

A collage of various industrial equipment. It includes a large vertical cylindrical vessel with a flange, a smaller horizontal vessel with a handwheel, a large horizontal cylindrical vessel with multiple ports, a small circular pressure gauge with a needle, a black control box with a digital display and buttons, a black control box with a green button, and a black control box with a digital display and buttons. The equipment is arranged in a grid-like fashion.

Section 2

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TIONA®

20" (508mm) FULL OPENING MANHOLE

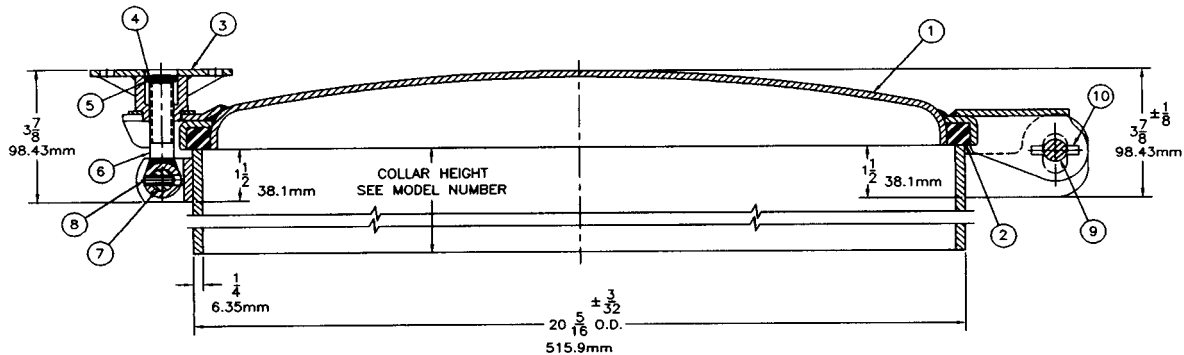


Model 8310

- THREADED HOLD-DOWNS
- HEAVY DUTY HINGES
- 4", 6", 10" HIGH COLLAR AVAILABLE

Tiona 20" Full Opening Manholes are fabricated for greater strength and less weight. Full 20 inch opening assures safe entrance for inspection or cleaning of tank. Extra heavy hinge pins and threaded swing bolts provide longer life and less maintenance

Weld Collar	Cover	Wing-Nut, Swing Bolts Hinge Pins	Number Holddowns	*Working Pressure	Weight	Collar Height	Assembly No.
Aluminum	Steel	Stnls 304	6	43.5 PSI 3 BAR	47LB 21.4Kg	4" (101.6mm)	8310ASW-4"
Aluminum	Stnls 316L	Stnls 304					8310ALW-4"
Steel	Steel	Stnls 304			58LB 26.4Kg		8310SCW-4"
Stnls 316L	Stnls 316L	Stnls 304					8310LCW-4"
Aluminum	Steel	Stnls 304	6	43.5 PSI 3 BAR	50LB 22.7Kg	6" (152.4mm)	8310ASW-6"
Aluminum	Stnls 316L	Stnls 304					8310ALW-6"
Steel	Steel	Stnls 304			68LB 30.9Kg		8310SCW-6"
Stnls 316L	Stnls 316L	Stnls 304					8310LCW-6"
Aluminum	Steel	Stnls 304	6	43.5 PSI 3 BAR	56LB 25.5Kg	10" (254mm)	8310ASW-10"
Aluminum	Stnls 316L	Stnls 304					8310ALW-10"
Steel	Steel	Stnls 304			86LB 36.28Kg		8310SCW-10"
Stnls 316L	Stnls 316L	Stnls 304					8310LCW-10"



No.	Description	Material	Part No.
1	Cover	Steel	6381MS
		Stainless 316L	6381LC
2	Gasket *	B Buna-N	3513BN
		V Viton	3513VT
		W White Hypalon	3513WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3513NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 304	3765SL
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin-Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3818SL
10	Roll Pin-Hinge Pin	Stnls 304	9Q8594

Tiona®

20" (508mm) FULL OPENING MANHOLE



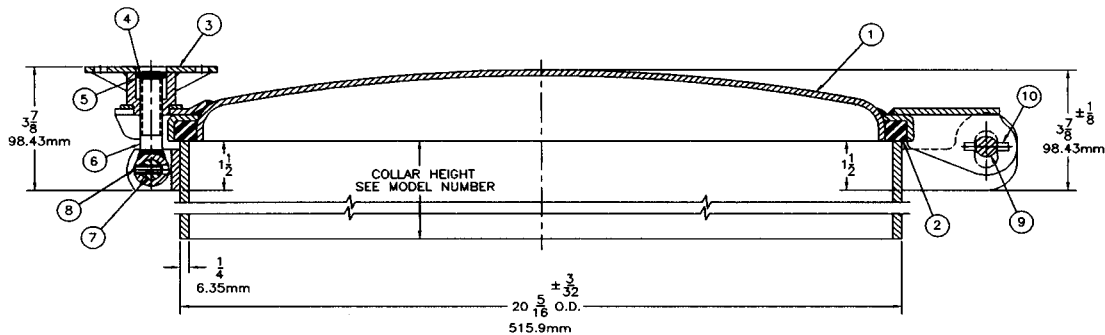
Model 8327

- THREADED HOLD-DOWNS
- LOW PROFILE
- 4", 6", 10" HIGH COLLAR AVAILABLE

Note: Not legal for DOT specification cargo tanks.

Tiona 20" Full Opening Manholes are fabricated for greater strength and less weight. Full 20 inch opening assures safe entrance for inspection or cleaning of tank.

Weld Collar	Cover	Wing-Nut, Swing Bolts Hinge Pins	Number Holddowns	*Working Pressure	Weight	Collar Height	Assembly No.
Aluminum	Steel	Stnls 304	4	5 PSI	44LB 20.0Kg	4" (101.6mm)	8327ASW-4"
Aluminum	Stnls 316L	Stnls 304					8327ALW-4"
Steel	Steel	Stnls 304			54LB 24.5Kg		8327SCW-4"
Stnls 316L	Stnls 316L	Stnls 304					8327LCW-4"
Aluminum	Steel	Stnls 304	4	5 PSI	47LB 21.4Kg	6" (152.4mm)	8327ASW-6"
Aluminum	Stnls 316L	Stnls 304					8327ALW-6"
Steel	Steel	Stnls 304			64LB 28.8Kg		8327SCW-6"
Stnls 316L	Stnls 316L	Stnls 304					8327LCW-6"
Aluminum	Steel	Stnls 304	4	5 PSI	53LB 24.1Kg	10" (254mm)	8327ASW-10"
Aluminum	Stnls 316L	Stnls 304					8327ALW-10"
Steel	Steel	Stnls 304			82LB 37.3Kg		8327SCW-10"
Stnls 316L	Stnls 316L	Stnls 304					8327LCW-10"



No.	Description	Material	Part No.
1	Cover	Steel	6403MS
		Stainless 316L	6403LC
2	Gasket *	B Buna-N	3513BN
		V Viton	3513VT
		W White Hypalon	3513WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3513NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 304	3765SL
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin-Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3818SL
10	Roll Pin-Hinge Pin	Stnls 304	9Q8594

TIONA®

20" (508mm) FULL OPENING MANHOLE

ASME TYPE

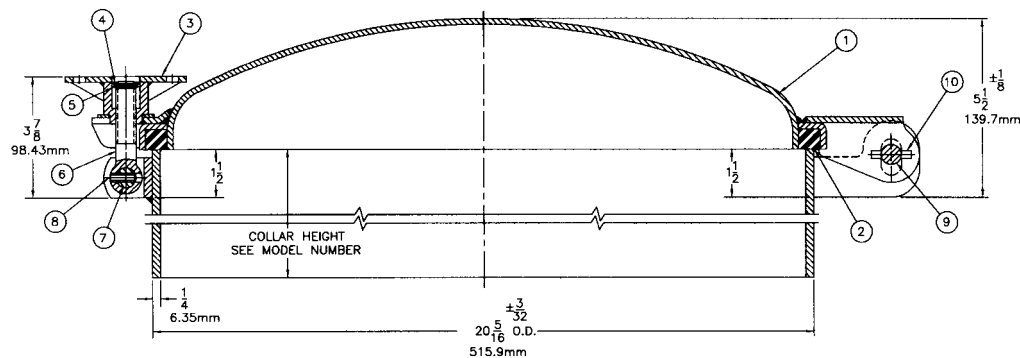


Model 8350

- ASME SYMBOL & DATA PROVIDED
- THREADED HOLD-DOWNS
- 6" or 10" HIGH COLLAR AVAILABLE

This Tiona 20" Full Opening Manhole conforms to the requirements of the ASME code for pressure vessels Section VIII, Division 1.

Weld Collar	Cover	Wing-Nut, Swing Bolts Hinge Pins	Number Holddowns	*Working Pressure	Weight	Collar Height	Assembly No.
Aluminum	Steel	Stnls 304	6	50 PSI 3.4 BAR	52LB 23.6Kg	6" (152.4mm)	8350ASW-6"
Aluminum	Stnls 316L	Stnls 304			8350ALW-6"		
Steel	Steel	Stnls 304			8350SCW-6"		
Stnls 316L	Stnls 316L	Stnls 304			8350LCW-6"		
Aluminum	Steel	Stnls 304	6	50 PSI 3.4 BAR	58LB 26.4Kg	10" (254mm)	8350ASW-10"
Aluminum	Stnls 316L	Stnls 304			8350ALW-10"		
Steel	Steel	Stnls 304			8350SCW-10"		
Stnls 316L	Stnls 316L	Stnls 304			8350LCW-10"		



No.	Description	Material	Part No.
1	Cover	Steel	6348FB
		Stainless 316L	6348LC
2	Gasket *	B Buna-N	3513BN
		V Viton	3513VT
		W White Hypalon	3513WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3513NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 17/4 PH	4102SF
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin-Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3818SL
10	Roll Pin-Hinge Pin	Stnls 304	9Q8594

20" (508mm) FULL OPENING MANHOLE

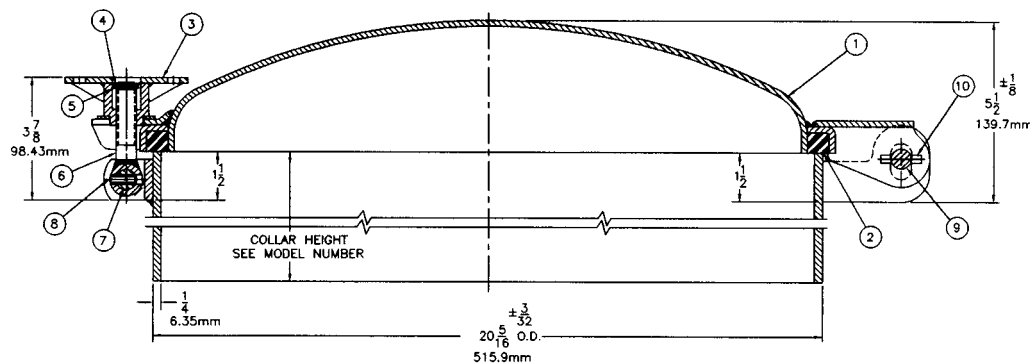


- THREADED HOLD-DOWNS
- 6" or 10" HIGH COLLAR AVAILABLE

Model 8355

Tiona 20" Full Opening Manholes are fabricated for greater strength and less weight. Full 20 inch opening assures safe entrance for inspection or cleaning of tank.

Weld Collar	Cover	Wing-Nut, Swing Bolts Hinge Pins	Number Holddowns	*Working Pressure	Weight	Collar Height	Assembly No.
Aluminum	Steel	Stnls 304	6	50 PSI 3.4 BAR	52LB 23.6Kg	6" (152.4mm)	8355ASW-6"
Aluminum	Stnls 316L	Stnls 304			8355ALW-6"		
Steel	Steel	Stnls 304			8355SCW-6"		
Stnls 316L	Stnls 316L	Stnls 304			8355LCW-6"		
Aluminum	Steel	Stnls 304	6	50 PSI 3.4 BAR	38LB 26.4Kg	10" (254mm)	8355ASW-10"
Aluminum	Stnls 316L	Stnls 304			8355ALW-10"		
Steel	Steel	Stnls 304			8355SCW-10"		
Stnls 316L	Stnls 316L	Stnls 304			8355LCW-10"		



No.	Description	Material	Part No.
1	Cover	Steel	6348FB
		Stainless 316L	6348LC
2	Gasket *	B Buna-N	3513BN
		V Viton	3513VT
		W White Hypalon	3513WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3513NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 304	3765SL
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin—Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3818SL
10	Roll Pin—Hinge Pin	Stnls 304	9Q8594

TIONA®

10" (254mm) PRESSURE FILL

ASME TYPE

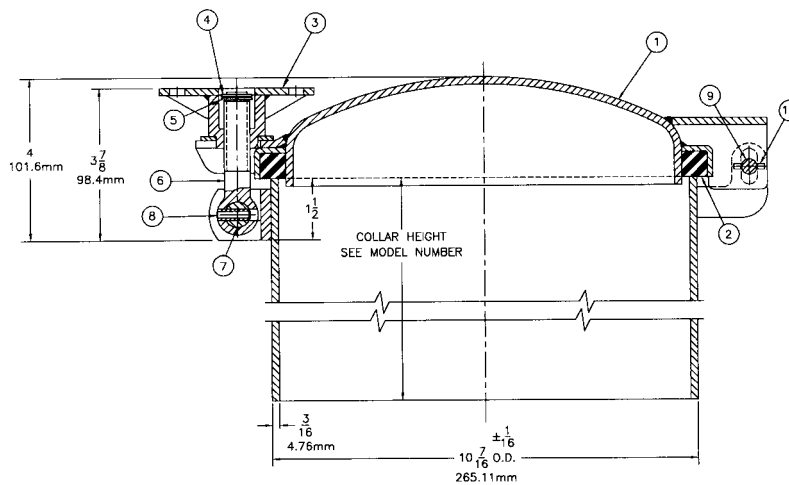


Model 8368

- ASME SYMBOL & DATA PROVIDED
- THREADED HOLD-DOWNS
- 6" or 10" HIGH COLLAR AVAILABLE

This Tiona 10" Pressure Fill conforms to the requirements of the ASME code for pressure vessels Section VIII, Division 1.

Weld Collar	Cover	Wing-Nut, Swing Bolts Hinge Pins	Number Holddowns	*Working Pressure	Weight	Collar Height	Assembly No.
Aluminum	Steel	Stnls 304	3	50 PSI 3.4 BAR	11.5LB 5.23Kg	6" (152.4mm)	8368ASW-6"
Aluminum	Stnls 316L	Stnls 304					8368ALW-6"
Steel	Steel	Stnls 304			21.5LB 9.77Kg		8368SCW-6"
Stnls 316L	Stnls 316L	Stnls 304					8368LCW-6"
Aluminum	Steel	Stnls 304	3	50 PSI 3.4 BAR	16.5LB 8.25Kg	10" (254mm)	8368ASW-10"
Aluminum	Stnls 316L	Stnls 304					8368ALW-10"
Steel	Steel	Stnls 304			32.5LB 14.77Kg		8368SCW-10"
Stnls 316L	Stnls 316L	Stnls 304					8368LCW-10"



No.	Description	Material	Part No.
1	Cover	Steel	6411FB
		Stainless 316L	6411LC
2	Gasket *	B Buna-N	3567BN
		V Viton	3567VT
		W White Hypalon	3567WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3567NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 17/4 PH	4102SF
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin-Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3618SL
10	Roll Pin-Hinge Pin	Stnls 304	9Q8601



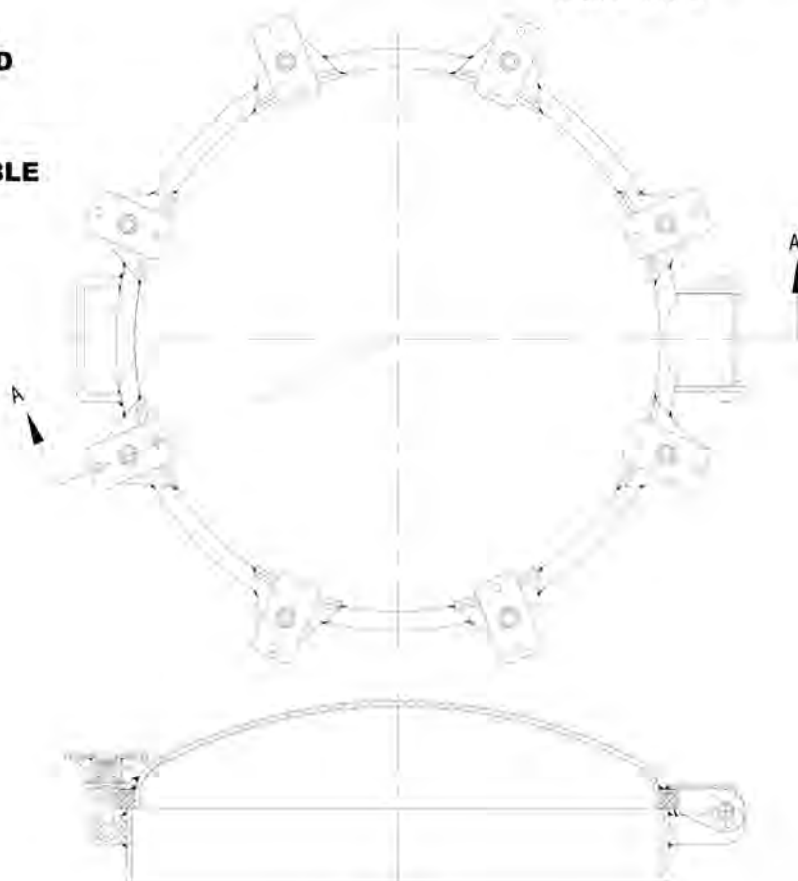
24" (609.6mm) FULL OPENING MANHOLE

ASME TYPE

ASME SYMBOL & DATA PROVIDED

THREADED HOLD-DOWNS

6" OR 10" HIGH COLLAR AVAILABLE



Section A-A
Model 8324

This Tiona 24" Full Opening Manhole conforms to the requirements of the ASME code for pressure vessels Section VIII, Division 1.

Weld Collar	Cover	Wing-Nut Washer Hinge Pins	Number Hold Downs	*Working Pressure		Weight	Collar Height	Assembly No.
Steel	Steel	Stnls 304	8	100 PSI	6.8 BAR	100LB	6" (152.4mm)	8324SCW-6"
Stnls 316L	Stnls 316L	Stnls 304				45.5Kg		8324LCW-6"
Steel	Steel	Stnls 304	8	100 PSI	6.8 BAR	125LB	10" (254mm)	8324SCW-10"
Stnls 316L	Stnls 316L	Stnls 304				56.9Kg		8324LCW-10"

Canadian Registration Number OH0344.0123456789

Notes: White Hypalon gasket furnished as standard (reference suffix "W" in assembly number). For other gaskets available, see parts page for correct suffix.

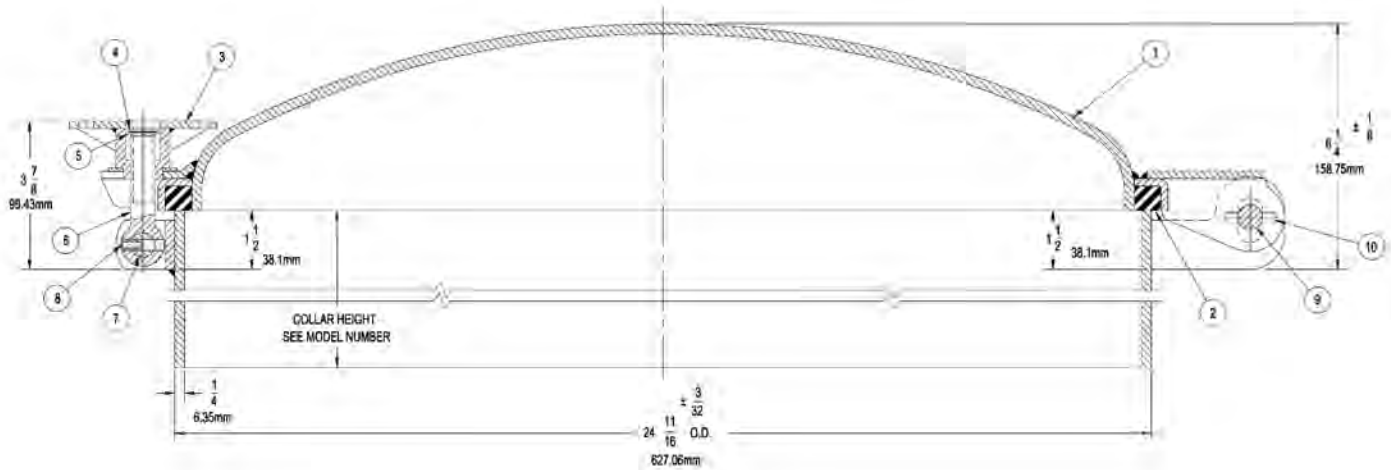
*Tests were conducted and ratings determined with homogeneous gaskets

During installation and welding the collars to the tank, care should be exercised to insure the collars remain flat and round in order to assure proper performance. If necessary a welding fixture should be used to prevent distortion.

Betts™
INDUSTRIES, INC.
WARREN, PA.

PARTS LIST

24" (609.6mm) FULL OPENING MANHOLE ASME TYPE



No.	Description	Material	Part No.
1	Cover	Steel	6455FB
		Stnls 316L	6455LC
2	Gasket*	B Buna-N	3907BN
		V Viton	3907VT
		W White Hypalon	3907WH
		E White Non-Asbestos with Teflon Suspensoid (Woven)	3907NT

No.	Description	Material	Part No.
3	Wing Nut	Stnls 304	3576SL
4	Snap Ring	Stnls 304	9Q4933
5	Snap Ring Washer	Stnls 304	3575SL
6	Swing Bolt	Stnls 17/4 PH	4102SF
7	Swing Bolt Pin	Stnls 304	3086SL
8	Roll Pin-Swg Bolt	Stnls 304	9Q8593
9	Hinge Pin	Stnls 304	3818SL
10	Roll Pin-Hinge Pin	Stnls 304	9Q8594

*Gasket Maximum Temperature

Buna-N (Nitrile)	250°F
Viton	400°F
White Hypalon	250°F
White Non-Asbestos with Teflon Suspensoid	500°F

GASKETS:

Check the condition of all gaskets and replace if their effectiveness as a seal is impaired in any way. Replacement gaskets must be compatible with products carried.

MAINTENANCE:

Manhole assembly should be inspected with sufficient frequency and with due regard to the products carried to insure a liquid tight closure. Any worn, damaged, or missing parts must be replaced.

WING NUTS AND SWING BOLTS:

All swing bolt and wing nut assemblies must be secured to the cover and tightened to insure the pressure and product retention performance of the manhole assembly.

WARNING Use only genuine Betts Industries Inc. replacement parts. Use of substitute parts can impair the proper functioning of this product.

Betts INDUSTRIES, INC.
WARREN, PA.



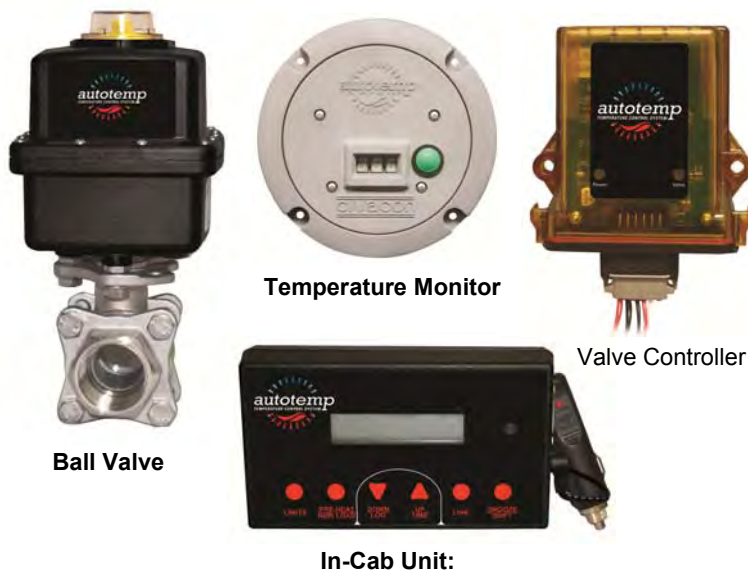
AUTOTEMP

AUTOTEMP from Civacon

A patent pending advanced digital, wireless monitoring and control system for in-transit temperature sensitive products. It features an in-cab display that keeps the driver fully informed, with updated temperature readings every 15 minutes. Optional set-point control can be added for long hauls requiring in-transit heat regulation.

Civacon's patent pending AUTOTEMP uses a solid-state digital temperature sensor to monitor the tank shell temperature and transmits the reading wirelessly to an in-cab receiver unit every fifteen minutes. Driver's can easily monitor the product temperature from the cab while driving; eliminating the time-consuming "stop and check" process of traditional dial temperature gauges. The display unit logs each time-stamped temperature reading and, with the addition of a handheld thermal printer, produce a detailed paper report. An audible alarm can alert the driver if the temperature goes above or below a pre-set range.

AUTOTEMP is also available with optional temperature regulating capabilities that can automatically control coolant flow to the tank's heat exchanger, forming a closed-loop system that will ensure a stable product temperature.



Features

- Solid-state digital Temperature Monitor wirelessly transmits tank shell temperature at adjustable intervals.
- In-cab unit receives and stores each temperature "transmission" Optional thermal printer can provide printed log output.
- Audible alarm notification if temperature goes above or below a pre-set range.
- Assures product integrity through constant monitoring "right in the cab" .
- Available with optional automatic regulating capabilities so temperature issues can be resolved easily and efficiently.
- Tracking and audit trail of load temperature re-assures the recipient that the load remained safe.

Ordering Specifications

TM100	Wireless Temperature Monitoring System Includes In-cab Unit and Temperature Monitor
TM101	Wireless Temperature Monitoring System. Includes In-cab Unit, Temperature Monitor and Printer
TM110	Wireless Temperature Closed-Loop Control System. Includes In-cab Unit, Temperature Monitor, Ball Valve and Valve Controller
TM111	Wireless Temperature Closed-Loop Control System. Includes In-cab Unit, Temperature Monitor, Ball Valve, Valve Controller and Printer



In-Cab Unit

The In-Cab Unit displays system settings, current activity, receives and logs temperature readings and has an alarm notification feature. Easily programmable by using the buttons on the front of the unit to create a link (pairing) with a Temperature Monitor, adjust alarm limits, pre-heat the trailer, clear the data log, adjust the clock and, control the audible portion of alarms. The buttons can also be used to display the radio signal strength and adjust the contrast of the display.

Product Specifications:

Part:

In-Cab Unit, 3601T

Dimensions:

3.25" x 6"

Materials:

Plastic Enclosure with Digital Display

Weight:

2lbs.

Temp. Range:

0° F to 150° F (0°C to 70° C)

Temperature Monitor

The Temperature Monitor takes a temperature reading every 15 minutes and sends the results to the In-Cab Unit. Once the In-Cab Unit acknowledges the transmission, the Temperature Monitor will hibernate to conserve battery life. The Temperature Monitor is typically awake for less than one half second per reading.

Product Specifications:

Part:

Temperature Monitor, 3602T

Dimensions:

5.84" OD

Materials:

Industry Standard Housing

Weight:

2 lbs.

Temp. Range:

-40° F to 150° F (-40°C to 70° C)

Controller/Ball Valve

The Ball Valve and Valve Controller are optional components. When added to the AUTOTEMP System the Controller opens and closes the Ball Valve to regulate coolant flow to the trailer's heat exchanger as directed by the In-Cab Unit.

Product Specifications:

Part:

Valve Controller 3603T, Ball Valve 3604T

Dimensions:

Valve Controller— 4" Mounting

Ball Valve - 5.75"

Materials:

Valve Controller – Sealed Plastic Housing

Ball Valve - Stainless Steel w/Teflon Seals

Weight:

5 lbs.

Temp. Range:

-40° F to 150° F (-40°C to 70° C)



OUTBREATHING VENT WITH OVERTURN DISC

S.P. OUTBREATHING 1 1/4 I.P.S.

The all new Single-Purpose Vents offer many advantages in venting. Vents are designed for use where ease of cleaning is important or where additional venting is required. May be installed singly or in multiples, according to requirements. This vent has been flow tested and marked in accordance with Nat. Fire Protection Assn. No. 385 (1964) Par. 2263 and No. 407 (1964) Par. 616.

	Thru Area	Capacity at 3 PSIG
Outbreathing	0.44 sq. in.	3285 cu. ft. hr.
Overturn Protection	Flat Disc	

Material			Thread Size- Right Hand	A	Wt.	Assembly No.
Body	Overturn Disc & Spring	Disc				
Alum.	Stnls. 316	Viton	1 1/4 I.P.S.	2 1/8	4.5 oz.	3008-ALV
Stnls. 316	Stnls. 316	Viton			11.6 oz.	3008-SSV



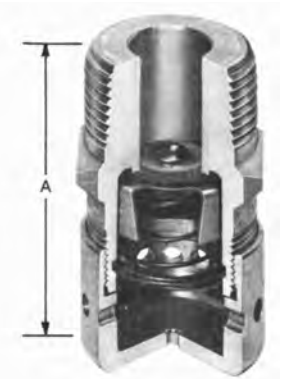
INBREATHING VENT—1 1/4 I.P.S.

S.P. INBREATHING 1 1/4 I.P.S.

Intake Vent is designed to be used with Exhaust Vent or for additional venting requirements. High capacity, ease of cleaning, few parts are outstanding features. Vents are installed inside manhole cover and protected by means of a weather-hood. This vent has been flow tested and marked in accordance with Nat. Fire Protection Assn. No. 385 (1964) Par. 2263 and No. 407 (1964) Par. 616.

	Thru Area	Capacity at 1 PSIG
Inbreathing	0.44 sq. in.	1750 cu. ft. hr.

Material			Thread Size- Left Hand	A	Wt.	Assembly No.
Body	Spring	Disc				
Alum.	Stnls. 316	Viton	1 1/4 I.P.S.	2 1/8	3.0 oz.	3010-ALV
Stnls. 316	Stnls. 316	Viton			7.7 oz.	3010-SSV



INBREATHING VENT—1 1/8-12 THD.



S.P. INBREATHING 1 1/8-12

This vent is to be used with Exhaust Vent No. 3008.

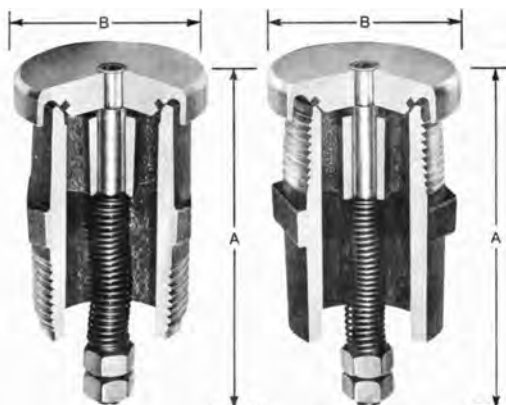
Vent is installed under fill cover; protected from weather and damage. Vent is easily cleaned and available in a variety of materials.

This vent has been flow tested and marked in accordance with Nat. Fire Protection Assn. No. 385 (1964) Par. 2263 and No. 407 (1964) Par. 616.

	Thru Area	Capacity at 1 PSIG
Inbreathing	0.44 sq. in.	1750 cu. ft. hr.

