

January 2022

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

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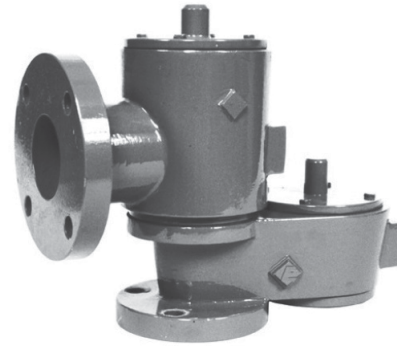


Figure 1. 450 Series Pressure/Vacuum Relief Valve - Pipe-Away

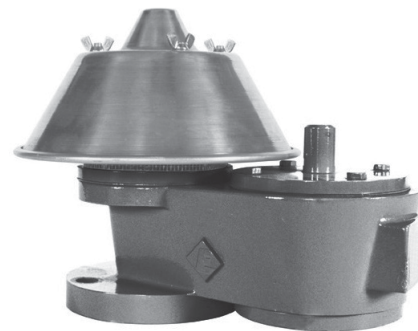


Figure 2. 550 Series Pressure/Vacuum Relief Valve - Vent-to-Atmosphere



### 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

# 450 and 550 Series

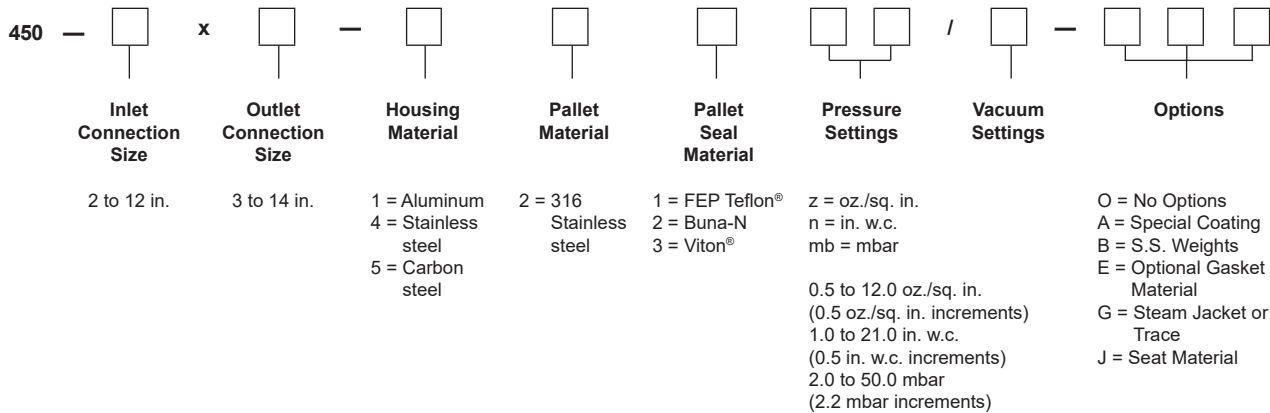
## Specifications

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.

<p><b>Available Construction</b> See Figures 3 and 4</p> <p><b>Available Sizes</b> 2 to 12 in. / 50 to 300 mm</p> <p><b>Pressure Setting Range<sup>(1)(2)(3)</sup></b></p> <p><b>450 Series:</b> 0.5 to 12.0 oz./sq. in. 1.0 to 21.0 in. w.c. 2.0 to 50.0 mbar</p> <p><b>550 Series:</b> 0.5 to 12.0 oz./sq. in. 1.0 to 21.0 in. w.c. 2.0 to 50.0 mbar</p> <p><b>Vacuum Setting Range<sup>(1)(2)(3)</sup></b></p> <p><b>450 Series:</b> 0.5 to 12.0 oz./sq. in. 1.0 to 21.0 in. w.c. 2.0 to 50.0 mbar</p>	<p><b>Vacuum Setting Range<sup>(1)(2)(3)</sup> (continued)</b></p> <p><b>550 Series:</b> 0.5 to 12.0 oz./sq. in. 1.0 to 21.0 in. w.c. 2.0 to 50.0 mbar</p> <p><b>Maximum Pressure/Vacuum Setting<sup>(1)</sup></b> See Table 1</p> <p><b>Housing Material</b> Aluminum, Carbon steel or Stainless steel</p> <p><b>Certification</b> EN IEC 60079-0:2018 EN IEC 60079-11:2012 EN ISO 80079-36:2016 EN ISO 80079-37:2016</p>
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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.

