER	CANCEL	

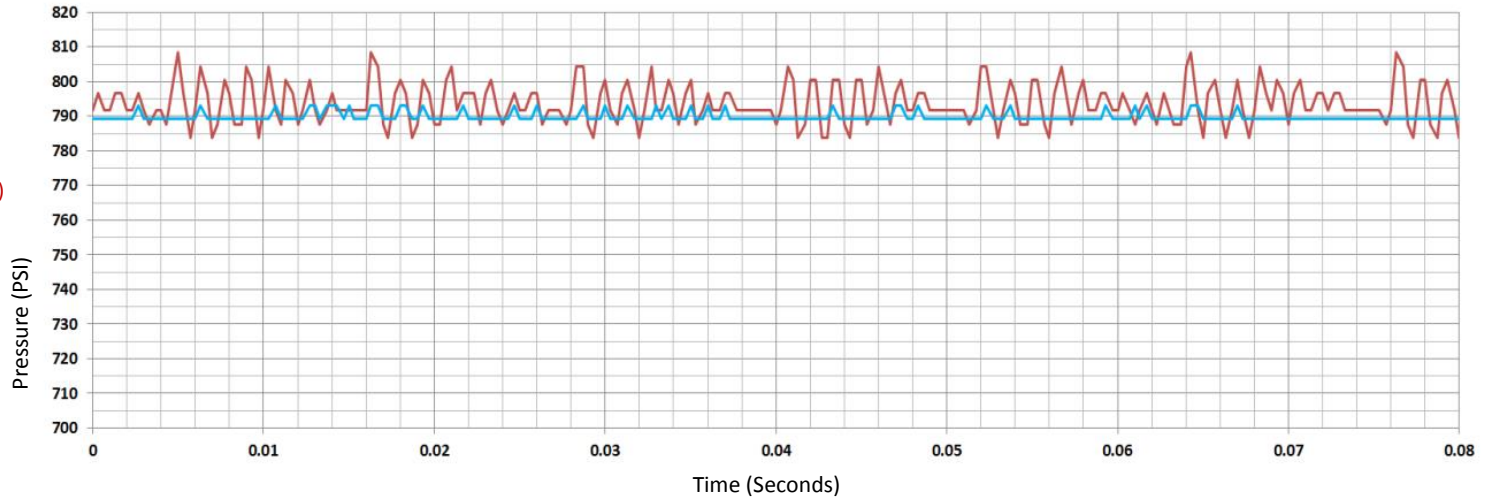
PERFORMANCE CHARTS



Triplex Pump

With SENTRY XPH Dampener

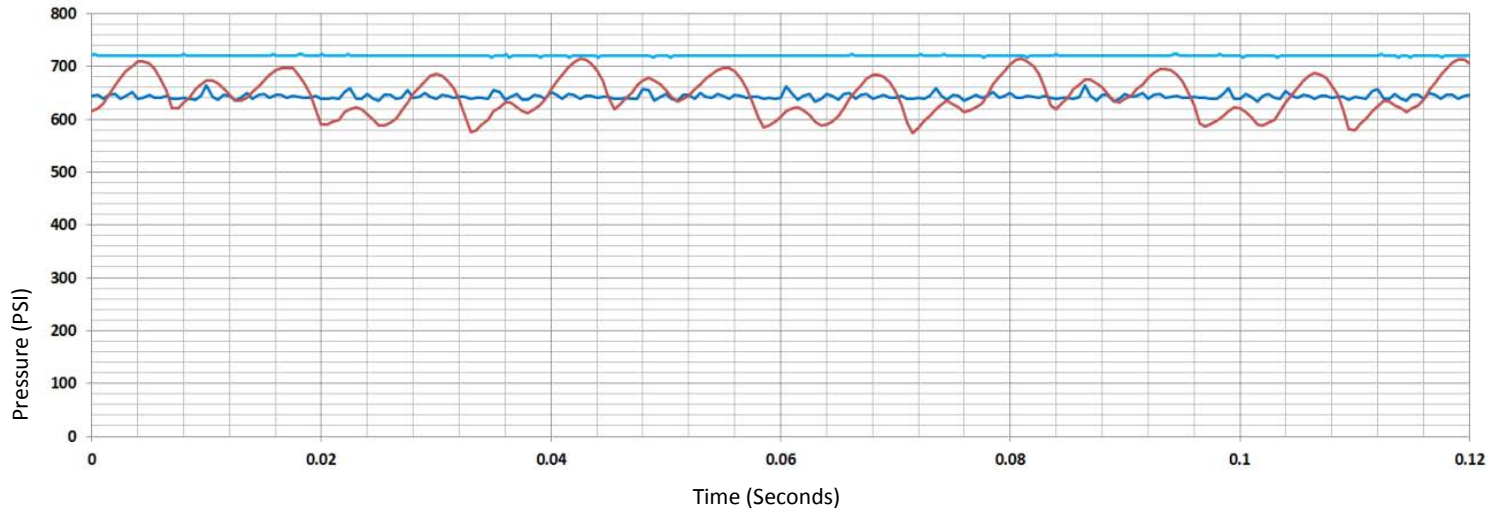
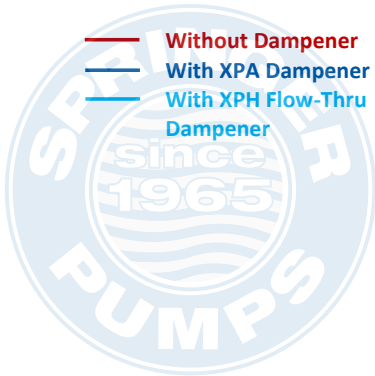
- Without Dampener (1715 rpm, 757 pulses/s)
- With XPH Flow-Thru Dampener (± 4 PSI)



