March 2015

450 and 550 Series Pressure/Vacuum Relief Valve (ATEX Approved)

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***Figure 1**. 450 Series Pressure/Vacuum Relief Valve - Pipe-Away*

***Figure 2**. 550 Series Pressure/Vacuum Relief Valve - Vent-to-Atmosphere*

⚠ WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Enardo pressure/vacuum relief valve must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations, and Emerson Process Management Regulator Technologies Tulsa, LLC (Emerson™) instructions.

Call a qualified service person to service the unit. Installation, operation, and maintenance procedures performed by unqualified person may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the 450 and 550 Series pressure/vacuum relief valve.

Introduction

Scope of the Manual

This manual provides specifications, installation, operation and maintenance instructions and parts ordering information for the 450 and 550 Series pressure/vacuum relief valve (PVRV).

North America Only

D103811X012

Specifications

The Specifications section on this page provides specifications for the 450 and 550 Series pressure/vacuum relief valve. Specification is stamped on the nameplate attached to the relief valve. Refer to Product Identification and Marking section for the nameplate details.

Available Construction
See Figures 3 and 4

Available Sizes
2 to 12 in. / 50 to 300 mm

Pressure Setting Range[1][2][3]

450 Series:
0.5 to 12.0 oz./sq. in.
1.0 to 21.0 in. w.c.
2.0 to 50.0 mbar

550 Series:
0.5 to 12.0 oz./sq. in.
1.0 to 21.0 in. w.c.
2.0 to 50.0 mbar

Vacuum Setting Range[1][2][3]

450 Series:
0.5 to 12.0 oz./sq. in.
1.0 to 21.0 in. w.c.
2.0 to 50.0 mbar

Vacuum Setting Range[1][2][3] (continued)

550 Series:
0.5 to 12.0 oz./sq. in.
1.0 to 21.0 in. w.c.
2.0 to 50.0 mbar

Maximum Pressure/Vacuum Setting[1]
See Table 1

Housing Material
Aluminum, Carbon steel or Stainless steel

Certification
EN 13463-1: 2001
EN 13463-5: 2003

1. The pressure limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.
2. Pressure or vacuum setting has an increment of 0.5 oz./sq. in., 0.5 in. w.c. or 2.2 mbar.
3. Pressure and vacuum settings vary by size. Refer to Table 1 for details.

