

# General Purpose Cars

## Midland General Purpose Rail Car Products

Reliable Quality and Innovative Design Combine to Provide Peace-of-Mind Safety in the Most Demanding Applications

### Gaging Devices

Midland Gaging Devices feature superior component engineering, resulting in the most accurate level measurement available. Graphite rods, a stainless steel cap, and zinc-plated body and flange all contribute to delivering long-term resistance to corrosion and fast, easy gage reading. The specific gravity adjustment nut allows builders to compensate for nozzle height variances. Serial numbers are attached to rods, bodies, and guide tubes for easy identification of devices.



### Pressure Relief Valves

Both internal and external designs are available in pressure ratings from 75 psig to 165 psig, and flow rates up to 35,527 scfm. Pressure relief valves also provide the security of re-closing after operation to minimize potential exposure of product/lading to atmosphere.



### Rupture Disc Devices

Engineered and constructed to operate from 75 psi to 165 psi, Rupture Disc Devices provide reliable, fail-safe operation and feature heavy-duty construction to withstand the common abuse of day-to-day operations. Surge protection devices are also available to prevent liquid surges in the tank from damaging the rupture disc.



### Vacuum Relief Valves

Provide low-cost assurance that excess vacuum will not collapse or otherwise damage a rail car. No-step designs are also available to help reduce NARs from damage caused by stepping on vacuum relief valves.



### Lift Assisters

Midland Lift Assisters include powder-coated springs to prevent corrosion in harsh chemical environments, and our unique design centers the manway cover on the nozzle to reduce pinching of the manway gaskets that can result in gasket damage and NARs.



### OPW ES Kamvalok® and Drylok® Valves

Used at liquid transfer points where product loss could occur, OPW Kamvalok® and Drylok® provide a reliable solution to prevent spillage during connection or disconnection of loading and unloading hoses and loading arms.



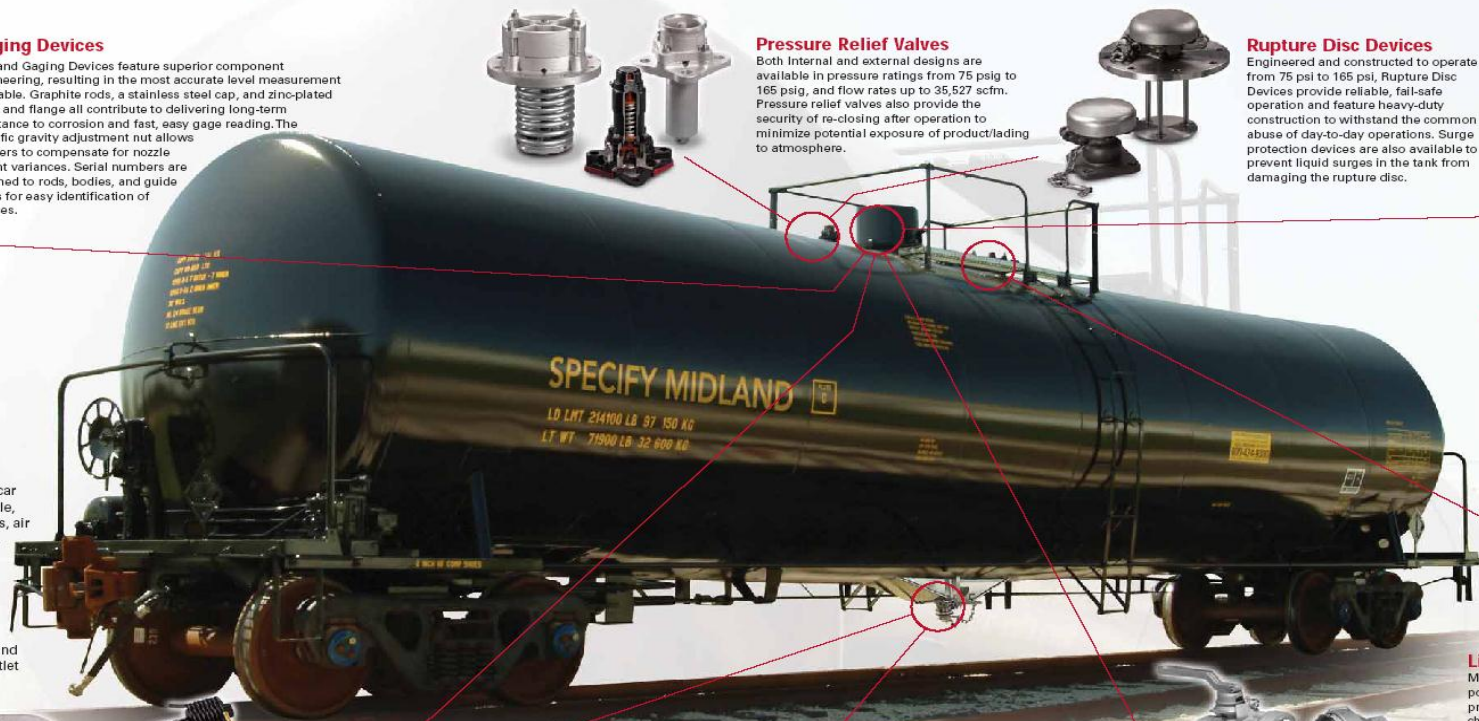
### Bottom Outlet Valves

Midland plug, butterfly and ball style Bottom Outlet Valves are specially engineered to reduce cost, extend service life, and improve unloading times without sacrificing operator safety.

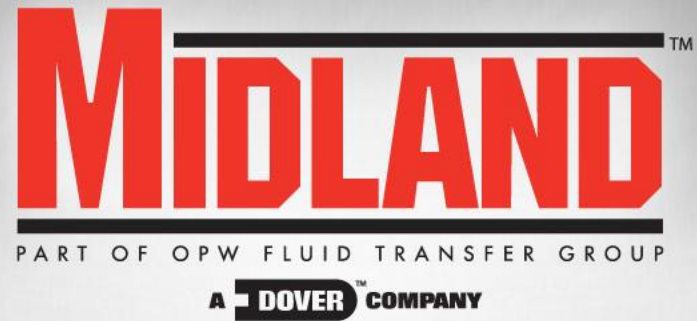


### Accessories

A complete range of car accessories is available, including thermowells, air connections, saddles, caps, plugs, nipples, OPW-ES Autolok™ quick couplers, OPW-ES quick coupling adaptors, and ergonomic helpers such as lift assisters and aluminum bottom outlet valve caps.



- **Pressure Relief Valves**
  - Internal
  - External
- **Bottom Outlet Valves**
  - Ball Valve
  - Plug Style
- **Vacuum Relief Valves**
- **Rupture Disc Devices**
- **Gaging Devices**



# Pressure Relief Valves

**Products typically shipped in General Purpose Cars using internal Pressure Relief Valves.  
(a.k.a. PRVs)**

- Ethanol
- Vegetable Oil
- Corn Syrup
- Sulfur
- Asphalt

## ■ Design

- Springs are Internal to the tank.
- Guided & Non Guided Springs
  - Non Guided are Actually Nozzle Guided
    - Metal to Metal and 'O'-Ring Seals
    - Typically Uncoated Springs
    - Flow Capacity
    - Applications

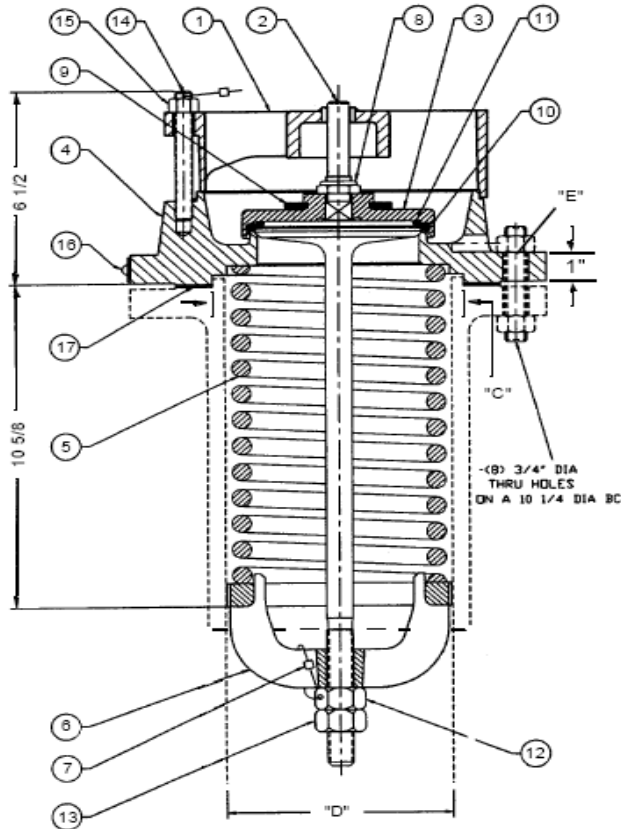
## ■ Operating Principals

- Set Pressure (i.e. 75 psig)
- Start to Discharge (min. 72 psig, max. 78 psig)
- Vapor Tight Pressure (60 psig)

## Pressure Relief Valves



© 2002 Midland Manufacturing Corp.  
 All designs subject to change without notice. Installation dimensions and mounting arrangements are for general information. Certified drawings are available upon request.