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

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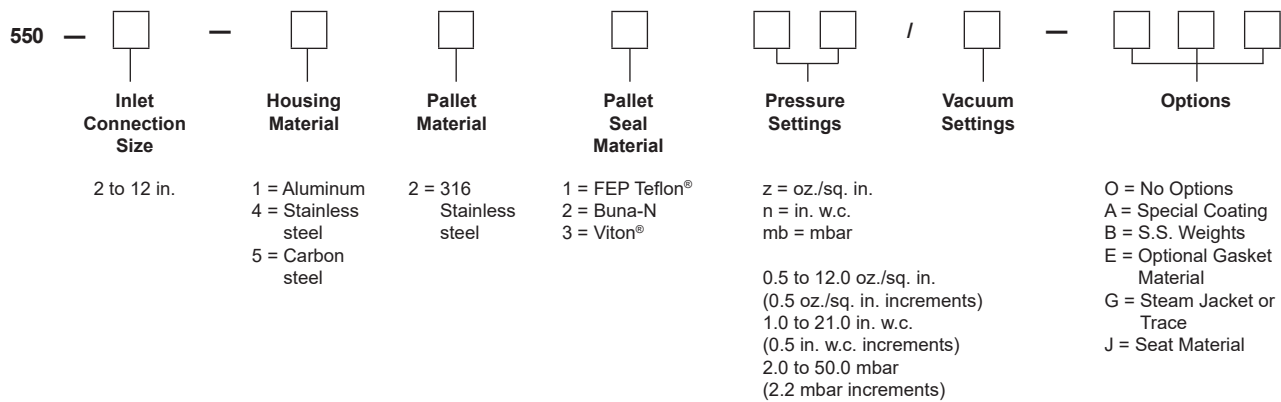


Figure 4. 550 Series Pressure/Vacuum Relief Valve Available Constructions and Model Numbering System



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. 550-4-521
- **Size** – Ex. 4 in.
- **Serial Number**
- **Tag Number (Optional)**
- **Notified Body Number** – Ex. 2460
- **Cat. No. (Category Number)**
  - Category 1 – Stainless steel, Carbon steel or Coated aluminum vents
  - Category 2 – Uncoated aluminum vents
- **Date** – Date of Manufacture
- **Certificate** – Ex. PRESAFE 17 ATEX 10273X
- **Pressure Setting and Flow Rate**
  - Setting – Ex. Z4.0
  - Flow Rate SCFH (Air) – Ex. 00000
- **Vacuum Setting and Flow Rate**
  - Setting – Ex. Z0.5
  - Flow Rate SCFH (Air) – Ex. 00000

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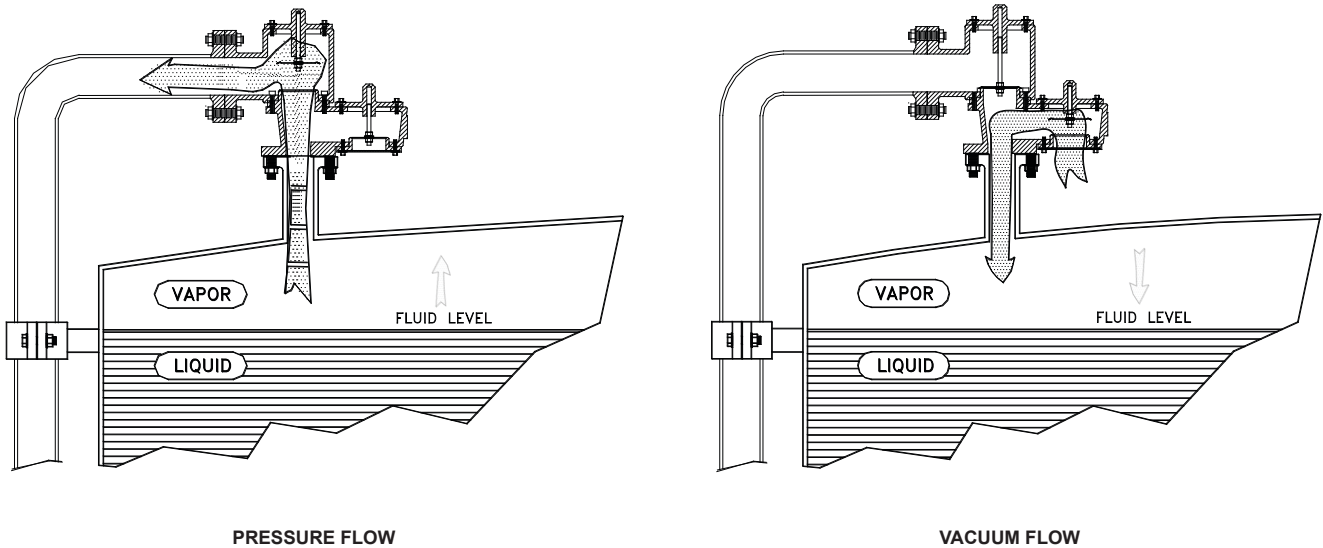


