A HMT Company

ENARDO ATEX APPROVED

Model 450 and 550 Pressure/Vacuum Relief Valve (PVRV)

INSTALLATION & MAINTENANCE

ISO 9001 Certified Since 1997

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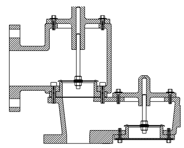
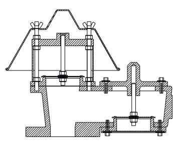
Table of Contents

Products Covered

The Model 450 and Model 550 Pressure/Vacuum Relief Valves are covered within the scope of this operating and maintenance manual.



Model 450 Pressure/Vacuum Relief Valve - Pipe Away



Model 550 Pressure/Vacuum Relief Valve - Vent to Atmosphere

Hazardous Locations

Enardo Pressure/Vacuum Relief valves are available with outer housings of carbon steel, stainless steel or aluminum, as indicated below.

II 1 G c T6	Outer housing of stainless steel, carbon steel or coated aluminium
II 2 G c T6	Outer housing of uncoated aluminium

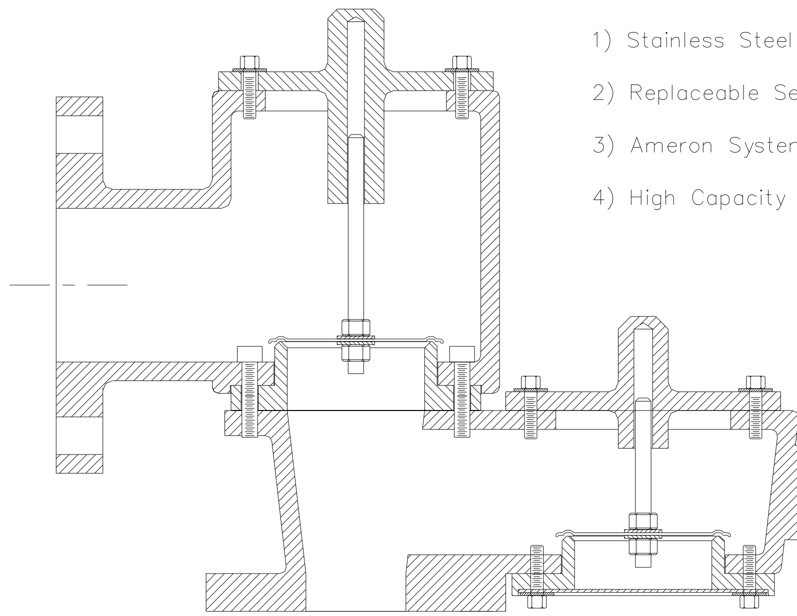
Product Identification and Marking

Nameplate

A nameplate will be attached to the valve, and will contain the following information:

- Model Number – Ex. VALVE, 450- 8X10-121
- Conn. Flange Size and Rating – Ex. 4” 150#
- Serial Number
- Tag Number (Optional)
- Notified Body Number – Ex. 0575
- Cat. No. (Category Number) – Ex. **II 1 G c T6 or II 2 G c T6**
- Year – Ex. 08
- Cert. No. (Certificate Number) – Ex. 19407
- Pressure
    - Setting – Ex. Z4.0
    - Flow Rate SCFH (Air) – Ex. 00000
- Vacuum
    - Setting – Ex. Z0.5
    - Flow Rate SCFH (Air) – Ex. 00000