ITEM NO.	QTY.	PART NAME	A-2095 STEEL W/STAINLESS TRIM		A-2097 STEEL W/STAINLESS TRIM		A-2099 STAINLESS STEEL	
			MATERIAL	PART NO.	MATERIAL	PART NO.	MATERIAL	PART NO.
1	1	TOP GUIDE	STEEL W/SS INSERT	23-1-XS	STEEL W/SS INSERT	29-1-XS	STAINLESS	23-1-SS
2	1	STEM	STAINLESS	29-2-SS	STAINLESS	29-2-SS	STAINLESS	29-2-SS
3	1	RETAINER	STEEL, PLATED	29-3-CS	STEEL, PLATED	29-3-CS	STAINLESS	29-3-SS
4	1	BODY	STEEL	29-4-CS	STEEL	29-4-CS	STAINLESS	29-4-SS
5	1	SPRING	ALLOY STEEL PLATED <sup>(3)</sup>	29-5-AS	ALLOY STEEL PLATED <sup>(3)</sup>	29-5-AS	STAINLESS	29-5-SS
6	1	FOLLOWER	STEEL, PLATED <sup>(3)</sup>	29-6-CS	STEEL, PLATED <sup>(3)</sup>	29-6-CS	STAINLESS	29-6-SS
7	2	WIRE SEAL	SS/LEAD	23-7-PB	SS/LEAD	23-7-PB	STAINLESS	23-7-PB
8	1	TOP LOCK NUT	STEEL, PLATED <sup>(3)</sup>	23-8-CS	STEEL, PLATED <sup>(3)</sup>	23-8-CS	STAINLESS	23-8-SS
9	1	WASHER	NEOPRENE <sup>(1)</sup>	23-9-NE	NEOPRENE <sup>(1)</sup>	23-9-NE	NEOPRENE <sup>(1)</sup>	23-9-NE
10	1	SEAT O-RING	BUNA-N <sup>(1)</sup>	29-10-BN	BUNA-N <sup>(1)</sup>	29-10-BN	BUNA-N <sup>(1)</sup>	29-10-BN
11	1	STEM O-RING	BUNA-N <sup>(1)</sup>	29-11-BN	BUNA-N <sup>(1)</sup>	29-11-BN	BUNA-N <sup>(1)</sup>	29-11-BN
12	1	ADJUSTMENT NUT	STEEL, PLATED <sup>(3)</sup>	23-12-CS	STEEL, PLATED <sup>(3)</sup>	23-12-CS	STAINLESS	23-12-SS
13	1	LOCK NUT	STEEL, PLATED <sup>(3)</sup>	23-13-CS	STEEL, PLATED <sup>(3)</sup>	23-13-CS	STAINLESS	23-13-SS
14A	2	STUD	ALLOY STEEL	23-14-AS	ALLOY STEEL	23-14-AS	STAINLESS	23-14-SS
14B	2	STUD WITH HOLE	ALLOY STEEL	23-141-AS	ALLOY STEEL	23-141-AS	STAINLESS	23-141-SS
15	4	NUT	STEEL	23-15-CS	STEEL	23-15-CS	STAINLESS	23-15-SS
16	1	NAMEPLATE	STAINLESS	25-16-SS	STAINLESS	29-16-SS	STAINLESS	25-16-SS
17	1	GASKET <sup>(2)</sup>	COMP. ASB <sup>(1)</sup>	27-17-AB	COMP. ASB <sup>(1)</sup>	27-17-AB	COMP. ASB <sup>(1)</sup>	27-17-AB

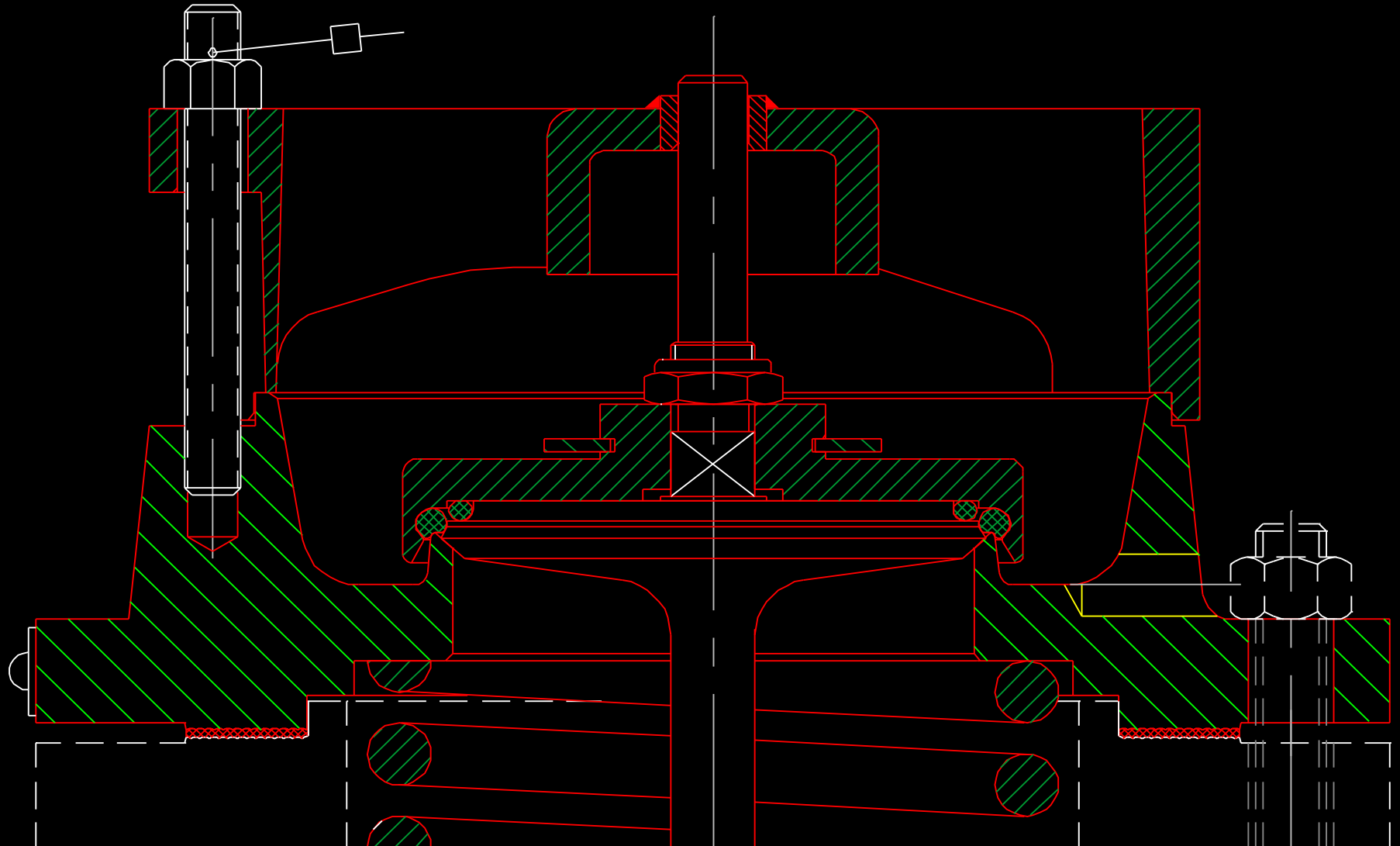
NOTES: 1 Alternate materials available. 2 Not furnished unless requested.  
 3 Standard plating for general service is zinc. Plating can be changed or eliminated per customer's specifications.

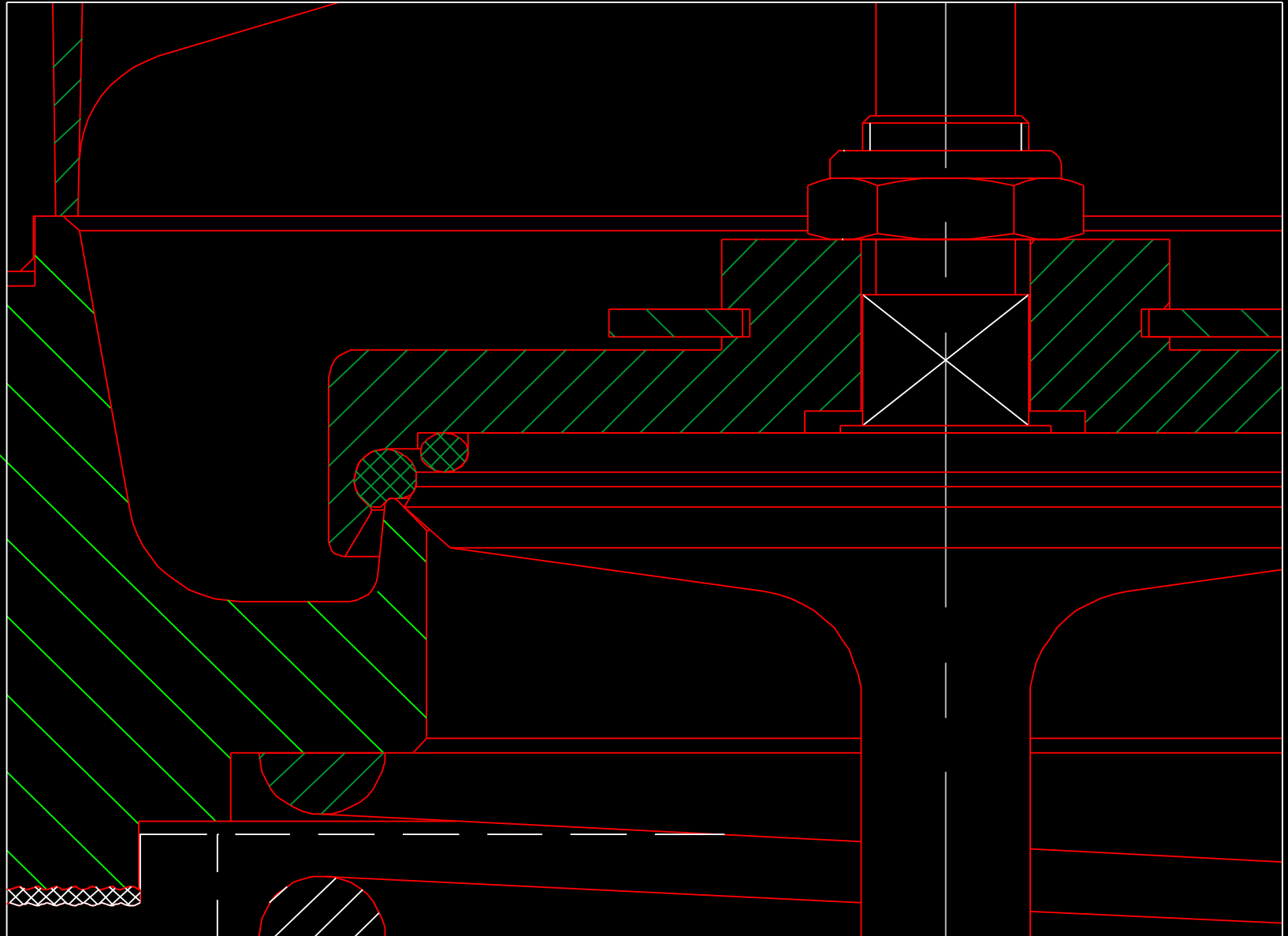
NET FLOW AREA: 16.36 SQUARE INCHES  
 WEIGHT OF VALVE: 85 LBS.  
 FLOW RATED @ 85 PSIG