Figure 6. 450/550 Series Pressure/Vacuum Relief Valve Operational Schematics

## 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

**Wear protective gloves and clothing to prevent skin contact when handling lead weights. Wear eye protection. Avoid breathing dust/fumes/mist/vapors/spray. Do not eat, drink or smoke while using the product. Avoid release to the environment. Wash hands with soap and water after handling. Keep away from excessive heat and open flames.**

### 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.

**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

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.
  - 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.

For proper bolt torquing of the valve connecting flange to the piping, please refer to Tables 2 to 4.

# 450 and 550 Series

**Table 2. Torque Specifications - Raised Face Flange, Steel only**

NOMINAL PIPE DIAMETER	NUMBER OF BOLTS	BOLT DIAMETER		TORQUE	
		In.	mm	ft-lbs	N•m
2	4	0.63	16.0	35	47.5
3	4	0.63	16.0	60	81.3
4	8	0.63	16.0	43	58.3
6	8	0.75	19.1	80	108
8	8	0.75	19.1	109	148
10	12	0.88	22.4	101	137
12	12	0.88	22.4	135	183
14	12	1.00	25.4	168	228

Assumptions:  
 Use of SAE Grade 5 bolts or studs or stronger  
 No lubricant  
 Compressed mineral fiber material or similar

Notes:  
 If lubricant is used on bolts, apply Torque Reduction Factor listed in Lubricant Table.  
 For best results, hardened steel washers should be used on all cast flange bolted connections.

**Table 3. Torque Specifications - Flat Face Flange, Steel or Aluminum**

NOMINAL PIPE DIAMETER	NUMBER OF BOLTS	BOLT DIAMETER		TORQUE	
		In.	mm	ft-lbs	N•m
2	4	0.63	16.0	32	43.4
3	4	0.63	16.0	47	64.7
4	8	0.63	16.0	32	43.4
6	8	0.75	19.1	49	66.4
8	8	0.75	19.1	68	92.2
10	12	0.88	22.4	69	93.6
12	12	0.88	22.4	98	133
14	12	1.00	25.4	138	187

Assumptions:  
 Use of SAE Grade 5 bolts or studs or stronger  
 No lubricant  
 Elastomer <70 Durometer Shore A

Notes:  
 Flat faced flanges should never be mated to a raised face flange for installation.  
 If lubricant is used on bolts, apply Torque Reduction Factor listed in Lubricant Table.  
 For best results, hardened steel washers should be used on all cast flange bolted connections.

**Table 4. Torque Reduction Factor per Lubricant**

DESCRIPTION	COEFFICIENT OF FRICTION	MULTIPLY TORQUE VALUE IN TABLE BY:
Machine Oil	f = 0.15	0.75
API SA2 Grease	f = 0.12	0.60
Nickel-based Lubricant	f = 0.11	0.55
Copper-based Lubricant	f = 0.10	0.50
Heavy-duty Lubricating Paste	f = 0.06	0.30

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## 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



**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.



# 450 and 550 Series

**Table 5. 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 well.
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 5 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 <sup>(1)</sup>
6	Seat, Vacuum <sup>(1)</sup>
7	Pallet, Pressure <sup>(1)(2)</sup>
8	Stem, Pallet <sup>(1)(2)</sup>
9	Seal, Pallet <sup>(1)(2)(3)</sup>
10	Support, Seal <sup>(1)(2)</sup>
11	Gasket, Lid (2 required) <sup>(1)(3)</sup>
12	Pallet, Vacuum <sup>(1)(2)</sup>
13	Gasket, Pressure Seat (2 required) <sup>(1)(3)</sup>
14	Gasket, Vacuum Seat <sup>(1)(3)</sup>
15	Screen, Vacuum
16	Cap Screw, Lid
17	Washer, Flat
18	Cap Screw
19	Nut, Hex <sup>(2)</sup>
20	Washer, Flat <sup>(2)</sup>
21	Cap Screw
22	Washer, Flat
23	Plate, Identification