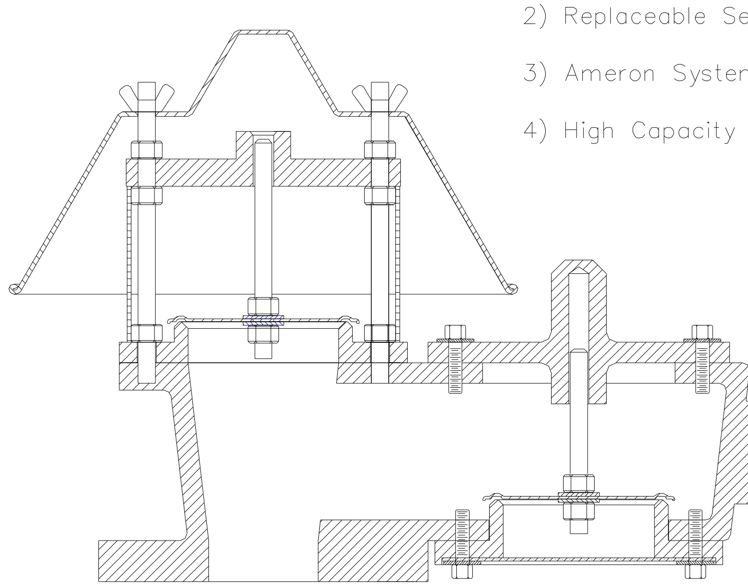
Model 450 Pipe Away



FEATURES:

1) Stainless Steel Pallet with FEP Teflon® Seal
2) Replaceable Seats
3) Ameron System 1 Coating
4) High Capacity Flow

Model 550 Vent to Atmosphere



FEATURES:

1) Stainless Steel Pallet with FEP Teflon Seal
2) Replaceable Seats
3) Ameron System 1 Coating
4) High Capacity Flow

Placing the Valve in Service

Warning: Make certain line is free of hazardous vapors before installing or servicing the valve.

1. Loosen fasteners on top of the valve and remove the lid, hood or guide.
2. Remove valve pallets from the unit. Separate the protective cardboard coverings from the pallets being careful not to damage the pallet seal surface.
3. Reinsert uncovered valve pallets back into the unit.
4. Remove any protective flange covers.
5. Reinstall pressure and/or vacuum pallet assemblies into their respective openings. Setting weights (if required) should be installed by engaging the hole in the weight on the appropriate pallet assembly stem.
   - 5.1. The weights are marked with their pressure equivalents and are shipped outside of the valve chamber. Verify that the appropriate weights are being installed to provide the specified pressure and/or vacuum setting. Refer to the nameplate data to verify the specified factory settings.
   - 5.2. To adjust valve settings higher than minimum, use the weights to increase the pressure setting. Weights are packed separately within the unit shipping package and are labeled "PRESSURE" and/or "VACUUM". If weights are shipped with the unit, they should be installed onto the pallets in the valve chamber in which they are labeled. Gently slide the weights onto the pallet stem and down on top of the valve pallet.

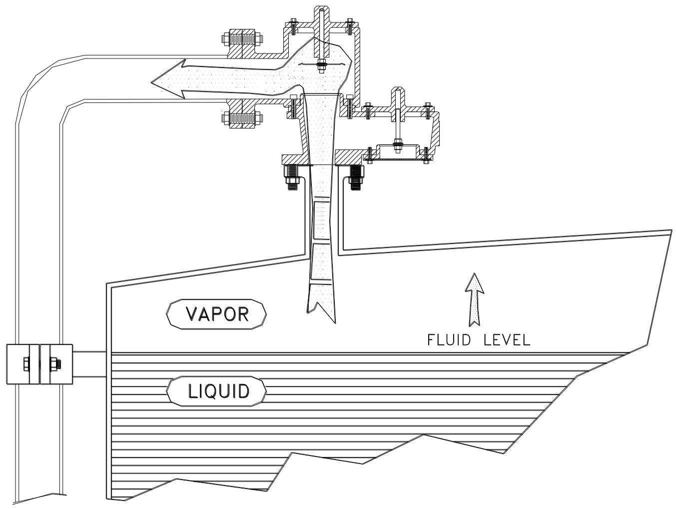
For more detail on using weights to adjust the pallet setting, read the section titled Adjustments.

6. Replace the covers and/or hood. **NOTE: Pallet should be centered inside unit. Do not force the lid down over the pallet stem. With correct installation, the lid should slip easily over the stem and the pallet should be free to move upwards, with the pallet stem traveling into the stem guide.**
7. Replace wing nuts or nuts and tighten to secure covers/hoods in position.
8. Attach the valve to the appropriate mating flange using appropriate flange gasket which is compatible with process conditions (customer provided). To insure proper function, the valve must be installed to a level surface no grater than 1° off horizontal so the pallet will move vertically. Units that are tilted during usage may suffer premature damage or wear.