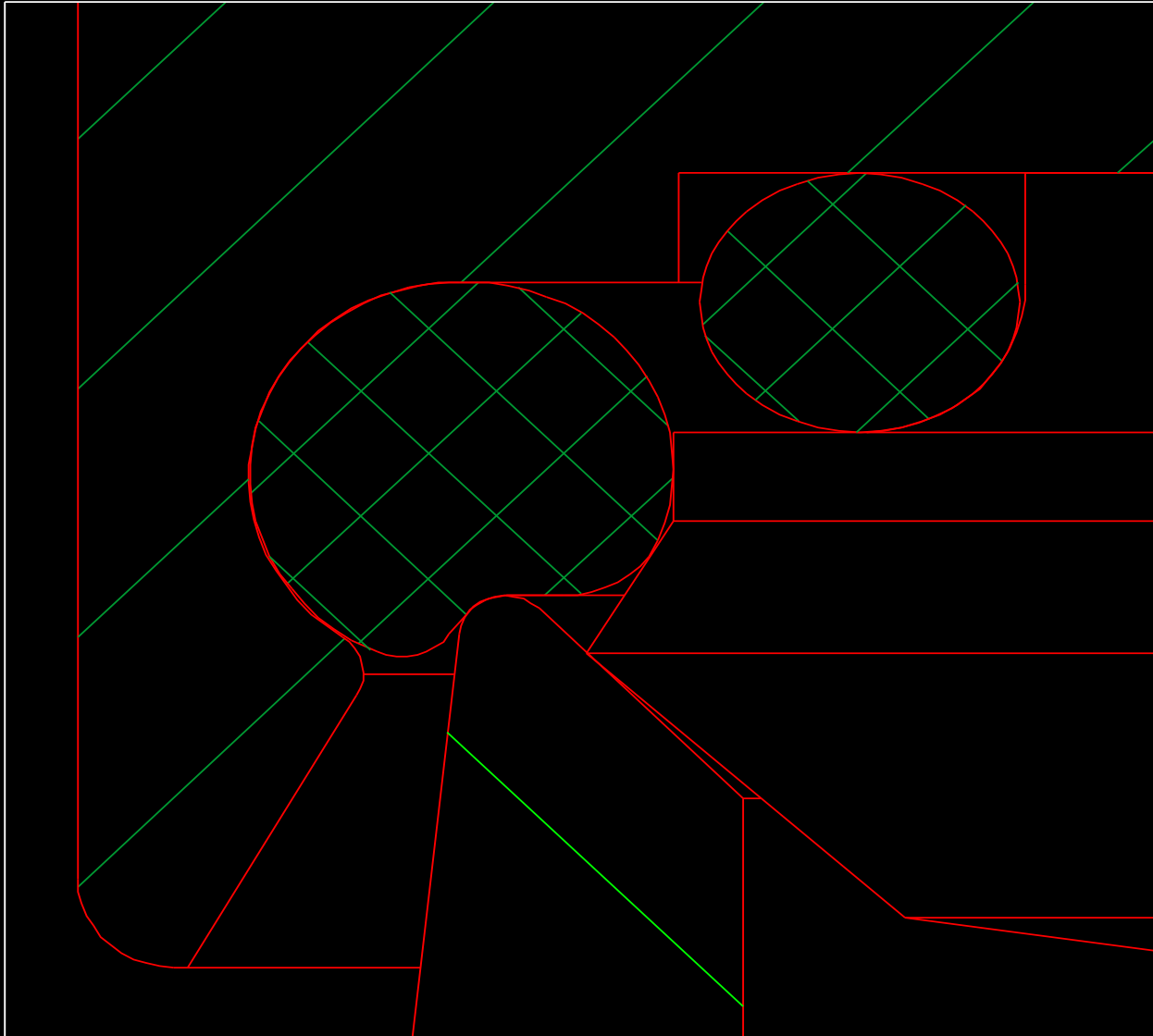
VALVE P/N	PRESSURE SETTING (PSIG)	FLOW RATE (SCFM AIR)
A-2095	75	20,464
A-2097	75	21,602
A-2099	75	20,555

MOUNTING PER AAR FIG. E 21.1A  
 "C" = 7.187" ± .005"  
 "D" = 6 15/32" dia. min., 6-17/32" dia. max. with out-of-roundness not to exceed these diameters.  
 "E" = (8) 3/4" holes on 10-1/4" bolt circle.









- **New requirements for hazardous commodities transported in general purpose railcars**
  - Ethanol and Crude Oil are the largest commodities affected
- **Current regulation is leading to a minimum of 27,000 scfm of relieving capability for the pressure relief valve at a lower set pressure, 75 psi**
- **Valves will no longer be applied to flues outside of the protective housing**
  - All new cars will have the PRV in the protective housing
- **Valves may or may not have a flue going up to the protective housing cover**

# Hi-Flow Internal Style Valve

**MIDLAND**<sup>TM</sup>

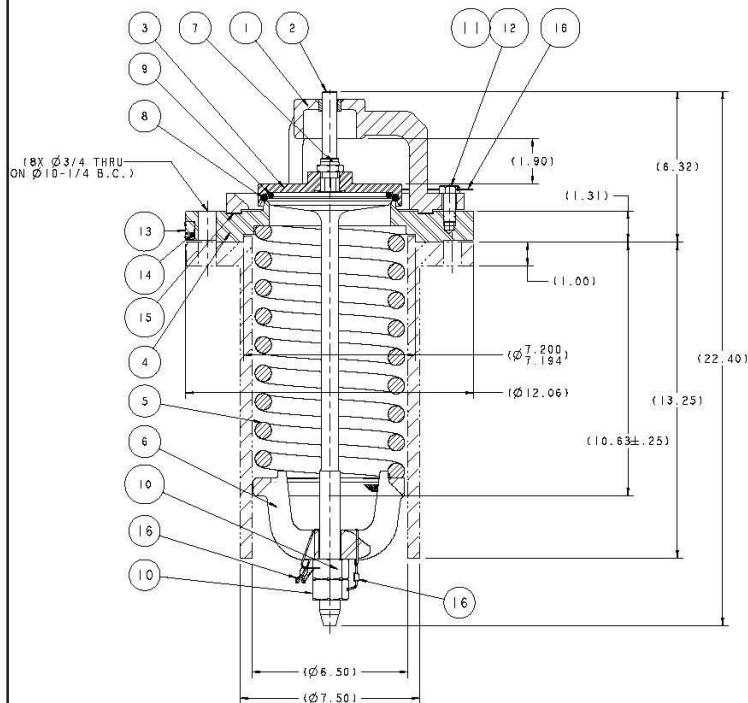
7733 Gross Point Road  
Skokie, Illinois 60077  
847-677-0333

## Model A-22075-CS

Pressure Relief Valve

June 18, 2013

(Rev 1)



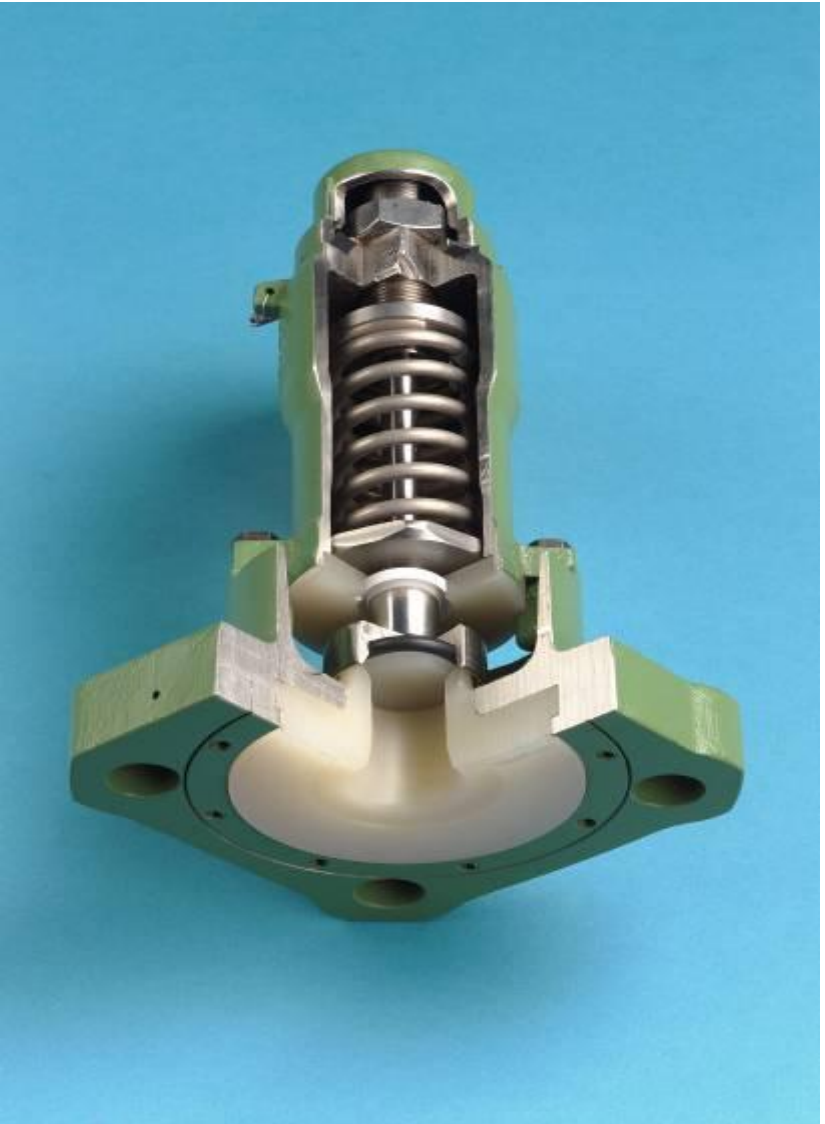
### SPECIFICATION

- Start-To-Discharge Pressure: 75 psig +/- 3 PSIG
- Vapor Tight Pressure: 60 PSIG minimum
- Certified Capacity at Flow Rating Pressure: 29,550 SCFM Air
- Flow Rating Pressure: 85 PSIG maximum
- Effective Orifice Area: 20 in<sup>2</sup>
- Discharge Coefficient (Kd): .81
- Maximum Operating Temperature: 250°F ~ 600°F (Depending on elastomer seal selection)
- Minimum Operating Temperature: -20°F
- Mounting Studs: (8) @ 5/8-11UNC X 3.0" Long (Min.)
- Mounting Stud Torque: 120 +/-10 ft-lb
- Top Guide Cap Screw (Items #11&12) Torque: 80 +/- 5 ft-lb
- Stem Locknut (Item #7) Torque: 110 +/-10 ft-lb
- Recommended gasket size: 9.5" OD X 7.25 ID X .125 Thk
- Mounting configuration per AAR M-1002, Fig E21A
- AAR Approval No.: PRD122007
- Note: Alternate o-ring materials available