Material			Thread Size	A	Wt.	Symbol	Assembly No.
Body	Spring	Disc					
Alum.	Stnls. 316	Viton	1 1/8-12	2 1/8	3.0 oz.	SPA	3006-ALV
Stnls. 316	Stnls. 316	Viton			7.7 oz.	SPS	3006-SSV

PAV-125 EMERGENCY VENT



EXTERIOR

INTERIOR

This Pressure-Actuated Vent is rated at 10,000 cubic feet of air per hour at 5 PSIG. It is designed to provide the pressure-actuated emergency venting as required by DOT MC-306, NFPA No. 385, and No. 407. This model may be installed from the tank exterior in such devices as manhole covers or pipe caps. The PAV 125 has been flow tested and marked in accordance with DOT MC-306 Par. 178.341-4(e), NFPA 385 Par. 2263, and NFPA 407 Par. 616.

RATED CAPACITY @ 5 PSIG—10,000 cu. ft. hr.

NOTE: To provide a proper load on disc, spring should be loaded to length of 1 1/4 inches.

Material			Thread Size	Dimensions		Wt.	Assembly No.	
Body	Disc	Trim		A	B			
Aluminum	Viton	Stnls. 316	1 1/4 I.P.S.	3 3/4	2	8 oz.	Interior	3350-ALV
Stnls. 316						18 oz.		3350-SSV
Aluminum	Viton	Stnls. 316	1 1/4 I.P.S.	3 3/4	2	8 oz.	Exterior	3338-ALV
Stnls. 316						18 oz.		3338-SSV



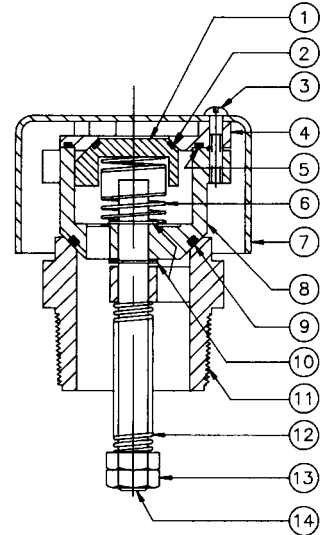
The all new pressure/vacuum valve is designed to provide the pressure relief and inbreathing needed for many types of containers. Valves are available with various pressure settings and are flow tested and marked

PRESSURE/VACUUM VALVE

Betts™ INDUSTRIES, INC.
WARREN, PA.

PARTS LIST

No.	Req.	Part No.	Description
1	1	3922TG	Vacuum Valve
2	1	3926VT	O Ring
3	3	9Q5842	#6-32 Rd. Hd. Mach. Screw
4	1	3923SS	Vacuum Valve Retainer
5	1	3943VT	O Ring
6	1	3933SS	Spring
7	1	3925SS	Cap
8	1	3921SS	Pressure Valve
9	1	3357VT	O Ring
10	2	9Q4957	Retaining Rings
11	1	3920SS	Body
12	1	3307SS	Spring-3# Setting
12a		3558SS	Spring-5# Setting
13	2	9Q5859	5/16-18UNC-3B Hex. Nut
14	1	3924SS	Stem



	Thru Area	Set Pressure	1 PSIG	1.5 PSIG	2 PSIG	5 PSIG	7 PSIG	9 PSIG
Inbreathing	.44 sq. in.	3 oz.	1350 cfh	1800 cfh	2200 cfh	NA	NA	NA
Outbreathing	.80 sq. in.	3 PSIG	NA	NA	NA	13,750 cfh	16,250 cfh	18,200 cfh
		* 5 PSIG	NA	NA	NA	NA	15,500 cfh	17,800 cfh

* For Valve with 5 PSIG setting add: suffix 239 to Assembly No.

Body	Material		Thread Size	Dimensions			Wt.	Assembly No.
	Vac. Disc	Seals		A	B	C		
316 Stnls.	Teflon	Viton	1 1/4 NPT	2 1/2	2 1/4	1 1/2	19oz.	6460SSV*



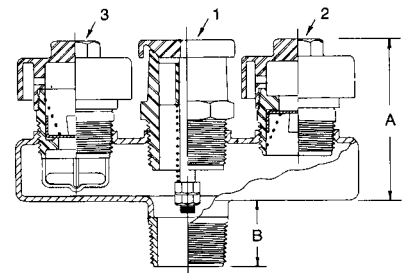
TRIDENT COMBINATION VENT

The Trident provides three-way venting plus overturn protection. It is designed to provide the pressure-actuated emergency venting plus inbreathing (vacuum) and outbreathing (pressure). The Trident can be disassembled for cleaning. The pressure-actuated emergency venting has been flow tested and marked in accordance with D.O.T. MC306 Para. 178.341-4, N.F.P.A. 385 Para. 2263, and N.F.P.A. 407 Para. 616.

	Thru Area	Capacity
Inbreathing Vent	0.44 sq. in.	1750 cu. ft. hr. @ 1 psig.
Outbreathing Vent	0.44 sq. in.	3285 cu. ft. hr. @ 3 psig.

Pressure Actuated Emergency Venting
Rated Capacity @ 5 PSIG — 10,000 Cu. Ft. Hr.

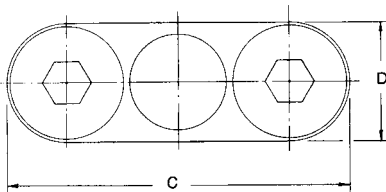
Note: To provide a proper load on disc, spring should be loaded to a length of 1 1/4 inches.



Trident Combination Vent

Part List

No.	Description	Material	Part No.	Thread
1	Emergency Vent	Alum	3338 ALV	1 1/4 NPT Right Hand
		Stls 316	3338 SSV	
2	Inbreathing Vent	Alum	3435 ALV	1 1/4 NPT Right Hand
		Stls 316	3435 SSV	
3	Outbreathing Vent	Alum	3436 ALV	1 1/4 NPT Left Hand
		Stls 316	3436 SSV	



Dimensions

Vent Assembly	Body	Seat	Wt.	Part No.
Aluminum with Stainless	Aluminum	Viton	2.0	6131 ALV
Stainless 316	Stainless		4.5	6131 SSV

Thread	A	B	C	D
1 1/4 NPT R.H.	4 1/8	1 1/8	7 7/16	2 1/2

Function and Purpose

This spring-loaded, dual-acting pressure and vacuum relief vent provides much needed protection from a dangerous build-up of positive and negative forces, known as pressure and vacuum, on tank trailers transporting hazardous chemicals.

Each vent is carefully assembled and tested to each customers' exact specifications.

Careful attention was paid to the design around the idea of a minimization of repair parts and a vent which could be easily disassembled with simple hand tools.

Disassembly

Our patented design can be disassembled using our T-wrench feature. This feature effectively "traps" the spring and reduces the internal pressure enough to allow easy separation of the valve housings. The main wearable parts are exposed, facilitating the cleaning and repair. The vent can be returned to service within minutes.

MATERIALS OF CONSTRUCTION

All metallic parts	Stainless Steel (316L)
"O" Ring	Teflon® encapsulated silicone
Gasket	Teflon®

PERFORMANCE SPECIFICATIONS (3" Design)

MAWP	Test Pressure	Flow (SCFH)	Exposed Surface
25	40	372,844	732
25	45	408,485	860
30	45	408,485	860
35	52.5	460,443	1061

PERFORMANCE SPECIFICATIONS(4" Design)

MAWP	Test Pressure	Flow (SCFH)	Exposed Surface
25	40	374,512	737
25	45	431,308	946
30	45	431,308	946
35	52.5	484,718	1156

Vacuum Performance

3,726 SCFH at 6" Hg (equivalent to 584 gpm)

Instant Opening at 4" Hg

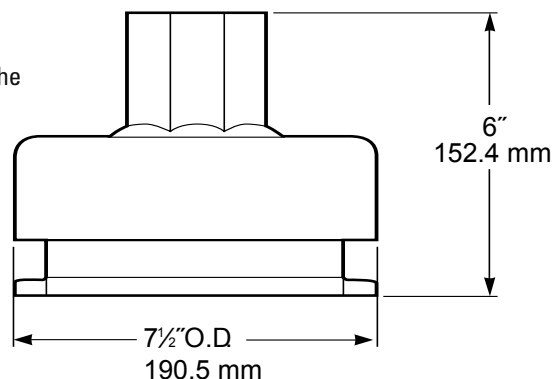


DOT 3X407T and DOT407LT

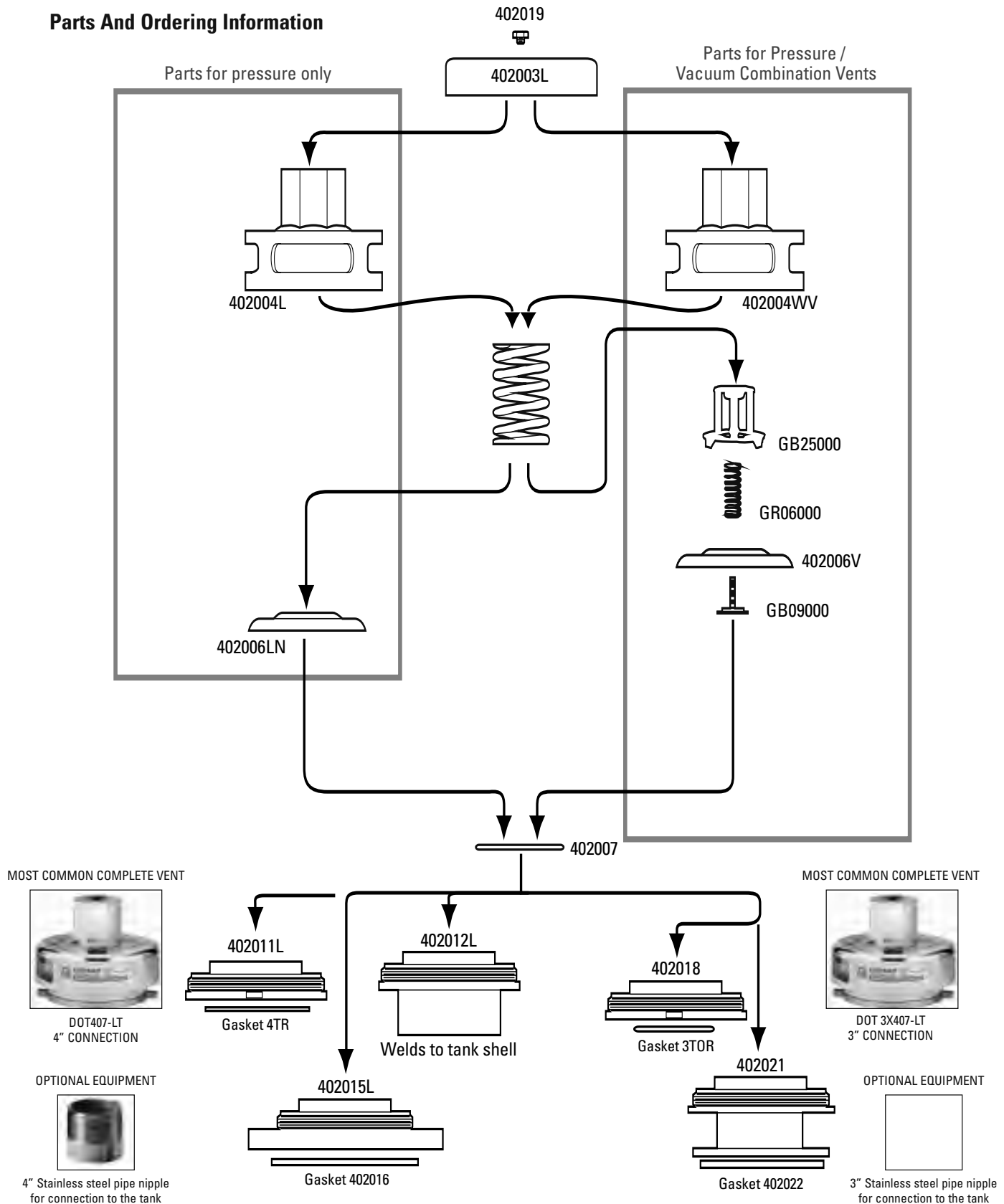
Weight: 11 lbs.

Installed

Height:
5 1/4" over the
top of the
pipe nipple



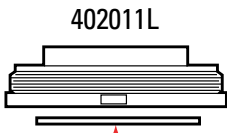
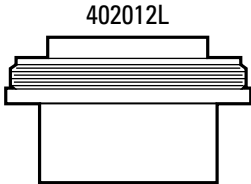
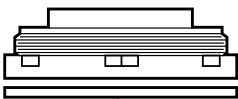
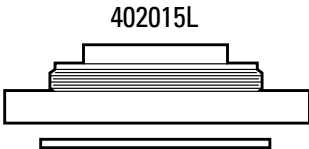
Parts And Ordering Information



FUNCTION

Our Low Profile DOT 407 Vent combines a low profile, light weight design with increased flow rates to meet the most demanding needs of virtually any DOT 407, DOT 412, MC 307 and MC 312 tank. See the table below for specific flow rates.

The stainless steel valve seat seals on a Teflon® encapsulated silicone "O" Ring. This "O" Ring provides complete chemical resistance and a bubble-tight seal to meet the latest DOT requirements. The unit also meets the surge requirements of 178.345-10 (b) (3).

Styles	Description
 <p>402011L</p> <p>Gasket 4TR</p>	<p>DOT407LT</p> <p>Vent with a 4" N.P.S. female pipe thread. Attaches to a 4" pipe nipple and seals against a solid Teflon® ring gasket.</p>
 <p>402012L</p>	<p>DOT 407LS</p> <p>Stub end vent. Lower housing terminates in a straight stub end. Designed to be welded to the tank shell.</p>
 <p>402014L</p> <p>Gasket 4CFE</p>	<p>DOT407LF</p> <p>Vent to mount on a 4" TTMA flange. Supplied with a 3/8"-16 removable thread inserts and a Teflon® envelope flange gasket.</p>
 <p>402015L</p> <p>Gasket 402016</p>	<p>DOT407LAF</p> <p>Vent to mount on a 4" ANSI flange. Supplied with a Teflon® envelope flange gasket and a 1/4" NPT "Tell-Tale" indicator tap.</p>

PERFORMANCE SPECIFICATIONS

MAWP	TEST PRESSURE	FLOW (SCFH)	EXPOSED SURFACE
25	40	374,512	737
25	45	431,308	946
30	45	431,308	946
35	52.5	484,718	1156

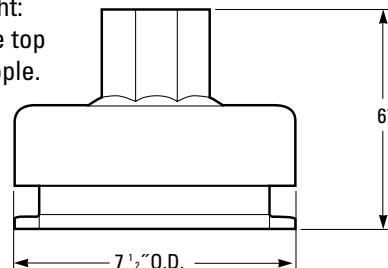
MATERIALS OF CONSTRUCTION

All metallic parts	Stainless Steel
"O" Ring	Teflon® encapsulated silicone
Gasket	Teflon®

DOT 407 LT:

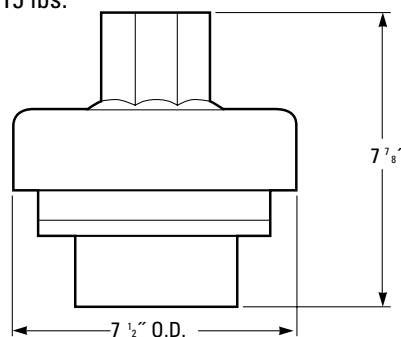
Weight: 11.95 lbs.

Installed Height:
5 1/2" over the top
of the pipe nipple.



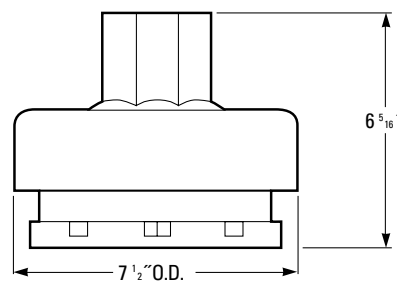
DOT407 LS:

Weight: 15.15 lbs.



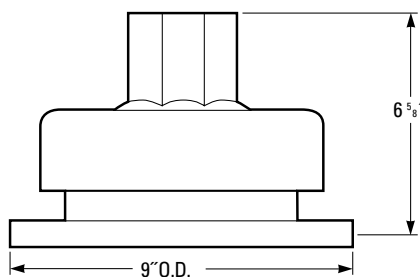
DOT 407 LF:

Weight: 13.75 lbs.

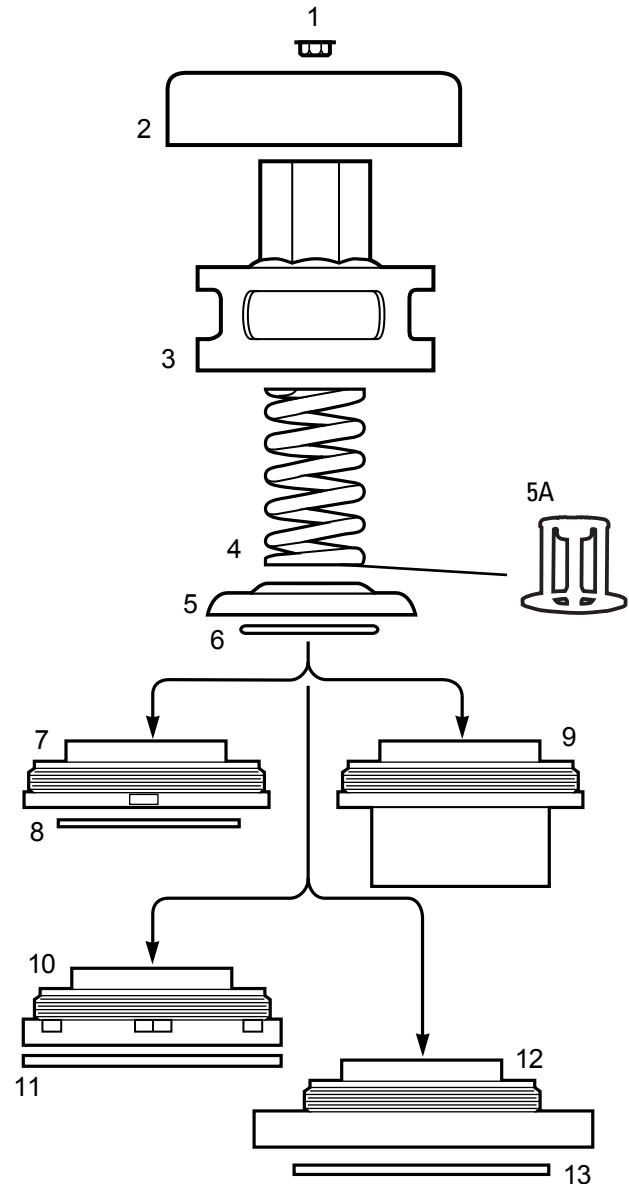


DOT407 LAF:

Weight: 24.85 lbs.



ITEMS	PART NUMBER	DESCRIPTION
1	402019	Plug
2	402003L	Rain Cover
3	402004L	Low Profile Upper Housing Specify MAWP
4	402005 402005HP	Spring (for MAWP < 45 only) Spring (for MAWP > 45 only)
5	402006LN	Low Profile Poppet with Spring Retainer (sold with GB25010)
5A	GB25010	Spring Retainer for Pressure Only Vents (sold separately)
6	402007	Teflon® Silicone "O" Ring
7	402011L	4" LT Model Lower Housing
8	4TR	Solid Teflon® Gasket
9	402012L	LS Model Lower Housing
10	402014L	4" LF Model Lower Housing
11	4CFE	Teflon® Encapsulated Flange Gasket (TTMA)
12	402015L	4" LAF Model Lower Housing
13	402016	Teflon® Envelope Flange Gasket (ANSI)



Repair And Disassembly: The disassembly feature was designed to allow users to easily disassemble the vent in one minute.



1) Remove the Plug.



2) Insert the T-Wrench into the nut of the Poppet.

3) Tighten the Lifting Nut.



4) Remove the Upper Housing.



5) Remove and replace the "O" Ring.

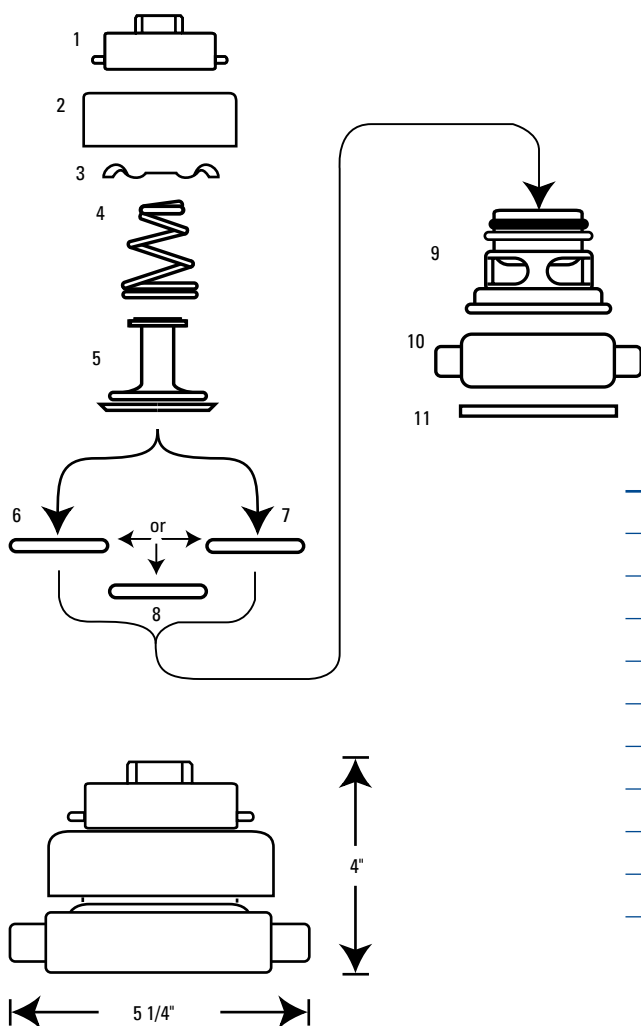
FUNCTION

The new ultra low-profile Magnetic Vacuum Breaker is a valve designed to limit a negative pressure (vacuum) in a typical tank trailer.

This model has a 3" NPS swivel connection and stands less than 4" when installed a typical tank nozzle making it easy to install under already existing overturn protection.

Customers interested in purchasing the older MC307 style 3MVB should consider this new model which is lower in cost and will provide an increased flow rate over the 3MVB.

Part Number:	Description
GE-DOT 3X407-MVB-UT	A standard style Vacuum Breaker with a Tef-O-Sil "O" Ring seal.



ITEMS	PART NUMBER	DESCRIPTION
1	403001	Cap
2	403003UL	Rain Cover
3	401017	Lock Ring
4	403006S	Conical Spring
5	403010-0	Poppet
6	401011K0	Kalrez® "O" Ring
7	401011TS	Tef-O-Sil "O" Ring
8	401011-V	Viton® "O" Ring
9	403012U	Ultralow Housing
10	3SSNUT-EP	3" Swivel (N.P.S.) Nut
11	3TSR	Teflon® Slim Gasket

FUNCTION

The DOT 407 Magnetic Vacuum Breaker is a valve designed to limit negative pressure (vacuum) in a typical tank trailer.

A permanent magnetic force controls the movement of the valve poppet to open on demand of 4" Hg or greater. All working parts are kept away from the airflow paths, which promotes easy cleaning and hassle-free repairs. The valve body is cast with a 1" female port inlet to accept a variety of air inlet fittings. A 1/4" female port is standard to accept a gauge. The unit is equipped with either: a "Tef-O-Sil", Viton, or a Kalrez® O-Ring seal.

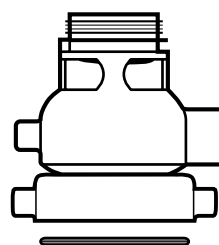


Viton, Teflon and Kalrez are standard. Special Elastomers are available upon request.

Styles

Description

4030123T



Gasket 3-TR

3" NPS Thread
Designed to thread on a 3" Nipple. Swivels 360° for easy positioning.

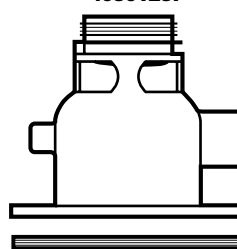
3X407MVBT-T Teflon®

3X407MVBT-K Kalrez®

3X407MVBT-V Viton®

These connection styles are tapped with a 1/4" gauge port and a 1" air accessory port as standard.

4030123F



Gasket 3CFE

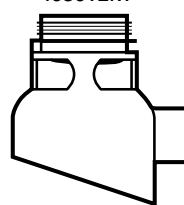
3" TTMA Flange
Designed to mount on a 3" TTMA Flanged Nozzle.

3X407MVBF-T Teflon®

3X407MVBF-K Kalrez®

3X407MVBF-V Viton®

403012M



1" Air Accessory Port.

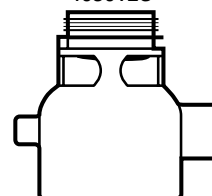
Mitred Cut
Designed to weld into a dome cover and conform to its curvature.

407MVBLM-T Teflon®

407MVBLM-K Kalrez®

407MVBLM-V Viton®

403012S



Straight Stub
Designed to weld to a domecover or tank shell.

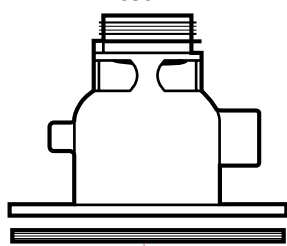
407MVBLS-T Teflon®

407MVBLS-K Kalrez®

407MVBLS-V Viton®

These connection styles are tapped with a 1/4" gauge port and a 1" air accessory port.

403012F



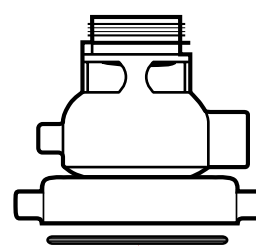
Gasket 4CFE

4" TTMA Flange
Designed to mount on a 4" TTMA Flanged Nozzle.

407MVBLF-T Teflon®

407MVBLF-K Kalrez®

407MVBLF-V Viton®



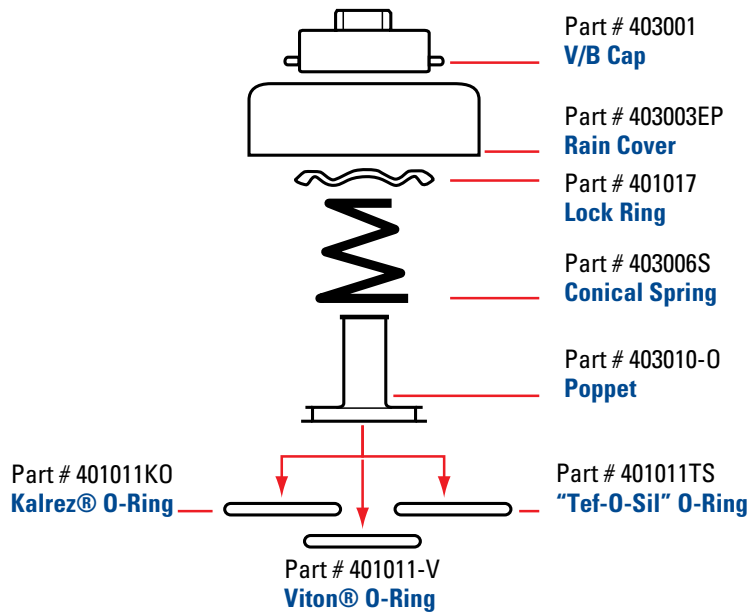
Gasket 4TR

4" NPT Thread
Designed to thread on a 4" Nipple. Swivels 360° for easy positioning.

407MVBLS-T Teflon®

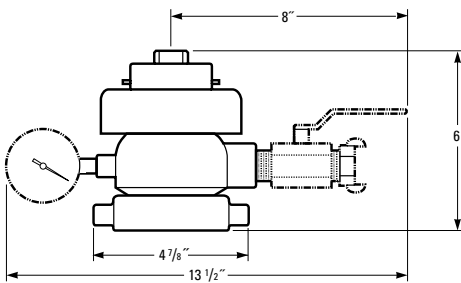
407MVBLS-K Kalrez®

407MVBLS-V Viton®



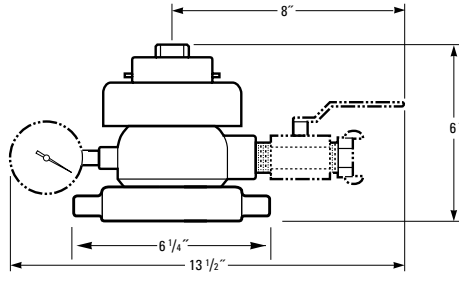
PERFORMANCE

Instant opening	at 4" Hg.
Flow rates	12,000 SCFH at 6" Hg.
Test Pressure	Seat is bubble tight on pressures from 0-50 PSIG.
Magnetic Field	Coated magnets. Can not be contaminated by surrounding metals or products being transported.
Teflon®	Suited for all ladings. (Check with the manufacturer).
Kalrez®	Identical chemical properties as Teflon®. Suited for all ladings.
Viton®	Suited for most ladings. Check compatibility.
Special Elastomers are available upon request	



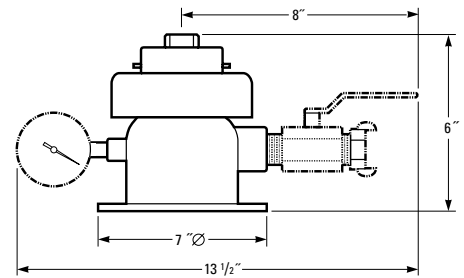
3X407MVBTX

Complete vacuum breaker with a 3" swivel connection. Designed to be attached to a 3" NPT tank trailer nipple.



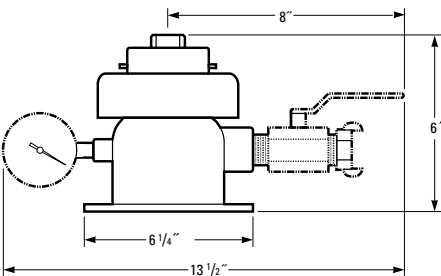
407MVBLTX

Complete vacuum breaker with a 4" swivel connection. Designed to be attached to a 4" NPT tank trailer nipple.



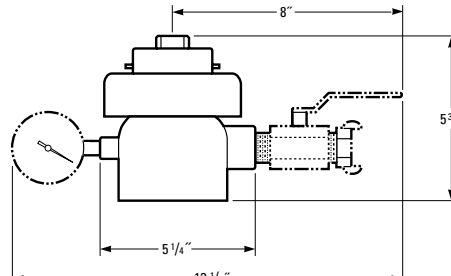
407MVBLFX

Complete vacuum breaker with a 4" TTMA flanged connection. Designed for installation on a tank trailer flanged nozzle.



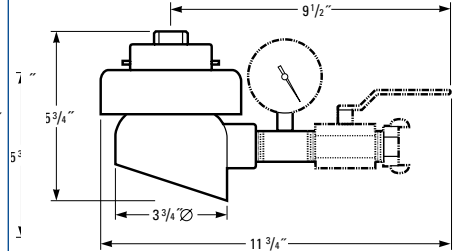
3X407MVBFX

Complete vacuum breaker with a 3" TTMA flanged connection. Designed for installation on a tank trailer flanged nozzle.



407MVBLSX

Complete vacuum breaker with a straight stub connection. Designed to be welded to either a domecover or the tank shell.



407MVBLMX

Complete vacuum breaker with a mitred connection. Designed to be welded to a domecover and conform to its curvature.