Triplex Pump

With SENTRY XP Dampeners

- Without Dampener
- With XPA Dampener
- With XPH Flow-Thru Dampener

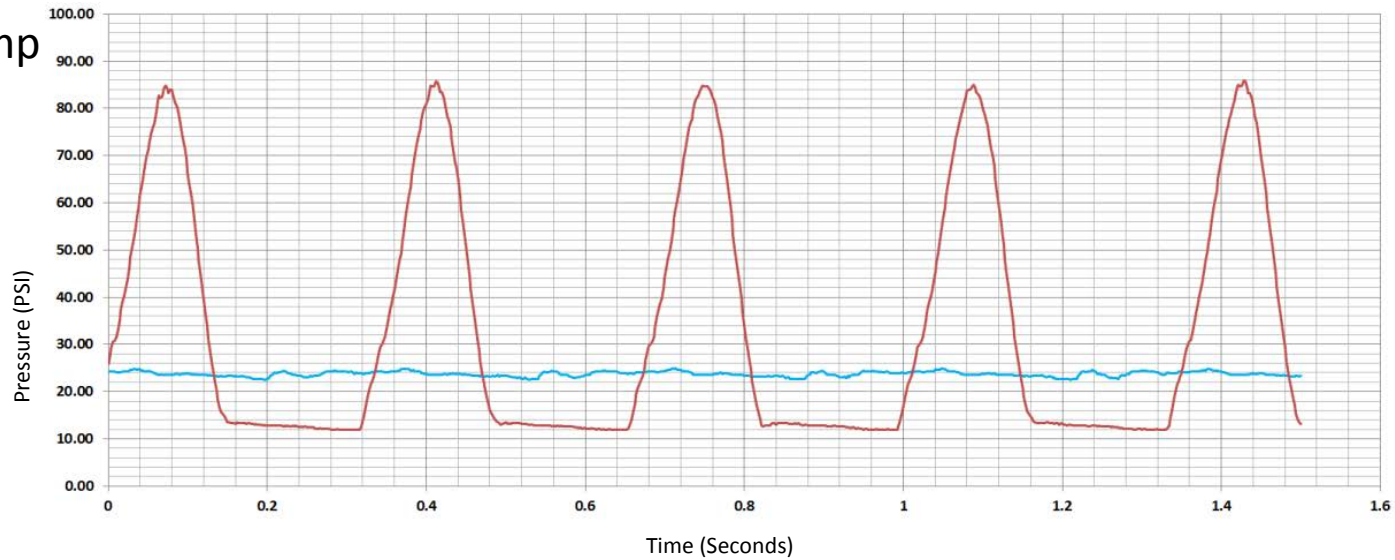


PERFORMANCE CHARTS

1" Metering Pump

With SENTRY II Dampener

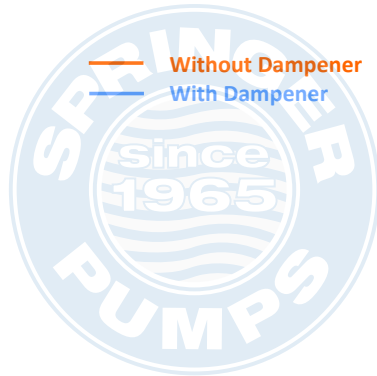
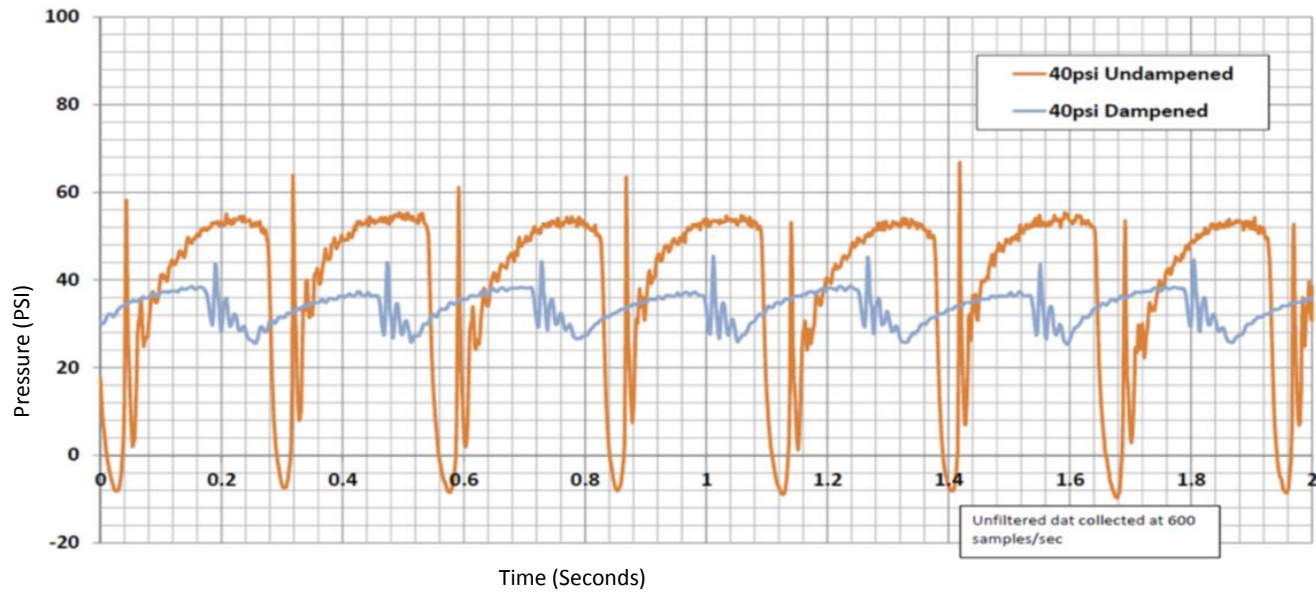
— Without Dampener
— With Dampener



1" AODD Pump

With 1" AODDampener

— Without Dampener
— With Dampener



E-Configurator

- ✓ Build your dampener online, and get a CAD drawing to your specifications



SpeedQuote

- ✓ A quick and easy way to request quotes online. Always available 24/7



Drawings

- ✓ Engineering assistance and 3D drawings also available upon request
- ✓ Easy implementation into your system model



Literature & Manuals

- ✓ Literature available in multiple languages
- ✓ Installation manuals in multiple languages
- ✓ Certifications



Application Assistance

- ✓ Stories & Case Studies
- ✓ Training Videos
- ✓ Maintenance Videos



Media Capabilities

- ✓ Blacoh TV
- ✓ Video Production
- ✓ Infotainment
- ✓ Graphic Design



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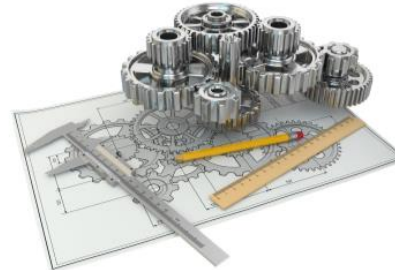
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CONVERSIONS & SIZING