ITEM NO.	QTY.	PART NAME	MATERIAL	PART NUMBER
1	1	TOP GUIDE WITH INSERT	CARBON STEEL	29-01-XS
2	1	VALVE STEM	STAINLESS STEEL	29-02-SS
3	1	RETAINER - BARSTOCK VERSION	CARBON STEEL	29-0301-CS
4	1	SAFETY VALVE BODY, MACHINED	CARBON STEEL	29-042-CS
5	1	PRV SPRING	ALLOY STEEL	29-51-AS
6	1	FOLLOWER, MACHINING	CARBON STEEL	29-06-CS
7	1	NYLON INSERT LOCKNUT	CARBON STEEL	23-8-CS
8	1	O-RING, 2-431	BUNA-N (NOTE)	29-010-BN
9	1	O-RING, 2-351	BUNA-N (NOTE)	29-011-BN
10	2	HEX NUT	CARBON STEEL	29-012-CS
11	2	HEX HEAD CAP SCREW	ALLOY STEEL	29-014-AS
12	2	HEX HEAD CAP SCREW	ALLOY STEEL	29-0141-AS
13	1	NAME PLATE	STAINLESS STEEL	29-0752-SS
14	2	DRIVE SCREW	STAINLESS STEEL	763-11-SS
15	1	GASKET	PTFE	29-170-PTFE
16	3	WIRE SEAL KIT	SS/LEAD	22-72-PB

## Products typically shipped in General Purpose Cars using external Pressure Relief Valves (a.k.a. PRVs)

- Caustic
- HCL
- Sulfuric Acid
- Hydrogen Peroxide



## ■ Design

- Springs are external to the tank above valve seat
- Metal to Metal and 'O'-Ring Seals
- Combination Devices
- High and Low Pressure Designs

## ■ Operating Principals

- Set Pressure (i.e. 75 psig)
- Start to Discharge (min. 72 psig, max. 78 psig)
- Vapor Tight Pressure



## External PRV Stem and Plug



# Combination External PRV

4X ø7/8" HOLES ON ø6 1/4" B.C. (LOCATED AT CORNERS OF 6" SQUARE FLANGE).

NOTES:  
 1. FOR STAINLESS STEEL FLUE, ADD SUFFIX -S TO MODEL NUMBER.  
 2. 15-112-SS ADJUSTMENT SCREW IS USED ON A-14377-ML AND A-14502-ML.  
 3. A-1402 SERIES VALVES CAN BE REBUILT TO A-1402-A SERIES VALVES.

VALVE MODEL NO.	ORIFICE AREA (SQ IN)	FLOW PRESSURE (PSIA)	FLOW RATE @ 10% > R.D. (CFM AIR)	THROUGH PUT EFFICIENCY (-)
A-14227-ML-A	1.35	252.2	4628	67
A-14377-ML-A	1.35	427.2	7288	67
A-14502-ML-A	1.35	564.2	8616	61

VALVE MODEL NO.	RUPTURE DISK SETTING (PSIG)	VALVE PRESSURE SETTING (PSIG)	VAPOR TIGHT PRESSURE (MINIMUM) (PSIG)	OUTER SPRING	INNER SPRING	NAMEPLATE	RUPTURE DISC	AAR NUMBER
A-14227-ML-A	202 - 225	210	200	15-150-MO	14-13-SS	14-227-ML-A	14-23-TA-225	PR092002
A-14377-ML-A	318 - 375	351	338	15-375-SS	14-13-SS	14-377-ML-A	14-23-TA-375	PR092002
A-14502-ML-A	480 - 500	470	448	15-450-SS	14-13-SS	14-502-ML-A	14-23-TA-500	PR092002

ITEM	QTY	PART NAME	HASTELLOY C TRIM	
			MATERIAL	PART NUMBER
1	1	TOP GUIDE	STAINLESS STEEL	14-101-SS
2	1	STEM	HAST. C/MONEL	14-2-XC
3	1	PLUG	HASTELLOY C	14-3-HC
4	1	BODY	HASTELLOY C	14-480-HC
5	1	OUTER SPRING	STAINLESS STEEL	SEE TABLE
6	1	FOLLOWER	STAINLESS STEEL	14-6-SS
7	1	GUIDE	STAINLESS STEEL	14-7-SS
8	1	TOP NUT	STAINLESS STEEL	15-8-SS
9	1	TOP GASKET	VITON	15-9-VA
10	1	SHAFT SEAL	PTFE	17-10-TF
11	1	ADJUSTING SCREW	STAINLESS STEEL	15-11-SS (2)
12	1	SEAL RETAINER	MONEL	14-12-ML
13	1	INNER SPRING	STAINLESS STEEL	SEE TABLE
14	1	CAP	STAINLESS STEEL	14-14-SS
15	1	SEAL SCREW	STEEL, PLATED	15-15-SS
16	4	STUD	MONEL	14-18-ML
17	4	NUT	MONEL	14-17-ML
18	1	WIRE SEAL	SS WIRE, LEAD SEAL	22-72-PB
19	1	RETAINER	HASTELLOY C	14-19-HC
20	1	SEAT "O" RING	VITON	10-10-VL
21	1	PLUG "O" RING	VITON	10-11-VL
22	1	FLUE "O" RING	VITON	14-22-VA
23	1	RUPTURE DISC	TANTALUM	SEE TABLE
24	1	FLUE	PLASTIC (1)	14-24-PC
25	4	RUPTURE DISC FLG BOLTS	STAINLESS	15-18-SS
26	1	RUPTURE DISC FLANGE	MONEL	14-372-ML
27	1	1/8" VALVE	MONEL	A-251
28	1	NAMEPLATE	MONEL	SEE TABLE
29	1	UPPER FILLER	VITON	14-29-VA
30	1	LOWER FILLER	VITON	14-30-VA
31	1	PROTECTIVE CAP/CHAIN	POLYETHYLENE/SS	14-31-PE
32	1	FLANGE O-RING INNER	VITON	14-321-VL
33	1	FLANGE O-RING OUTER	VITON	14-331-VL

DOC	PRO092002 WAS SRD 98064	FS	3/31/09	MN
DOC	15-112-SS WAS 15-111-SS IN NOTE #2	FS	1/13/09	MN
DOB	14-321-VL & 14-331-VL WERE 14-321-VA & 14-331-VA	FS	12/19/06	MN
A	22-72-PB WAS 15-18-P3 (ITEM 18), ADDED "-A" TO NAMEPLATE'S PART NO'S	FS	11/22/06	RHD
LTR	REVISIONS	DRN	DATE	APP

FOR CHLORINE SERVICE

**MIDLAND** MANUFACTURING CORP.  
 SKOKIE, IL, U.S.A.

TOP STYLE SAFETY VALVE,  
 O-RING SEAL WITH RUPTURE DISC

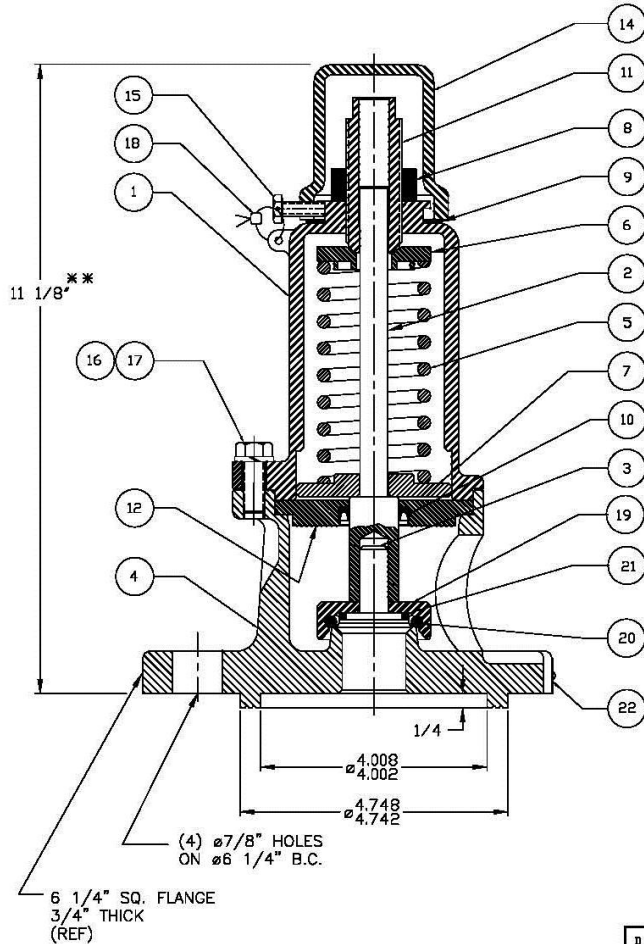
MATERIAL: SEE TABLE  
 TOLERANCES UNLESS SPECIFIED:  
 2 PLACE DECIMAL ± .015  
 3 PLACE DECIMAL ± .005  
 ANGULAR ± 1° FRACTIONS ± 1/84  
 CHAMFERS AND WELD PREP .5