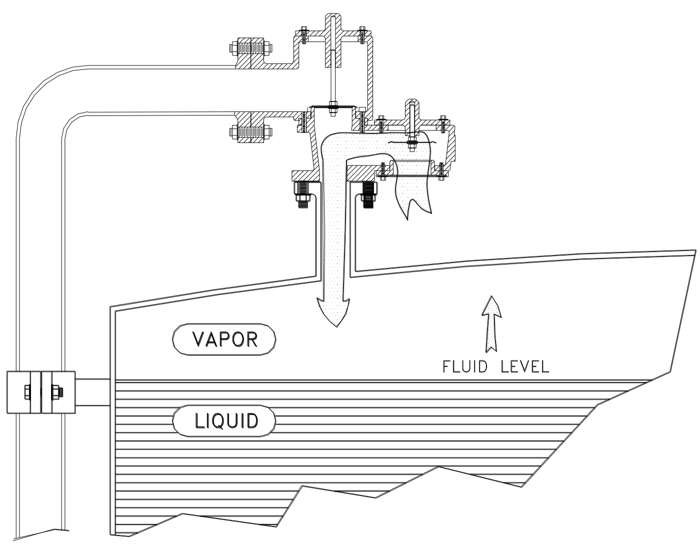
Valve Operation

The Enardo 450/550 PVRV maintains a tight seal until system pressure, or vacuum, exceeds the set pressure of the valve. Set pressure is determined by stacking a series of weights onto the valve pallet unless the pressure and vacuum set points have been specified for the minimum settings. When over-pressure occurs the weighted pallet lifts, breaking the seal between the seat and pallet. This allows vapors to pass through the valve orifice and relieve pressure buildup. The valve reseals upon relief and remains sealed.

It is important to know that relieving vapors near the set pressure in a continuous manner may cause the pallet to flutter, or oscillate, inside the valve chamber. This is common to products of this type. Operating the valve with flutter, or oscillation, may cause premature valve damage or wear over time. Enardo PVRV flow charts and sizing program results designate the "flutter zone" to assist with correct valve sizing. Contact Enardo with any questions or additional assistance.



Pressure Flow



Vacuum Flow

Adjustments

The Enardo PVRV can achieve various pressure and vacuum settings in units of ounces (oz.) or inches of water column (in.). Standard Enardo valve pallets installed alone reach minimum settings of ½ oz. or 1 in. The pallets are calibrated by the seal support located on the bottom side of the pallet. The pallet's setting of ½ oz. or 1 in. is etched into the support. When a valve requires a setting higher than the ½ oz. or 1 in. standard pallet setting, weights must be used to increase the pallet's ability to achieve the required setting.

Enardo weights also come in units of ounces (oz.) or inches of water column (in.). The individual setting of each weight is either etched or imprinted into the weight. Enardo offers several different sizes of PVRVs. To ensure that the right weight is placed on the right pallet, keep in mind that the weights and pallets that go together will have the same outside diameter. Standard Enardo weights allow the user to stack in increments of ½ oz. or ½ in.

Your Enardo PVRV shipment will include prepackaged weight kits to use to achieve the proper settings for the valve you ordered. The package labeled "PRESSURE" goes on the pallet in the pressure chamber. The package labeled "VACUUM" goes on the pallet in the vacuum chamber. All of the weights in these packages should be installed. If one or neither of these packages is included with your order, then they are not needed.

A common question is, "What if my pressure and vacuum weights get mixed together?" If this happens, the weights need to be sorted and reorganized.

When installing weights for the Enardo PVRV, find the required settings for the valve located on the tag attached to the unit. Then add weights to the pallet that will give you the required setting. For example, if you have a valve pallet that requires a setting of 6 oz., you will need to add weights totaling an additional 5-1/2 oz.; the pallet alone achieves 1/2 oz. setting. Therefore, the weights to be added must total the remaining balance of the required setting, which in this example is 5-1/2 oz.

Valve Maintenance

Warning:

Make sure line is free of hazardous vapors before installing or servicing the valve. The use of non-sparking tools is necessary if flammable vapors are present.

Observe all applicable safety requirements. Only qualified and trained personnel should perform maintenance functions in hazardous locations.