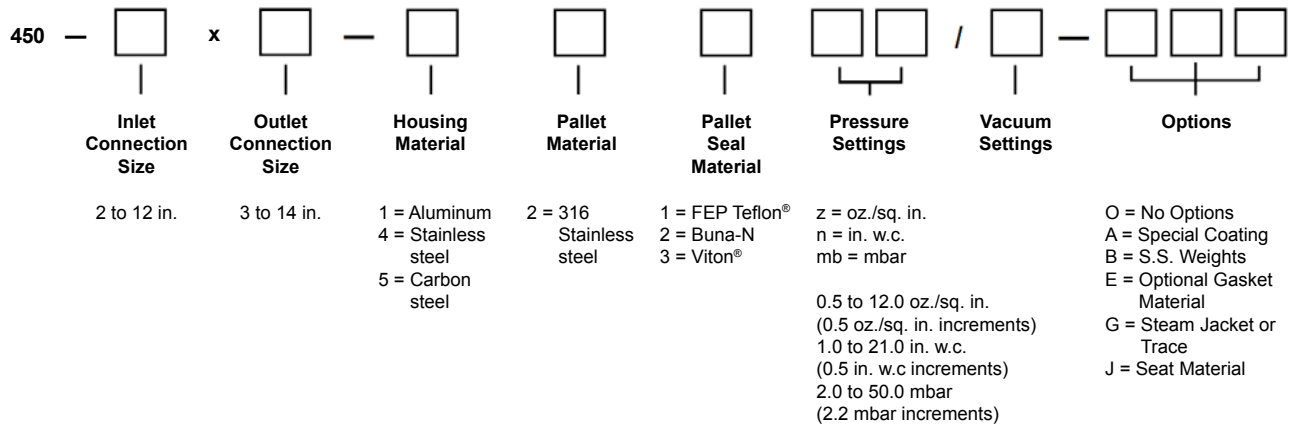

***Figure 3**. 450 Series Pressure/Vacuum Relief Valve Available Constructions and Model Numbering System*

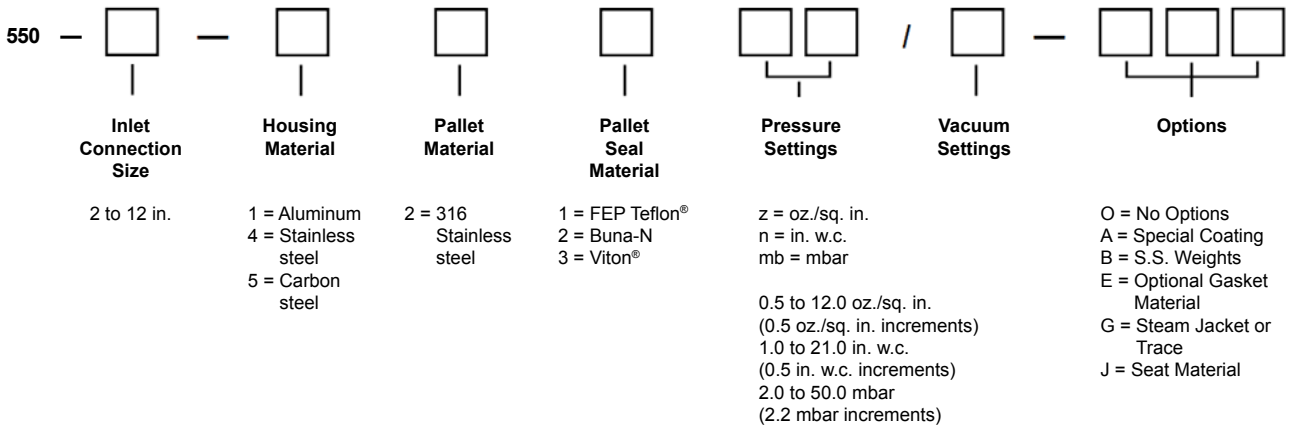

***Figure 4**. 550 Series Pressure/Vacuum Relief Valve Available Constructions and Model Numbering System*

***Figure 5**. Hazardous Locations*

Product Description

The 450 and 550 Series pressure/vacuum relief valves provide protection against positive or vacuum overpressure and prevent air intake and evaporative losses of product while helping to contain odorous and potentially explosive vapors. The 450 Series is used for routine service in pipe-away applications while the 550 Series is used for vent-to-atmosphere application.

Features

- Stainless steel pallet with FEP Teflon® Seal
- Replaceable Seats
- Ameron System 1 Coating
- High Capacity Flow

Product Identification and Marking

Hazardous Locations

Enardo pressure/vacuum relief valves are available with outer housings of carbon steel, stainless steel or aluminum, as indicated in Figure 5.

Nameplate

A nameplate is attached to the valve and contains 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