REMOVE ALL BURRS,  
 BREAK ALL EDGES & CORNERS.  
 FINISH (Ra) : √ = 125

SCALE: 3/4 DRAWN: FS DATE: 11/14/06 APPROVED: RHD

CAD FILE NO. SIZE DWG NO. REV  
 815B B A-1402-A SERIES 00D

# External Pressure Relief Valve



ITEM NO.	QTY.	PART NAME	A-1775 THRU A-17450 STAINLESS TRIM		A-1779 THRU A-17454 STAINLESS STEEL	
			MATERIAL	PART NO.	MATERIAL	PART NO.
1	1	TOP GUIDE	STEEL	15-1-CS	STAINLESS STEEL	15-1-SS
2	1	STEM	STAINLESS STEEL	17-2-SS	STAINLESS STEEL	17-2-SS
3	1	PLUG	STAINLESS STEEL	17-3-SS	STAINLESS STEEL	17-3-SS
4	1	BODY	STEEL	15-4-STD-CS	STAINLESS STEEL	15-4-STD-MO
5	1	SPRING	STAINLESS STEEL	SEE TABLE	STAINLESS STEEL	SEE TABLE
6	1	FOLLOWER	STEEL	14-6-CS	STAINLESS STEEL	14-6-SS
7	1	GUIDE	STAINLESS STEEL	15-7-SS	STAINLESS STEEL	15-7-SS
8	1	TOP NUT	STEEL	15-8-CS	* STEEL	15-8-CS
9	1	TOP GASKET	* BUNA-N	15-9-BN	* BUNA-N	15-9-BN
10	1	SHAFT SEAL	TEFLON	17-10-TF	TEFLON	17-10-TF
11	1	ADJUSTMENT SCREW	STAINLESS STEEL	15-11-SS	STAINLESS STEEL	15-11-SS
12	1	SEAL RETAINER	STEEL	17-12-CS	STAINLESS STEEL	17-12-SS
13						
14	1	** CAP	STAINLESS STEEL	15-14-SS	STAINLESS STEEL	15-14-SS
15	1	CAP SCREW	STEEL	15-15-CS	* STEEL	15-15-CS
16	3	BOLT	STEEL	15-16-CS	STAINLESS STEEL	15-16-SS
17	3	LOCKWASHER	STEEL	15-17-CS	STAINLESS STEEL	15-17-SS
18	1	WIRE SEAL	LEAD/SS WIRE	22-72-PB	LEAD/SS WIRE	22-72-PB
19	1	RETAINER	STAINLESS STEEL	17-19-SS	STAINLESS STEEL	17-19-SS
20	1	SEAL "O" RING	* BUNA-N	10-10-BN	* BUNA-N	10-10-BN
21	1	PLUG "O" RING	* BUNA-N	10-11-BN	* BUNA-N	10-11-BN
22	1	NAMEPLATE	STAINLESS STEEL	SEE TABLE	STAINLESS STEEL	SEE TABLE

\* ALTERNATE MATERIALS AVAILABLE.  
 \*\* WITH 14-14-SS CAP. THIS DIMENSION IS 10 3/16"

PRESSURE SETTING (PSIG)	FLOW RATE (SCFM-AIR)	SPRING PART NUMBER	A-1775 THRU A-17450		A-1779 THRU A-17454	
			VALVE PART NUMBER	NAMEPLATE PART NUMBER	VALVE PART NUMBER	NAMEPLATE PART NUMBER
75	1340	15-75-MO	A-1775	17-24-SS	A-1779	17-28-SS
150	1960	15-150-SS	A-17150	17-25-SS	A-17154	17-29-SS
165	2827	15-165-SS	A-17165	17-44-SS	A-17169	17-48-SS
225	3250	15-225-SS	A-17225	17-26-SS	A-17229	17-30-SS
247.5	3368	15-300-SS	A-17247	17-45-SS	A-17251	17-49-SS
255	3933	15-225-SS	A-17255	17-38-SS	A-17259	17-39-SS
280.5	3782	15-300-SS	A-17280	17-46-SS	A-17284	17-51-SS
300	4002	15-300-SS	A-17300	17-34-SS	A-17304	17-35-SS
330	3935	15-375-SS	A-17330	17-47-SS	A-17334	17-52-SS
375	3646	15-375-SS	A-17375	17-36-SS	A-17379	17-37-SS
450	4198	15-450-SS	A-17450	17-40-SS	A-17454	17-41-SS

AAR APPROVAL #PRD092019

NET FLOW AREA: 994 SQUARE INCHES

WEIGHT OF VALVE: 22 LBS.

**MIDLAND** MANUFACTURING CORP.  
 SKOKIE, IL, U.S.A.

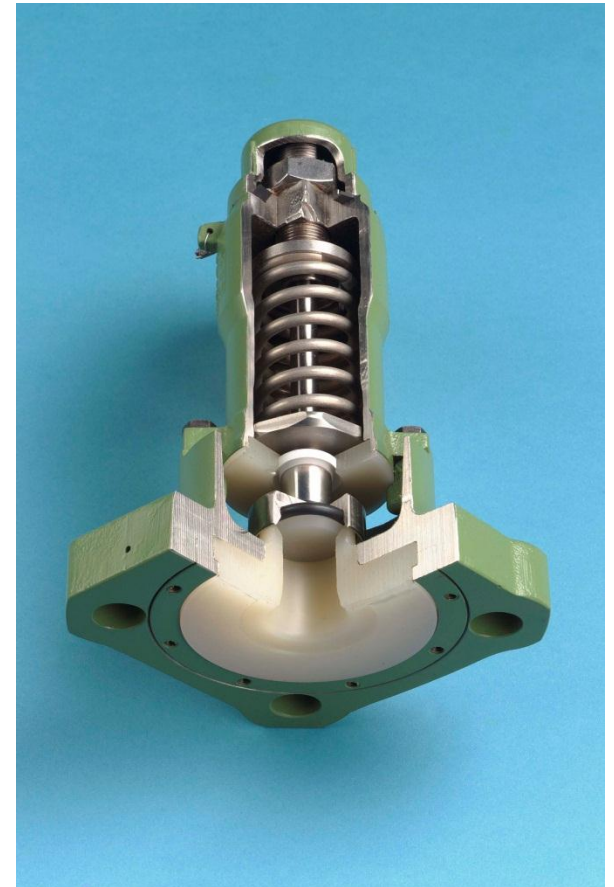
PRESSURE RELIEF VALVES  
 TOP STYLE

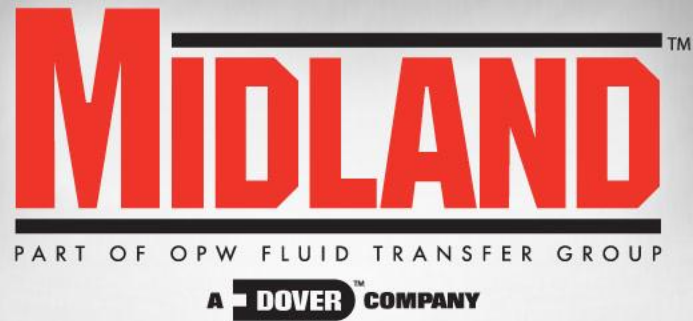
D	ADDED AAR APPROVAL #	FS	12/08/09	MN
C	15-14-SS, 22-72-PB, 14-14-SS, & 15-75-MO WERE 15-4-CS, 15-18-PB, 14-4-CS, & 15-75-SS	FS	11/14/08	MN
B	ON ITEM 15, CAP SCREW WAS SET SCREW. ON ITEM 4, 15-4-STD-MO WAS 15-4-STD-SS.	KM	5/5/05	CHP
A	CAD REDRAVN.	KM	9/17/99	---
LTR	REVISIONS	DRN	DATE	APP

MATERIAL:	SEE TABLE	TOLERANCES UNLESS SPECIFIED: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 1', FRACTIONS ± 1/64 CHAMFERS AND WELD PREP ± 5'
REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS.	FINISH (Ra) : √ = 125	
SCALE: 1:2	DRAWN: L.K.T.	DATE: 4/6/72
CAD FILE NO.	SIZE	DWG NO.
3382	B	A-1700 SERIES
REV		D

# HCL Pressure Relief Valves

- **A-14167-KY and A-14167-3KY**
  - All Wetted Parts are PVDF
  - Stainless Body
  - Teflon Coated
  - Are being used to replace safety vents

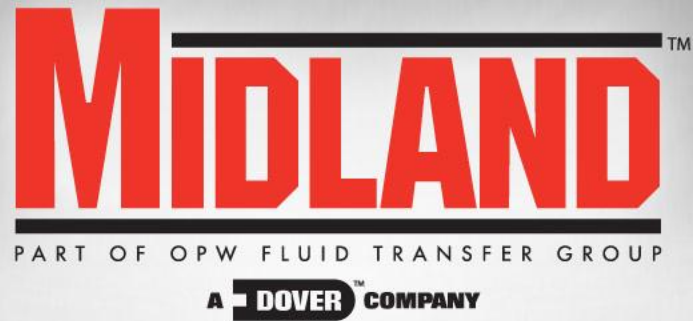




# **Bottom Outlet Valves (a.k.a. BOVs)**







# Bottom Outlet Ball Valves



## Bottom Outlet Ball Valves

### Advantages

- Quarter turn operation
- Universally compatible seats
- Adjustable packing
- DuraSteel Seats
- Highest flow capacity ball valve on the market
- Well accepted by shippers
- Operator familiarity
- Midland field service and support

### Disadvantages

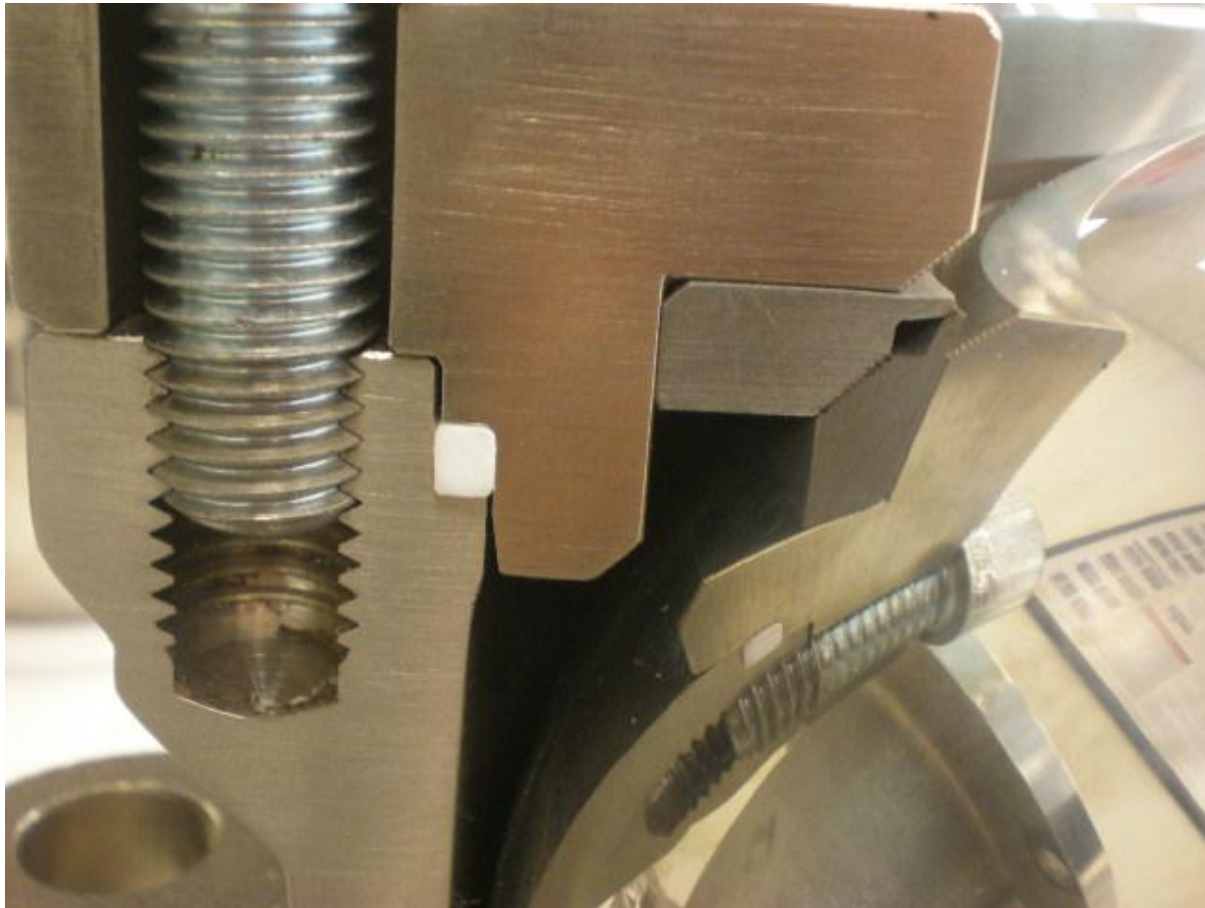
- Higher installed costs
- Heavier installed weight
- Sensitive to debris and fouling of seats
- Sensitive to cold temperatures
- Not retrofittable to plug valve at later date