Valves should be removed from the location having a potentially explosive atmosphere and taken to a safe location for repair and maintenance.

It is possible to perform limited maintenance while the valve is installed on the tank, provided all necessary safety precautions have been taken. The sealing performance of the 450/550 Series PVRV is dependent on having a well maintained product with clean and undamaged pallet seals and seats. To access the pallets:

1. Loosen fasteners on top of the valve and remove the lid, hood or guide. The pallets and weights will then be accessible.

2. Remove any valve pallets and weights from the unit. Keep in mind that these will be reinstalled, so keep track of the chamber from which they were removed.

3. Inspect the pallets for any damage or buildup that may affect its sealing characteristics or its ability to move properly inside the valve. If necessary, gently clean the pallet and seal with a suitable solvent and nonabrasive cloth. Never fold or crease the seal. If the seal is damaged, it must be replaced.

4. Clear away any buildup that may be on the weights.

5. Inspect the valve seats installed in the unit. The sealing surfaces should be smooth and free of nicks or buildup. If necessary, gently clean the seats with a suitable solvent and nonabrasive cloth.

6. If your valve has a lid, clean any buildup that may exist in or around the guide hole located in the center of the part.

7. Clear away any blockage in the pressure or vacuum screens that may impede proper flow.

8. Reinstall valve pallets and weights into their proper chambers.

9. Reinstall weights onto their appropriate valve pallets.

10. Replace any lid, hood or guide that was previously removed and fasten securely. When tightening down lids, make sure the lid gasket has full contact with the sealing surface.

NOTE: Pallet should be centered inside unit. Do not force the lid down over the pallet stem. With correct installation, the lid should slip easily over the stem.

Valve Repair

Warning:

Make sure line is free of hazardous vapors before installing or servicing the valve.

Observe all applicable safety requirements. Only qualified and trained personnel should perform maintenance functions in hazardous locations.

All replacement parts must be provided by Enardo.

The valve should be removed from the tank before attempting any repairs beyond pallet assembly and weight maintenance as described above.

Most repairs will consist of replacing pallet seals, lid gaskets and in some cases, the body gaskets. The seats are also replaceable if the need arises. These repairs are relatively simple and can normally be handled by plant maintenance personnel using common hand tools.

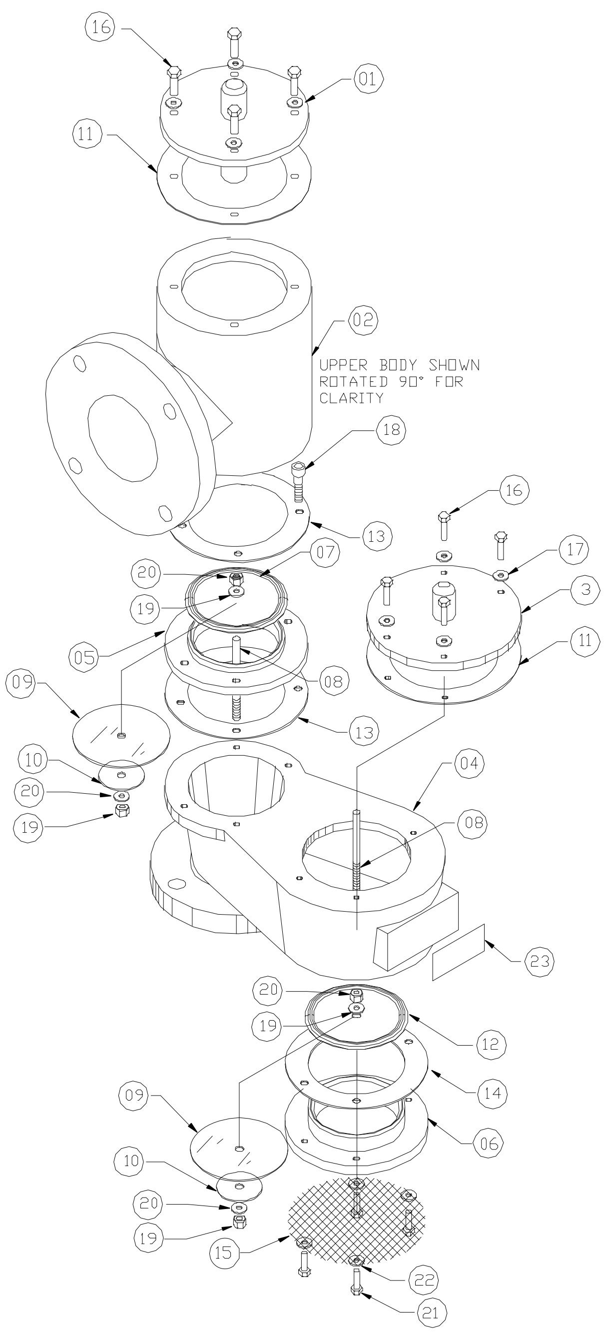
Most valve maintenance can be performed by the customer or by a valve repair facility.