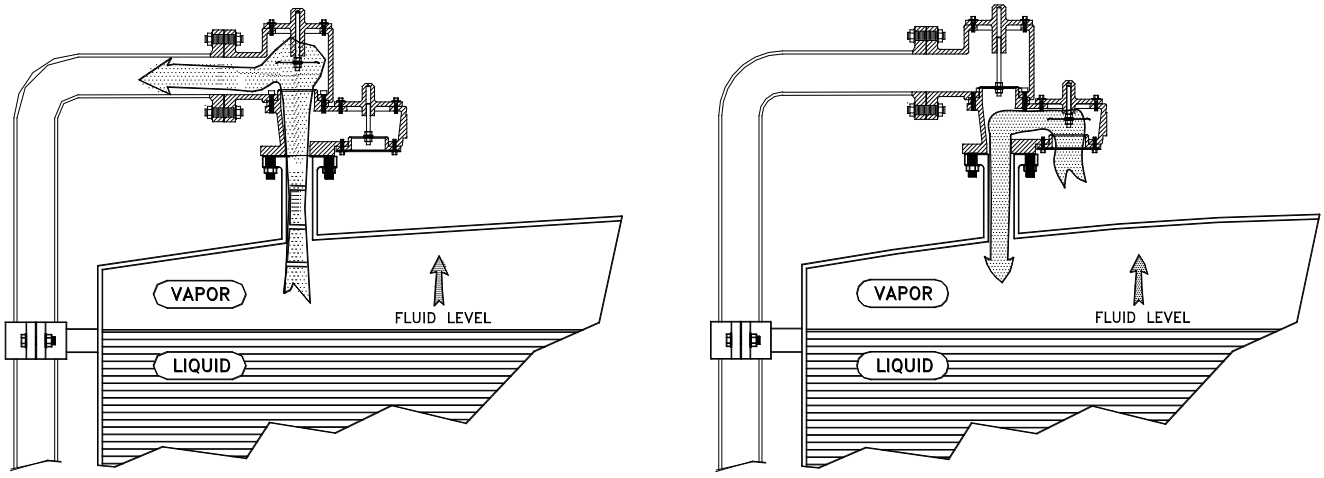

***Figure 6**. 450/550 Series Pressure/Vacuum Relief Valve Operational Schematics*

Principle of Operation

The 450 and 550 Series pressure/vacuum relief valves maintain 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 overpressure 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.

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 pressure/vacuum relief valve flow charts and sizing program results designate the “flutter zone” to assist with correct valve sizing. Contact your local Sales Office with any questions or additional assistance.

Installation

⚠ WARNING

Ensure 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. Carefully separate the protective cardboard coverings from the pallets to avoid damage on 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. Install the setting weights (if required) by engaging the hole in the weight on the appropriate pallet assembly stem.

Table 1. *450 and 550 Series Maximum Pressure/Vacuum Setting*

MODEL	PRESSURE SETTING		VACUUM SETTING	
	In. w.c.	oz./sq. in.	In. w.c.	oz./sq. in.
450-02	21.0	12.0	16.0	9.0
450-03	21.0	12.0	18.0	10.0
450-04	21.0	12.0	21.0	12.0
450-06	21.0	12.0	21.0	12.0
450-08	21.0	12.0	21.0	12.0
450-10	21.0	12.0	21.0	12.0
450-12	21.0	12.0	19.0	11.0
550-02	19.0	10.5	16.0	9.0
550-03	21.0	12.0	18.0	10.0
550-04	17.5	10.0	21.0	12.0
550-06	17.5	10.0	21.0	12.0
550-08	19.0	10.5	21.0	12.0
550-10	16.0	9.0	21.0	12.0
550-12	21.0	12.0	19.0	11.0

a. 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.

b. 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 labelled “PRESSURE” and/or “VACUUM”. If weights are shipped with the unit, install the weights onto the pallets in the valve chamber in which they are labelled. Gently slide the weights onto the pallet stem and down on top of the valve pallet.

Refer to Adjustments section for more details on using weights to adjust the pallet setting.

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 travelling 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 ensure proper function, install the valve to a level surface, not greater than 1° off horizontal so the pallet moves vertically. Valves that are tilted during usage may suffer premature damage or wear.

Adjustments

The 450 and 550 Series pressure/vacuum relief valves have wide range of pressure and vacuum settings in units of oz./sq. in. or in. w.c. Standard Enardo valve pallets installed alone has minimum settings of 1/2 oz./sq.in or 1 in. w.c. The pallets are calibrated by the seal support located on the bottom side of the pallet. The pallet's setting of 1/2 oz./sq.in or 1 in. w.c. is etched into the support. When a valve requires a setting higher than the 1/2 oz./sq. in. or 1 in. w.c. standard pallet setting, use weights to increase the pallet's setting up to the required setting.