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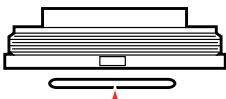
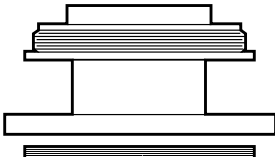
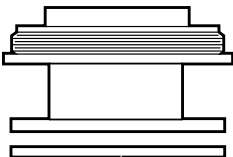
2-19

www.wertswelding.com

FUNCTION

Our 3" DOT 407 Vents allow you to upgrade virtually any MC 307 or MC 312 tank to DOT 407 or DOT 412 venting. All the benefits of the 400 Series Vents without expensive hot-work. Flow rates are slightly less than our standard DOT 407 Vents, but are more than sufficient for most tanks. **See the table below for specific flow rates.**

The stainless steel valve seat seals on a Teflon® encapsulated silicone "O" Ring. This "O" Ring provides complete chemical resistance and a bubble-tight seal to meet the latest DOT requirements. The unit also meets the surge requirements of 178.345-10 (b) (3).

Styles	Description
<p>402018</p>  <p>Gasket 3TOR</p>	<p>DOT3X407T</p> <p>Vent with a 3" N.P.S. female pipe thread. Attaches to a 3" pipe nipple and seals against a solid Teflon® "O" Ring Gasket.</p>
<p>402020</p>  <p>Gasket 3-CFE</p>	<p>DOT3X407F</p> <p>Vent to mount on a 3" TTMA flange. Supplied with a Teflon® envelope flange gasket.</p>
<p>402021</p>  <p>Gasket 402022</p>	<p>DOT3X407AF</p> <p>Vent to mount on a 3" ANSI flange. Supplied with a Teflon® envelope flange gasket and a 1/4" NPT "Tell-Tale" indicator tap.</p>

PERFORMANCE SPECIFICATIONS

MAWP	TEST PRESSURE	FLOW (SCFH)	EXPOSED SURFACE
25	40	372,844	732
25	45	408,485	860
30	45	408,485	860
35	52.5	460,443	1061

MATERIALS OF CONSTRUCTION

All metallic parts	Stainless Steel
"O" Ring	Teflon® encapsulated silicone
Gasket	Teflon®



REPLACEMENT PARTS

The 3" T, F and AF Models are similar in every detail with the only exception being the connection on the lower housing.

When ordering replacement parts, please refer to the exploded view of the vent and order by: quantity, part number, and description (i.e., 6 each of part number 402006L Low Profile Poppet).

ORDERING INFORMATION

All Vents are designated by the connection style and the Maximum Allowable Working Pressure (MAWP) of the tank that it will be attached to. Order Vents by style-pressure code.

PRESSURE CODE:	MAWP	CODE
	25	(none)
	30	1
	35	2
	Other (Specify)	3

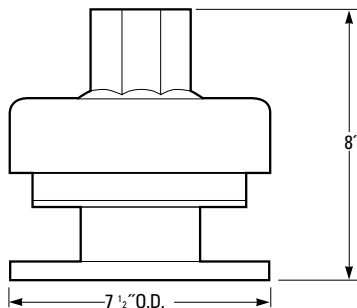
MAINTENANCE INFORMATION

Repair manuals, as well as special tools, are available upon request.

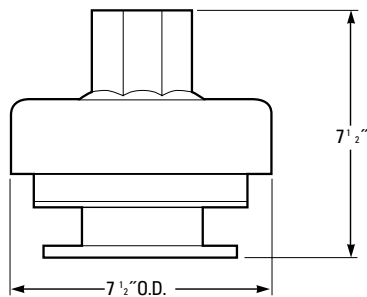
ITEMS	PART NUMBER	DESCRIPTION
1	402019	Plug
2	402003L	Rain Cover
3	402004L	Low Profile Upper Housing Specify MAWP
4	402005 402005HP	Spring (for MAWP < 45 only) Spring (for MAWP > 45 only)
5	402006LN	Low Profile Poppet with Spring Retainer (sold with GB25010)
5A	GB25010	Spring Retainer for Pressure Only Vents (sold separately)
6	402007	Teflon® Silicone "O" Ring
7	402018	3" T Model Lower Housing
8	3TOR	Solid Teflon® "O" Ring Gasket
9	402020	3" F Model Lower Housing (TTMA)
10	3CFE	Teflon® Envelope Flange Gasket (TTMA)
11	402021	3" AF Model Lower Housing
12	402022	Teflon® Envelope Flange Gasket (ANSI)

DOT 3X407AF

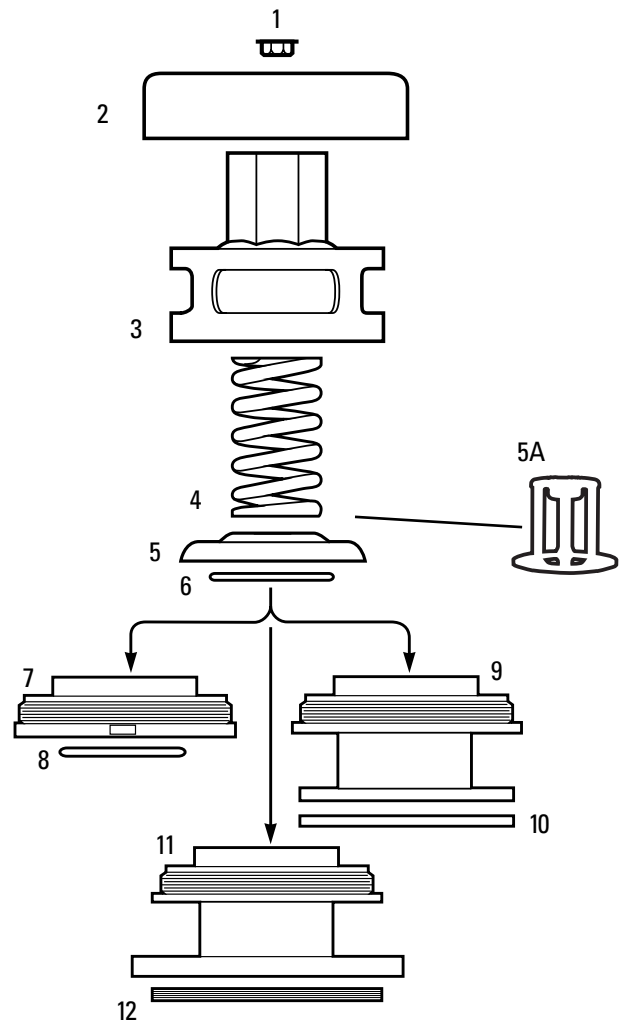
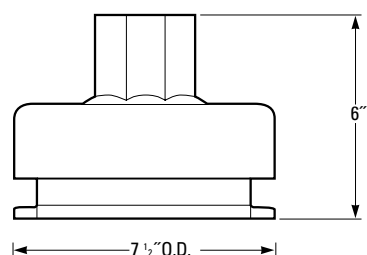
(3" ANSI)

 Weight:
19 lbs.

DOT 3X407F

(3" TTMA Flange)

 Weight:
15 lbs.

DOT 3X407T

Weight: 11 lbs.

 Installed
Height:
5 1/4" over the
top of the
pipe nipple

 3" N.P.S
Female
Thread

FUNCTION

Girard Equipment, Inc.'s Teflon® lined Pressure Relief Valve is designed to protect against aggressive ladings that normally would chemically attack stainless steel.

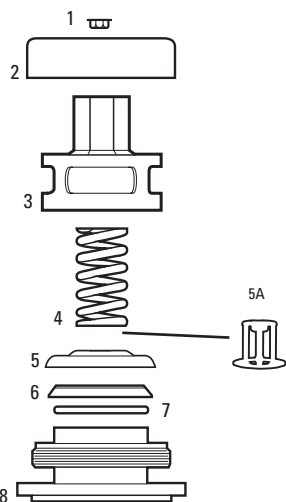
All wetted surfaces are lined with a 1/8" thick Teflon® liner. The valve seat seals on a Teflon® encapsulated silicone "O" Ring. This "O" Ring provides complete chemical resistance and a bubble-tight seal. The vent is designed to be easily removed from the tank for inspection and or cleaning.

Style: **GE-DOT 3X407-AFTL**

Description: Vent to mount on a 3" ANSI, 4-Bolt Flange. Supplied with a Teflon® liner and a valve seat.
(When ordering, please specify pressure setting.)

MATERIALS OF CONSTRUCTION

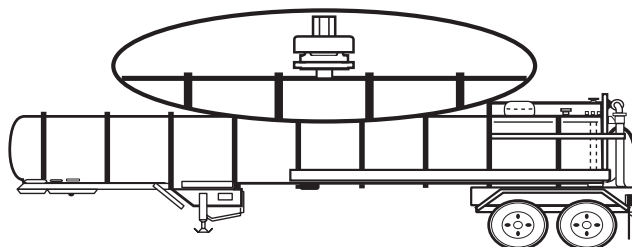
All metallic parts	Stainless Steel
"O" Ring	Teflon® encapsulated silicone
Valve Seat	White Teflon®
Liner	White Teflon®



ITEMS	PART NUMBER	DESCRIPTION
1	40219	Plug
2	402003L	Rain Cover (Low Profile)
3	402004L	Upper Housing (Low Profile)
4	402005	Spring
5	402006LN	Low Profile Poppet with Spring Retainer (sold with GB25010)
5A	GB25010	Spring Retainer for Pressure Only Vents (sold separately)
6	402008	Teflon® Seat
7	402007	Teflon® Silicone "O" Ring
8	402021 TL	Teflon® lined Lower Housing

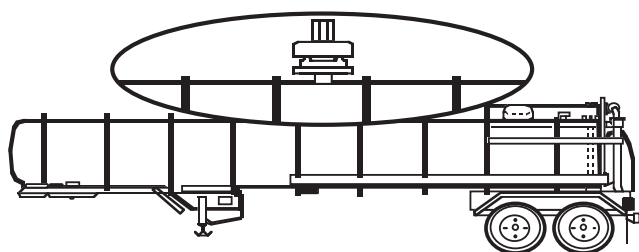


3" ANSI Flange, 4-Bolt





4" ANSI Flange, 8-Bolt



Style:

GE-DOT407-LAFTL

Description:

Vent to mount on a 4" ANSI, 8-Bolt Flange. Supplied with a Teflon® liner and a valve seat.
(When ordering, please specify pressure setting.)

MATERIALS OF CONSTRUCTION

All metallic parts

Stainless Steel

"O" Ring

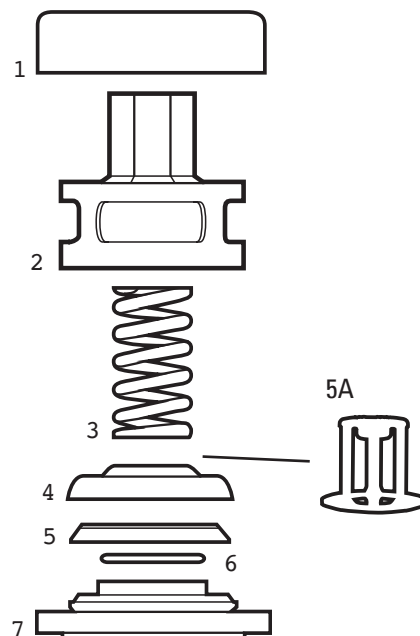
Teflon® Encapsulated Silicone

Valve Seat

White Teflon®

Liner

White Teflon®



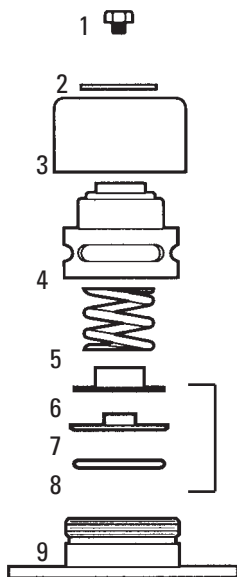
ITEMS	PART NUMBER	DESCRIPTION
1	402019	Plug
2	402003L	Rain Cover (Low Profile)
3	402004L	Upper Housing (Low Profile)
4	402005	Spring
5	402006LN	Low Profile Poppet with Spring Retainer (sold with GB25010)
5A	GB25010	Spring Retainer for Pressure Only Vents (sold separately)
6	402008	Teflon® Seat
7	402007	Teflon® Silicone "O" Ring
8	402015 LPTL	Teflon® Lined Lower Housing

Style: **GE-PV300-2AFTL**

Description: Vent to mount on a 2" ANSI, 4-Bolt Flange. Supplied with a Teflon® liner and a valve seat. **(When ordering, please specify pressure setting.)**

MATERIALS OF CONSTRUCTION

All metallic parts	Stainless Steel
"O" Ring	Teflon® encapsulated silicone
Valve Seat	White Teflon®
Liner	White Teflon®

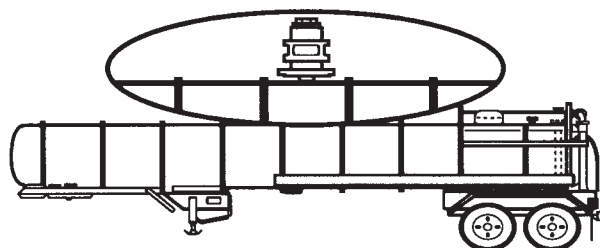


Teflon® liner doubles as the inlet gasket.

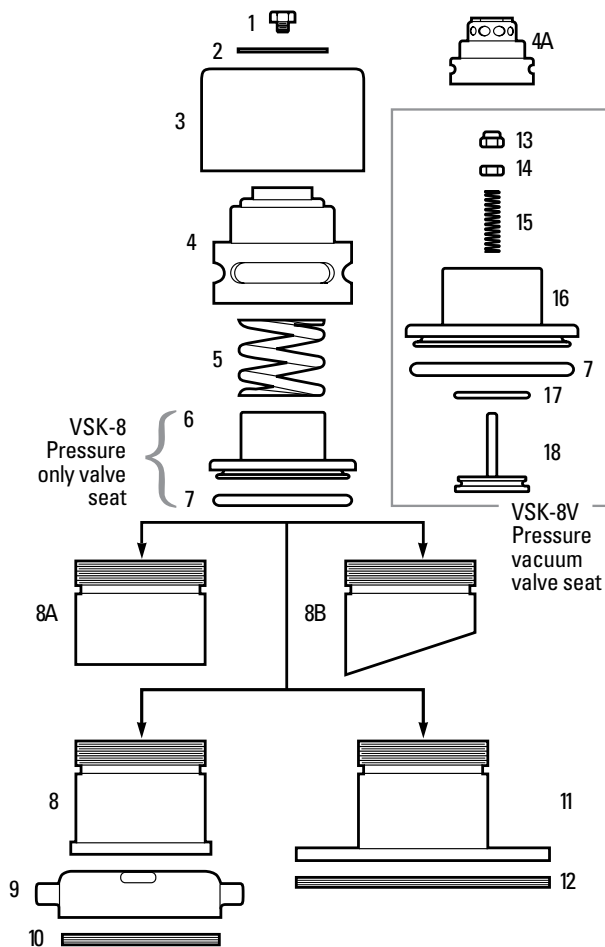
ITEMS	PARTS NUMBER	DESCRIPTION
1	202001	Bolt
2	202002PV	Identification & Rating Disc
3	202003-1	Rain Cover
4	20204-1	Upper Housing
5	202005	Pressure Spring
6	202006C	Upper Spring Retainer
7	202020C	Solid Teflon® Valve Seat
8	202008C	Teflon® Silicone "O" Ring
9	202014TL	Teflon® Lined Lower Housing



2" ANSI Flange, 4-Bolt
(Shown without Rain Cover)



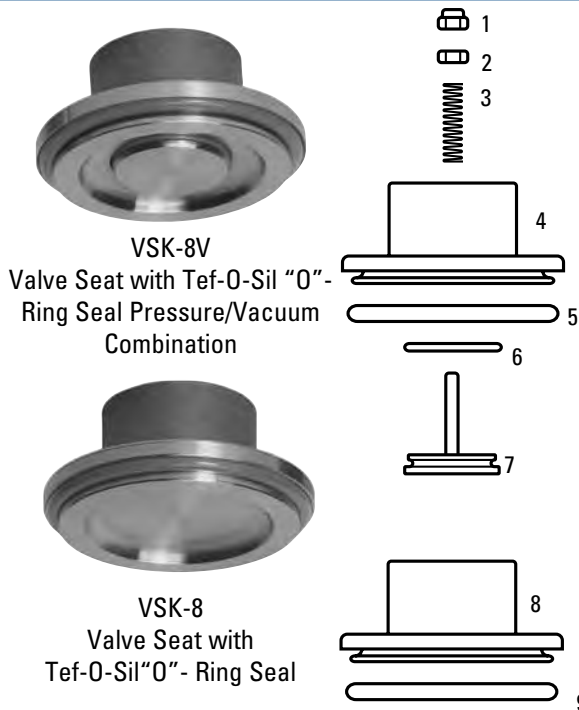
This vent meets the "leaks less than one liter" surge requirements of 178.345.10 (b) (3).



	Part #	Description
1	202001	Bolt
2	202002	Identification & Rating Disc
3	202003-1	Rain Cover
4	202004-1	Upper Housing-pressure only
4A	202004	Upper Housing - Pressure Vac. Vents
5	202005	Pressure Spring
6	202006D	VSK-8 Spring Retainer
7	202008D	Tef-O-Sil Pressure "O"-Ring
8	202011	Lower Housing -B Model
8A	202011A	Lower Housing - S Model
8B	202011B	Lower Housing - M Model 18 Degree Bias
9	202012	Swivel Nut-B Model
10	3-TR	Solid Teflon® Gasket
11	202014	Lower Housing -Flange-F Model
12	202015	Teflon® Envelope Flange Gasket
13	202039A	Locknut
14	202039	Nut
15	202038	Vacuum Spring
16	202006DV	VSK-8V Spring Retainer
17	202037	Tef-O-Sil "O"-Ring (Vacuum)
18	202035	Vacuum Poppet

Valve Seat Kits

GIRARD



	Part #	Description
1	202039A	Locknut
2	202039	Nut
3	202038	Vacuum Spring
4	202006DV	VSK-8V Spring Retainer
5	202008D	Tef-O-Sil Pressure "O"- Ring
6	202037	Vacuum "O"- Ring
7	202035	Vacuum Poppet
8	202006D	VSK-8 Spring Retainer
9	202008D	Tef-O-Sil Pressure "O"- Ring

FUNCTION

The Girard Equipment 3" Magnetic Vacuum Breaker is a valve designed to prevent negative pressure (vacuum) from developing and imploding a typical tank transport.

Girard Equipment uses a permanent magnetic force along with conventional springs to control the movement of the valve seat. Permanent magnetization within the valve, holds the seat tightly closed during transit and allows movement only on demand of 2" Hg, or greater.

The unit is equipped with either a "Tef-O-Sil" "O" Ring, Viton® "O" Ring, or a Kalrez® gasket to meet the requirements for bubble-tightness given in docket HM-183.



Styles	Description
3MVB-SX	Complete vacuum breaker with stub end outlet. Designed to be welded in the dome of the transport.
3MVB-MX	Complete vacuum breaker with 18 degree stub end outlet. Designed to be welded in the dome of the transport and to conform to its curvature.
3MVB-FX	Complete vacuum breaker with 3" TTMA drilled flange outlet. Designed for installation on the flanged nozzle in the transports.
3MVB-TX (Shown in photo)	Complete vacuum breaker with a 3" N.P.T. swivel nut outlet. Designed for attachment to a tank truck "cleanout" nipple.

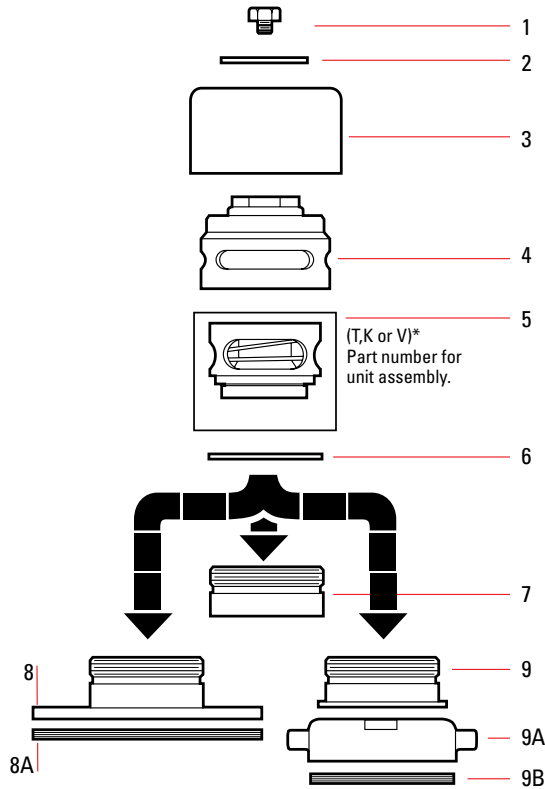
SEAT TYPE	(substitute letter code for "X")
Teflon® Seat with a Tef-O-Sil "O" Ring.	T
Teflon® Seat with a Kalrez® Gasket.	K
Teflon® Seat with Viton® Gasket	V

MATERIALS OF CONSTRUCTION

All Metallic Parts	Stainless Steel
Valve Seat	Teflon® with "Tef-O-Sil," or Kalrez®
Gaskets	Teflon® / Teflon® Envelope
Magnets	Ferrite

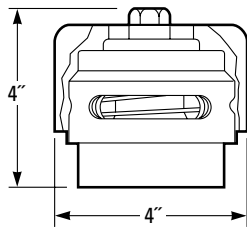
PERFORMANCE

Instant Opening	At 2" Hg. Flow rates at 2" Hg - 11,900 SCFH. For high flow rate vacuum breakers see "New Generation DOT 407 Magnetic vacuum Breakers
Test Pressure	Seat is bubble tight on pressures from 0-50 PSIG.
Vibration Test	25 times gravitational acceleration, or 25G.
Magnetic Field	Ferrite Magnets - can not be contaminated by surrounding metals, or products being transported.
Teflon®	Suited for all ladings. (Check with the manufacturer).
Kalrez®	Identical chemical properties as Teflon®. Suited for all ladings.

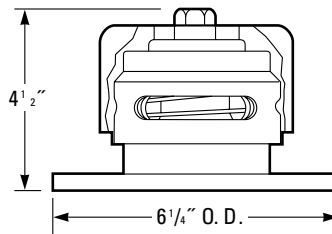


Item	Part #	Description
1	201001	Bolt
2	201002	Rating Disc
3	201003	Rain Cover
4	201004	Upper Housing
5K*	201005K	Valve Housing with Kalrez®
5T*	201005T	Same as the above, with Tef-O-Sil "O" Ring. *(Assembled Unit).
5V*	201005V	Same as the above, with Viton® "O" Ring. (green) *(Assembled Unit).
6	201006TS	Tef-O-Sil "O" Ring
7	201007-1	Stub End - Lower Housing
8	201008	Flanged Lower Housing - 3" TTMA
8A	201009	Teflon® Envelope Flange Gasket
9	201007	Swivel Spud - Lower Housing
9A	201011	Swivel Nut - 3" N.P.T.
9B	3-TR	Teflon® Ring Gasket

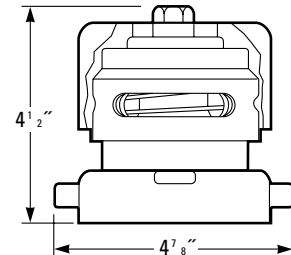
Substitute "X" for T=Teflon®, K=Kalrez®, V= Viton®



3MVB-SX Weight: 4 lbs., 4 ozs.
To conform to the curvature of a dome cover, please specify 18° bias cut. (3 MVB-M)



3MVB-FX Weight: 5 lbs., 4 ozs.



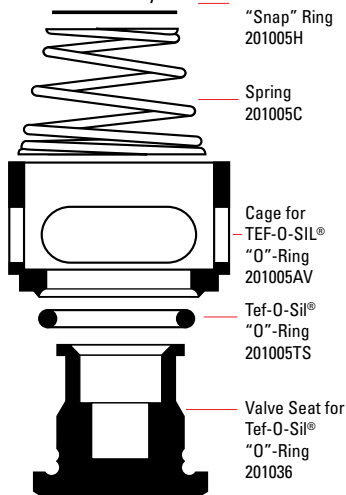
3MVB-TX Weight: 5 lbs., 4 ozs.

Vacuum Breaker Housings

GIRARD

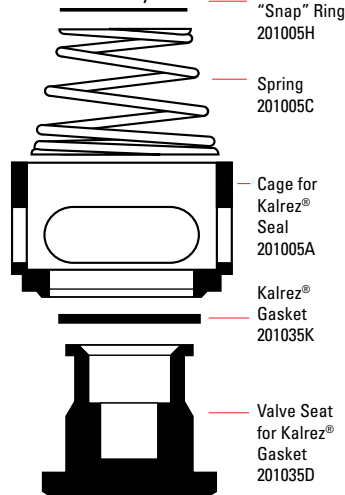
TEF-O-SIL O-RING VALVE SEAT

Assembly Part # 201005T



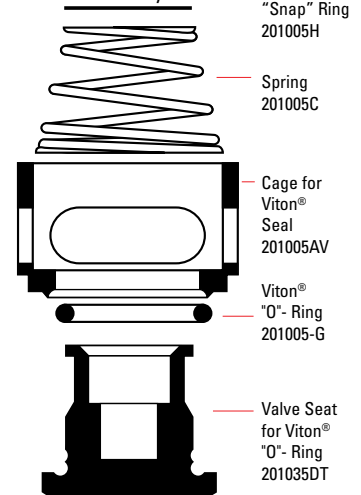
KALREZ® O-RING VALVE SEAT

Assembly Part # 201005K







VITON® O-RING VALVE SEAT

Assembly Part # 201005V







GIRARD EQUIPMENT, INC.

New Valve Seat Kits for Girard Pressure Relief Vents

New Valve Seat	Replaces seats listed below	
 <p>VSK-8V (With Vacuum Section)</p>  <p>GE-202004 Upper Housing Equipped with Vacuum Relief Holes</p>	 <p>VSK-1 (PVS-1)</p>	<p>Teflon Valve Seat with Ball/Spring Vacuum Section.</p> <p>Est. 1972</p>
	 <p>VSK-5V</p>	<p>Stainless Steel Valve Seat with Kalrez Gasket Seal.</p> <p>With Vacuum Section</p> <p>Est. 1996</p>

Replaces:

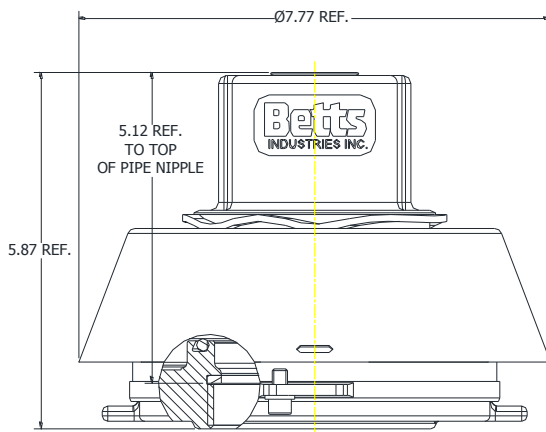
 <p>VSK-8 Not Vacuumed Equipped</p>	 <p>VSK-3</p>	Solid Teflon Seat
	 <p>VSK-4</p>	Large Spring Retainer & Teflon Seat
	 <p>VSK-5</p>	Stainless Steel Valve Seat with Kalrez Gasket Seal. No Vacuum Section



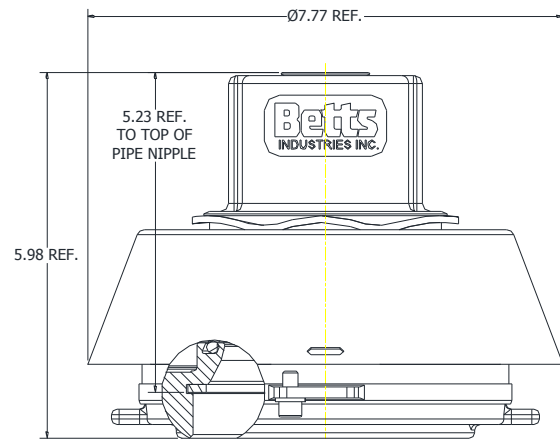
Guardian 407 NPS Stainless Steel Pressure Vent



Betts Guardian 407 vent is a spring loaded reclosing pressure relief device/valve for use as a cargo tank's primary pressure relief system. They are constructed of 316 Stainless Steel and all seals are Teflon. They are permanently marked with company logo, part number, set pressure, flow rates and connection. The pressure relief valve is designed, tested and marked in accordance with 49CFR §178.345-10, 49CFR §178.347-4 and 49CFR §178.348-4. They are easily maintained, and have a safety stop screw to help prevent accidental unthreading of the main housing while the spring is under compression. There are seal tabs on the shroud and housing to accommodate security ties or cables.



3" Version



4" Version

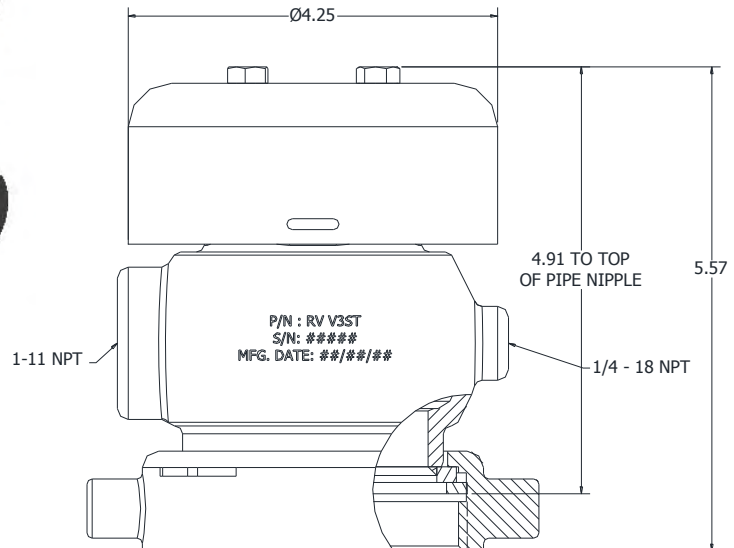
Part Number	Size and Connection	Tank MAWP	Set pressure (PSIG)	Flow
RVP3NT-25	3" NPS	25	30	379,461 SCFH @ 40 PSIG
RVP3NT-30		30	36	409,558 SCFH @ 45 PSIG
RVP3NT-35		35	42	409,558 SCFH @ 45 PSIG
RVP4NT-25	4" NPS	25	30	457,740 SCFH @ 52.5 PSIG
RVP4NT-30		30	36	389,482 SCFH @ 40 PSIG
RVP4NT-35		35	42	432,563 SCFH @ 45 PSIG
				496,954 SCFH @ 52.5 PSIG



Guardian 407 NPS Stainless Steel Vacuum Vent



Betts Guardian 407 vacuum vent is a spring loaded, magnet-assisted reclosing vacuum relief valve for use as a cargo tank's vacuum relief system. They are constructed of 316 Stainless Steel and all seals are Teflon. They are permanently marked with company logo, part number, set pressure, flow rates and connection. The vacuum relief valve is designed, tested and marked in accordance with 49CFR §178.345-10, 49CFR §178.347-4 and 49CFR §178.348-4. They are easily maintained and have seal tabs on the shroud and housing to accommodate security ties or cables.



Part number	Size	Conn.	Set Pressure	Flow
RVV3ST	3"	Swivel NPS	1.5 PSIG	18,000 SCFH @ 3.0 PSIG
RVV4ST	4"			



3" Hyper Tank Vent Relief Valve - 3" NPT swivel connection with PTFE seal. Suitable for a pressure range of between 5 PSI to 60 PSI (0.34 to 4.14 Bar) and a vacuum range of between 1" Hg to 22" Hg (-0.03 to -0.75 Bar). Valve body incorporates NPS connections for a pressure gauge and airline valve. Contact parts manufactured in 316 stainless steel. Fitted with Forty seals (FEP encapsulated silicone). Weatherproof cowl fitted as standard. Retained spring which allows for easier dismantling.