These include:

Part	Replacement
Pallet Seals:	Simple replacement. Provided with gasket repair kit along with other gaskets. The pallet seals are fragile and should be handled carefully to avoid damage. They must never be folded or creased. Never use abrasive cleaners on a pallet seal.
Pallet Assemblies:	Drop-in replacement. Requires removal of lid and replacement of gasket. Again, care must be taken not to damage the seals.
Body Gaskets:	Requires disassembly. Provided with gasket repair kit.
Seats	Requires gasket to be replaced as well.
Weights	Requires removal of lid and replacement of gasket on Model 450 Pipe-Away valves. The customer must be careful to install the proper weights in the right location.

In most cases, it is not necessary to return the valves to the factory. If the valve needs to be tested and certified at a specified pressure and/or vacuum, it should be returned to the factory or else sent to a qualified valve repair facility that is capable of performing the necessary tests in accordance with API Bulletin 2521 recommendations.
Contact Enardo with any questions or additional assistance you may need for repairing your valve.

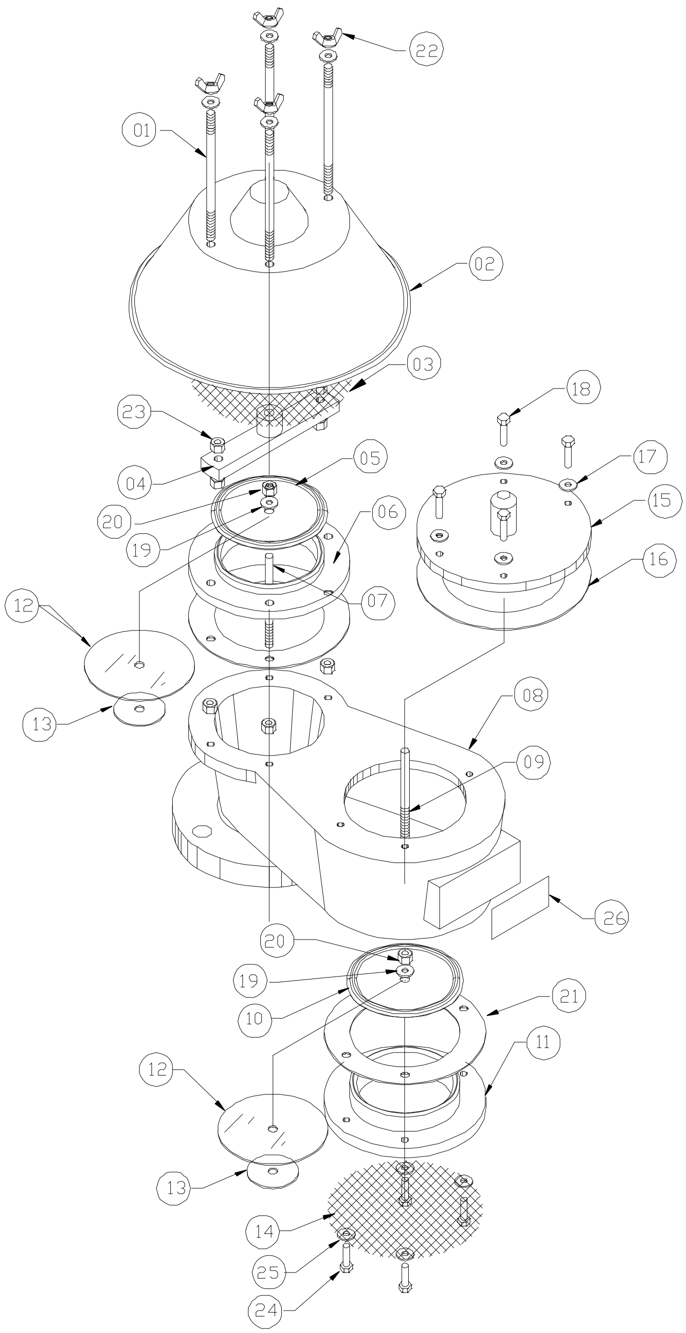
Model 450 PVRV Typical Parts List



Ref. No.	Description	Notes
01	Lid, Pressure	
02	Body, Upper	
03	Lid, Vacuum	
04	Body, Lower	
05	Seat, Pressure	1
06	Seat, Vacuum	1
07	Pallet, Pressure	1, 2
08	Stem, Pallet	1, 2
09	Seal, Pallet	1, 2, 3
10	Support, Seal	1, 2
11	Gasket, Lid (2)	1, 3
12	Pallet, Vacuum	1, 2
13	Gasket, Press. Seat (2)	1, 3
14	Gasket, Vacuum Seat	1, 3
15	Screen, Vacuum	
16	Cap Screw, Lid	
17	Washer, Flat	
18	Cap Screw	
19	Nut, Hex	2
20	Washer, Flat	2
21	Cap Screw	
22	Washer, Flat	
23	Plate, Identification	

(1) Normal replacement item
(2) Included in replacement pallet Assy.