Enardo weights also come in oz./sq. in. or in. w.c. The individual setting of each weight is either etched or imprinted into the weight. Emerson™ offers several different sizes of pressure/vacuum relief valve. To ensure that the right weight is placed on the right pallet, take note that the weights and pallets that go together have the same outside diameter. Standard Enardo weights allow the user to stack in increments of 1/2 oz./sq. in. or 1/2 in. w.c.

Pressure/vacuum relief valve is shipped with prepackaged weight kits to set the valve pressure properly. The package labelled "PRESSURE" is for the pallet in the pressure chamber, while the package labelled "VACUUM" is for the pallet in the vacuum chamber. All weights in these packages should be installed. If one or neither of these packages is included with your order, then they are not needed.

If the pressure and vacuum weights are mixed together, sort and reorganize the weights.

When installing weights in the relief valve, check the required setting on the tag attached to the relief valve. Add weights to the pallet to achieve the required setting. If the relief valve's setting is 6 oz./sq. in., add weights with the total setting of 5-1/2 oz./sq. in. to the valve since the pallet's setting alone is 1/2 oz./sq. in. Hence, the valve pressure setting is the sum of the settings of the pallet and the weights.

Relief Valve Maintenance

⚠ WARNING

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

Observe all applicable safety requirements. Only qualified and trained personnel shall maintain the valve 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.

Limited maintenance of the relief valve installed on the tank is possible, provided that all necessary safety precautions have been taken. To have the optimum sealing performance of the 450 and 550 Series, maintain the valve and use clean and undamaged pallet seals and seats. To access the pallets:

1. Loosen the fasteners on top of the valve and remove the lid, hood or guide.
2. Remove any valve pallets and weights from the unit. Take note of the proper chamber of the pallets and weights.
3. Inspect the pallets for any damage and/or buildup. Damaged pallets could not seal and move inside the valve properly. 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, replace it.
4. Remove any buildup on the weights.
5. Inspect the valve seats. 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 lid is available on the valve, clean any buildup in or around the guide hole located in the center of the part.
7. Remove any blockage in the pressure or vacuum screens that may impede proper flow of fluid.

Table 2. *450 and 550 Series Parts Repair*

PART	REPLACEMENT
Pallet Seals	Simple replacement. Provided with gasket repair kit along with other gaskets. The pallet seals are fragile, handle the seals carefully to avoid damage. Never fold or crease the pallet seal. Never use abrasive cleaners on a pallet seal.
Pallet Assemblies	Drop-in replacement. Requires removal of lid and replacement of gasket. Be careful not to damage the seals.
Body Gaskets	Requires disassembly. Provided with gasket repair kit**.**
Seats	Requires gasket to be replaced as we**ll.**
Weights	Requires removal of lid and replacement of gasket on 450 Series valves. Ensure that the proper weights are installed in the right location.

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 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 the unit. Do not force the lid down over the pallet stem. With correct installation, the lid should slip easily over the stem.

Relief 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 shall perform maintenance functions in hazardous locations.

All replacement parts must be provided by Emerson™.

Remove the relief valve from the tank before attempting any repairs beyond pallet assembly and weight maintenance as described on the Relief Valve Maintenance section.

Most repairs consist of replacing pallet seals, lid gaskets and in some cases, the body gaskets. The seats are also replaceable if necessary. 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. See Table 2 for the proper maintenance of the relief valve parts.

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, return it to the factory or send it to a qualified valve repair facility that is capable of performing the necessary tests in accordance with API Bulletin 2521 recommendations.

Contact your local Sales Office with any questions or additional assistance needed for repairing the relief valve.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment serial number stamped on the nameplate.

When ordering replacement parts, specify the complete 7-character part number of each required part as found in the following parts list.