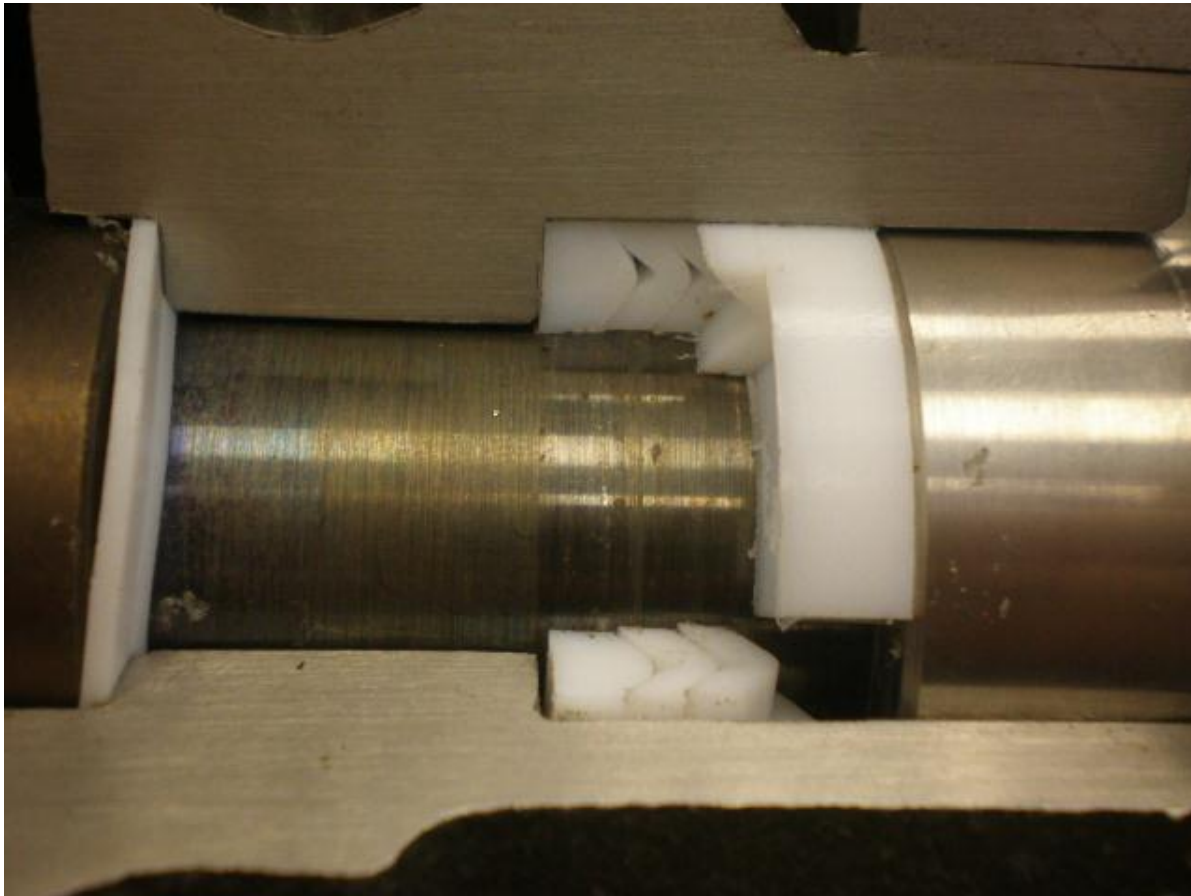
## Ball Valve Cut-A-Way

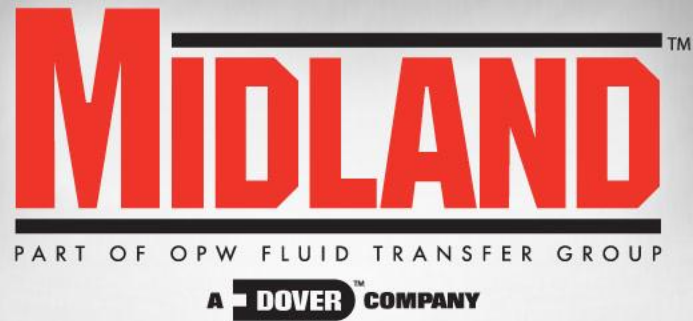


## Ball Valve Sealing



## Ball Valve Stem Seal





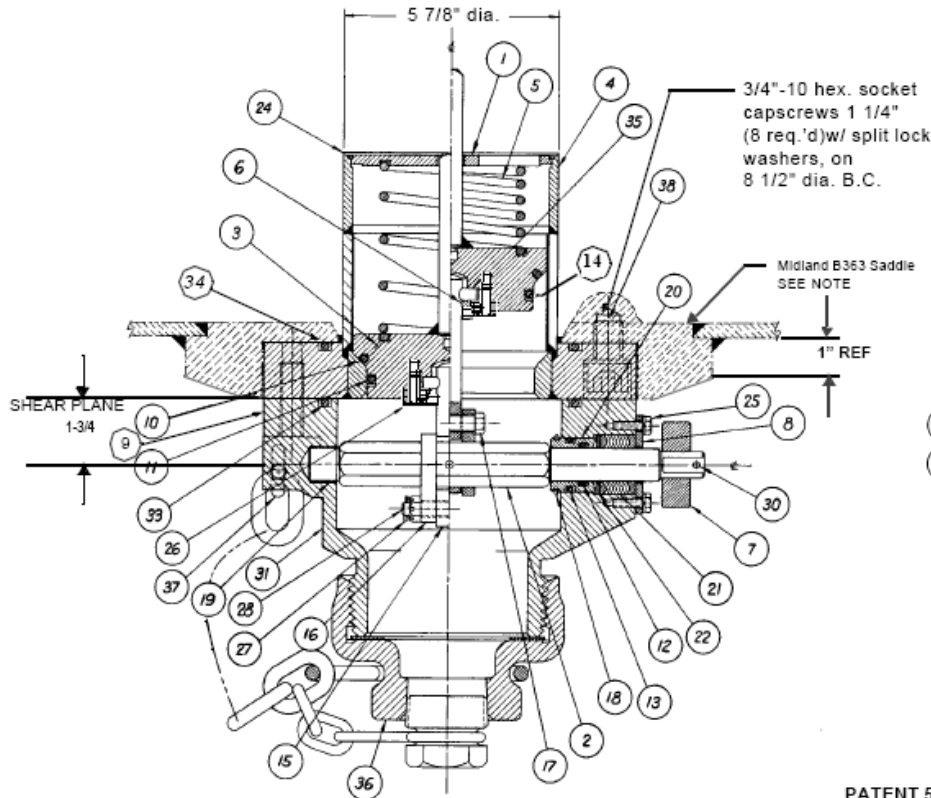
# Bottom Outlet Plug Valves



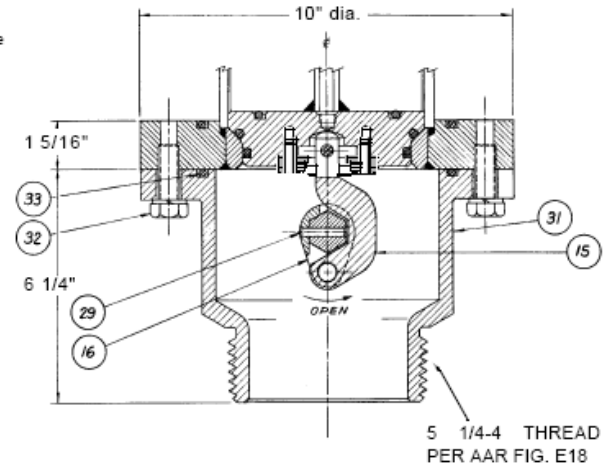
**BOTTOM EQUIPMENT  
OUTLET VALVE - 5 1/4"-4 AAR**