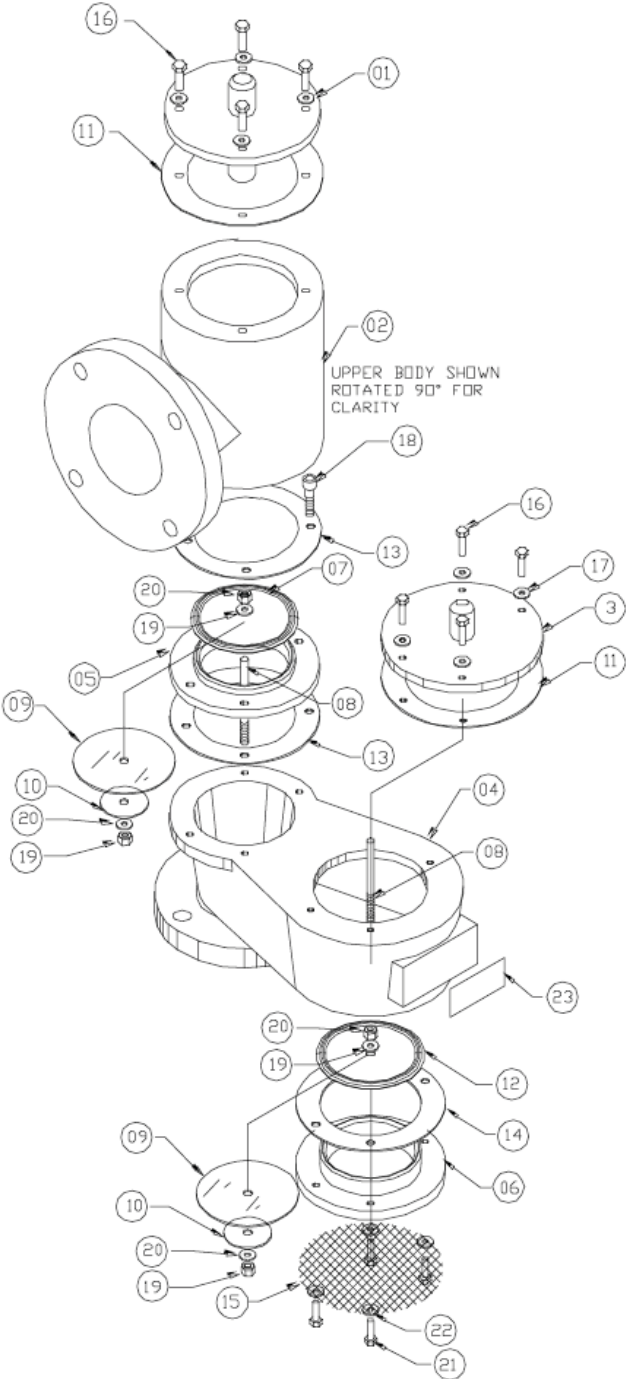


Figure 7. 450 Series Pressure/Vacuum Relief Valve Assembly

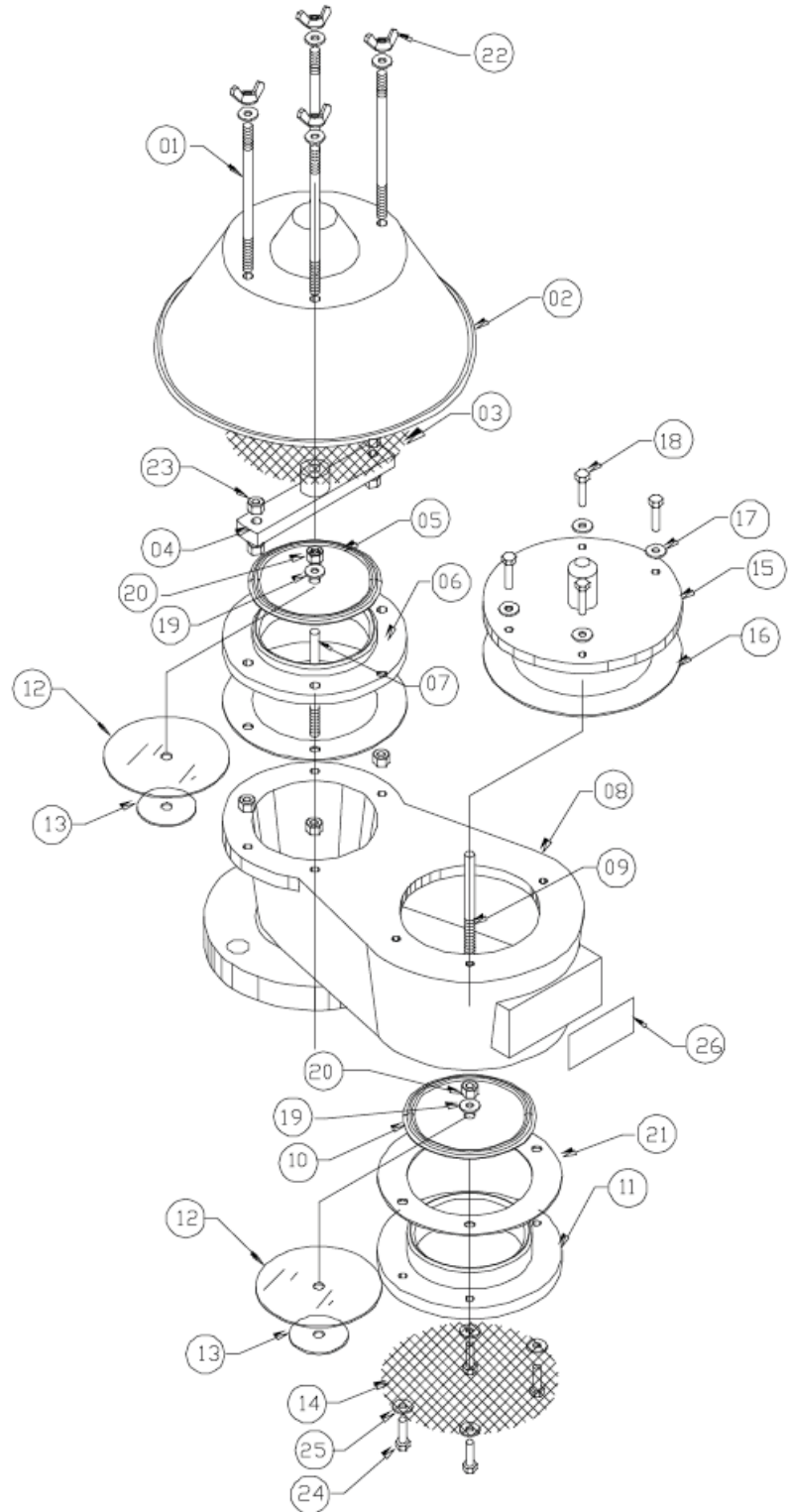
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1. Normal replacement item  
 2. Included in replacement pallet assembly  
 3. Included in gasket kit

# 450 and 550 Series

## 550 Series

Key	Description
1	Stud, Vent Assembly
2	Hood, Vent
3	Screen, Pressure
4	Guide Assembly, Pallet
5	Pallet, Pressure <sup>(1)(2)</sup>
6	Seat, Pressure <sup>(1)</sup>
7	Stem, Pallet, Pressure <sup>(1)(2)</sup>
8	Body, Lower
9	Stem, Pallet, Vacuum <sup>(1)(2)</sup>
10	Pallet, Vacuum <sup>(1)(2)</sup>
11	Seat, Vacuum <sup>(1)</sup>
12	Seal, Pallet <sup>(1)(2)(3)</sup>
13	Support, Seal <sup>(1)(2)</sup>
14	Screen, Vacuum
15	Lid, Vacuum
16	Gasket, Vacuum, Lid <sup>(1)(3)</sup>
17	Washer, Flat
18	Cap Screw, Lid
19	Washer, Flat <sup>(2)</sup>
20	Nut, Hex <sup>(2)</sup>