(3) Included in gasket kit.

Model 550 Typical Parts List



Ref. No.	Description	Notes
01	Stud, Vent Assy.	
02	Hood, Vent	
03	Screen, Pressure	
04	Guide Assy., Pallet	
05	Pallet, Pressure	1, 2
06	Seat, Pressure	1
07	Stem, Pallet, Pressure	1, 2
08	Body, Lower	
09	Stem, Pallet, Vacuum	1, 2
10	Pallet, Vacuum	1, 2
11	Seat, Vacuum	1
12	Seal, Pallet	1, 2, 3
13	Support, Seal	1, 2
14	Screen, Vacuum	
15	Lid, Vacuum	
16	Gasket, Vacuum, Lid	1, 3
17	Washer, Flat	
18	Cap Screw, Lid	
19	Washer, Flat	2
20	Nut, Hex	2
21	Gasket, Vacuum Seat	1, 3
22	Nut, Wing	
23	Nut, Hex	
24	Cap Screw	
25	Washer, Flat	
26	Plate, Identification	

(1) Normal replacement item
(2) Included in replacement pallet Assy.
(3) Included in gasket kit.

Replacement Parts

Seats				
		Part Number		
Series	Description	Aluminum	Carbon Steel	Stainless Steel
450	Pressure Seat, 2”	8853743	8853722	8853701
450	Pressure Seat, 3”	8853744	8853723	8853702
450	Pressure Seat, 4”	8853745	8853724	8853703
450	Pressure Seat, 6”	8853746	8853725	8853704
450	Pressure Seat, 8”	8853747	8853726	8853705
450	Pressure Seat, 10”	8853748	8853727	8853706
450	Pressure Seat, 12”	8853749	8853728	8853707
550	Pressure Seat, 2”	8853750	8853729	8853708
550	Pressure Seat, 3”	8853751	8853730	8853709
550	Pressure Seat, 4”	8853752	8853731	8853710
550	Pressure Seat, 6”	8853753	8853732	8853711
550	Pressure Seat, 8”	8853754	8853733	8853712
550	Pressure Seat, 10”	8853755	8853734	8853713
550	Pressure Seat, 12”	8853756	8853735	8853714
450, 550	Vacuum Seat, 2”	8853757	8853736	8853715
450, 550	Vacuum Seat, 3”	8853758	8853737	8853716
450, 550	Vacuum Seat, 4”	8853759	8853738	8853717
450, 550	Vacuum Seat, 6”	8853760	8853739	8853718
450, 550	Vacuum Seat, 8”	8853761	8853740	8853719
450, 550	Vacuum Seat, 10”	8853762	8853741	8853720
450, 550	Vacuum Seat, 12”	8853763	8853742	8853721