**A-549-CS, A-549-XS,  
A-549-SS, A-549-MO**

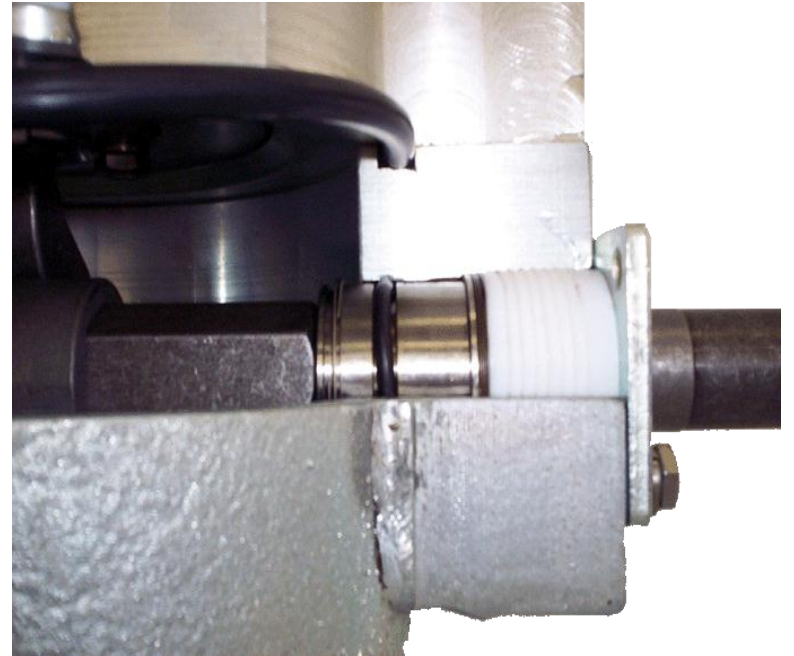
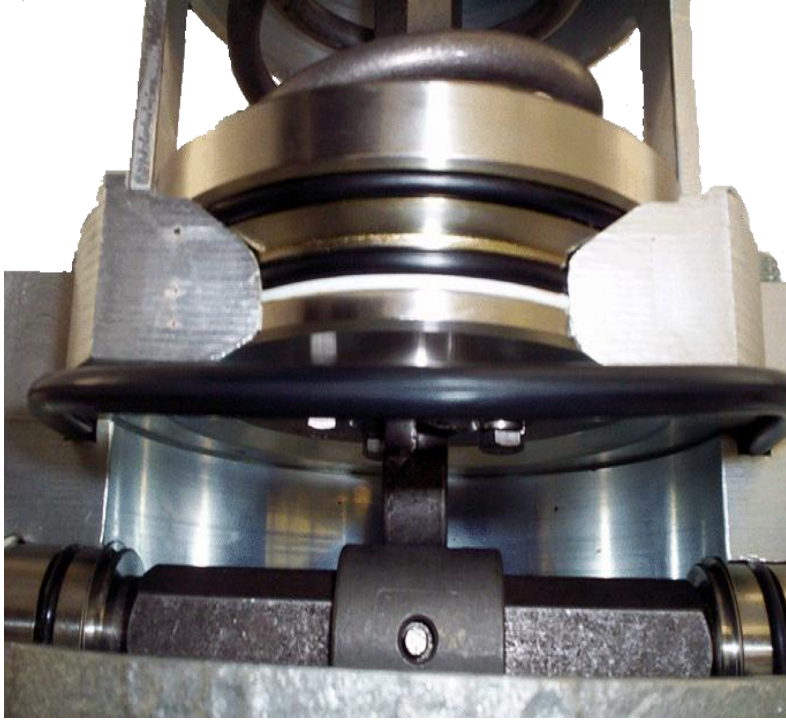
© 2003 Midland Manufacturing Corp.  
All designs subject to change without notice. Installation dimensions and mounting  
arrangements see for general information. Certified drawings are available upon request.



NOTE: APPROVED FOR PROTECTION LEVEL A OF AAR  
CIRCULAR D.V. 2007.



PATENT 5,342,026





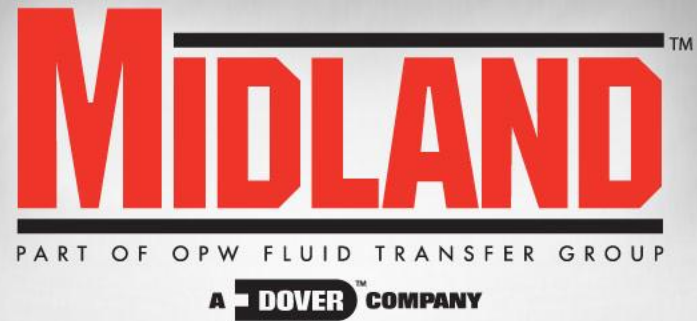
## Plug Style Bottom Outlet Valves

### ■ Seating Principal

- O-Rings Compressed by Cam (Spring Loaded)
- Multiple Seals to Atmosphere
- Stem Sealing
  - Live Loaded Stem Seal
  - Non-Adjustable
  - Not Exposed to Product with Valve in Closed Position

## Plug Style Bottom Outlet Valves

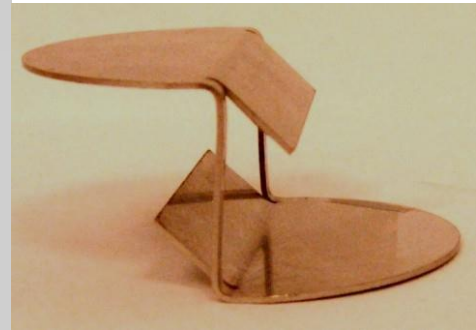
- **Common Problems with Plug Style Bottom Outlet Valves**
  - Incompatible O-Rings for Lading
  - Contamination or Debris on Seating Area
  - Corrosion of Seating Area
  - Open Valve with Product Hardened in Valve



# Vacuum Relief Valves

Vacuum Relief Valves (VRVs)





## Vacuum Relief Valves

- **Design**
  - Quad Ring Sealing
  - Step vs. No Step Designs
- **Operating Principals**
  - Vacuum Relief
  - Set Pressures
  - Positive Pressure Sealing

## Vacuum Relief Valves

- **Common Problems with Vacuum Relief Valves**
  - Incompatible O-Rings to the Lading
  - Damage from Use as Foot Valve
  - Corrosion on seating Areas
  - Contamination of Seats & seals with Debris

# Current Vacuum Relief Valve Design

ITEM NO.	QTY.	PART NAME	A-208-W-NS		A-209-W-NS		A-209-W-NS-WD	
			MATERIAL	PART NO.	MATERIAL	PART NO.	MATERIAL	PART NO.
1	1	BODY	STEEL	208-14-SS	STAINLESS	209-14-SS	STAINLESS	209-14-MD
2	1	SPRING	STAINLESS	207-2-WD	STAINLESS	207-2-WD	STAINLESS	207-2-MD
3	1	BEARING SEAT	STAINLESS	207-3-SS	STAINLESS	207-3-SS	STAINLESS	207-3-SS
4	1	LOCKOUT	STEEL	207-41-SS	STAINLESS	207-41-SS	STAINLESS	207-41-SS
5	1	STEM ASM	STAINLESS	207-52-WD	STAINLESS	207-52-WD	STAINLESS	207-52-MD
6	1	PRESSURE SEAL	FLUOR N (1)	202-9-BN	FLUOR N (1)	202-9-BN	FLUOR N (1)	202-9-BN
7	1	WEATHER GAP ASM	STAINLESS	208-7-SS	STAINLESS	208-7-SS	STAINLESS	208-7-SS
8	1	NAMEPLATE	STAINLESS	208-68-SS	STAINLESS	208-68-SS	STAINLESS	208-68-SS
9	3	GAP SCREW	STAINLESS	208-8-SS	STAINLESS	208-8-SS	STAINLESS	208-8-SS

**NOTES:**

- (1) ALTERNATE MATERIAL AVAILABLE.
- (2) STANDARD MINIMUM START TO DISCHARGE PRESSURE SETTING IS .75 PSI VACUUM. ALTERNATE START TO DISCHARGE PRESSURE SETTINGS ARE AVAILABLE.
- (3) AAR # E102007

NET FLOW AREA: 1.12 SQUARE INCHES.

ADDED DATE #				RS	3/4/04	MM
D	302-05-40 WIG	302-08-05	307-41-05	305-14-05	302-8-05	FS 4/11/05 MM
D	208-14-05 WIG	208-14-05	308-14-05	308-14-05	308-14-05	FS 6/05/05 MM
B	ITEM #	308-14-05 WIG	308-14-05	308-14-05	308-14-05	FS 3/04/05 BND
A	308-01	308-01	308-01	308-01	308-01	FS 3/05/05 BND
LYN	308-01	308-01	308-01	308-01	308-01	APP

**MIDLAND MANUFACTURING CORP.**  
WARR, N. CAR.

**VACUUM RELIEF VALVES - 2 1/2" NPT**

INTERNAL: SEE TABLE

TELEPHONE: UNLESS OTHERWISE SPECIFIED  
 3 PLAIN: 308 MM ± .010  
 3 PLAIN: 308 MM ± .010  
 3 PLAIN: 308 MM ± .010  
 3 PLAIN: 308 MM ± .010  
 3 PLAIN: 308 MM ± .010

REWORK ALL ORDER  
 BREAK ALL ORDER & REWORK

REWORK FULL: BNDMM FS DATE 3/18/05 APPROVED: RHD

END FILE NO. 7001

REV: 0-208-W-NS, 0-209-W-NS, 0-209-W-NS-WD

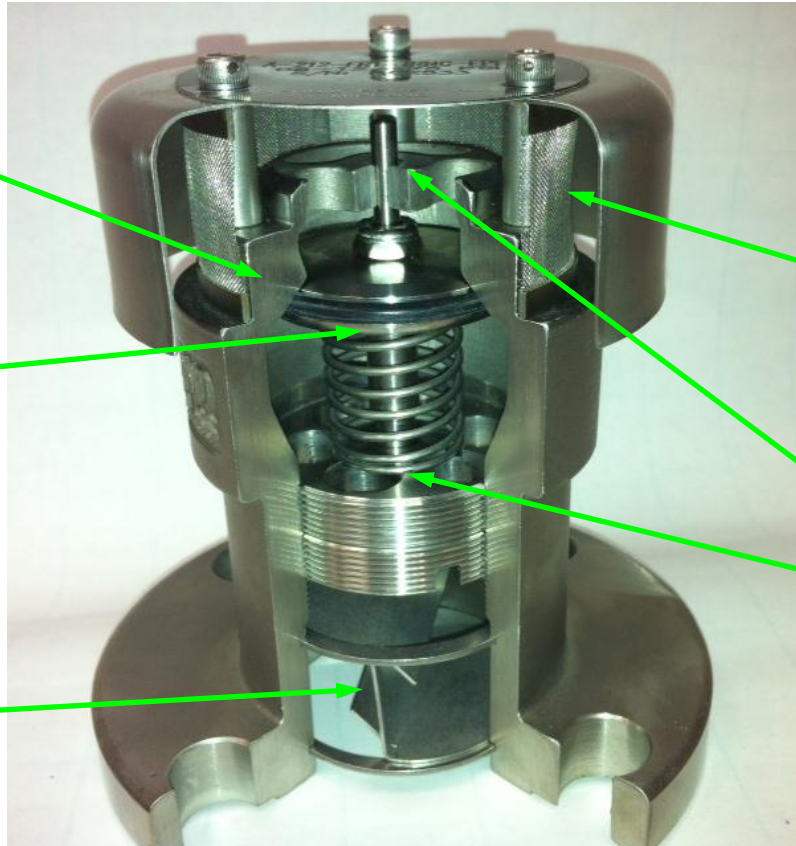


Models for retrofit and new applications

Poppet moved to top of valve to prevent contact with liquid product.