Parts List

450 Series

Key	Description
1	Lid, Pressure
2	Body, Upper
3	Lid, Vacuum
4	Body, Lower
5	Seat, Pressure[1]
6	Seat, Vacuum[1]
7	Pallet, Pressure[1][2]
8	Stem, Pallet[1][2]
9	Seal, Pallet[1][2][3]
10	Support, Seal[1][2]
11	Gasket, Lid (2 required)[1][3]
12	Pallet, Vacuum[1][2]
13	Gasket, Pressure Seat (2 required)[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

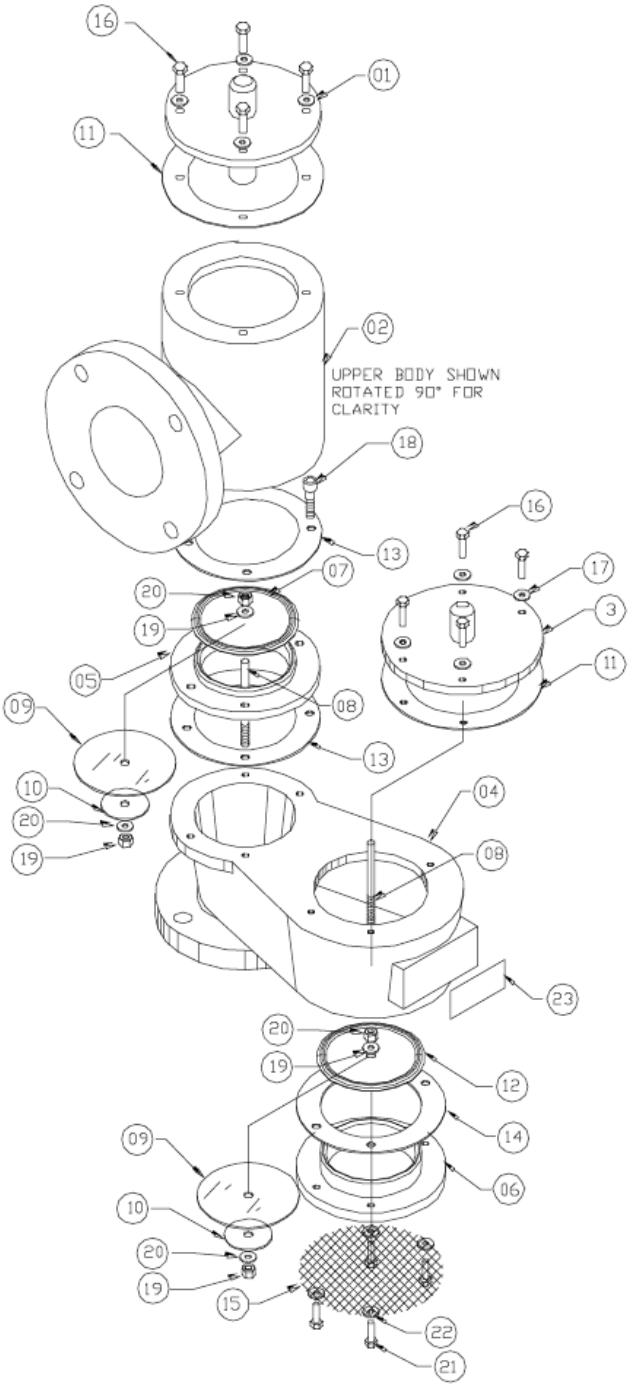

***Figure 7**. 450 Series Pressure/Vacuum Relief Valve Assembly*

1. Normal replacement item
2. Included in replacement pallet assembly
3. Included in gasket kit

550 Series

Key	Description
1	Stud, Vent Assembly
2	Hood, Vent
3	Screen, Pressure
4	Guide Assembly, Pallet
5	Pallet, Pressure[1][2]
6	Seat, Pressure[1]
7	Stem, Pallet, Pressure[1][2]
8	Body, Lower
9	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