Options - pressure only version. Alternative tank connections available (see Range below). Valves may be fitted with Viton seals or Kalrez® on request.

Specification

Weight	14 Lbs (6.5 Kg)
Design Pressure	75 PSIG (5.2 Bar)
Test Pressure	147 PSIG (10.14 Bar)
Design Temperature	-67°F to 392°F (-55°C to 200°C)
U.S. DOT Registration No.	CT-5411

PLEASE NOTE: Above data may vary according to the valve specification.

This valve design has undergone flow testing at National Board Facilities and performance rates exceed all DOT requirements per **CFR 49 178.345-10** (See separate data sheet for flow rate information)

Tank Vents must be fitted using a spanner wrench. Hammer blows, or similar impact, may impair the unit and invalidate the valve warranty.

Range

Part No.	Connection	Side Tappings
A407/XXXXXX	3" ANSI flange	¾" NPS & ¼" NPS
B407/XXXXXX	3" NPT	None
F407/XXXXXX	3" TTMA flange	¾" NPS & ¼" NPS
R407/XXXXXX	3" NPT swivel	¾" NPS & ¼" NPS

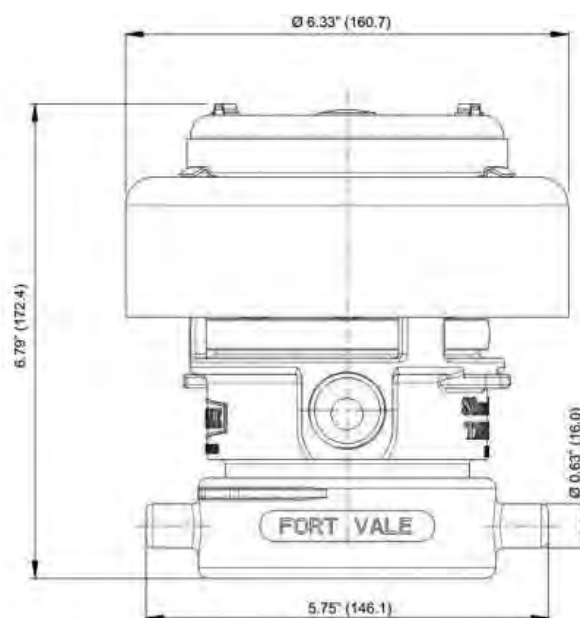
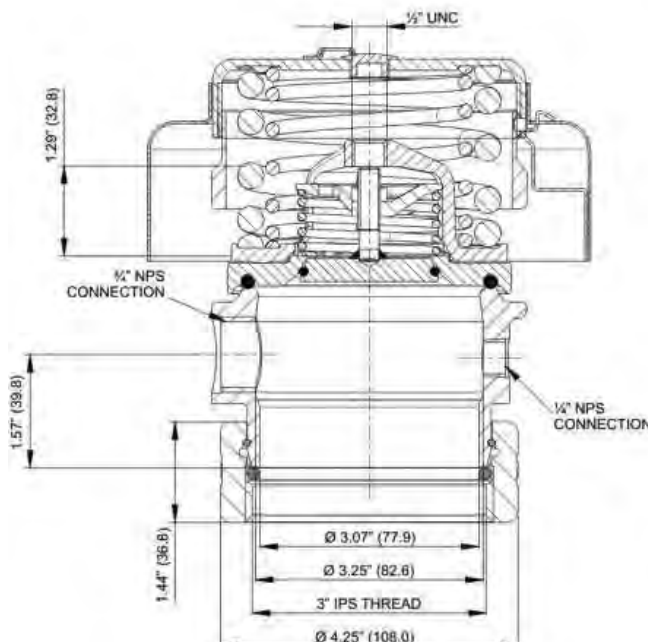
Associated Parts

Part Number	Description
US007	¾" NPT female socket ball valve
US000	¼" NPT pressure gauge 0 to 60 PSIG
US100	60 PSIG air charge kit

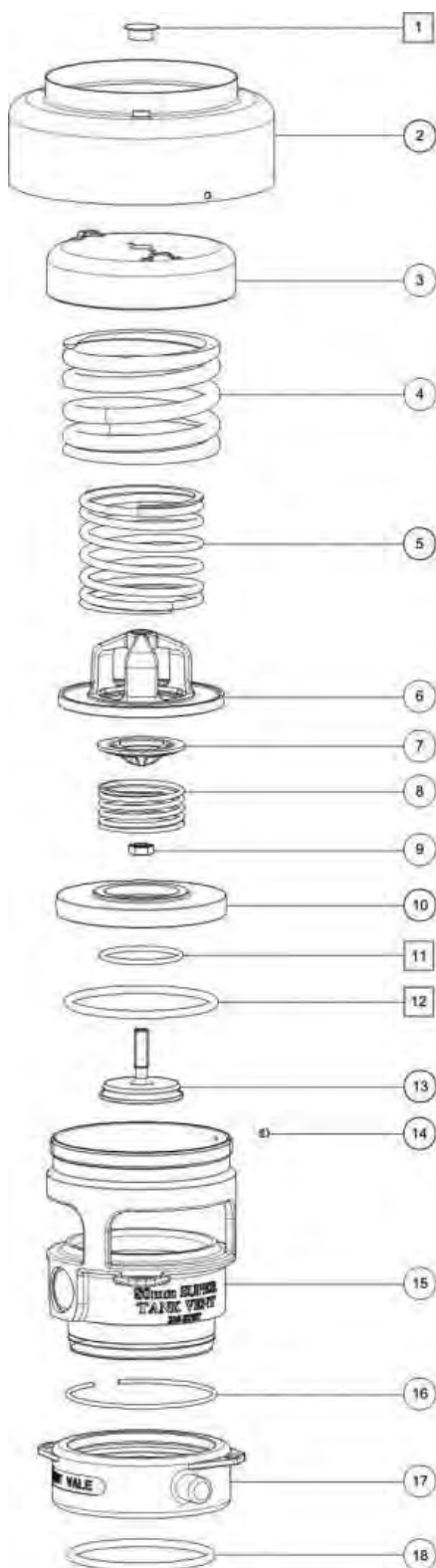
See separate data sheet for our full range of **Venting Device Accessories**.

Fitting Details

Example shown : R407/XXXXXX



Parts drawing



Item	Description	Part No.
1	Plastic plug	10978 <input type="checkbox"/> <input type="checkbox"/>
2	Low profile rain cowl assembly	176/6110
3	Top cap	1760/0009
4	Outer pressure spring	6104-XXXX
5	Inner pressure spring	6104-XXXX
6	Spider spring locator	1760/0043
7	Spring pad	85/1007
8	Vacuum spring	5104-XXXA
9	M8 half nut	5112-004
10	Pressure plate	1760/006XA
11	Vacuum O ring - Fortyt Viton	5005-118 <input type="checkbox"/> 5005-172 <input type="checkbox"/>
12	Pressure O ring - Fortyt Viton	5005-104 <input type="checkbox"/> 5005-376 <input type="checkbox"/>
13	Vacuum poppet	85/1033
14	Grubscrew	5121-001
15	Super Tank Vent body	1760/0750
16	Retaining ring clip	5120-025
17	3" NPSL swivel assembly	1780/0710
18	PTFE O ring	5005-103P

SEAL KITS

Part No. **USR407/1SK** contains Fortyt O rings marked ☐
 Part No. **USR407/0SK** contains Viton O rings marked ☐

Kalrez® seals available on request.



407/412 - 3" Super Tank Vent - 3" NPT swivel connection with PTFE seal. Suitable for a pressure range of between 5 PSI to 60 PSI (0.34 to 4.14 Bar) and a vacuum range of between 1"Hg to 22"Hg (-0.03 to -0.75 Bar). Valve body incorporates NPS connections for a pressure gauge and airline valve. Contact parts manufactured in 316L stainless steel. Fitted with Fortyt seals (FEP encapsulated silicone). Weatherproof cowl fitted as standard.

Options - pressure only version. Alternative tank connections available (see **Range** below). Valves may be fitted with Viton seals or Kalrez® on request.

Specification

Weight	10 Lbs (4.5 Kg)
Design Pressure	75 PSIG (5.17 Bar)
Test Pressure	147 PSIG (10.14 Bar)
Design Temperature	400°F (204°C)
U.S. DOT Registration No.	CT-5411

PLEASE NOTE: Above data may vary according to the valve specification.

This valve design has undergone flow testing at National Board Facilities and performance rates exceed all DOT requirements per **CFR 49 178.345-10** (See separate data sheet for flow rate information)

Super Tank Vents must be fitted using a spanner wrench. Hammer blows, or similar impact, may impair the unit and invalidate the valve warranty.

Range

Part Number	Connection	Side Tappings
A29/XXXXX	3" ANSI flange	¾"NPS & ¼"NPS
B29/XXXXX	3" NPT	None
F29/XXXXX	3" TTMA flange	¾"NPS & ¼"NPS
0H3/XXXXX	3" ANSI flange Hastelloy contact parts	None
R29/XXXXX	3" NPT swivel	¾"NPS & ¼"NPS

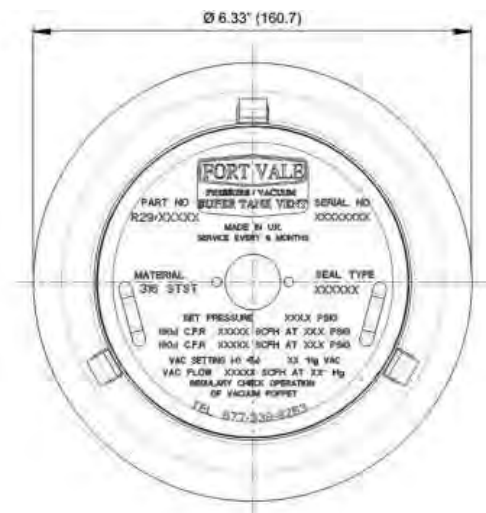
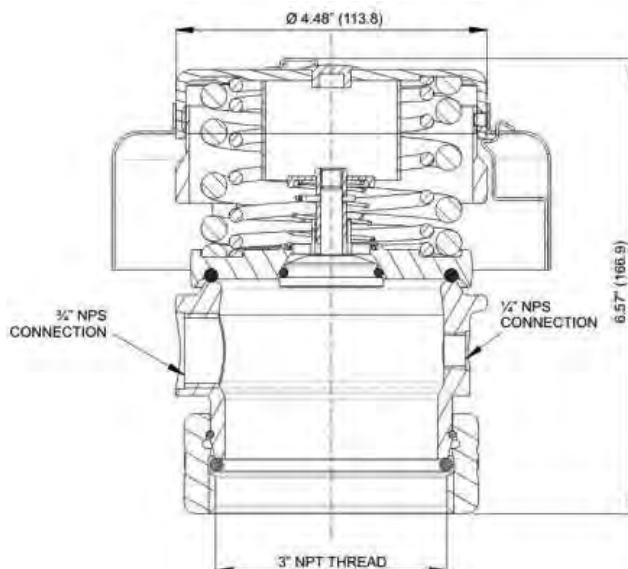
Associated Parts

Associated Parts	Part No.
¾"NPT female socket ball valve	US007
¼"NPT pressure gauge 0 to 60 PSIG	US000
60 PSIG air charge kit	US100

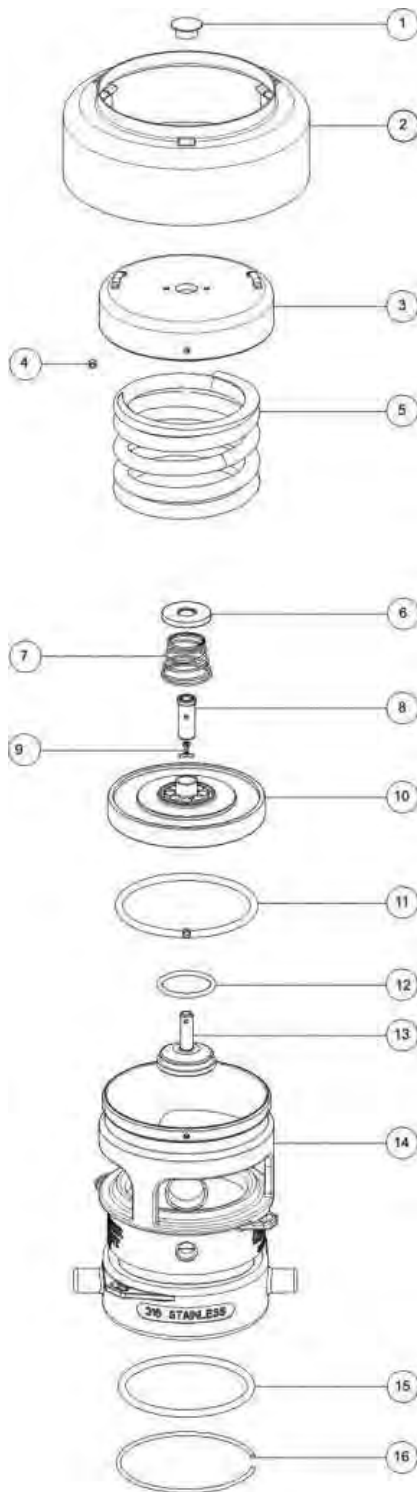
See separate data sheet for our full range of **Venting Device Accessories.**

Fitting Details

Example shown : R29/XXXXX



Parts drawing



Item	Description	Part No.
1	Nylon plug	10978 <input type="checkbox"/> <input type="checkbox"/>
2	Cowl	176/6110
3	Cap assembly	1760/0040
4	Locking grub screw	5121-001
5	Pressure spring - 7 PSIG 15 PSIG 25 PSIG 30 PSIG 36 PSIG (pair)	6104-0067 6104-0165 6104-0252 6104-0310 6104-0048 & 6104-0310
6	Spring pad	175/0201
7	Vacuum spring - 2" Hg 22" Hg	5104-873 5104-879
8	Vacuum stem	175/0203
9	Split pin	5118-016
10	Pressure plate - (Fortyt) (Viton/Kalrez®)	1760/0065 1760/0066
11	Pressure O ring - Fortyt Viton Kalrez®	5005-104 <input type="checkbox"/> 5005-376 <input type="checkbox"/> 5005-666 <input type="checkbox"/>
12	Vacuum O ring - Fortyt Viton Kalrez®	5005-108H <input type="checkbox"/> 5005-107 <input type="checkbox"/> 5005-508 <input type="checkbox"/>
13	Vacuum poppet	10983V/2
14	Body assembly - A29/series B29/series F29/series R29/series	1760/0800 1760/0300 1760/0400 1760/0760
15	PTFE O Ring <i>(included in item 14)</i>	5005-103P
16	Snap ring <i>(included in item 14)</i>	5120-025

Please note, items 15 and 16 are only required on body assembly R29/series.

SEAL KITS

Part No. **USS29/1SK** contains Fortyt O rings marked ☐
 Part No. **USS29/0SK** contains Viton O rings marked ☐

Kalrez® seals available on request.



3" Vacuum Breaker Vent - 3" NPSL swivel connection with PTFE seal. Standard setting : 2"Hg. Body with 3/4" NPS air inlet provision and 1/4" NPT gauge connection. Contact parts manufactured in 316 stainless steel with Fortyt seal (FEP encapsulated silicone). Weatherproof cowl fitted as standard.

Options - Alternative vacuum settings. 3" NPSL fixed connection available. Valve may be fitted with Viton seal.

Specification

Weight :-

Swivel connection valve 6 Lbs (2.7 Kg)
Fixed connection valve 3 Lbs (1.4 Kg)

Vacuum Breaker Vents must be fitted using a spanner wrench. Hammer blows, or similar impact, may impair the unit and invalidate the valve warranty.

Flow Rates

Set Vacuum ("Hg)	Full Flow Rate (SCFH)
2"Hg	15,500 SCFH at 4"Hg
2"Hg	17,300 SCFH at 6"Hg

Note : Flow rates for other valve settings are available on request.

Range

Part Number	Vent Specification
83/X00XX	3" NPSL swivel connection / 1/4" NPT & 3/4" NPS tapping to body
81/X00XX	3" NPSL fixed connection

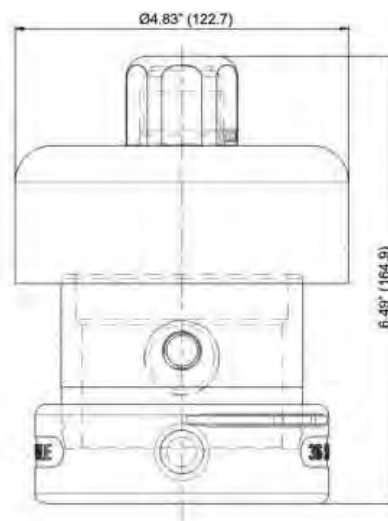
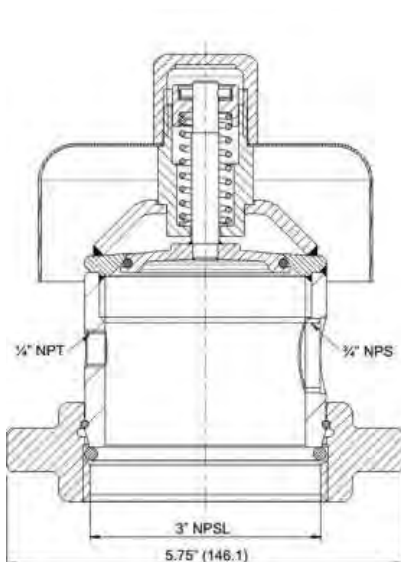
Associated Parts

Associated Parts	Part No.
3/4"NPT female socket ball valve	US007
1/4"NPT pressure gauge 0 to 60 PSIG	US000
60 PSIG air charge kit	US100

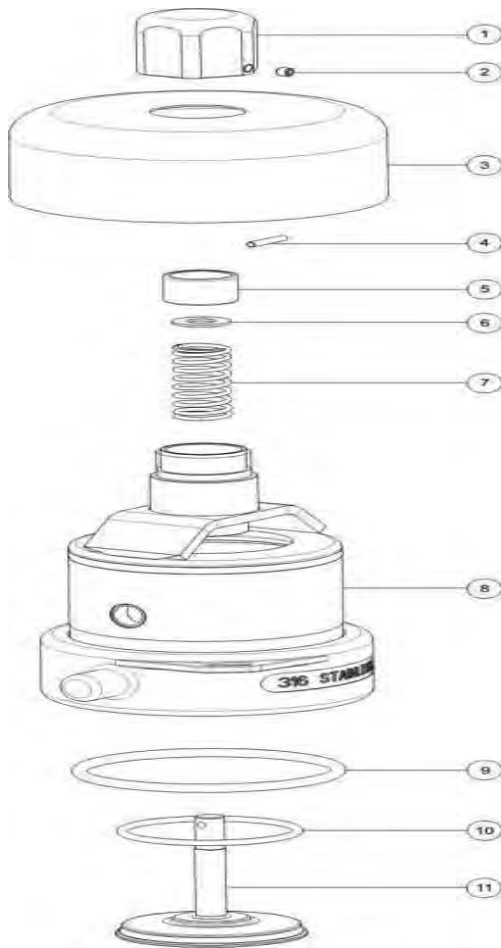
See separate data sheet, ref. **USREL105** for our full range of **Venting Device Accessories**.

Fitting Details

Example shown : 83/X00XX

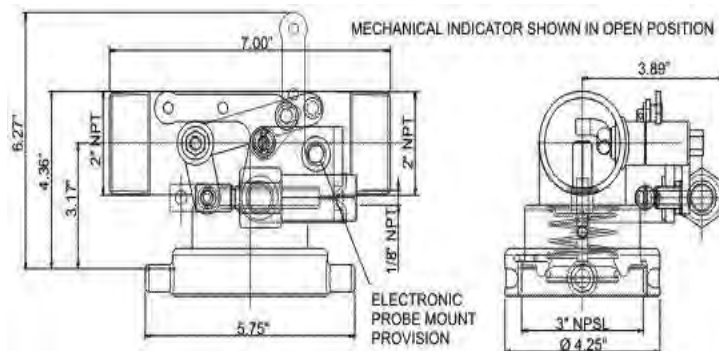


Parts drawing



Item	Description	Part No.
1	Top cap	1780/0580
2	Sockethead setscrew	5121-001
3	Weatherproof cowl	1780/0560
4	Retaining pin	5118-020
5	Spring locator	1780/0570
6	Plain washer	5123-007
7	Vacuum spring – 2"Hg 4"Hg	5104-004 5104-006
8	Body & swivel assembly	1780/0730
9	PTFE O ring	5005-103P
10	Poppet O ring – Fortyt Viton	5005-679 5005-201
11	Vacuum poppet	1780/0550

2" NPT Dual Outlet Hydraulic Vapor Recovery Vent



Part Number Example: 2" NPT Dual outlet hydraulic Uniact Vent Valve, # 57B/#00##
(part number varies according to vacuum setting and poppet seal material)

Repair Kit: Part # 57A/10SK

FUNCTION

Girard Equipment's hydraulically operated vapor recovery adapter is manufactured from T316 stainless steel investment castings and is electropolished for easy cleaning.

The standard unit can be supplied with a 3" straight threaded female swivel outlet for mounting on a 3" clean-out nipple and one or two 2" N.P.T. outlets to allow for both top and bottom vapor recovery.

The adapter is closed in transit and opens consecutively with the tanks' hydraulic internal valve using the existing hydraulic hand pump.

The external hydraulic cylinder is completely isolated from the tanks' lading. The main sealing surface is a Teflon® Encapsulated O-ring (Tef-o-Sil), which is compatible with most chemicals. The adapter is designed to be "Cleaned-In-Place", without removing the assembly from the tank trailers pipework. This feature also allows for the operator to remove the cylinder to either replace or repair as needed. A fluorescent orange indicator provides positive visual confirmation that the valve is open and can be seen from ground level. An additional provision has been added to enable the use of a variety of valve position sensors. This assembly has an effective flow-through area of 2", which should be more than adequate to handle most industrial vapor recovery applications. The unit can also double as an air-unloading device.

Part#	Mounting	Outlet Config.	For Use On:
GVRA-B2	3" NPS Swivel	2" NPT (Single)	3" Tank Nozzle
GVRA-BXT	3" NPS Swivel	2" NPT (Tee)	3" Tank Nozzle

Other mounting and inlet styles are available, please consult our sales people with any inquiries

Materials of Construction

Valve Body/Cylinder	316 Stainless Steel
O-Ring Seals	Teflon® Encapsulated Silicone (Tef-O-Sil)
Wipers and Gaskets	White Teflon®



Girard's Hydraulic Vapor Recovery Adapters are easy to clean and maintain in place. Repair manuals are included with each adapter. For additional repair manuals, please contact our office.



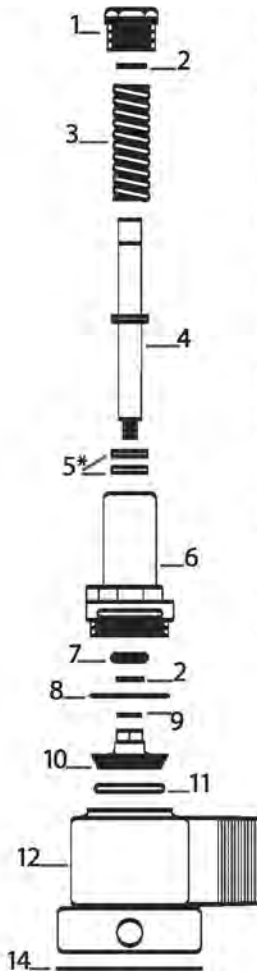
GVRA-B2

- Mounts on a 3" Tank Nozzle.
- 2" NPT Male Outlet.
- Hydraulic Cylinder completely isolated from tank lading.
- Shear Section on Outlet.



GVRA-BXT

- Mounts on a 3" Tank Nozzle.
- 2" NPT Male Outlet.
- 2 Outlets (TEE), for both top and bottom vapor recovery.
- Shear Section on Outlets.



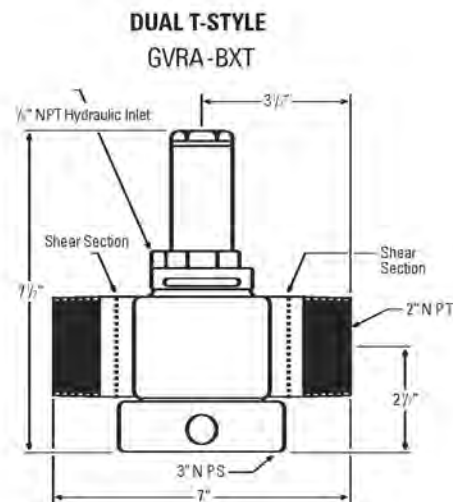
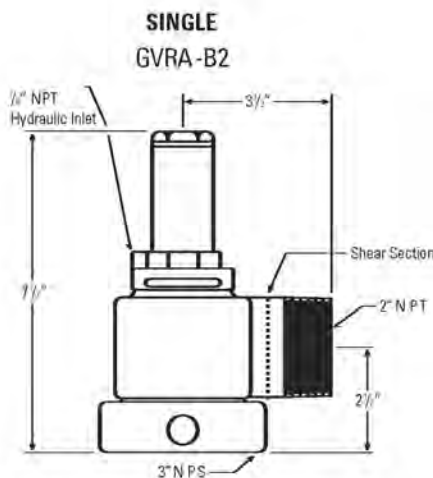
Item	Part #	Description
1	701001	Cylinder Cap
2	701002	Rod O-Ring (2 Required)
3	701003	Spring
4	701004	Rod
5*	701005U 701005L	Hydraulic Seals (Upper) Hydraulic Seals (Lower)
6	701006	Cylinder
7	701007	Wiper
8	701008	Cylinder / Housing O-Ring
9	701009	Lock Washer
10	701010	Poppet
11	701011	Poppet O-Ring (Tef-O-Sil)
12	701012-1	Housing-Single 2" NPS Port 3" NPT Swivel Connection
13	701013-2	Housing-Tee (Not Shown)
14	3-TSR	3" Teflon® Gasket



A fluorescent orange indicator provides positive visual confirmation that the valve is open and can be seen from ground level. An additional provision has been added to enable the use of a variety of valve position sensors.



Hydraulic vapor recovery valve with EZ-Clean Piping



Note: Installed height is 6" over pipe nipple.

3X2VRA**3" x 2" Vapor Recovery Adapter**

The new 3" x 2" Vapor Recovery Adapter is designed for use on an existing 3" tank nozzle. The swivel connection allows easy positioning in confined spaces. The fixed 3" male NPT section could accommodate a 3" cap (solid or fusible). Adapter comes standard with a 2" full-port ball valve, dust cap and chain.

**3VRA****3" Vapor Recovery Adapter**

This 90° Vapor Recovery Adapter with a 3" NPT Swivel inlet is used to safely recover vapors in a "Closed Loop" loading and unloading situation.

**Vapor Recovery Adapter Options**

Air Operated
Vapor Recovery Adapter



Vapor Recovery Adapter
With Liquid Level Sensor


3" SOLID CAP 3-SC

- Straight thread, seals on gasket
- Large sealing tabs
- Seals on an extra thick teflon® gasket
- Swivelhook for attaching cable or chain


3" STAINLESS FUSIBLE 3-SF

- Straight thread, seals on gasket
- Large sealing tabs
- Seals on an extra thick teflon® gasket
- Swivelhook for attaching cable or chain


3" STAINLESS POLYMER FUSIBLE 3-SPF

- Chemically inert thermoplastic polymer used to join two piece cap together
- Fully repairable, call factory for details
- Large seal tabs
- Seals on an extra thick teflon® gasket


4" STAINLESS FUSIBLE 4-SF

- 4" fusible cap
- Extra thick teflon® gasket, standard
- Large seal tabs


4" SOLID CAP 4-SC

- Straight thread, seals on gasket
- Large sealing tabs
- Seals on an extra thick teflon® gasket
- Swivelhook for attaching cable or chain


UNIVERSAL SPANNER WRENCH NSW

A light weight, universal spanner type wrench for pin lug fittings and pipe caps. Fits sizes: 3" and 4". Cast in malleable iron


REDUCER 3X2S

- To reduce from 3" NPT(female) to a 2" NPT male thread


3" X 3" ADAPTER 3X3S

This heavy duty adapter can be used to restore 3" NPT (tapered) nipples like those found on tank trailers clean-out nipples, nose lines, and valve outlets that have been damaged due to "cross threading". Also, threads that are galled, out of round, or partially stripped can be renewed without the need for costly work on the trailer.

Quick Clean

Chemical Hydraulic Valve

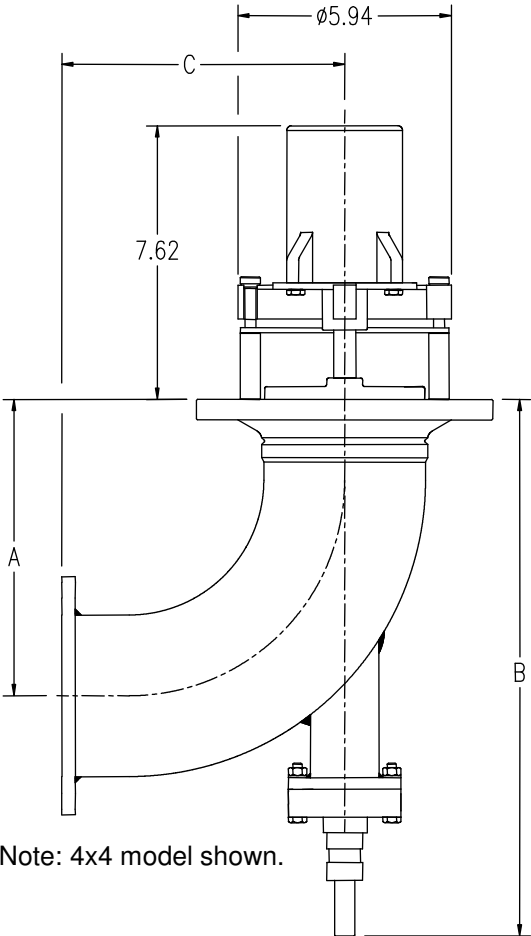
QUICK CLEAN
VALVE

- Quick Disassembly
- Shear Section Provided
- Hydraulics Isolated from Product
- Product Contact Seals PTFE

The Quick Clean Chemical Hydraulic Valve meets the requirements of an internal self-closing stop valve. It is designed for use with a wide variety of chemicals. The Quick Clean features a readily removable spring housing assembly and a hydraulic actuator that can be replaced without removing the valve from the tank. The hydraulic system is completely isolated to eliminate possible product contamination. A resilient Teflon® encapsulated o-ring with a tapered seat provides positive sealing. A heavy mounting flange is provided to insure a flat gasket surface.

Valve includes a shear section which meets requirements of 49CFR178.345-8 and tested per TTMA RP 84. An indicator rod located at the base of the actuator moves in relation to the seat.

¼ NPT hydraulic port is located on the flange of the actuator. 1,500 psi [103 bar] minimum hydraulic line pressure required to operate valve, but do **not** exceed 3,000 psi [206 bar] hydraulic line pressure as provided by Betts' pump HP46982.



Note: 4x4 model shown.