Disk-type seal "captured" in poppet assembly.

Baffle to prevent splashing of product onto the poppet.



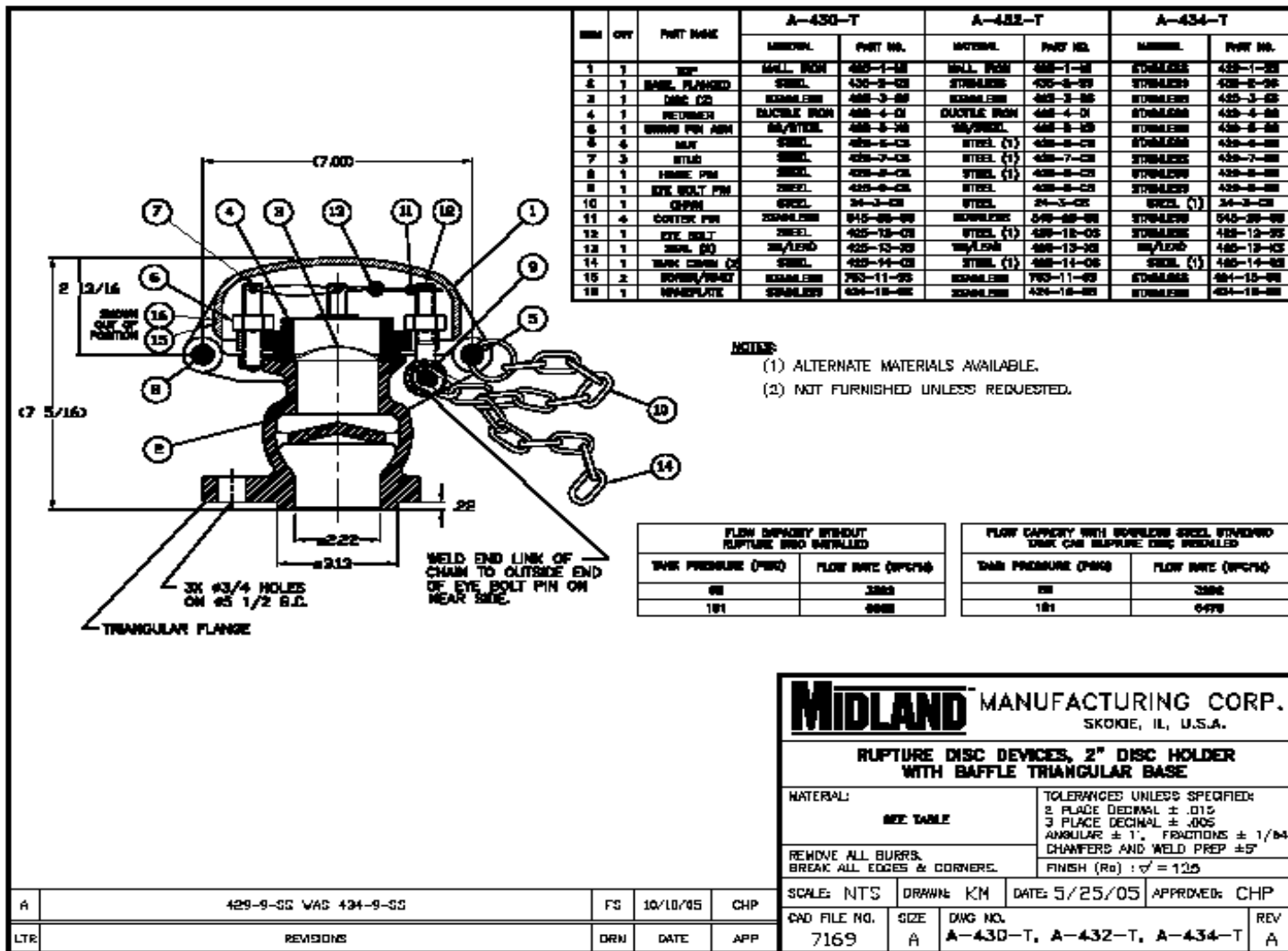
Alternate Screen

Filter & cap designed to prevent ingress of debris into the valve

Stem is guided at 2 points for stability.

## Rupture Disc Holders





**MIDLAND** MANUFACTURING CORP.  
SKOKIE, ILL. U.S.A.

**RUPTURE DISC DEVICES, 2" DISC HOLDER WITH BAFFLE TRIANGULAR BASE**

**MATERIAL:** SEE TABLE

**TOLERANCES UNLESS SPECIFIED:**

- 3 PLACE DECIMAL ± .015
- 3 PLACE DECIMAL ± .005
- ANGULAR ± 1°
- FRACTIONS ± 1/64
- CHAMFERS AND WELD PREP ± 5°

REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS. FINISH (Ra) : √ = 125

SCALE: NTS	DRAWN: KM	DATE: 5/25/05	APPROVED: CHP
CAD FILE NO. 7169	SIZE A	DWG NO. A-430-T, A-432-T, A-434-T	REV A

A	425-9-02 WAS 434-9-02	FS	10/10/05	CHP
LTR	REVISIONS	DRN	DATE	APP

**MIDLAND**<sup>TM</sup>

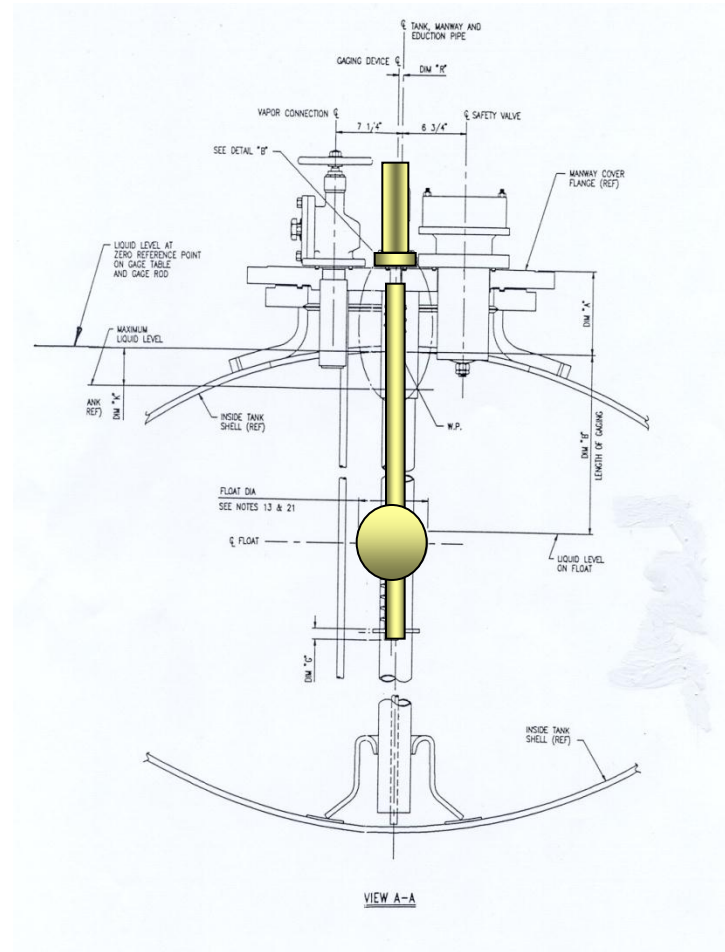
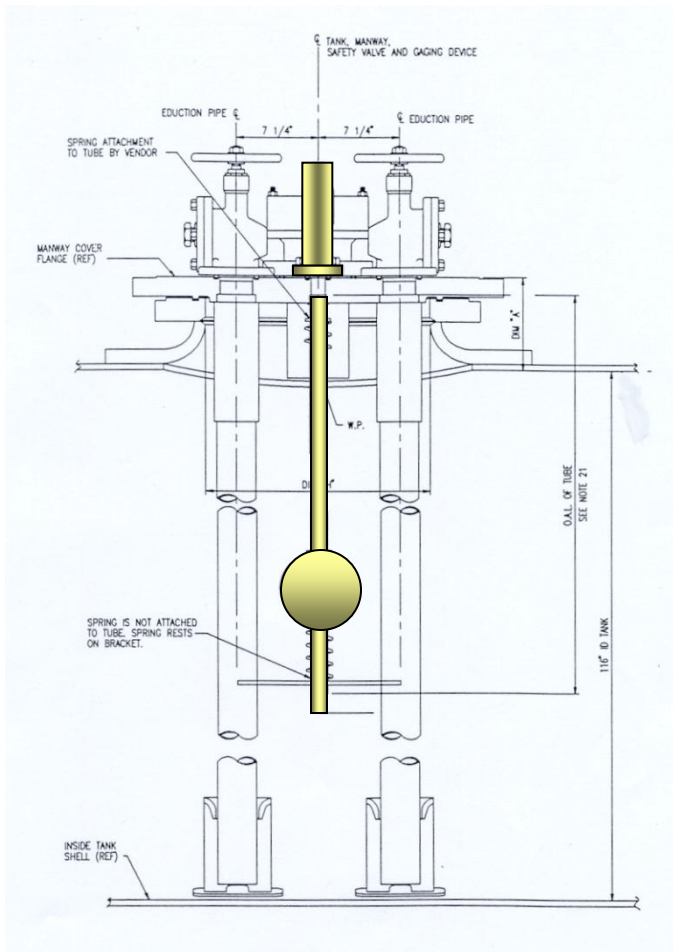
PART OF OPW FLUID TRANSFER GROUP

A **DOVER**<sup>TM</sup> COMPANY

**Gaging**



# Magnetic Gauge on a general Purpose cars.



## **B-612 Magnetic Gaging Device**

### **■ Operating Principal**

- Magnet on Rod Engages Magnet inside Float
- Float Rises and Lift Rod
- Specific Gravity Dictates Scale on Rod
- Custom for Each Car Built

### **■ Common Problems with Magnetic Gaging Devices**

- Incorrect Rod for Lading
- Broken Rod



**OUR COMMON GOAL !**