FLOW	
Liter/Min x 0.26	=Gal/Min (US)
Gal/Min x 3.79	=Liter/Min
Lbs. of Water/Hr x 0.002	=Gal/Min (US)
Gal/Min x 500.7	=Lbs of Water/Hr
<u>Lbs of Fluid/Hr x 0.002</u> Specific Gravity	=Gal/Min
m ³ Hr x 4.40	=Gal/Min (US)
Gal/Min x 0.23	=m ³ / Hr
kg of water/Min x 0.26	=Gal/Min (US)
Gal/Min x 3.79	=kg of Water/Min

VOLUME	
Lbs. of Water x 0.12	=Gallon
Gallon (UK) x 1.20	=Gallon (US)
Gallon x 128	=Fluid Ounces
ft ³ x 7.48	=Gallon
in ³ x .0043	=Gallon
Gallon x 3.79	=Liters
Liter x 0.26	=Gallon
m ³ x 264.2	=Gallon
m ³ x 1000	=Liter
Liters x 1000	=cm ³
cm ³ x 0.034	=Fluid Ounces
Fluid Ounces x 29.57	=cm ³

PRESSURE	
Ft of Water x 0.43	=PSI
PSI x 2.31	=Ft of Water
Inches Hg x 0.49	=PSI
Inches Hg x 1.13	=Ft of Water
ATM x 14.69	=PSI
ATM x 33.9	=Ft of Water
Kg/ cm ² x 14.22	=PSI
Meters of Water x 1.42	=PSI
ATM x 760.0	=mm Hg
mm Hg x .039	=Inches Hg
Bar x 14.5	=PSI
Newton/Meter ²	=Pascal
PSI x 6.89	=kPa
kPa x 0.145	=PSI
PSI x 0.069	=Bar

CERTIFICATES & TESTING
CRN
NAFTA
ATEX
NACE
3.1
PED COMPLIANCE
CERTIFICATE OF ORIGIN
ARRA COMPLIANCE
MATERIAL CERTS
TEST CERTS
DYE PENETRATION TESTING
X-RAY/ RADIOGRAPHY
BOLT TESTING

PROBLEMS	SOLUTIONS
Shaking Pipes	Blacoh Pulsation Dampener
PD Pump Pulsations	Blacoh Pulsation Dampener
System Damage Due To Pressure Spikes	Blacoh Surge Suppressor
Hydraulic Noise	Blacoh Surge Suppressor
Premature Pump (Component) Failure	Blacoh Dampener / Suppressor
Valves Leaking	Blacoh Dampener / Suppressor
Fittings Breaking	Blacoh Pulsation Dampener

AODD SIZING	
AODD PUMP PORT SIZE	BLACOH DAMPENER
1/4"	10 in ³ (0.16 L)
3/8"	10 in ³ (0.16 L)
1/2"	36 in ³ (0.59 L)
3/4"	85 in ³ (1.40 L)
1"	1.0" AODDampener
1.25"	175 in ³ (2.87 L)
1.50"	1.5" AODDampener
2"	2.0" AODDampener
3"	5 Gal (18.93 L)
4"	5 or 10 Gal (37.85 L)

PERISTALTIC PUMP: 2 SHOE/ROLLER			
PORT SIZE	GALLON PER REVOLUTION	LITER PER REVOLUTION	SENTRY DAMPENER
1/4" – 1/2"	0.001-0.010	0.0038 - 0.038	10 in ³ (0.16 L)
3/4"	0.011 - 0.025	0.041 - 0.950	36 in ³ (0.59 L)
1"	0.026 - 0.080	0.098 - 0.303	85 in ³ (1.40 L)
1.25"	0.081 - 0.390	0.306 - 1.476	175 in ³ (2.87 L)
2" - 2.5"	0.400 - 0.890	1.514 - 3.369	370 in ³ (6.06 L)
2"	0.400 - 0.890	1.514 - 3.369	577 in ³ (9.46 L)
3" - 4"	0.900- 3.100	3.407 - 11.74	5 Gal (18.93 L)
5" - 6"	3.110 - 6.000	11.77 - 22.71	10 Gal (37.85 L)