Size	Assembly No.	Material *	Inlet Flange		Outlet		Dimensions			Wt. (lbs.)
			B.C.	Holes	B.C.	Holes	A	B	C	
4x3 90° Elbow	CH46861SSTS	316 SS	7.25" [184 mm]	8 Holes Ø .56" [14.2 mm]	4.88" [124 mm]	8 Holes Ø .44" [11.1 mm]	4.75" [121 mm]	12.05" [307 mm]	4.50" [114 mm]	26 [11.8 kg]
	CH46861LHTS	316 SS w/ Hastelloy® trim**								
4x4 90° Elbow	CH46874SSTS	316 SS			5.88" [149 mm]		8.13" [206 mm]	14.81" [376 mm]	7.88" [200 mm]	29 [13.1 kg]
	CH46874LHTS	316 SS w/ Hastelloy® trim**								

* Material listing is for wetted surfaces exposed during normal operation of valve.

** Hastelloy® trimmed valve is an option that includes Hastelloy® C-22 overlay on the seat area in contact with the seat o-ring (15). The Hastelloy® overlay reduces the potential of the seat pitting at the seal contact area.

*** Values shown are test values. Actual values may vary due to service conditions.

NOTE: A flat mounting surface must be provided. Recommended mounting pad is MP19752LC. For hydraulic pump and distributor, see section 35, page 3B and 3D.

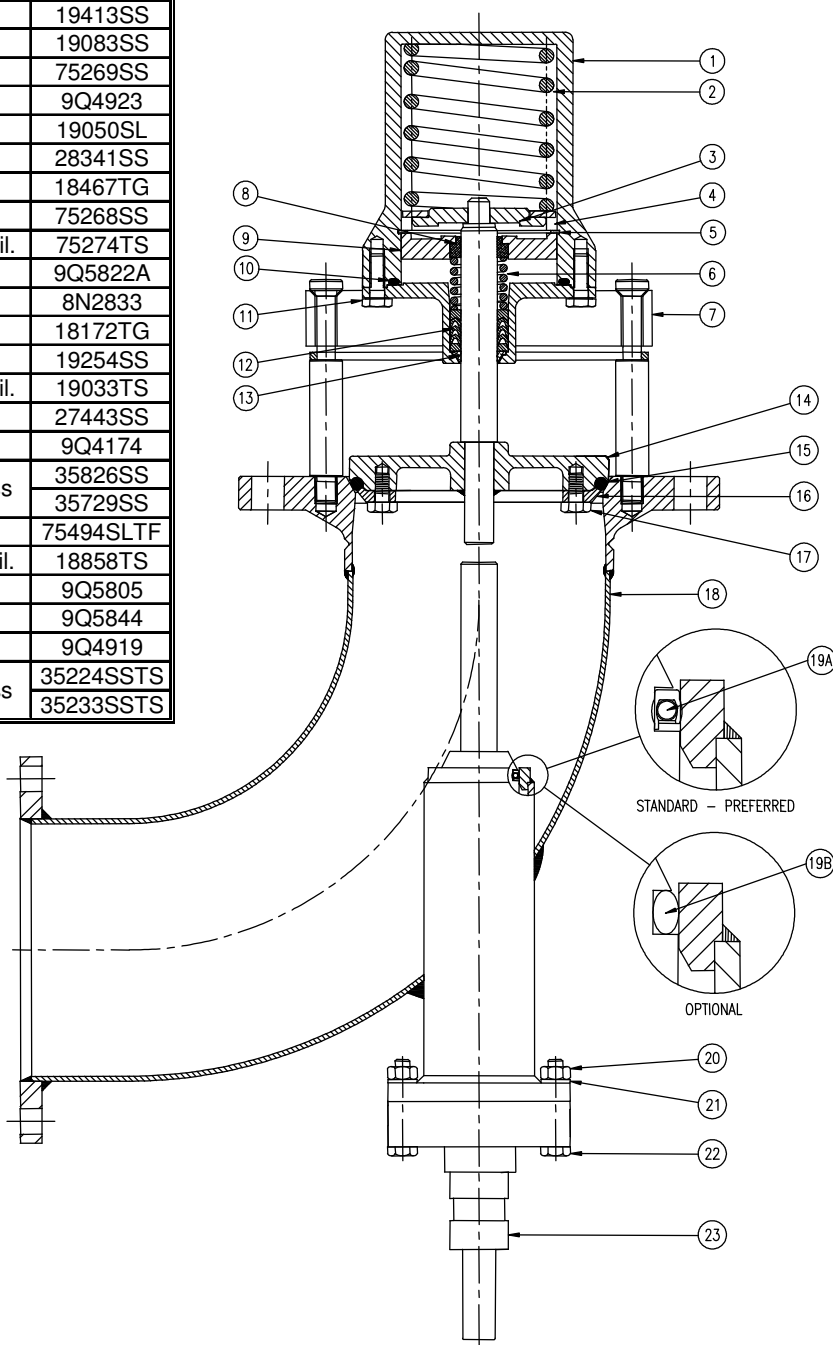
Temp. Range ***	MAWP
-40°F to +400°F [-40°C to +204°C]	50 psi [3.4 bar]

PARTS LIST

QUICK CLEAN CHEMICAL HYDRAULIC VALVE

No.	Description	Req.	Material	Part No.
1	Spring Housing	1	316 Stainless	28244SS
2	Spring	1	316 Stainless	19413SS
3	Washer	1	316 Stainless	19083SS
4	Spring Washer	1	316 Stainless	75269SS
5	Retaining Ring	1	302 Stainless	9Q4923
6	Packing Spring	1	302 Stainless	19050SL
7	Spider	1	316 Stainless	28341SS
8	Spacer Sleeve	1	Teflon/Glass	18467TG
9	Bushing Holder	1	316 Stainless	75268SS
10	Base O-Ring	1	Tef. Encap. Sil.	75274TS
11	Retaining Screw	4	316 Stainless	9Q5822A
12	Packing Set	1	Teflon	8N2833
13	Wiper	1	Teflon/Glass	18172TG
14	Stem & O-ring Holder	1	316 Stainless	19254SS
15	Seat O-ring	1	Tef. Encap. Sil.	19033TS
16	Retainer Plate	1	316 Stainless	27443SS
17	Cap Screw 1/2"	4	316 Stainless	9Q4174
18	Body Assy - 4x4	1	316 Stainless	35826SS
	Body Assy - 4x3			35729SS
19A	Barrel Cap U-Cup Seal	1	TFM/Elgiloy	75494SLTF
19B	Barrel Cap O-Ring		Tef. Encap. Sil.	18858TS
20	Hex Nut 1/4-20NC	4	316 Stainless	9Q5805
21	Lockwasher 1/4"	4	316 Stainless	9Q5844
22	Cap Screw 1-1/2"	4	316 Stainless	9Q4919
23	Hyd. Actuator - 4x4	1	316 Stainless	35224SSTS
	Hyd. Actuator - 4x3			35233SSTS

- Spring Housing Assembly, 36054SSTS, includes items 1 through 13.
- Seal Kit for Spring Housing Assembly, CH75549TF, includes items 8, 10, 12, & 13.
- Consult maintenance manual MM-CH001 for Spring Housing Assembly repairs.
- Consult maintenance manual MM-CH002 for Valve repairs.



WARNING: Use only genuine BETTS INDUSTRIES, INC. replacement parts. Use of substitute parts can impair the proper function of this product and void all warranties.

Chemical Hydraulic Valve

EXTERNAL VALVE

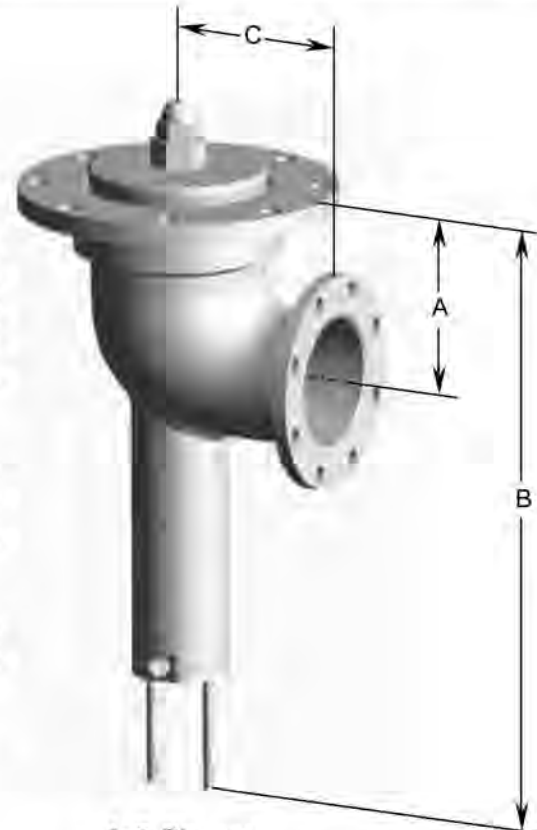
- Replaceable Teflon® Seat
- Removable-Replaceable Disc
- All Seals PTFE
- 2 Piece Replaceable Stem

The Chemical Hydraulic Valve is designed for use with a wide variety of chemicals. A replaceable Teflon® seat and removable disc are provided for ease in repairing should damage occur from dirt or other foreign material. A heavy mounting flange is provided to insure a flat gasketing surface.

¼ NPT Hydraulic connection conveniently located at the base of the piston cylinder. Indicator pins, which move in relation to the piston, show the position of the disc at all times.

This valve does NOT contain a shear section. The cargo tank must protect the valve by providing suitable protection as specified in 49 CFR 178.345-8(2).

1,500 psi minimum hydraulic line pressure required to operate valve, but do not exceed 3,000 psi hydraulic line pressure.



4x3 Shown

Size	Assembly No.	Material *	Inlet Flange		Outlet		Dimensions			Wt. (lbs.)	Temp. Range	MAWP
			B.C.	Holes	B.C.	Holes	A	B	C			
4x3 90° Elbow	CH46955SST	316 SS	7.25"	8- ⁹ / ₁₆	4 ⁷ / ₈	8- ⁷ / ₁₆	4 ³ / ₄	16	4 ¹ / ₂	29	-40°F to +400°F	50
	CH46955LHT	316 SS w/ Hastelloy trim**										
4x4 90° Elbow	CH46949SST	316 SS			5 ⁷ / ₈		7 ⁵ / ₈	16	7 ⁷ / ₈	30.5		
	CH46949LHT	316 SS w/ Hastelloy trim**										

* Material listing is for all wetted surfaces exposed to product during normal operation of valve.

** Hastelloy trimmed valve has a hastelloy C-22 overlay on the disc (3) in the area in contact with the seal (6). The hastelloy overlay reduces the potential of the disc pitting at the seal contact area.

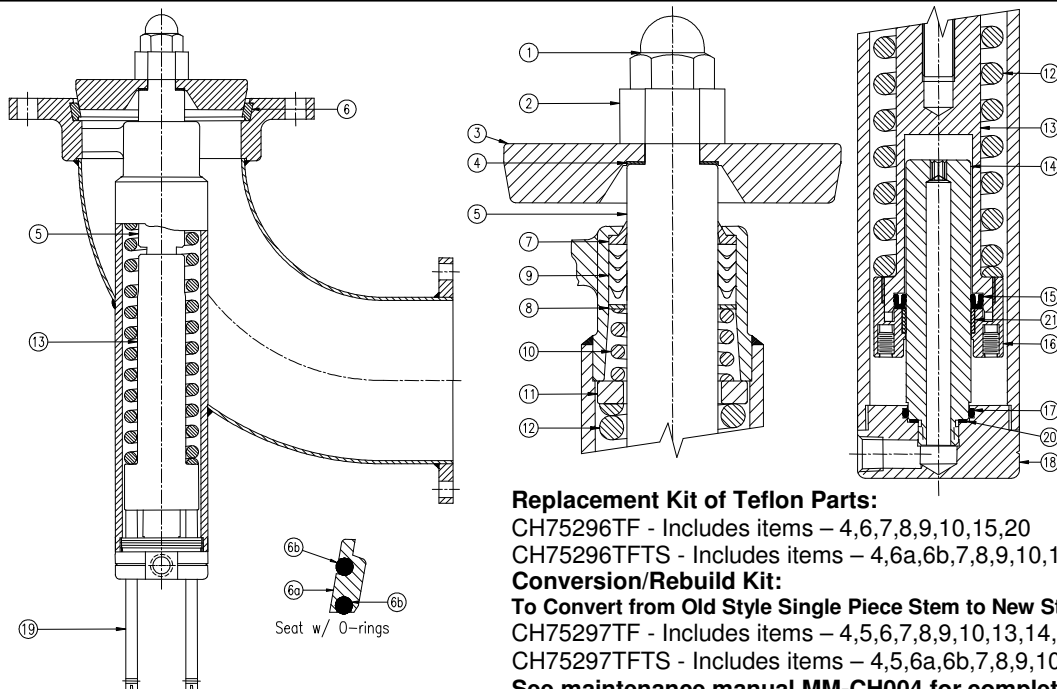
Suffix "017" indicates Teflon Seat w/ Double Tef-Sil O-Ring.

NOTE: A flat mounting surface must be provided for valve seat flange. Recommended mounting pad is MP19752LC.

Betts INDUSTRIES, INC. WARREN, PA.

PARTS LIST

CHEMICAL HYDRAULIC VALVE



Replacement Kit of Teflon Parts:

CH75296TF - Includes items – 4,6,7,8,9,10,15,20

CH75296TFTS - Includes items – 4,6a,6b,7,8,9,10,15,20

Conversion/Rebuild Kit:

To Convert from Old Style Single Piece Stem to New Style 2 Piece Stem

CH75297TF - Includes items – 4,5,6,7,8,9,10,13,14,15,16,17,18,20

CH75297TFTS - Includes items – 4,5,6a,6b,7,8,9,10,13,14,15,16,17,18,20

See maintenance manual MM-CH004 for complete rebuilding instructions

No.	Description	Req.	Material	Part No.	No.	Description	Req.	Material	Part No.
1	Cap Nut	1	316 Stnls	16672SS	8	Follower Washer	1	316 Stnls	19594SS
2	Cap Collar	1	316 Stnls	16671SS	9	Packing Rings	1 set of 3	Teflon	15759TF
3	Disc	1	316 Stnls Hast. C-22 Trim	16743SS 16743LH	10	Spring - Stuffing Box	1	316 Stnls	19616SS
4	Teflon Washer	1	Teflon	16690TF	11	Washer - Main Spring	1	304 Stnls	15684SL
5	Upper Stem Half	1	316 Stnls Hast. C276	28202SS 28202HC	12	Main Spring	1	Chr. Van.	18850EY
6	Replaceable Seat	1	Teflon	16644TF	13	Lower Stem Half	1	303 Stnls	28201SL
6a	Replaceable Seat w/ O-rings		Kalrez	16644KA	14	Piston	1	303 Stnls	75136SL
6b	Seat O-ring Only		Teflon	18897TFTS	15	Main Seal	1	302SS/PTFE	75207SSTF
			Kalrez	18897KA	16	Seal Retainer Ring	1	303 Stnls	75190SL
			Tef-Sil	18246TS	17	Piston O-Ring Seal	1	Tef-Sil	75206TS
			Kalrez	18246KA	18	Piston Holder	1	316 Stnls	75137SS
7	Wiper	1	Teflon	15862TF	19	Indicator Pins	2	304 Stnls	16133SL
					20	Seal Washer	1	Fiber	9Z6185
					21	Bearing	1	Carbon PTFE	75455TF

REPLACE DISC AND/OR SEAT:

- Hold cap collar (2) and remove cap nut (1) and remove disc (3).
- Care should be taken not to lose Teflon washer (4).
- Remove seat (6), use care not to damage seat surface of seat flange.
- Install new disc (3) and/or seat (6).

REPLACE STUFFING BOX PACKING OR MAIN SEAL:

- Disconnect hydraulic line and unscrew indicator pins (19) and piston holder assembly (14) & (18).
- To ensure disc (6) does not get damaged, hold cap collar (2) stationary while using a spanner wrench (16236MS) to unscrew the seal retainer ring (16).

REPLACE STUFFING BOX PACKING:

- If lower stem half (13) remains in valve body after seal retainer ring (16) has been removed, hold cap collar (2) and insert a 1/4" thick x 2" wide piece of plate into the slots on the bottom of the lower stem half and unscrew it from the upper stem half.
- Remove main spring (12), washers (8) & (11) and stuffing box spring (10).
- Remove old packing (9) and wiper (7) and replace with new.

REPLACE MAIN SEAL:

- If lower stem half (13) unscrews from the upper stem half (95) it will be necessary to clamp the lower stem half (13) in a vice to unscrew seal retainer ring (16).
- After removing seal retainer ring (16), remove old main seal and install new.
- Care should be taken not to damage seal surface of lower stem half (13).

WARNING:

Use only genuine BETTS INDUSTRIES, INC. replacement parts. Use of substitute parts can impair the proper function of this product and void all warranties.

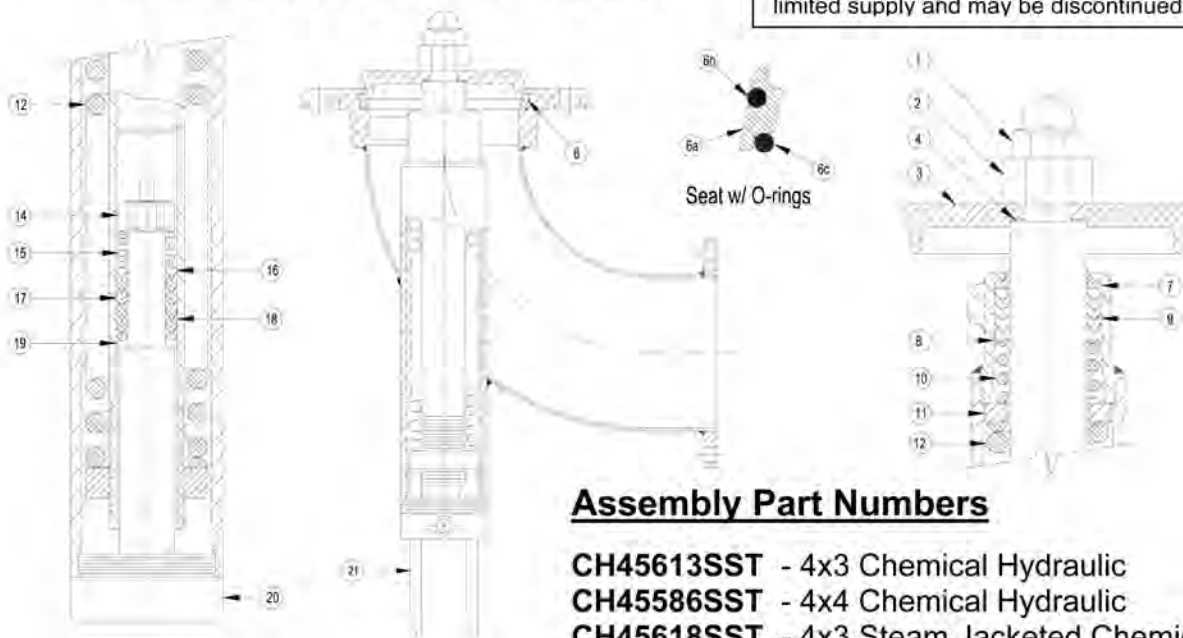
Obsolete Section

Replacement Parts Only

Chemical Hydraulic Valve & Steam Jacket Valve

Replaced with New Designs (See Section 35)

PLEASE NOTE: All parts may not be available do to limited supply and may be discontinued without notice.



Assembly Part Numbers

CH45613SST - 4x3 Chemical Hydraulic

CH45586SST - 4x4 Chemical Hydraulic

CH45618SST - 4x3 Steam Jacketed Chemical Hydraulic

CH45616SST - 4x4 Steam Jacketed Chemical Hydraulic

CH45670MSB - 6" Hot Products Hydraulic

(Internal components the same. See Sec 35 page 6D for Hot Products Disc and Seal components)

Replacement Kit of Teflon Parts

CH17828TF-Includes items 4,6,7,9 and 18

CH19032TF-Includes items 4,6a,7,9 and 18

No.	Description	Req.	Material	Part No.
1	Cap Nut	1	316 Stnls	16672SS
2	Cap Collar	1	316 Stnls	16671SS
3	Disc	1	316 Stnls	16743SS
4	Teflon Washer	1	Teflon	16690TF
6	Replaceable Seat	1	Teflon	16644TF
6a	Replaceable Seat w/ O-Rings		Tef-Sil	18897TFTS
6b	Seat O-Ring only	1	Tef-Sil	18246TS
6c	O-Ring	1	Tef-Sil	18834TS
7	Wiper	1	Teflon	15862TF
8	Follower Washer-Stuffing Box	1	316 Stnls	19594SS
9	Packing Rings-Stuffing Box	Set	Teflon	15759TF

No.	Description	Req.	Material	Part No.
10	Spring-Stuffing Box	1	316 Stnls	19616SS
11	Washer-Main Spring	1	304 Stnls	15684SL
12	Main Spring	1	Chr. Van.	18850EY
14	Retainer Nut-Piston	1	304 Stnls	15630SL
15	Spring-Piston	1	316 Stnls	15652SS
16	Male Adapter-Piston	1	304 Stnls	15629SL
17	Separator Rings-Piston	4	304 Stnls	15628SL
18	Packing Rings-Piston	Set	Teflon	15634TF
19	Female Adapter-Piston	1	304 Stnls	16732SL
20	Piston	1	304 Stnls	25757SL
21	Indicator Pins	2	304 Stnls	16133SL

MAINTENANCE INSTRUCTIONS

TO REPLACE DISC: Hold nut No.2 and remove nut No.1. The disc No.3 can be removed. Care should be taken not to damage or lose teflon washer No.4.

TO REPLACE STUFFING BOX PACKING: Disconnect hydraulic line. Remove indicator pins No.21 and piston assembly No.20. Use spanner wrench remove nut No.13. This nut loads the main spring and care should be taken in removing not to allow disc to turn and damage the seat. Hold nut No.2 to prevent this. Remove main spring, washers, and stuffing box spring. Remove old packing and replace with a full set of new packing. (If packing has become solid due to solidification of product, it may be necessary to remove stem No.5 to replace packing)

TO REPLACE PISTON PACKING: Disconnect hydraulic line. Remove indicator pins No.21. The piston assembly No.20 may then be removed and packing replaced. Use only full sets of packing for best results.

We suggest the use of NEVER-SEEZ anti-seize and lubricating compound or equal on all threads.

Betts TM INDUSTRIES, INC. WARREN, PA.

Chemical Hydraulic Valve

INTERNAL VALVE

The Internal Chemical Hydraulic Valve is designed for use with a wide variety of chemicals. It is an internal self-closing stop valve, therefore it does not require under carriage crash protection. Available elbows are supplied with shear sections to meet 49CFR 178.345-8(a)(4). A heavy mounting flange is provided to insure a flat surface for a positive seal. A replaceable Teflon® seat and a replaceable stem are provided for ease in repairing a damaged valve.

The 1/8 NPT Hydraulic connection is located on the outside of the mounting flange. 1,500 psi minimum hydraulic line pressure is required to operate the valve, but do not exceed 4,000 psi hydraulic line pressure.



Description	Assembly No.	Material *	Flange O.D.	Bolt Circle	Bolt Holes	Temp. Range	MAWP	Wt.
Internal Hydraulic Valve	CH47003SST	316 Stainless	8 3/16"	7 1/4"	8 - 9/16"	-40° F to +400° F	50	31#
	CH47003LHT	316 SS w/Hastelloy® trim**						

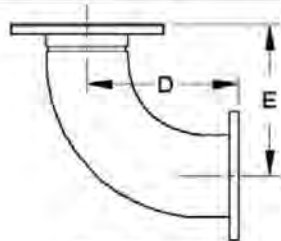
NOTE: A flat mounting surface must be provided for the valve. Recommended mounting pad with extended studs is MP19741LC found in Section 40 Page 1A.

* Material listing is for all wetted surfaces exposed to product during normal operation of valve.

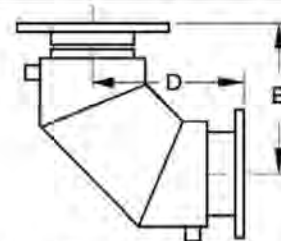
** Hastelloy® trimmed valve is an option that includes Hastelloy® C-22 overlay on the disc (5) in the area in contact with the seal (15). The Hastelloy® overlay reduces the potential of the disc pitting at the seat contact area.

Suffix "017" indicates Teflon Seat w/ Double Tef-Sil O-Ring.

Available Elbows



Standard Elbow



Steam Jacketed Elbow Steam Connections 3/4" NPT

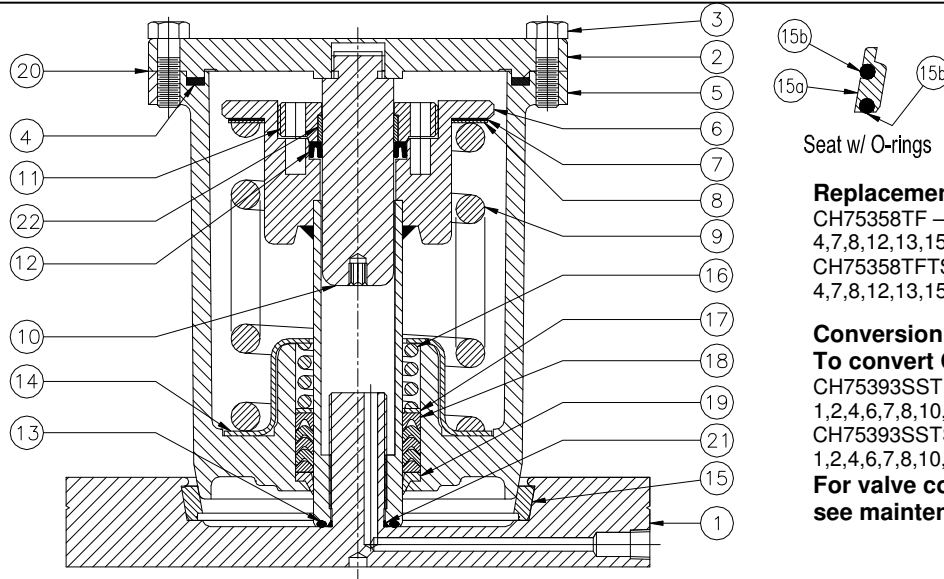
Size	Elbow Description	Elbow Assembly No.	Material	D	E	Inlet Flange			Outlet Flange			Wt.
						O.D.	B.C.	Holes	O.D.	B.C.	Holes	
4 x 3	90° Elbow	CH26165SS	316 SS	4 1/2"	4 3/4"	8 3/16"	7 1/4"	8 - 9/16"	5 5/8"	4 7/8"	8 - 7/16"	9.4#
4 x 3	90° Elbow w/Steam Jacket	CH26166SS	316 SS									13.7#
4 x 4	90° Elbow	CH16859SS	316 SS	8 11/32"	8 11/32"	8 3/16"	7 1/4"	8 - 9/16"	6 5/8"	5 7/8"	8 - 7/16"	11.8#
4 x 4	90° Elbow w/Steam Jacket	CH16826SS	316 SS									13.7#

Teflon Envelope Gasket G27229TF-MIL is recommended for use between valve and outlet elbow.

Betts INDUSTRIES, INC. WARREN, PA.

PARTS LIST

INTERNAL CHEMICAL HYDRAULIC VALVE



Replacement Kit of Teflon Parts

CH75358TF – Includes items

4,7,8,12,13,15,16,17,18,19,20,21

CH75358TFTS – Includes items

4,7,8,12,13,15a,15b,16,17,18,19,20,21

Conversion Kit

To convert CH45843SST to CH47003SST

CH75393SSTF – Includes items

1,2,4,6,7,8,10,11,12,13,15,16,17,18,19,20,21,22

CH75393SSTS – Includes items

1,2,4,6,7,8,10,11,12,13,15a,15b,16,17,18,19,20,21,22

For valve conversion instructions, see maintenance manual MM-CH005.

No.	Description	Req.	Material	Part No.	No.	Description	Req.	Material	Part No.
1	Seat Flange	1	316 Stnls	46937SS	14	Packing Retainer	1	316 Stnls	19446SS
2	Cover Plate	1	316 Stnls	75160SS	15	Replaceable Seat	1	Teflon	16644TF
3	Cap Screw - Cover Plate	12	316 Stnls	9Q3305				Kalrez	16644KA
4	Gasket - Cover Plate	1	Teflon	17295TF	15a	Replaceable Seat w/ O-rings		Teflon	18897TFTS
5	Disc	1	316 Stnls	27996LC001	15b	Seat O-ring only	2	Tef-Sil	18246TS
			Hast. C-22 Trim	28235LH001				Kalrez	18246KA
6	Stem/Spring Retainer	1	316 Stnls	75224SS	16	Spring-Stuffing Box	1	316 Stnls	19616SS
7	Backup Shim-Spring	1	Teflon	16867TF	17	Follower Washer	1	316 Stnls	19594SS
8	Shim-Spring	1	304 Stnls	16866SL	18	Packing Rings	Set	Teflon	15759TF
9	Main Spring	1	316 Stnls	16890SS	19	Wiper - Suffing Box	1	Teflon	15862TF
10	Piston	1	303 Stnls	75161SL	20	Gasket - Cover Plate	1	Teflon	19720TF
11	Seal Retainer	1	316 Stnls	75162SS	21	O-ring - Stem Backup	1	Viton	3926VT
12	Main Hydraulic Seal	1	PTFE/302SS	75207SSTF	22	Bearing Ring	1	Teflon/Graphite	75455TF
13	O-ring - Stem	1	Tef-Sil	75206TS					

INSTALLATION INSTRUCTIONS:

- Mount valve on mounting pad.
- Connect Hydraulic line to 1/8" NPT fitting on O.D. of seat flange leaving fitting loose.
- Operate pump until all air is bled from system.
- Tighten fitting and refill pump reservoir.
- Inspect all fittings for leaks.

WARNING:

Use only genuine BETTS INDUSTRIES, INC. replacement parts. Use of substitute parts can impair the proper function of this product and void all warranties.

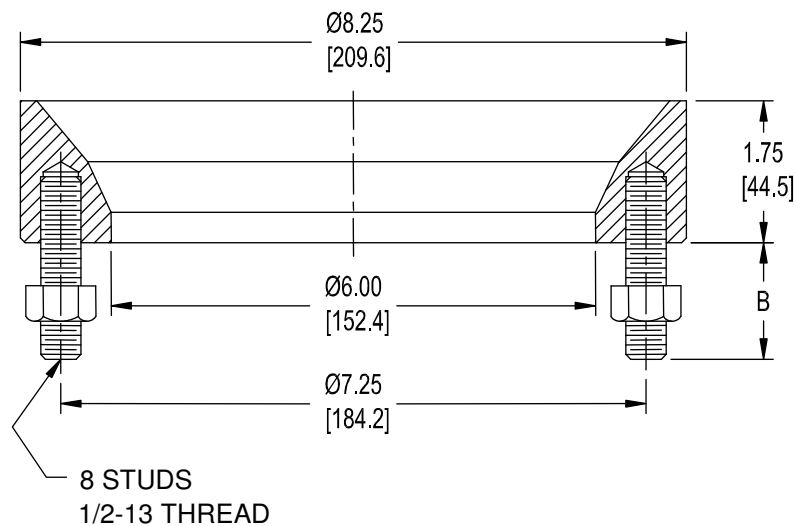
REBUILDING VALVE: (Betts recommends using parts kit CH75358TF when rebuilding valve).