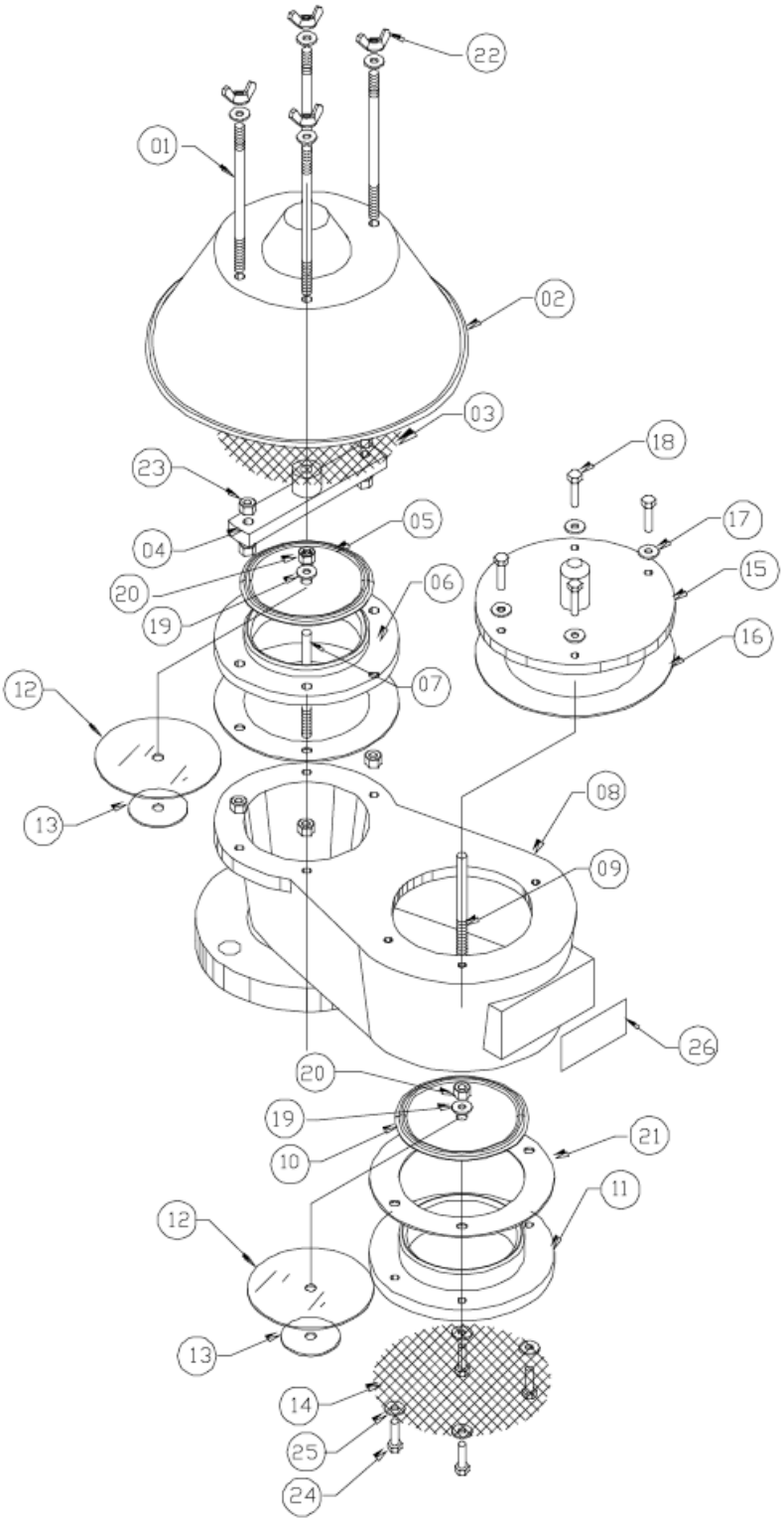

***Figure 8**. 550 Series Pressure/Vacuum Relief Valve Assembly*

1. Normal replacement item
2. Included in replacement pallet assembly
3. Included in gasket kit

***Table 3**. 450 and 550 Series Pressure Relief Valve Seats Part Number*

SERIES	DESCRIPTION	PART NUMBER		
		Aluminum	Carbon Steel	Stainless Steel
450	2 in.	8853743	8853722	8853701
	3 in.	8853744	8853723	8853702
	4 in.	8853745	8853724	8853703
	6 in.	8853746	8853725	8853704
	8 in.	8853747	8853726	8853705
	10 in.	8853748	8853727	8853706
	12 in.	8853749	8853728	8853707
550	2 in.	8853750	8853729	8853708
	3 in.	8853751	8853730	8853709
	4 in.	8853752	8853731	8853710
	6 in.	8853753	8853732	8853711
	8 in.	8853754	8853733	8853712
	10 in.	8853755	8853734	8853713
	12 in.	8853756	8853735	8853714

***Table 4**. 450 and 550 Series Vacuum Relief Valve Seats Part Number*

SERIES	DESCRIPTION	PART NUMBER		
		Aluminum	Carbon Steel	Stainless Steel
450 and 550	2 in.	8853757	8853736	8853715
	3 in.	8853758	8853737	8853716
	4 in.	8853759	8853738	8853717
	6 in.	8853760	8853739	8853718
	8 in.	8853761	8853740	8853719
	10 in.	8853762	8853741	8853720
	12 in.	8853763	8853742	8853721

***Table 5**. 450 and 550 Series Pallet Assembly[1] Part Number*

MODEL	VALVE SIZE		PART NUMBER	
	In.	mm	Pressure (Pallet Location)	Vacuum (Pallet Location)
450	2 x 3	51 x 76	8850401	8850401
	3 x 4	76 x 102	8850402	8850402
	4 x 6	102 x 152	8850404	8850403
	6 x 8	152 x 203	8850406	8850405