Pallet Assemblies; 316 stainless steel with FEP (Teflon) seals			
		Part Number / Pallet Location	
Model	Valve Size, in.	Pressure	Vacuum
550	2	8850401	8850401
550	3	8850402	8850402
550	4	8850403	8850403
550	6	8850405	8850405
550	8	8850407	8850407
550	10	8850409	8850409
550	12	8850411	8850411
450	2 x 3	8850401	8850401
450	3 x 4	8850402	8850402
450	4 x 6	8850404	8850403
450	6 x 8	8850406	8850405
450	8 x 10	8850408	8850407
450	10 x 12	8850410	8850409
450	12 x 14	8850412	8850411

Gasket Sets (Includes body and lid gaskets and pallet seal)			
Model	Valve Size, in.	Part Number	Material
550	2	6105001	Compressed Fiber
550	2	6105003	Teflon®
550	3	6105004	Compressed Fiber
550	3	6105006	Teflon®
550	4	6105007	Compressed Fiber
550	4	6105009	Teflon®
550	6	6105010	Compressed Fiber
550	6	6105012	Teflon®
550	8	6105013	Compressed Fiber
550	8	6105015	Teflon®
550	10	6105016	Compressed Fiber
550	10	6105018	Teflon®
550	12	6105019	Compressed Fiber
550	12	6105021	Teflon®
450	2 x 3	6105022	Compressed Fiber
450	2 x 3	6105024	Teflon®
450	3 x 4	6105025	Compressed Fiber
450	3 x 4	6105027	Teflon®
450	4 x 6	6105028	Compressed Fiber
450	4 x 6	6105030	Teflon®
450	6 x 8	6105031	Compressed Fiber
450	6 x 8	6105033	Teflon®
450	8 x 10	6105034	Compressed Fiber
450	8 x 10	6105036	Teflon®
450	10 x 12	6105037	Compressed Fiber
450	10 x 12	6105039	Teflon®
450	12 x 14	6105040	Compressed Fiber
450	12 x 14	6105042	Teflon®

Product Warranty

Limited Warranty. Seller warrants, to the extent stated herein, all Products manufactured by it are free from original defects in workmanship or material for a period of twelve (12) months. During such 12-month warranty period, Seller at its option will repair or replace any defective Products returned to Seller's factory, transportation charges prepaid. Seller will not be responsible for, and this limited warranty shall not apply to, any failure of or damage to any Products caused by (1) abuse, misuse, neglect, improper handling or installation, or lack of proper maintenance, (2) shipping damage, (3) repair, alteration or modification made outside of Seller's factory, or (4) acts of God, accident, collision, fire, theft, vandalism, riot, explosion, lightning, windstorm, hail, flood, water or other cause other than ordinary use.

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EC Declaration of Conformity

to the ATEX Directive 94/9/EC

of the European Commission
in accordance with Standard **EN 13463-1: 2001, EN 13463-5: 2003**
This model Relief Vent is in compliance with these standards and the ATEX Directive
Based on EC-Type Examination Certificate: **DNV-2008-OSL-ATEX-19407**
For
Emergency Pressure Vacuum Relief Vent
Pressure Vacuum Relief Vent
With Quality System Audited by Notified Body **0575**:
DET NORSKE VERITAS AS
Veritasveien 1, 1322 HOVIK
Norway, www.dnvcert.com

Type Identification

450 (pipe-away), Combination pressure/vacuum relief valve (pipe-away)
550 (vent-to-atmosphere), Combination pressure/vacuum relief valve (vent to atmosphere)
850 (pipe-away), Combination pressure/vacuum relief valve (pipe-away)
950 (vent-to-atmosphere), Combination pressure/vacuum relief valve (vent to atmosphere)

CE **0575** Ex **II 1G c T6**
Ex **II 2G c T6**

Certification Date:
June 6, 2008

John Cockerham

Enardo ATEX Authorized Person

Providing Responsive Solutions with Safety and Environmental Vapor Control Products