- Remove cap screws (3). Cover plate (2) can now be removed. Discard gaskets (4) and (20). Inspect piston (10), if piston (10) is scratched or damaged it should be replaced.
- Remove seal retainer (11) and stem/spring retainer (6) with spanner wrench 75325MS. Remove hydraulic seal (12).
 - Inspect Stem/spring retainer (6); if stem is damaged or scratched it must be replaced.
- Lift disc (5) off seat flange (1) and remove all components remaining in disc (5).
- Replace seat (15), wiper (19), packing (18), spring-stuffing box (16), stem O-ring seal (13) and backup seal (21) with new parts included in kit.
- Reinstall packing retainer (14), main spring (9) and shims (6) and (7).
- Thoroughly coat threads of seat flange (1) with a high quality removable thread lock compound and insert stem/spring retainer (6) through packing (18) and thread onto hub of seat flange (1); tighten to 90 ft lbs.
- Insert new hydraulic seal (12) with lips facing inwards apply anti-seize compound and install seal retainer (11); tighten to 30 ft lbs.
- Install new gaskets (4) and (20) and bolt cover plate assembly (2) using cap screws (3); tighten cap screws to 40 ft lbs.

4" Mounting Pad

MOUNTING PAD

- HEAVY CROSS SECTION INSURES FLAT SURFACE
- REMOVABLE STUDS
- CLEAN INTERIOR SURFACE
- PHONOGRAPHIC GASKET SURFACE



Betts 4" mounting pads are designed for any style valve and are recommended for use with Betts Hydraulic Valves.

The pad is designed with a heavy cross section to eliminate warpage, which may be transmitted to the valve seat causing leakage. The studs are removable for ease of replacement. The pad has a clean interior surface, free of discoloration that occurs when studs are welded and the gasket surface has a phonographic finish for improved sealing.

Mill Test Reports for ASME code work are furnished for stainless mounting pads only.

Studs conform to SA193 B8M CL1.

Description	Part No.	Material	Wt. lb. [kg]	“B” in. [mm]	MAWP psi [bar]	Temp °F [°C]
Mounting Pad	MP19752LC	ASME SA351 CF3M - Stnls 316L	10.9 [4.9]	1.44 [36.5]	150 [10.3]	-40 to 600 [-40 to 315]
	MP16590AL	ASTM B26 356-T6 Aluminum	4.5 [2.0]			
Mounting Pad *	MP19741LC	ASME SA351 CF3M - Stnls 316L	11.2 [5.1]	2.75 [69.9]		
	MP16914AL	ASTM B26 356-T6 Aluminum	4.8 [2.2]			
Mounting Pad Only No Studs	MP19688LC	ASME SA351 CF3M - Stnls 316L	9.7 [4.4]	N/A		
	MP17322AL	ASTM B26 356-T6 Aluminum	3.4 [1.5]			

* Please Note – The special mounting pad with longer studs is required for the Internal Hydraulic Valve CH47003SST or CH45843SST.

Hydraulic Pump

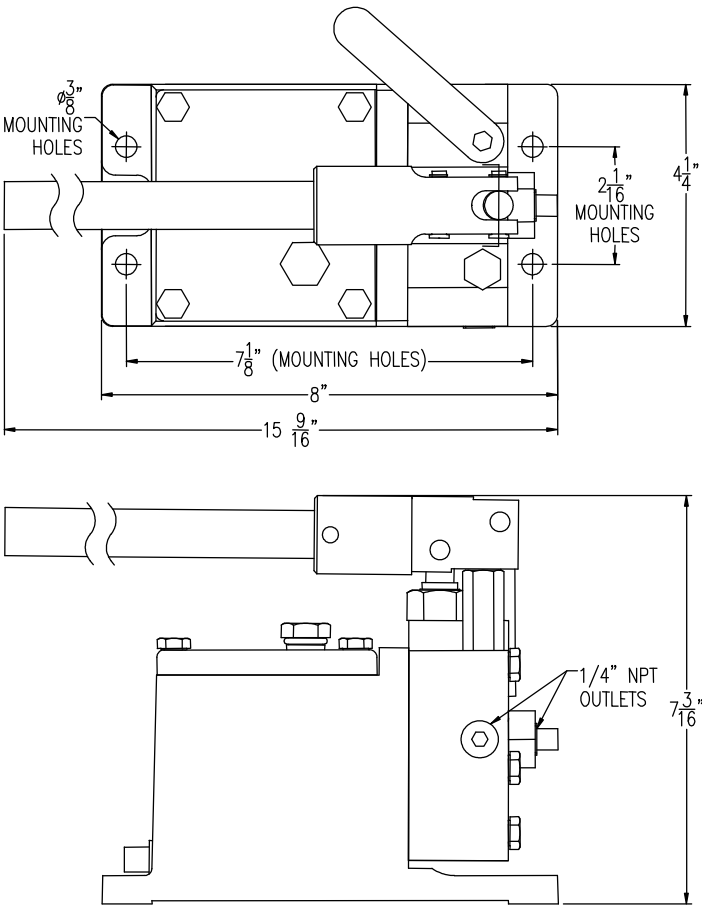
- Stainless Steel Valve Block and Internal Components
- Horizontal or Vertical Mounting
- Tamper Resistant Pressure Relief
- Front and Side Outlet Ports

The Betts Hydraulic Pump HP46982ALSL is designed as a corrosion resistant, reliable hydraulic pump for use with any Betts hydraulically operated valve or vent. The pump head and internal parts are made of corrosion resistant stainless steel. The reservoir is made of aluminum with a durable E-coating.

1/4 NPT hydraulic connections are conveniently located at both the front of the pump and on the right side. A drain plug allows the reservoir to be drained without unbolting the pump.

Pump can be mounted horizontally or vertically with outlet end down.

The pump contains a tamper resistant pressure relief set to bypass at approximately 3,000 psi [207 bar].



Assembly No.	Rated Pressure	Displacement per Stroke	Fluid Capacity*		Dry Weight
			Total**	Useable***	
HP46982ALSL	3000 psi [207 bar]	.43 in^3 [7 ml]	38 in^3 (21 oz) [620 ml]	25 in^3 (14 oz) [410 ml]	13 lb [6 kg]

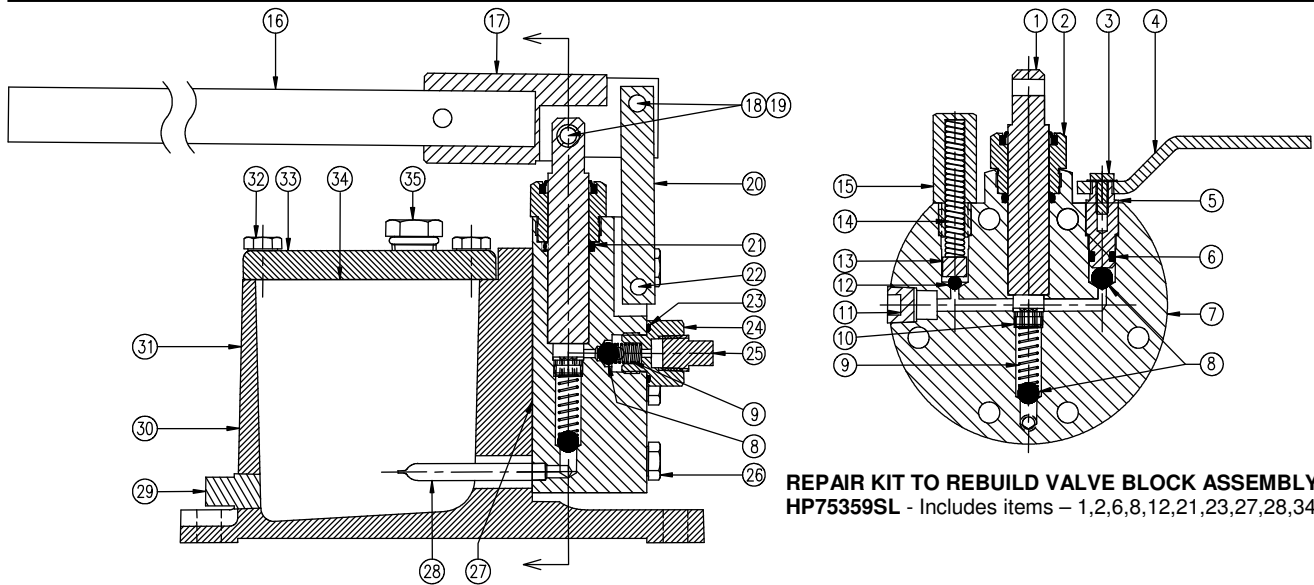
- * Pumps are shipped dry with no hydraulic fluid.
** Total = amount of fluid to fill reservoir to within 1/4" of the cover plate (33).
*** Useable = amount of fluid to take 'Total' fluid down to just above the filter screen (28).

Betts™ INDUSTRIES, INC. WARREN, PA.



PARTS LIST

HYDRAULIC PUMP



**REPAIR KIT TO REBUILD VALVE BLOCK ASSEMBLY
HP75359SL** - Includes items – 1,2,6,8,12,21,23,27,28,34

No.	Description	Req.	Material	Part No.	No.	Description	Req.	Material	Part No.
1	Piston	1	303 Stainless	75233SL	19	E-Clip	2	Coated Steel	9Q4733A
2	Bushing/Wiper	1	Brass/Polyurethane	75239BR	20	Link	1	303 Stainless	75234SL
3	Release Handle Screw	1	304 Stainless	9Q4170	21	Piston Seal	1	Buna-N	17946BN
4	Pressure Release Handle	1	304 Stainless	75145SL	22	Pin	1	303 Stainless	9Q4950
5	Release Stem	1	304 Stainless	75236SL	23	Outlet O-ring	1	Buna-N	75584BN
6	Release Stem Seal	1	Buna-N	75254BN	24	Outlet	1	Brass	75583BR
7	Valve Block	1	303 Stainless	35965SL	25	1/4" NPT Pipe Plug	1	Plastic	9Z6145
8	Ø.313 Ball	3	440 Stainless	9Z8505	26	Valve Block Cap Screw	6	304 Stainless	9Q5975
9	Ball Spring	2	302 Stainless	75255SL	27	Head Gasket	1	Cellulose Fiber	75244CF
10	Spring Retainer	1	Brass	75298BR	28	Filter Screen	1	304 Stainless	75148SL
11	Auxiliary Outlet Plug	1	Brass	9V4925	29	Drain Plug	1	Brass	9V4914
12	Ø.188 Ball	1	440 Stainless	9Z8507	30	Reservoir	1	Aluminum E-Coat	46973ALEY
13	Bypass Plug	1	304 Stainless	75237SL	31	Priming Instructions	1	Vinyl	9Z4022
14	Bypass Spring	1	17-7PH Stainless	75256SL	32	Cover Cap Screw	4	304 Stainless	9Q5861
15	Bypass Cap	1	Brass	75238BR	33	Cover Plate	1	Aluminum E-Coat	75246ALEY
16	Handle	1	Galv. Steel	HP19165-01	34	Cover Gasket	1	Cellulose Fiber	75245CF
17	Beam	1	E-Coat Steel	75240EY	35	Vent Plug	1	Brass/Viton	75242BR
18	Clevis Pin	2	Zinc Plated Steel	9Q4733					

NOTE:

Most hydraulic failures can be attributed to the presence of dirt or foreign materials in the hydraulic system. It is imperative that all components are cleaned and that only new, clean fluid is used in the reservoir. Be sure that all fittings and lines are clean and free from dirt, filings and debris.

PUMP FILLING AND PRIMING INSTRUCTIONS:

- Pumps are shipped dry and must be filled and primed before use.
- Remove vent plug (35) and fill pump to within 1/4" of cover plate (33) with fluid.
- Loosen pressure release handle (4) and pump at least 10 full strokes to prime pump.
- Pause briefly at the bottom of each down stroke to allow air to bleed out of valve block (7).

- Recheck fluid level and reinstall vent plug (35).
- If pump fails to prime, follow these steps:
 - Ensure top of pump is clean, & free of dirt & debris.
 - Remove e-clip (19) and clevis pin (18) on top of stem (1).
 - Pull stem (1) out and fill stem cavity with same fluid in reservoir (30).
 - Reinstall stem (1), clevis pin (18) and e-clip (19).
 - Loosen pressure release handle (4) and pump at least 10 full strokes.

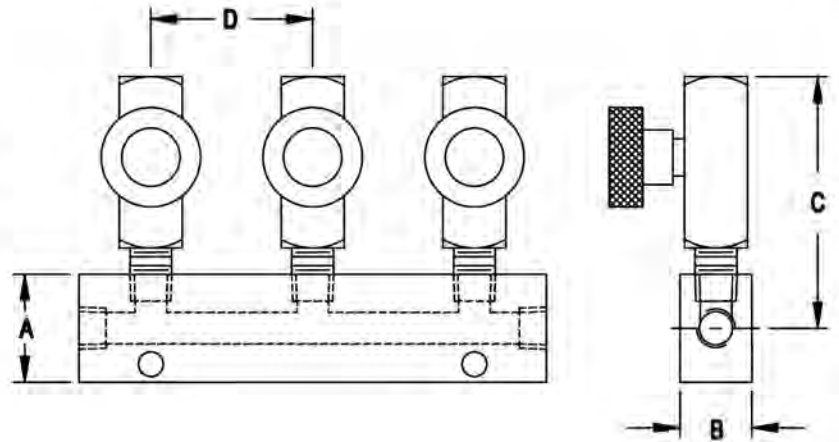
VERTICAL MOUNTING INSTRUCTIONS:

- Remove drain plug (29) and vent plug (35).
- Reinstall both but swap locations.
- Mount pump with outlet end down.

WARNING: Use only genuine BETTS INDUSTRIES, INC. replacement parts. Use of substitute parts can impair the proper function of this product and void all warranties.

Hydraulic Distributor

The hydraulic distributor consists of a multiple compartment manifold with individual control valves for each compartment. The special control valves limit flow to designated compartments yet allows free for flow of fluid back to manifold block even if control valve is closed. This ensures all emergency valves will close if fusible or frangible remote control is tripped.



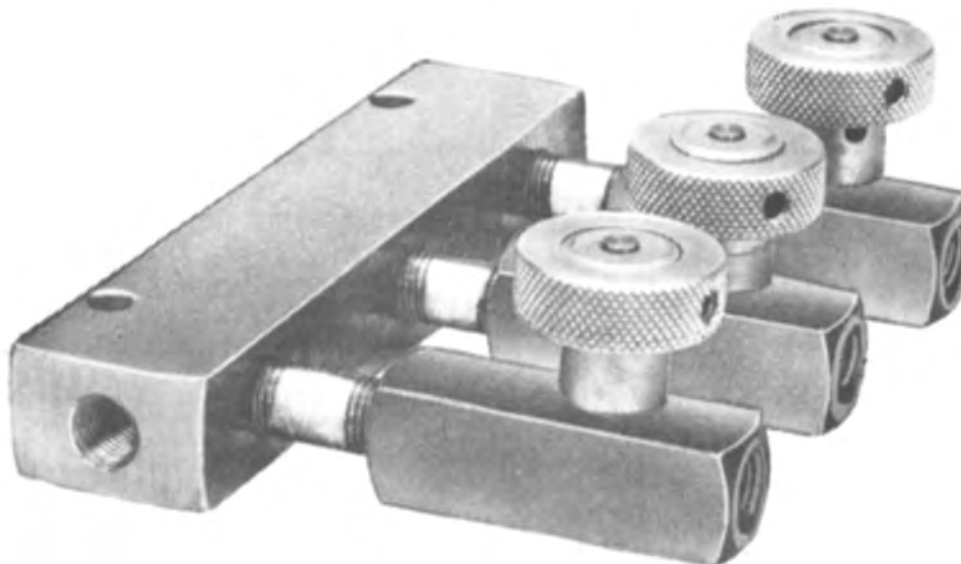
Description	Wt.	Part No.
2 Compartment	1.8	CH16283-2MS
3 Compartment	2.7	CH16283-3MS
4 Compartment	3.6	CH16283-4MS
5 Compartment	4.5	CH16283-5MS
6 Compartment	5.4	CH16283-6MS

DIMENSIONS

A	B	C	D
1.5"	1"	4"	2.25"

NOTE: All connections $\frac{1}{4}$ N.P.T.

Individual Valve Part # F400S



FUSIBLE PLUG

Assy. No. FP15003BR

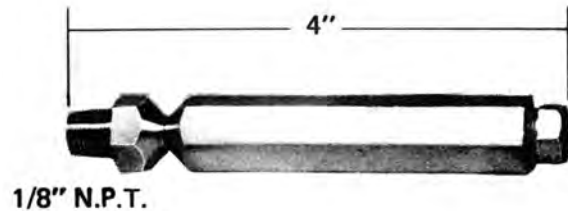


Thawing 220-225°F

Thawing of a plug dumps air and closes all emergency valves and air operated vents.

FUSIBLE & FRANGIBLE PLUG

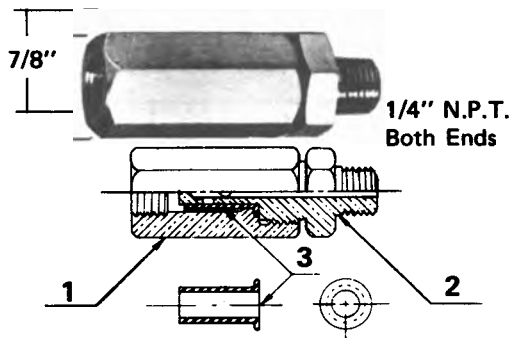
Assy. No. FP 15017BR



Breaking of frangible device or thawing of plug dumps air and closes all emergency valves and air operated vents.

CHECK VALVE

Assy. No. CK25107BR



Used in conjunction with hand pump to check return air.

No.	Description	Req.	Part No.
1	Body	1	16896BR
2	Stem	1	16897BR
3	Sleeve	1	16007BN

PRESSURE GAUGE

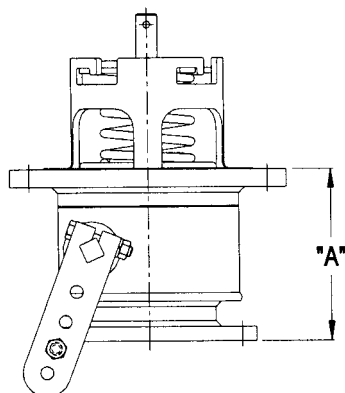
Assy. No. PG16349MS



1/8" N.P.T. Fitting

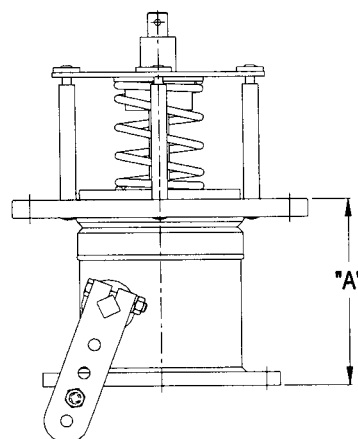
Emergency Valve Stainless Steel

- Air or Cable Operated
- Tapered Seat
- Teflon Encapsulated Seals



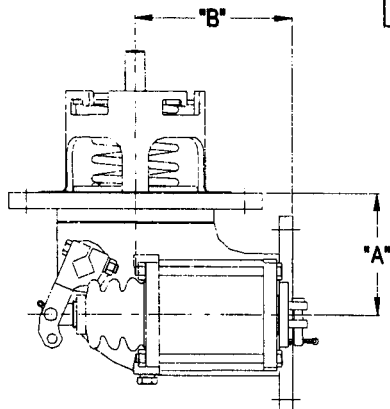
3in. CABLE / FLANGED

STRAIGHT



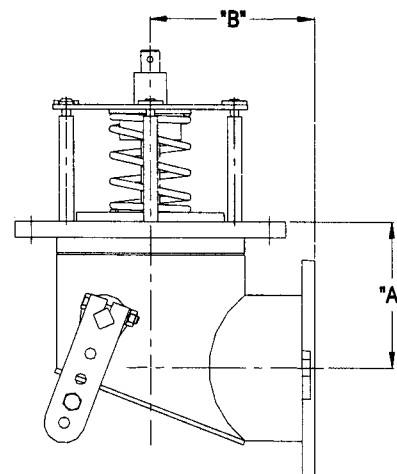
4in. CABLE / FLANGED

Size	Assembly No.	Air/Cable	Outlet	Wt.	Dimensions	Inlet Flange		Outlet Flange	
					A	B.C.	Holes	B.C.	Holes
3"	Not Available	Air	3" Flg	N.A.	4.50"	6.25"	6-9/16	4.88"	8-7/16
	EV46326SSTS	Cable	3" Flg	13.0					
4"	Not Available	Air	4" Flg	N.A.	5.25"	7.25"	8-9/16	5.88"	8-7/16
	EV46629SSTS	Cable	4" Flg	15.7					



3in. AIR / FLANGED

90° ELBOW



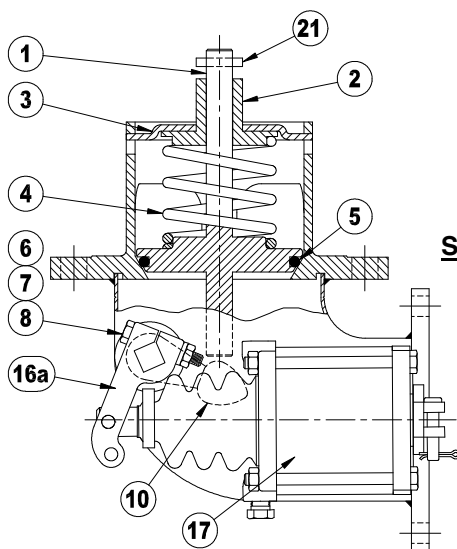
4in. CABLE / FLANGED

Size	Assembly No.	Air/Cable	Outlet	Wt.	Dimensions		Inlet Flange		Outlet Flange	
					A	B	B.C.	Holes	B.C.	Holes
3"	EV46110SSTS	Air	3" Flg	15.5	3.50"	4.50"	6.25"	6-9/16	4.88"	8-7/16
	EV46097SSTS	Cable	3" Flg	13.2						
4"	EV46227SSTS	Air	4" Flg	26.5	4.38"	5.00"	7.25"	8-9/16	5.88"	8-7/16
	EV46242SSTS	Cable	4" Flg	24.2						

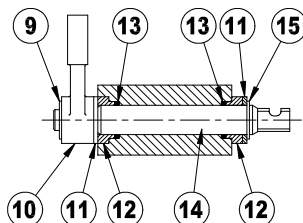
PARTS LIST

Emergency Valve

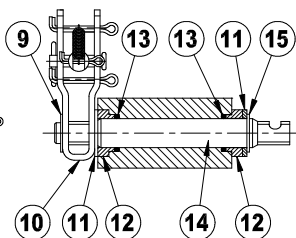
Stainless Steel



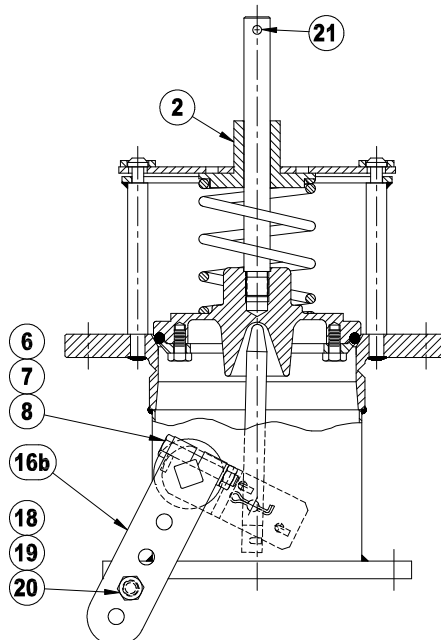
3in. Air Operated / Elbow



Stuffing Box Detail w/ Cam



**Stuffing Box Detail w/
Straight Lift (4" only)**



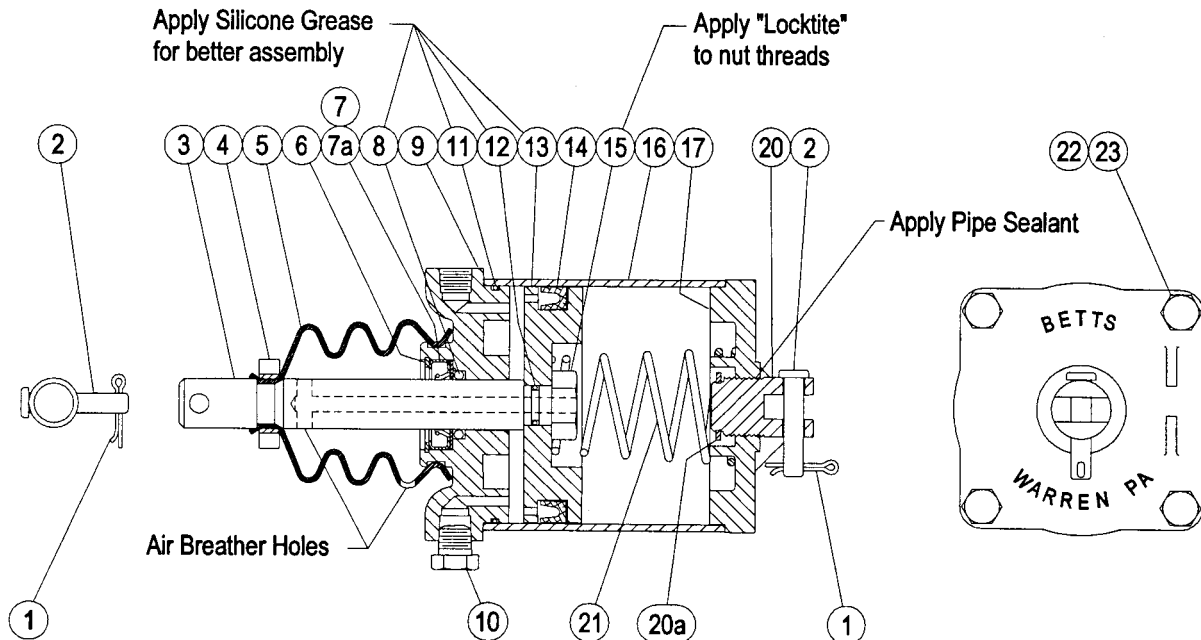
4in. Cable Operated / Straight

NO.	REQ.	DESCRIPTION	MATERIAL	PART NO.	
				3" VALVE	4" VALVE
1	1	Stem & O-Ring Holder	Stnls 316	18119SS	28141SS001
1a	1	O-Ring Retainer	Stnls 316	N.A.	27443SS
1b	4	Cap Screw 1/4 -28 x 1/2	Stnls 316	N.A.	9Q4174
2	1	Shaft guide	Stnls 316	75310SS	75310SS
3	1	Bonnet	Stnls 316	17888SS	27017SS
4	1	Spring	Stnls 316	17884SS	18222SS
5	1	Seat O-Ring	Tef-Sil	17890TS	19033TS
6	1	Cap Screw 1/4-20UNC x 1-1/2"	Steel – Zinc Plt.	9Q5947	9Q5947
7	1	Lockwasher 1/4"	Steel – Zinc Plt.	9Q5845	9Q5844
8	1	Hex Nut 1/4-20UNC	Steel – Zinc Plt.	9Q5806	9Q5806
9	1	Cam Retaining Ring	Stnls 316	9Q4933	9Q4933
10	1	Cam	Stnls 316	15086SS	N.A.
10a	1	Straight Lift Assembly	Stnls 316	N.A.	28137SS
11	2	Washer	Teflon	15432TF	15432TF
12	2	Retaining Sleeve	Stnls 316	18467SS	18467SS
13	2	Cam Shaft O-Ring	Tef-Sil	17946TS	17946TS
14	1	Cam Shaft	Stnls 316	18469SS	18469SS
15	1	Spacer Sleeve Retaining Ring	Stnls 316	9Q4970	9Q4970
16a	1	Lever Arm – Air Cylinder	Steel – Plt.	18366EY	18705MS
16b	1	Lever Arm – Cable	Steel – "E" Coated	10587EY	10587EY
17	1	Air Cylinder	Aluminum/Buna	AC35005ALB	AC35005ALB
18	1	Bolt 5/16-18UNC x 1" lg.	Steel – Zinc Plt.	9Q5829	9Q5829
19	1	Lockwasher 5/16"	Steel – Zinc Plt.	9Q5847	9Q5847
20	1	Hex Nut 5/16-18UNC Thd.	Steel – Zinc Plt.	9Q5808	9Q5808
21	1	Bail Pin 3/16 x 1" lg.	Stnls 316	9Q5901	9Q5901
22	1	Stuffing Box Boot	Neoprene	19937NE	19937NE
23	1	Cable Tie	Nylon	9W3384	9W3384

N.A. Not Applicable

PARTS LIST

**Air Cylinder
AC35005ALB**



REBUILD KIT AC19307BN - Includes Items 3, 4, 5, 7, 7a, 8, 11, 12, 14, 20, and 21
REPAIR KIT AC18674BN - Includes Items 4, 5, 6, 7, 7a, 8, 11, 12, and 14

NO.	REQ.	DESCRIPTION	MATERIAL	PART NO.
1	2	Cotter Pin 3/32 X 3/4"	Brass	9Q5865
2	2	Clevis Pin	Steel Zinc Plt.	9Q4728
3	1	Shaft	Stnls 304	17661SL
4	1	Boot Retainer	Delrin	17952DL
5	1	Boot	Neoprene	17777NE
6	1	Retaining Ring	Steel - Zinc Plt.	9Q4967
7	1	Wiper Seal	Steel - Phosphate Coated	19085PA
7a	1	Spacer	Teflon	19057TF
8	1	O-Ring Shaft Seal	Buna-N	18066BN
9	1	End Plate	Aluminum	17880AL
10	1	Fusible Plug	Brass	FP15003BR
11	1	O-Ring - End Plate	Buna-N	17666BN
12	1	O-Ring - Shaft	Buna-N	17781BN
13	1	Piston	Aluminum	17660AL
14	1	Piston Seal	Buna-N (special low temp.)	17669BN
15	1	Hex Half Nut 1/2-20 Thd.	Steel - Zinc Plt.	9Q5910
16	1	Cylinder	Aluminum	17659AL
17	1	Mounting End Plate	Aluminum	17881AL
20	1	Clevis	Steel - Black Epoxy Coated	19060EY
20a	1	Clevis Retaining Ring	Stnls. 316	9Q4970
21	1	Spring	Steel - Black Epoxy Coated	18742EY
22	4	Locknut 1/4-28 Thd.	Steel - Zinc Plt.	9Q5807
23	4	Bolt 1/4-28 X 4"	Steel - Zinc Plt.	9Q1270

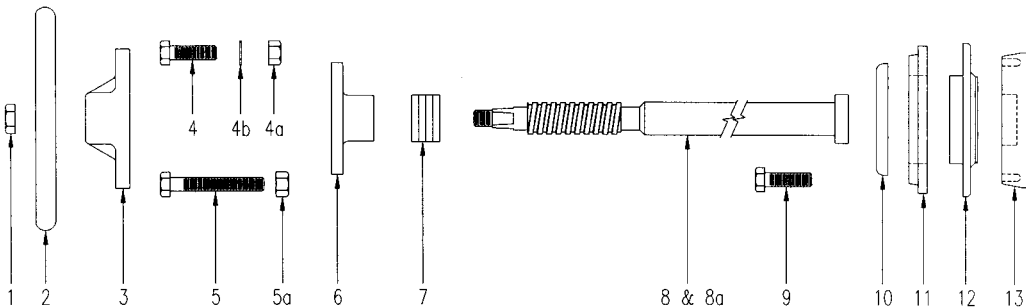
Flush Valve

STANDARD VALVE

The Betts FLUSH VALVE is designed to handle heavy, viscous material. Fabricated design provides greater strength with less weight, full direct flow, complete drainage and replaceable parts. The outside screw and yoke keeps threads free of product, maintaining smooth operation.