	8 x 10	203 x 254	8850408	8850407
	10 x 12	254 x 305	8850410	8850409
	12 x 14	305 x 356	8850412	8850411
550	2	51	8850401	8850401
	3	76	8850402	8850402
	4	102	8850403	8850403
	6	152	8850405	8850405
	8	203	8850407	8850407
	10	254	8850409	8850409
	12	305	8850411	8850411

1. Pallet assemblies with 316 Stainless steel with FEP (Teflon®) seals.

Teflon® is a mark owned by E. I. du Pont de Nemours and Company.

Table 6. *450 and 550 Series Gasket Sets[1] Part Number*

MODEL	VALVE SIZE		MATERIAL	PART NUMBER
	In.	mm		
450	2 x 3	51 x 76	Compressed Fiber	6105022
			Teflon®	6105024
	3 x 4	76 x 102	Compressed Fiber	6105025
			Teflon®	6105027
	4 x 6	102 x 152	Compressed Fiber	6105028
			Teflon®	6105030
	6 x 8	152 x 203	Compressed Fiber	6105031
			Teflon®	6105033
	8 x 10	203 x 254	Compressed Fiber	6105034
			Teflon®	6105036
	10 x 12	254 x 305	Compressed Fiber	6105037
			Teflon®	6105039
	12 x 14	305 x 356	Compressed Fiber	6105040
			Teflon®	6105042
550	2	51	Compressed Fiber	6105001
			Teflon®	6105003
	3	76	Compressed Fiber	6105004
			Teflon®	6105006
	4	102	Compressed Fiber	6105007
			Teflon®	6105009
	6	152	Compressed Fiber	6105010
			Teflon®	6105012
	8	203	Compressed Fiber	6105013
			Teflon®	6105015
	10	254	Compressed Fiber	6105016
			Teflon®	6105018
	12	305	Compressed Fiber	6105019
			Teflon®	6105021

1. Gasket sets include body and lid gaskets and pallet seal.

North America Only

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