TEMPERATURE RATING: Aluminum valve 375°F. max., Steel or Stainless 500°F. max. with Non-Asbestos Disc, with Buna-N Disc 150°F., with Viton or Teflon Disc 250°F.

	Size	Flanged Outlet Assembly No.	Threaded Outlet Assembly No.	Wt.	Material
	3"	FV863 MSM	TV863 MSM	14.3	Steel
					316 Stainless
	4"	FV864 MSM	TV864 MSM	18.4	Steel
		FV864 SSM	TV864 SSM		316 Stainless
		FV864 ALM	NOT AVAILABLE *	11.5	Alum./Stainless
	6"	FV866 SSM	NOT AVAILABLE *		316 Stainless
		FV866 ALM			Alum./Stainless
	3"	FV893 MSM	TV893 MSM	14.6	Steel
		FV893 SSM	TV893 SSM		316 Stainless
	4"	FV894 SSM	TV894 MSM	18.7	Steel
		FV894 SSM	TV894 SSM		316 Stainless
		FV894 ALM	NOT AVAILABLE *	12.3	Alum./Stainless
	6"	FV896 MSM	NOT AVAILABLE *		Steel
		FV896 SSM			316 Stainless



No.	Description	Req'd.	Size	Material	Part No.
1	Hex Half Nut	1	3" & 4"	Steel Zinc Plt.	9Q5811
			6"	Steel Zinc Plt.	9Q5812
2	Handwheel	1	3" & 4"	Aluminum	26604AL
			6"	Aluminum	26605AL
3	Nut	1	3" & 4"	Cast Iron	25468CI
			6"	Bronze	25669BR
4	Cap Screw	2	3" & 4"	Steel Zinc Plt.	9Q5810
				304 Stnls	9Q5815
		4	6"	Steel Zinc Plt.	9Q5926
				304 Stnls	9Q5929
4a	Hex Nut	2	3" & 4"	Steel Zinc Plt.	9Q5890
				304 Stnls	9Q5809
		4	6"	Steel Zinc Plt.	9Q5812
				304 Stnls	9Q5853
4b	Lockwasher	2	3" & 4"	Steel Zinc Plt.	9Q5886
	External Tooth	4	6"	Steel Zinc Plt.	9Q5918
5	Adjusting Screw	2	3" & 4"	Steel Zinc Plt.	9Q5889
				304 Stnls	9Q5802
			6"	Steel	16756MS
				304 Stnls	16756SL
5a	Hex Nut	2	3", 4" & 6"	Steel Zinc Plt.	9Q5890
				304 Stnls	9Q5809
6	Packing Gland	1	3" & 4"	304 Stnls	15503SL
			6"	Steel	16754MS
				316 Stnls	16754SS
7	Packing	Set	3" & 4"	Non-Asbestos	15655NA
				Non-Asb/Tef	15655NT
			6"	Non-Asb/Tef	16769NT
8	Stem	1	3"	Steel	25469MS
	Standard and			316 Stnls	25469SS
	ASA style		4"	Steel	25470MS
				316 Stnls	25470SS
			6"	Steel	26121MS
				316 Stnls	26121SS

No.	Description	Req'd.	Size	Material	Part No.
8a	Stem	1	3"	Steel	25470MS
	Steam Jacketed			316 Stnls	25470SS
	style		4"	Steel	25732MS
				316 Stnls	25732SS
9	Cap Screw	6	3", 4" & 6"	Steel Zinc Plt.	9Q5832
	3/8 - 24 x 3/4			316 Stnls	9Q5831
10	Retainer Plate	1	3"	Steel	15605MS
				316 Stnls	15605SS
			4"	Steel	15626MS
				316 Stnls	15626SS
			6"	Steel	16755MS
				316 Stnls	16755SS
11	Disc	1	3"	Buna-N	16657BN
				Non-Asbestos	16657NA
				Viton	16657VT
				Teflon	16657TF
			4"	Buna-N	16583BN
				Non-Asbestos	16583NA
				Viton	16583VT
				Teflon	16583TF
			6"	Buna-N	16752BN
				Non-Asbestos	16752NA
				Viton	16752VT
				Teflon	16752TF
12	Disc Holder	1	3"	Steel	15604MS
				316 Stnls	15604SS
			4"	Steel	15625MS
				316 Stnls	15625SS
			6"	Steel	26120MS
				316 Stnls	26120SS
13	Metal Disc Replaces		3"	Steel	16612MS
	Items #11			316 Stnls	16612SS
	and #12		4"	Steel	16613MS
				316 Stnls	16613SS
			6"	Steel	16670MS
				316 Stnls	16670SS

REAR HEAD VALVE

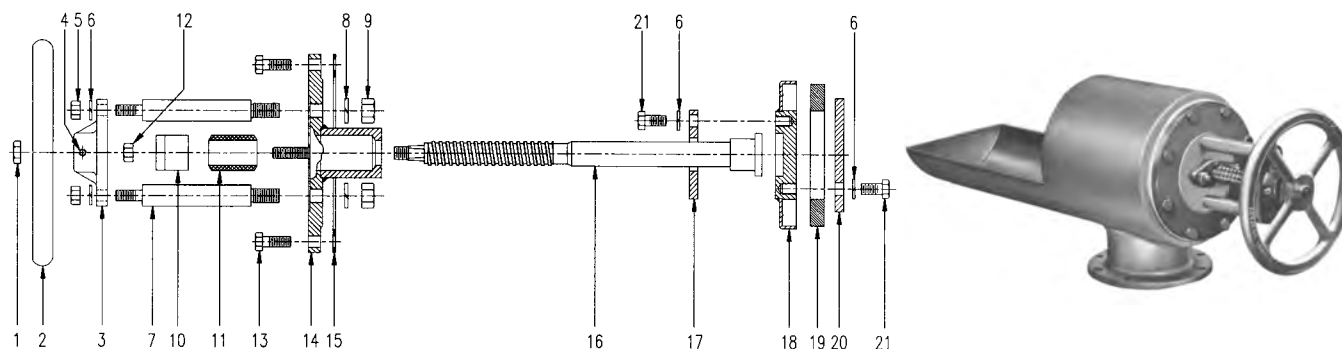
The Betts Rear Head Valve is designed to be welded into the bottom of the tank at the rear head, for use in hot, viscous material service. The valve is light in weight yet rugged due to the fabricated construction. The disc opens away from the product past the center line of the outlet, providing full flow.

TEMPERATURE RATING: Aluminum valve 375° F. max., Steel 500° F. max.

Dimensions								
Material			Assembly No.	Wt.	Assembly No.	Wt.	Assembly No.	Wt.
Size	Body	Trim						
4"	Alum	Steel	RH45919ALA	29.0	RH45926ALA	30.0	RH45944ALA	32.0
	Steel	Steel	RH45919MSA	40.0	RH45926MSA	42.0	RH45944MSA	44.0
6"	Alum	Steel			RH46279ALA		RH46280ALA	
	Steel	Steel			RH46279MSA		RH46280MSA	

Dimensions

Size	A	B	C	D	E	F	G	H	I	J	Flanged Outlet				Plain Outlet
											I.D.	O.D.	B.C.	Holes	Pipe Size
4"	13 1/4	3 7/8	7 5/8	9 7/8	6	2 3/4	7 5/8	6 1/8	8 3/4	5	4	6 5/8	5 7/8	8 - 7/16	4"
6"	13 1/4	3 7/8	7 5/8	9 7/8	6	2 3/4	9 5/8	6 1/8	12	6 1/8	6 11/16	9	8 1/8	12 - 7/16	6"



No.	Description	4" Size				6" Size			
		Alum w/ Steel Trim		Steel		Alum w/ Steel Trim		Steel	
		Req'd.	Part No.	Req'd.	Part No.	Req'd.	Part No.	Req'd.	Part No.
1	Hex Half Nut	1	9Q5811	1	9Q5811	1	9Q5811	1	9Q5811
2	Handwheel	1	26604AL	1	26604AL	1	26604AL	1	26604AL
3	Stem Nut	1	26576CI	1	26576CI	1	26576CI	1	26576CI
4	Grease Fitting	1	9Z3058	1	9Z3058	1	9Z3058	1	9Z3058
5	Hex Nut 3/8"-24UNF THD.	2	9Q5905	2	9Q5905	2	9Q5905	2	9Q5905
6	Lock Washers 3/8"	11	9Q5907	11	9Q5907	14	9Q5907	14	9Q5907
7	Post	2	17491MS	2	17491MS	2	17491MS	2	17491MS
8	Lock Washers 1/2"	2	9Q5899	2	9Q5899	2	9Q5899	2	9Q5899
9	Hex Nut 1/2"-20UNF THD.	2	9Q5812A	2	9Q5812A	2	9Q5812A	2	9Q5812A
10	Packing Gland	1	15503SL	1	15503SL	1	15503SL	1	15503SL
11	Packing	1	15655NT	1	15655NT	1	15655NT	1	15655NT
12	Hex Nut 3/8"-16UNC THD.	2	9Q5890	2	9Q5890	2	9Q5890	2	9Q5890
13	Cap Screw 3/8"-24UNF x 1" LG.	8	9Q5833	8	9Q5833	8	9Q5833	8	9Q5833
14	Tophead & Bonnet	1	26575MS	1	26575MS	1	35109MS	1	35109MS
15	Tophead Gasket	1	17493NA	1	17493NA	1	18637NA	1	18637NA
16	Stem	1	26574MS	1	26574MS	1	26574MS	1	26574MS
17	Stem Retainer	1	17489MS	1	17489MS	1	17489MS	1	17489MS
18	Disc Holder	1	17488MS	1	17488MS	1	18926MS	1	18926MS
19	Disc	1	15024NA	1	15024NA	1	18639NA	1	18639NA
20	Disc Retainer	1	17490MS	1	17490MS	1	18636MS	1	18636MS
21	Cap Screw 3/8"-24UNF x 3/4" LG.	9	9Q5832	9	9Q5832	12	9Q5832	12	9Q5832

Material suffix designations:

AL - Aluminum
NA - Non-Asbestos
NT - Non-Asbestos w/Teflon

CI - Cast Iron
MS - Mild Steel
SL - 304 Stainless

Emergency Unloading Fixture

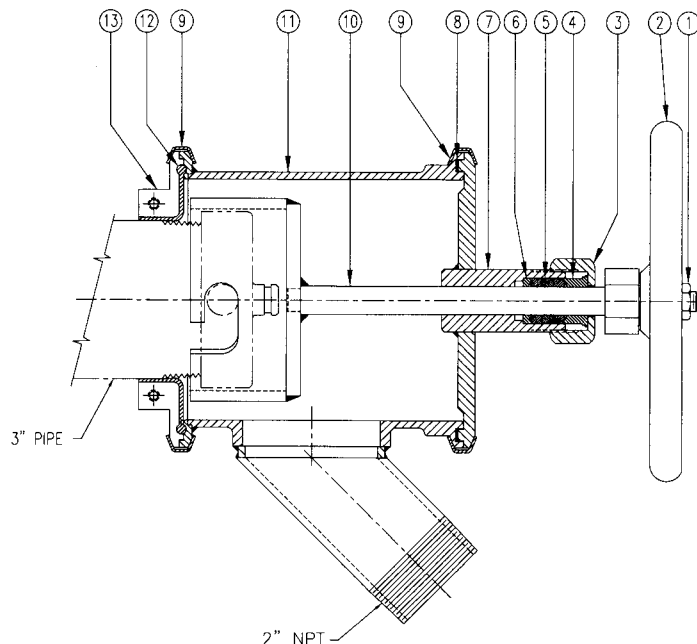
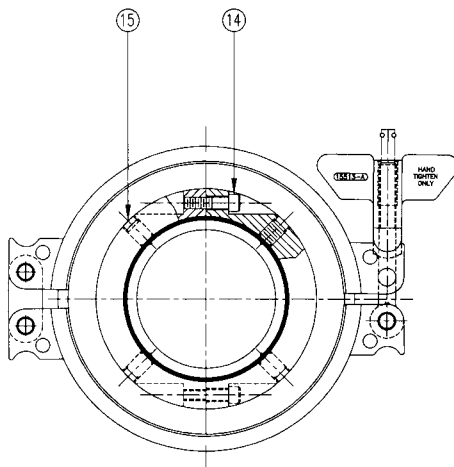
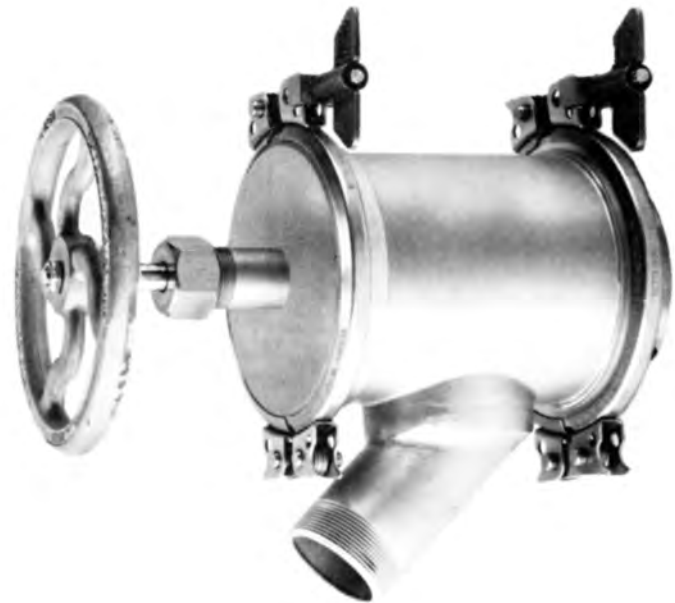
Assembly No. EM46443SS

This fixture is designed to make possible the emergency unloading of an overturned tank through a capped 3" NPT clean-out without spillage of product. After clamping on the unloading fixture as described in the operational instruction sheet, clean-out cap can be removed within the fixture and with proper discharge lines hooked up unload product down to the level of the clean-out.

No.	Description	Req.	Material	Part No.
* 1	Nut-Handwheel	1	Steel Zinc Plt.	9Q5811
* 2	Handwheel	1	Aluminum	27423AL
* 3	Stuffing Box Nut	1	Stainless	15026SL
* 4	Top Gland	1	Stainless	15220SS
* 5	Packing	3	Non-Asb/Tef.	15227NT
* 6	Bottom Gland	1	Stainless	15076SS
* 7	Tophead & Bonnet	1	Stainless	19164SS
* 8	Tophead Gasket	1	Teflon	15977TF
* 9	Q.R.B. Clamp Assembly	1	Stainless	25683SL
* 10	Stem & Adapter Assembly	1	Stainless	27419SS
* 11	Body Assembly	1	Stainless	35342SS
* 12	Gasket	1	Viton	19111VT
* 13	Clamp	1	Stainless	27376SS
** 14	1/4" -20UNC-2A x 1"Lq. S.H.C.S.	2	Steel	9Q5935
** 15	3/8" -16UNC-2A x .63 Lq. Socket Set Screw	4	Steel	9Q5936
** 16	Hex T-Handle Wrench	1	Steel	9Z3057

* Included w/ Part No. 35368SS

** Included w/ Item 13 Clamp



Q.R.B. Hydrolet Valve

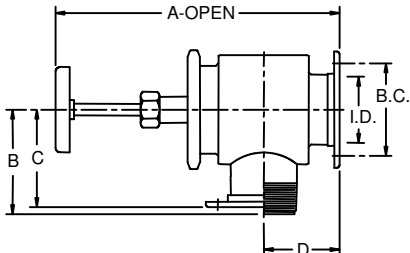
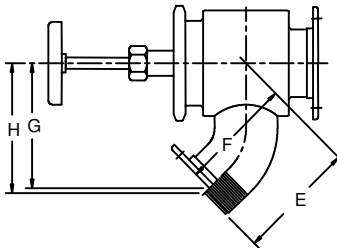
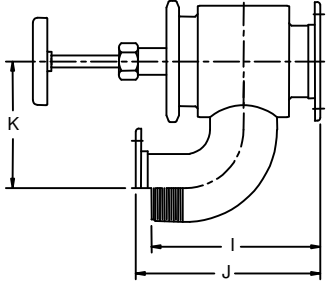
STANDARD VALVE

Quick Removable Bonnet

The Betts Q.R.B. Hydrolet Valve with the exclusive quick-removable bonnet, is designed for use on transport tanks hauling a variety of products, where easy dismantling for cleaning and inspection is essential. The valve is available in the three styles shown below in 3" and 4" sizes with flanged or threaded outlets. The valve is constructed of 316 stainless for compatibility with a wide range of products.

Pressure and Temperature Rating:

- Max working pressure (MAWP): 35 psi [2.4 bar]
- Max temperature (dependent on seal):
 - PTFE, FKM or Non-Asbestos: 400°F [204 °C]
 - Nitrile (Buna-N): 230°F [110 °C]

		Straight Outlet		45° Elbow		90° Elbow	
							
Size		Assembly No.	Wt.	Assembly No.	Wt.	Assembly No.	Wt.
FLANGED	3"	QR723SST	15.0 lb [6.8 kg]	QR763SST	15.3 lb [6.9 kg]	QR703SST	16.0 lb [7.3 kg]
	4"	QR724SST	19.8 lb [9 kg]	QR764SST	20.3 lb [9.2 kg]	QR704SST	20.5 lb [9.3 kg]
THREADED	3"	QR733SST	14.0 lb [6.4 kg]	QR773SST	14.3 lb [6.5 kg]	QR713SST	15.0 lb [6.8 kg]
	4"	QR734SST	19.8 lb [9 kg]	QR774SST	20.3 lb [9.2 kg]	QR714SST	20.5 lb [9.3 kg]

NOTE: Stainless 316 valves are standard with PTFE disc, gasket & packing (Suffix "T").

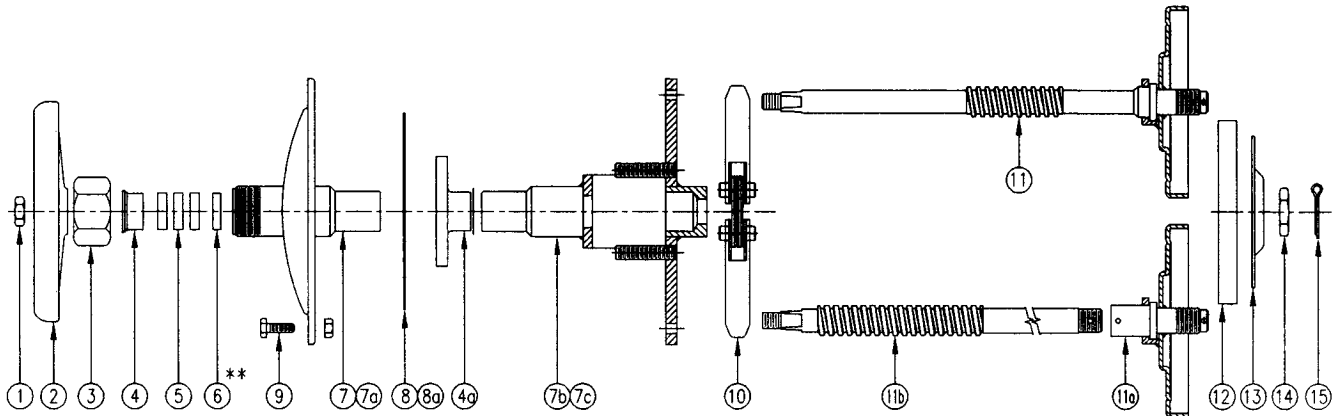
Dimensions

Size	A	B	C	D	E	F	G	H	I	J	K	Flange-Inlet & Outlet			Thd. Outlet
												I.D.	B.C.	Holes	Pipe Size
3"	15 ¹ / ₄ " [387 mm]	5 ¹ / ₂ " [140 mm]	5 ¹ / ₈ " [130 mm]	4" [102 mm]	6 ⁹ / ₁₆ " [167 mm]	6 ¹ / ₄ " [159 mm]	6 ³ / ₄ " [171 mm]	7" [178 mm]	8 ¹³ / ₁₆ " [224 mm]	9 ⁵ / ₈ " [244 mm]	6 ¹ / ₂ " [165 mm]	3 ³ / ₈ " [86 mm]	4 ⁷ / ₈ " [124 mm]	8- ⁷ / ₁₆ " [11 mm]	3"
4"	15 ³ / ₈ " [391 mm]	6 ⁷ / ₁₆ " [164 mm]	5" [127 mm]	4 ⁵ / ₁₆ " [110 mm]	8 ¹ / ₈ " [206 mm]	7 ³ / ₄ " [197 mm]	8 ⁵ / ₁₆ " [211 mm]	8 ¹⁷ / ₃₂ " [217 mm]	10 ³ / ₄ " [273 mm]	10 ⁷ / ₁₆ " [265 mm]	8" [203 mm]	4 ³ / ₈ " [111 mm]	5 ⁷ / ₈ " [149 mm]	8- ⁷ / ₁₆ " [11 mm]	4"

Betts™ INDUSTRIES, INC. WARREN, PA.

PARTS LIST

Hydrolet Valves



No.	Description	Req'd.	Size	Material	Part No.
1	Hex Nut 7/16-14 Tnd.	1	3"- 4"	Steel Zinc Plt.	9Q5811
2	Handwheel	1	3"	Aluminum	25186AL
3	Stuffing Box Nut	1	3"- 4"	Aluminum	25245AL
4	Top Gland	1	3"- 4"	Aluminum	15026AL
4a	Top Gland OS&Y Style	1	3"- 4"	304 Stnls	15026SL
5	Packing Set	Set	3"- 4"	304 Stnls	15220SS
6**	Bottom Gland	1	3"- 4"	Non-Asb/Tef.	16758SL
6*	Bottom Gland Bolted Style	1	3"- 4"	316 Stnls	15227NT
7	Tophead & Bonnet Bolted Style	1	3"	Steel	15076SS
			4"	Steel	15382MS
			4"	Aluminum	15382AL
7a	Tophead & Bonnet QRB Style	1	3"	Steel	25365MS
			4"	Aluminum	25365AL
7b	Tophead & Bonnet QRB OS&Y	1	3"	316 Stnls	15573SS
			4"	Aluminum	15573AL
7c	Tophead & Bonnet Bolted OS&Y	1	3"	316 Stnls	16126SS
			4"	Aluminum	16126AL
8	Tophead Gasket Bolted Style	1	3"	316 Stnls	26133SS
			4"	Aluminum	26133AL
8a	Tophead Gasket QRB Style	1	3"	316 Stnls	26138SS
			4"	Aluminum	26138AL
			3"	Steel	26145MS
			4"	Aluminum	26145AL
			3"	Steel	26150MS
			4"	Aluminum	26150AL
			3"	Cork-Buna-N	15022CB
			4"	Non-Asbestos	15022NA
			4"	Teflon-Env.	15022TF
			3"	Cork-Buna-N	15265CB
			4"	Non-Asbestos	15265NA
			4"	Teflon-Env.	15265TF
			3"	Cork-Buna-N	15905CB
			4"	Non-Asbestos	15905NA
			4"	Teflon-Env.	15905TF
			3"	Cork-Buna-N	15977CB
			4"	Non-Asbestos	15977NA
			4"	Teflon-Env.	15977TF

No.	Description	Req'd.	Size	Material	Part No.
9	Bolts & Nuts(Set)	Set	3"	Steel Zinc Plt.	15023ZC
			4"	18-8 Stnls	15023SL
			4"	Steel Zinc Plt.	16549ZC
			4"	18-8 Stnls	16549SL
10	QRB Clamp	1	3"	304 Stnls	25641SL
			4"	304 Stnls	25683SL
11	Disc Holder & Stem Assy. Bolted & QRB Style	1	3"	All Aluminum	17683AL
			4"	All Steel	17683MS
			4"	All Stnls	17683SS
11a	Disc Holder & Button OS&Y Style	1	3"	All Aluminum	17684AL
			4"	All Steel	17684MS
			4"	All Stnls	17684SS
11b	Stem OS&Y Style	1	3"-4"	Steel	17167MS
			3"-4"	316 Stnls	17167SS
			3"-4"	Steel	17168MS
			3"-4"	316 Stnls	17168SS
12	Disc	1	3"	Aluminum	25857AL
			4"	Steel	25857MS
			4"	316 Stnls	25857SS
13	Disc Retaining Plate	1	3"	Buna-N	15202BU
			4"	Non-Asb.	15202NA
			4"	Teflon	15202TF
			4"	Viton	15202VT
			3"	Buna-N	15024BU
			4"	Non-Asb.	15024NA
			4"	Teflon	15024TF
			4"	Viton	15024VT
14	Disc Plate Nut	1	3"- 4"	316 Stnls	17028SS
15	Cotter Pin 1/8 x 1	1*	3"- 4"	Steel	15051MS
				Aluminum	15051AL
				316 Stnls	15051SS
				316 Stnls	15204SS
				316 Stnls	9Q5867

* 2 Req'd. on OS&Y Models

** This part not req'd. on OS&Y Models

HYDROLET SUB-ASSEMBLIES

Size	Hydrolet Material	Bolted Style	Bolted OS&Y Style	QRB Style	QRB-OS&Y Style
3"	Steel	WV17593MSB	WV17607MSB		
	Aluminum	WV17593ALB	WV17607ALB	WV17609ALB	WV17611ALB
	316 Stnls.			WV17609SS	WV17611SS
4"	Steel	WV17594MSB	WV17608MSB		
	Aluminum	WV17594ALB	WV17608ALB	WV17610ALB	WV17612ALB
	316 Stnls.			WV17610SS	WV17612SS

NOTES: Cotter pins only provided on sub-assemblies ordered with either Teflon or Non-Asbestos disc.

Bolted sub-assemblies do not include QRB clamp (Item #10)

QRB sub-assemblies do not include Bolts & Nuts (Item #9)

Steel and Aluminum sub-assemblies are standard with Buna-N disc, Cork-Buna-N GASKET and Non-Asbestos packing (Suffix "B").

Stainless sub-assemblies are standard with Teflon disc, packing and gasket (Suffix "T").

VARIATIONS: (Suffix "A"-Bolted Style) when used would include non-asbestos disc, packing and gasket.

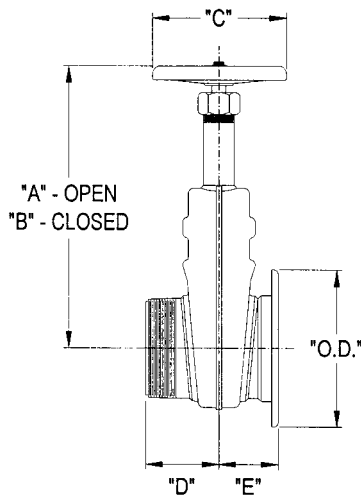
(Suffix "A"-QRB Style) when used would include non-asbestos disc, packing and teflon gasket.

(Suffix "V"-Bolted or QRB Style) when used would include viton disc, teflon packing and gasket.

Gate Valve

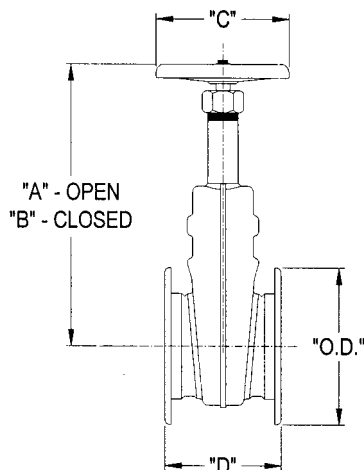
Fabricated – Double Acting

Flanged x Threaded



Descriptions						
Pipe Size	Material				Part Numbers	Wt Lbs.
	Body	Stem	Discs	Packing		
3	Steel	Brass	Stainless Steel	3 Teflon Suspensoid Rings	G 1003	9.4
	Steel	Steel	Stainless Steel		FG 1003	9.3
	Aluminum	Aluminum	Stainless Steel		AAG 1003	4.5
	Aluminum	Stainless Steel	Stainless Steel		ASG 1003	5.0
	Stainless Steel	Stainless Steel	Stainless Steel		SG 1003	9.3
	316 Stainless	316 Stainless	316 Stainless		SSG 1003	9.3
4	Steel	Brass	Stainless Steel	3 Teflon Suspensoid Rings	G 1004	12.5
	Steel	Steel	Stainless Steel		FG 1004	12.3
	Aluminum	Aluminum	Stainless Steel		AAG 1004	6.3
	Aluminum	Stainless Steel	Stainless Steel		ASG 1004	6.9
	Stainless Steel	Stainless Steel	Stainless Steel		SG 1004	12.3
	316 Stainless	316 Stainless	316 Stainless		SSG 1004	12.3

Flanged x Flanged



Descriptions						
Pipe Size	Material				Part Numbers	Wt Lbs.
	Body	Stem	Discs	Packing		
3	Steel	Brass	Stainless Steel	3 Teflon Suspensoid Rings	G 1013	9.9
	Steel	Steel	Stainless Steel		FG 1013	9.8
	Aluminum	Aluminum	Stainless Steel		AAG 1013	4.7
	Aluminum	Stainless Steel	Stainless Steel		ASG 1013	5.2
	Stainless Steel	Stainless Steel	Stainless Steel		SG 1013	9.8
	316 Stainless	316 Stainless	316 Stainless		SSG 1013	9.8
4	Steel	Brass	Stainless Steel	3 Teflon Suspensoid Rings	G 1014	13.3
	Steel	Steel	Stainless Steel		FG 1014	13.1
	Aluminum	Aluminum	Stainless Steel		AAG 1014	6.6
	Aluminum	Stainless Steel	Stainless Steel		ASG 1014	7.2
	Stainless Steel	Stainless Steel	Stainless Steel		SG 1014	13.1
	316 Stainless	316 Stainless	316 Stainless		SSG 1014	13.1

SLIDING VALVE

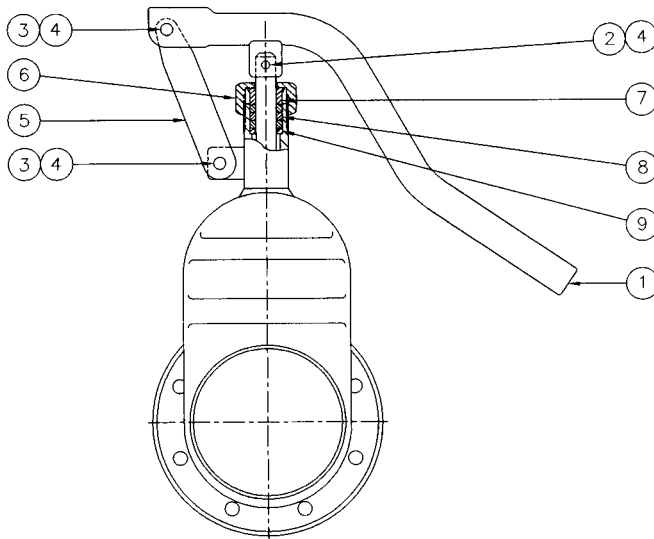
3", 4", & 6" VALVE

TTMA DRILLING

Size	Assembly No. Flanged x Flanged	Material	Wt.	Size	Assembly No. Flanged x Threaded	Material	Wt.
3"	SV903 MSM	Steel	11.4	3"	SV913 MSM	Steel	10.9
	SV903 SSM	316 Stainless			SV913 SSM	316 Stainless	
4"	SV904 MSM	Steel	14.9	4"	SV914 MSM	Steel	14.1
	SV904 SSM	316 Stainless			SV914 SSM	316 Stainless	
6"	SV906 MSM	Steel	32.5	6"	SV916 MSM	Steel	30.0
	SV906 SSM	316 Stainless			SV916 SSM	316 Stainless	

ANSI DRILLING *

Size	Assembly No. Flanged x Flanged	Material	Wt.	Size	Assembly No. Flanged x Threaded	Material	Wt.
3"	SV953 MSM	Steel	19.0	3"	SV963 MSM	Steel	15.0
	SV953 SSM	316 Stainless			SV963 SSM	316 Stainless	
4"	SV954 MSM	Steel	24.5	4"	SV964 MSM	Steel	20.0
	SV954 SSM	316 Stainless			SV964 SSM	316 Stainless	
6"	SV956 MSM	Steel	46.0	6"	SV966 MSM	Steel	40.0
	SV956 SSM	316 Stainless			SV966 SSM	316 Stainless	



Item No.	Description	Req'd.	Material	3" & 4" Valve Part No.	6" Valve Part No.
1	Handle	1	Steel "E" Coated	35131EY	26764EY
2	Clevis Pin 1/4 x 1 1/4	1	Steel Zinc Plt.	9Q4728	9Q4728
3	Clevis Pin-Link	2	Steel "E" Coated	15757EY	15757EY
4	Cotter Pin 3/32 x 3/4	3	Brass	9Q5865	9Q5865
5	Link	1	Steel "E" Coated	17446EY	17903EY
6	Stuffing Box Nut	1	Aluminum	15026AL	15026AL
			304 Stainless	15026SL	15026SL
7	Top Gland	1	316 Stainless	15220SS	15220SS
8	Packing	Set	Non-Asbestos/Teflon	15227NT	15227NT
9	Bottom Gland	1	316 Stainless	15076SS	15076SS

*ANSI Dimension 3 1/2"

*Drilling Dimensions Only

SLIDING VALVE

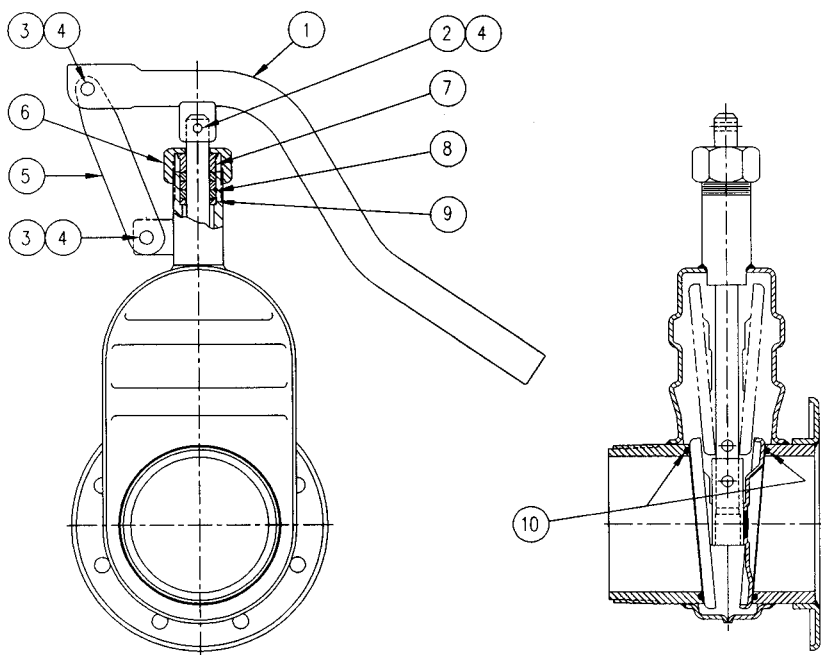
WITH REPLACEABLE O-RING SEAT

TTMA DRILLING

Size	Assembly No. Flanged x Flanged	Material	Wt.	Size	Assembly No. Flanged x Threaded	Material	Wt.
4"	SV804 MSTs	Steel	14.9	4"	SV814 MSTs	Steel	14.1
	SV804 SSTs	316 Stainless			SV814 SSTs	316 Stainless	
6"	SV806 MSTs	Steel	32.5	6"	SV816 MSTs	Steel	30.0
	SV806 SSTs	316 Stainless			SV816 SSTs	316 Stainless	

ANSI DRILLING **

Size	Assembly No. Flanged x Flanged	Material	Wt.	Size	Assembly No. Flanged x Threaded	Material	Wt.
4"	SV854 MSTs	Steel	24.5	4"	SV864 MSTs	Steel	20.0
	SV854 SSTs	316 Stainless			SV864 SSTs	316 Stainless	
6"	SV856 MSTs	Steel	46.0	6"	SV866 MSTs	Steel	40.0
	SV856 SSTs	316 Stainless			SV866 SSTs	316 Stainless	



4" & 6" VALVE

*ANSI Dimension $3\frac{7}{16}$ "

**Drilling Dimensions Only

Dimensions

TTMA Flange				ANSI Flange **				Max. Working
O.D.	B.C.	Holes	Thick.	O.D.	B.C.	Holes	Thick.	Pressure
$7\frac{1}{8}$	$5\frac{7}{8}$	$8-\frac{7}{16}$.1345	9	$7\frac{1}{2}$	$8-\frac{3}{4}$	$\frac{1}{2}$	75 PSI
$9\frac{3}{8}$	$8\frac{1}{8}$	$12-\frac{7}{16}$.1345	11	$9\frac{1}{2}$	$8-\frac{7}{8}$	$\frac{1}{2}$	50 PSI

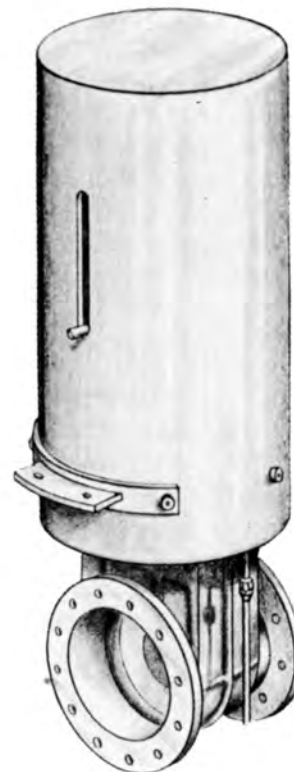
Item No.	Description	Req'd.	Material	4" Valve Part No.	6" Valve Part No.
1	Handle	1	Steel "E" Coated	35131EY	26764EY
2	Clevis Pin $\frac{1}{4}$ x $1\frac{1}{4}$	1	Steel Zinc Plt.	9Q4728	9Q4728
3	Clevis Pin-Link	2	Steel	15757MS	15757MS
4	Cotter Pin $\frac{3}{32}$ x $\frac{3}{4}$	3	Brass	9Q5865	9Q5865
5	Link	1	Steel "E" Coated	17446EY	17903EY
6	Stuffing Box Nut	1	Aluminum	15026AL	15026AL
			304 Stainless	15026SL	15026SL
7	Top Gland	1	316 Stainless	15220SS	15220SS
8	Packing	Set	Non-Asbestos/Teflon	15227NT	15227NT
9	Bottom Gland	1	316 Stainless	15076SS	15076SS
10	O-Ring	2	Tef-Sil	19430TS	19428TS

Sliding Valve

HYDRAULIC OPERATED

DIMENSIONS

TTMA FLANGE				ANSI FLANGE*				Maximum Working Pressure
OD	BC	Holes	Thick	OD	BC	Holes	Thick	
6 $\frac{5}{8}$	5 $\frac{7}{8}$	8- $\frac{7}{16}$	$\frac{3}{8}$	9	7 $\frac{1}{2}$	8- $\frac{3}{4}$	$\frac{1}{2}$	75 PSI
9	8 $\frac{1}{8}$	12- $\frac{7}{16}$	$\frac{1}{2}$	11	9 $\frac{1}{2}$	8- $\frac{7}{8}$	$\frac{1}{2}$	50 PSI



TTMA DRILLING

ANSI DRILLING

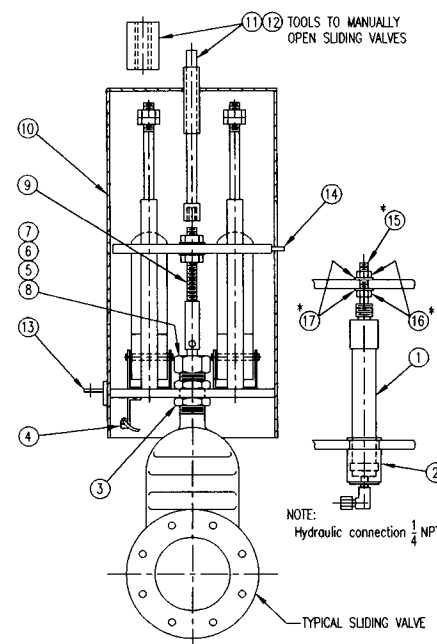
Size	Material	Flange x Flange		Flange x Thread		Flange x Flange		Flange x Thread	
		Wt.	Assembly No.	Wt.	Assembly No.	Wt.	Assembly No.	Wt.	Assembly No.
4"	Steel	73#	SV46206MSM	72.5#	SV46214MSM	75#	SV46235MSM	74.5#	SV46219MSM
	316 Stnls		SV46206SSM		SV46214SSM		SV46235SSM		SV46219SSM
6"	Steel	91#	SV46207MSM	88.5#	SV46215MSM	92.5#	SV46233MSM	90#	SV46220MSM
	316 Stnls		SV46207SSM		SV46215SSM		SV46233SSM		SV46220SSM

No.	Description	Req.	Material	3&4" Valve	
				Part No.	Part No.
1	Cylinder Assembly	2	Steel	18668MS	18656MS
2	Cylinder Support Ass'y	2	Steel "E" Coated	18398EY	18418EY
3	Jam Nut-Stuffing Box	2	304 Stnls	18384SL	18384SL
4	Bracket & "I" Ass'y	1	Steel	18628MS	18628MS
5	Bottom Gland	1	316 Stnls	15076SS	15076SS
6	Packing Set	Set	Non-Asb/Tef	15227NT	15227NT
7	Top Gland	1	316 Stnls	15220SS	15220SS
8	Stuffing Box Nut	1	304 Stnls	15026SL	15026SL
9	Shaft Connector	1	Steel "E" Coated	18633EY	18633EY
10	Can Assembly	1	Steel "E" Coated	35081EY	35078EY
11	Nut-Manual Open Tool	1	Aluminum	18638AL	18638AL
12	Shaft-Manual Open Tool	1	Brass	27085BR	27085BR
13	Mounting Bracket	2	Steel "E" Coated	26995EY	26995EY
14	Indicator Pin	1	Steel	18422MS	18422MS
15	Cylinder Adj. Screw	*2	Steel	18397MS	18397MS
16	5/16-24 Hex Nuts	*2	Steel	9Q5808	9Q5808
17	5/16 Flat Washers	*2	Steel	9Q5846	9Q5846

* Parts are included with Item No.1 Cylinder Assembly

CAUTION: Do not attempt to disconnect or replace springs. To do so could result in injury. Packing can be replaced and cylinders changed without disconnecting springs.

* ANSI DIMENSION 3 $\frac{1}{2}$ "



* Drilling Dimensions Only

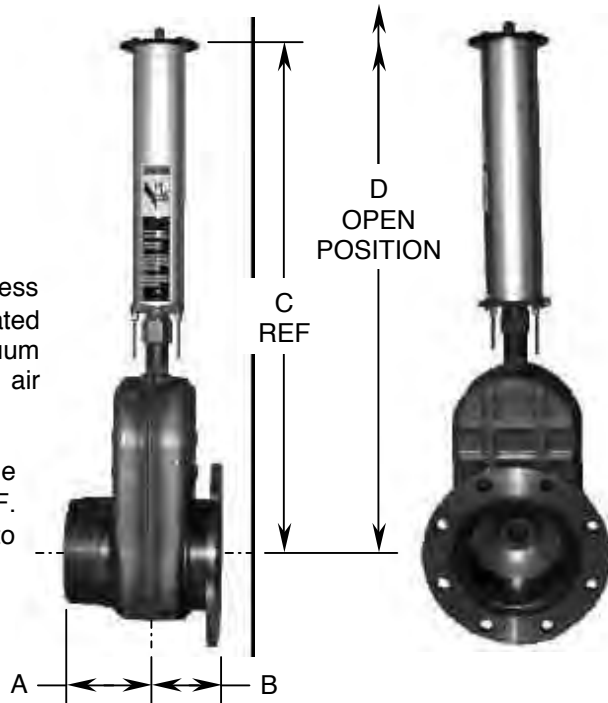
Pneumatic Sliding Valve

With Replaceable O-ring Seats

- Air Open / Spring Close
- Teflon® Encapsulated Seats
- TTMA, ANSI, or Sump Flange Drilling

The Betts Pneumatic sliding valve is standard with 316 stainless steel gates and stem, and replaceable Teflon® encapsulated O-ring seats to provide a positive seal for pressure or vacuum service. A fusible plug is installed in air cylinder to dump air pressure in case of a fire.

The aluminum air cylinder has a working temperature range of -40° F to 250° F. The fusible plug is set to melt at 212° F. The valve body has a working temperature range of -40° F to 400° F. 90 PSI line pressure is required to fully open valve.



Size	Material (Body)	TTMA DRILLING				ANSI DRILLING				TTMA Flange x ANSI Flange Assembly No.	Wt. (lbs)
		Flange x Flange Assembly No.	Wt. (lbs)	Flange x Thread Assembly No.	Wt. (lbs)	Flange x Flange Assembly No.	Wt. (lbs)	Flange x Thread Assembly No.	Wt. (lbs)		
4"	Steel	SV704MSTS	17	SV714MSTS	16	SV754MSTS	27	SV764MSTS	22	SV774MSTS	22
	316 Stnls	SV704SSTS	17	SV714SSTS	16	SV754SSTS	27	SV764SSTS	22	SV774SSTS	22
6"	Steel	SV706MSTS	35	SV716MSTS	32	SV756MSTS	48	SV766MSTS	42	SV776MSTS	42
	316 Stnls	SV706SSTS	35	SV716SSTS	32	SV756SSTS	48	SV766SSTS	42	SV776SSTS	42

Size	Material (Body)	Sump Flange x Sump Flange		SUMP Flange x ANSI Flange		Sump Flange x TTMA Flange	
		Assembly No.	Wt. (lbs)	Assembly No.	Wt. (lbs)	Assembly No.	Wt. (lbs)
4"	Steel	SV724MSTS	27	SV744MSTS	27	SV734MSTS	22
	316 Stnls	SV724SSTS	27	SV744SSTS	27	SV734SSTS	22
6"	Steel	SV726MSTS	48	SV746MSTS	48	SV736MSTS	42
	316 Stnls	SV726SSTS	48	SV746SSTS	48	SV736SSTS	42

DIMENSIONS

Size	A	B	C	D	TTMA FLANGE				ANSI FLANGE**				SUMP FLANGE				Maximum Working Pressure
					OD	BC	Holes	Thick	OD	BC	Holes	Thick	OD	BC	Holes	Thick	
4"	3 ⁵ / ₁₆	2 ⁵ / ₈	26 ⁷ / ₈	31 ⁷ / ₈	7 ¹ / ₈	5 ⁷ / ₈	8 - ⁷ / ₁₆	.135	9	7 ¹ / ₂	8 - ³ / ₄	1 ¹ / ₂	9	7 ¹ / ₄	8 - ⁵ / ₈	1 ¹ / ₂	50 PSI
6"	5 ¹ / ₁₆	4	37 ³ / ₄	30 ³ / ₈	9 ³ / ₈	8 ¹ / ₈	12 - ⁷ / ₁₆	.135	11	9 ¹ / ₂	8 - ⁷ / ₈	1 ¹ / ₂	11	9 ¹ / ₄	12 - ⁵ / ₈	1 ¹ / ₂	50 PSI

* ANSI AND SUMP DIMENSION 3 ¹/₂"

** Drilling Dimensions Only

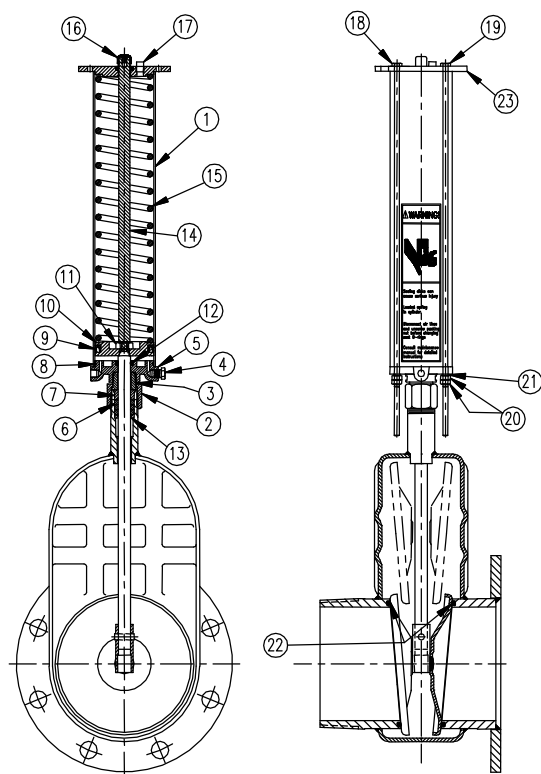
Betts™ INDUSTRIES, INC. WARREN, PA.

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PARTS LIST

Pneumatic Sliding Valve



No.	Description	Req.	Material	Part No.
1	CYLINDER TUBE	1	ALUM-HARDCOAT ID	75202AL
2	PACKING NUT	1	303 SS	75192SL
3	SWIVEL INSERT	1	303 SS	75193SL
4	FUSIBLE PLUG	1	BRASS	FP15003BR
5	CYLINDER ENDPLATE	1	ALUMINUM	75191AL
6	PACKING SET OF 3 PCS.	SET	NON-ASB/TEF	15227NT
7	TOP GLANK	1	316 SS	C15220SS
8	ENDPLATE O-RING	1	BUNA-N	17666BN
9	PISTON SEAL	1	BUNA-N	17669BN
10	PISTON	1	ALUMINUM	75201AL
11	PISTON NUT	1	STEEL Z.P.	9Q5910
12	SHAFT SEAL	1	BUNA-N	18066BN
13	BOTTOM GLAND	1	316 SS	C15076SS
14	INDICATOR ROD	1	ALUMINUM	75249AL
15	MAIN SPRING	1	STEEL E-COAT	75197EY
16	INDICATOR CAP	1	VINYL	9Z6180
17	VENT PLUG	1	BRASS	9Z4895
18	SHORT TIE BOLT	2	304 SS	75230SL
19	LONG TIE BOLT	2	304 SS	75230SL
20	HEX NUT	8	BRASS	9Q5038
21	LOCK WASHER	4	304 SS	9Q5844
22	SEAT O-RING 4" VALVE	2	TEF. ENCAP. SILICONE	19430TS
	SEAT O-RING 6" VALVE			19428TS
23	CYLINDER ENDPLATE	1	ALUM. E COAT	75200ALEY

CAUTION: AIR CYLINDER CONTAINS A LOADED SPRING. DO NOT ATTEMPT TO CHANGE SEAT O-RINGS WITHOUT DETACHING AIR CYLINDER FROM VALVE BODY.

INSTALLATION NOTES:

To prevent fatigue in the air cylinder neck or rotation of the air cylinder, the air cylinder must be properly supported by bolting the air cylinder endplate (#23) to a rigid bracket directly connected to the same support member as the valve. When mounting valve make sure there is sufficient clearance to allow the indicator pin to project beyond the air cylinder endplate and clearance for the air cylinder to be slid outward to change the valve seat O-rings.

PROCEDURE TO CHANGE SEAT O-RINGS:

Disconnect air line. Unscrew packing nut #2. Open valve by pulling air cylinder away from valve. It may be necessary to use a small rubber hammer to tap lower air cylinder endplate (#5) to free the disks. **CAUTION:** Air cylinder must be completely detached prior to replacing O-rings or severe injury could result. Remove old O-rings and snap new O-rings into the grooves. Heating the new O-rings in hot water will ease installation. Close valve by pushing air cylinder back onto the body. It may be necessary to use a rubber hammer to tap upper cylinder endplate (#23) to seat the disks. Screw packing nut unto valve body.

PROCEDURE TO ADJUST STEM PACKING:

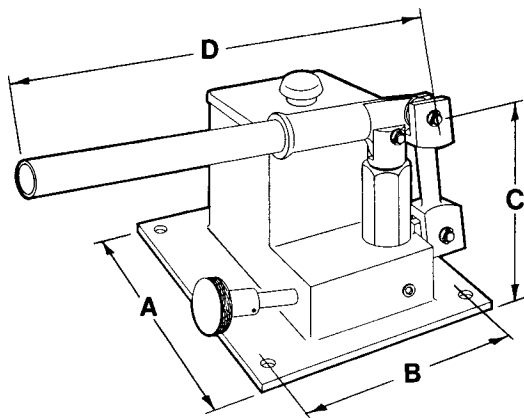
Valve stem packing should be checked on a weekly basis. Using a wrench or pliers tighten packing nut #2 to 25 ft-lbs. Do not over tighten. Check valve for proper functioning. If valve sticks or does not operate, loosen packing nut slightly and check operation again. Replace packing if necessary

PROCEDURE TO MANUALLY OPEN VALVE:

Disconnect air line. Remove indicator cap #16 and unscrew indicator pin #14. Thread a piece of 5/16-18 allthread rod at least 15" long through endplate #23 and into valve stem. Put a flat washer over the allthread rod against the endplate then screw a nut unto the rod. Tighten nut to open valve. **CAUTION:** This technique to be used only for emergency. Do not use this technique to service valve

WARNING Use only genuine BETTS INDUSTRIES INC. replacement parts. Use of substitute parts can impair the proper function of this product and void all warranties.

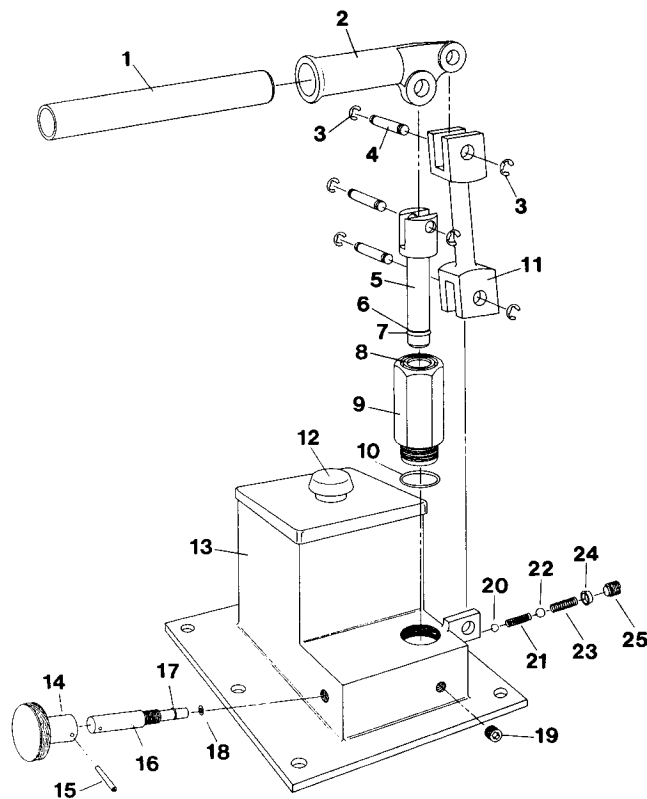
Sliding Valve Hydraulic Pump



Mat'l.	Wt.	Part No.
Steel	19.3#	HP18343MS

A	B	C	D
8" Sq.	6 ⁵ / ₈	7	14 ¹ / ₂

Piston Dia. - $\frac{3}{4}$ "
 Displacement - .66 cu. in. per stroke
 Oil Capacity - 75 cu. in.
 By Pass - Yes (5000 psi)



Item	Description	Req'd	Part No.
1	Lever	1	HP18963
2	Socket	1	HP18915
3	Retaining Ring	6	9Q4933
4	Link Pin	3	HP18916
5	Pump Piston	1	HP18914
6	Back up Ring	1	See Kit
7	O-Ring - Piston	1	See Kit
8	Dirt Seal	1	See Kit
9	Pump Barrel	1	HP18913
10	O-Ring - Barrel	1	See Kit
11	Link	1	HP18922
12	Breather	1	HP18414
13	Reservoir		Not Saleable
14	Release Knob	1	HP18920

Item	Hydraulic Pump Parts	Req'd	Part No.
15	Roll Pin	1	9Q5826
16	Release Valve Screw	1	HP18921
17	O-Ring	1	See Kit
18	O-Ring	1	HP18964
19	Pipe Plug	1	9V8596
20	Ball $\frac{1}{4}$ Dia.	1	9Z4854
21	Spring	1	HP18919
22	Ball $\frac{3}{8}$ Dia.	1	HP18024
23	Spring	1	HP18918
24	Seal	1	See Kit
25	Plug	1	HP18917
	Seal Kit (Includes 6,7,8,10,17,18,24,25)		HP18415
	Pressure Relief Valve Assembly (Includes 16,17,18)		HP18923

Universal Chicago Fittings

Zinc Plated Ductile Iron (Rated to 110 PSI)

Size	Hose Ends		Male N.P.T. Ends		Female N.P.T. Ends	
	Part Number		Part Number		Part Number	
1/4	--		AMB-1	*	AMC-1	
3/8	AMH		AMB		AMC	
1/2	AM-1		AM-2		AM-3	
3/4	AM-6		AM-7		AM-8	
1	AM-11		AM-12		AM-13	

* Also available in stainless steel



Blank End

Part Number
AMO



Washer

Part Number
AWR-4

3/4" x 50' Air Hose

DJCR075x50ABX

300 PSI Working pressure
2-Lug Universal/Crimped ends



Ball Valves

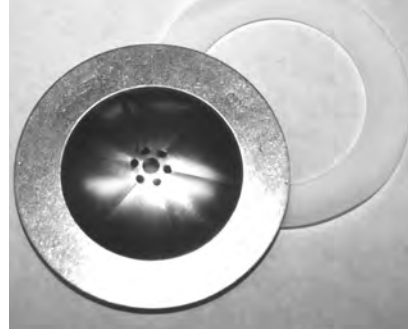
Brass and Stainless Steel 1/4" to 3" styles
Call for details



CONTINENTAL DISC CORPORATION

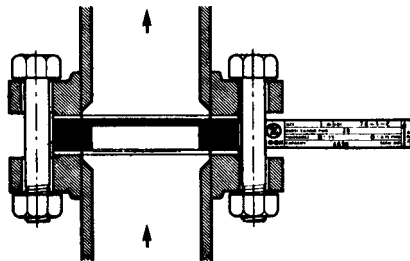
Rupture Disc

Part # -- TK1



Maximum tank operating pressure to assure maximum disc life:
40-45 PSIG @ 72° F. disc 32 PSIG max.

Zook
Rupture
Disks

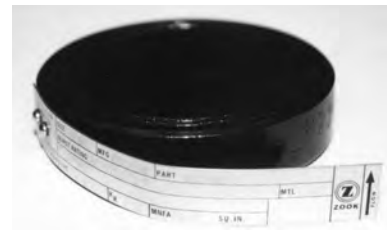


Part #'s

2" -- 240

2" -- 250

3" -- 340



Tretrice

Dial Sizes 2 1/2"
Case Stainless Steel
Ring Stainless Steel, Bayonet Type
Connection 1/4" NPT Lower
Mounting Stem
Window Polycarbonate
Dial Brushed Aluminum
Pointer Friction Adjustable
Bourdon Tube Stainless Steel
Movement Stainless Steel
Accuracy 2-1-2%*
Filler, Plug & Gasket Buna-N
Sealant RTV
Ranges Vacuum to 15,000 psi
*ANSI B40.1 Grade A



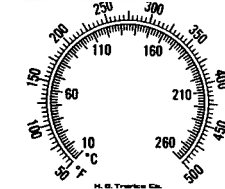
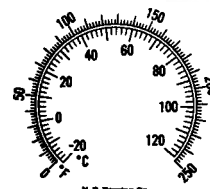
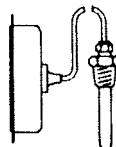
Part # 1008SL

DIAL THERMOMETERS BI-METAL TYPE STAINLESS STEEL CASE
3" Face...1/2" Back Connection...6" and 9" Stingers

3 1/2" Face...Back Mount
with 5 ft. Double Braided
Bronze Armored Tubing.



Range 0-250
#WTO8200



2-69

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Polypropylene Bolted Ball Valves

- Stainless Steel Bolts
- Viton Seals
- 100% Teflon Seats

FEATURES

- Stainless steel bolts.
- Precision molded in polypropylene. Polypropylene is reinforced with fiberglass for additional strength.
- Self-aligning ball moves freely against the Teflon® seats for smooth operation. The valve opens and closes with very little pressure on the handle.
- Ball is diamond turned, after molding, to make it spherically perfect, which provides precise contact between ball and seats.
- Viton "O" ring stem seal.
- Teflon® self-lubricating stem bushings and seats cannot stick or bind.



Polypropylene Cam Lever Couplings

FEATURES

- Stainless steel rings, arms & pins
- Most complete line of polypropylene couplings available.
- Versatile — interchangeable with all types of cam lever couplers.
- Precision molded — insures a uniform and accurate fit.
- Durable — Polypropylene is glass filled for rugged strength and durability.
- Smooth operating — finger rings are designed for easy opening of cam levers.
- Complete series of 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 3" and 4" NPT thread. BSP threads available 1"-3" sizes
- Operating conditions:
 - 3/8" thru 2" — 100 P.S.I. at 0°F; 125 P.S.I. at 70°F; 70 P.S.I. at 150°F.
 - 2 1/2", 3" & 4" Cap-50 P.S.I. Couplings 75 P.S.I. max.
- Economical and superior in performance.
- Standard with EPDM gaskets. Buna "N", and Viton® also available.



Polypropylene Nozzle Valves

FEATURES

Lightweight hose end valve for convenient transfer of liquids into drums, tanks, etc. Angled end flange with 8" long polypropylene fill spout.



Polypropylene Pipe Fittings

FEATURES

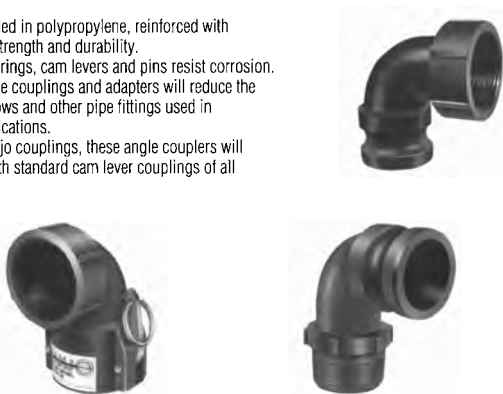
- Reinforced Polypropylene.
- Heavy duty (Schedule 80).
- Lightweight with excellent strength.
- NPT threads.
- Excellent chemical resistance.
- Pressure to 150 P.S.I. at 70°F.



Polypropylene 90° Couplings

FEATURES

- Precision molded in polypropylene, reinforced with fiberglass for strength and durability.
- Stainless steel rings, cam levers and pins resist corrosion.
- Banjo 90° angle couplings and adapters will reduce the number of elbows and other pipe fittings used in plumbing applications.
- As with all Banjo couplings, these angle couplers will interchange with standard cam lever couplings of all types.



Polypropylene Hose Barbs

FEATURES

- Precision molded in polypropylene.
- Glass reinforced for stability, strength and toughness.
- Hose barbs are molded specifically to fit properly into hoses.
- Sizes range from 1/4" to 4".
- Combination sizes available for elbows and straight barbs.
- Excellent chemical resistance.
- Pressure to 150 P.S.I. at 70°.



Polypropylene Class 150 ANSI Flanges

FEATURES

- Glass reinforced for stability, strength and durability.
- Precision molded solid, one-piece construction.
- 150 P.S.I. maximum operating pressure.
- Gasket sold separate.