21	Gasket, Vacuum Seat <sup>(1)(3)</sup>
22	Nut, Wing
23	Nut, Hex
24	Cap Screw
25	Washer, Flat
26	Plate, Identification



North America Only

**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 6. 450 and 550 Series Pressure Relief Valve Seats Part Number**

SERIES	DESCRIPTION	PART NUMBER		
		Aluminum	Carbon Steel	Stainless Steel
450	2 in.	NE8853743A0	NE8853722A0	NE8853701A0
	3 in.	NE8853744A0	NE8853723A0	NE8853702A0
	4 in.	NE8853745A0	NE8853724A0	NE8853703A0
	6 in.	NE8853746A0	NE8853725A0	NE8853704A0
	8 in.	NE8853747A0	NE8853726A0	NE8853705A0
	10 in.	NE8853748A0	NE8853727A0	NE8853706A0
	12 in.	NE8853749A0	NE8853728A0	NE8853707A0
550	2 in.	NE8853750A0	NE8853729A0	NE8853708A0
	3 in.	NE8853751A0	NE8853730A0	NE8853709A0
	4 in.	NE8853752A0	NE8853731A0	NE8853710A0
	6 in.	NE8853753A0	NE8853732A0	NE8853711A0
	8 in.	NE8853754A0	NE8853733A0	NE8853712A0
	10 in.	NE8853755A0	NE8853734A0	NE8853713A0
	12 in.	NE8853756A0	NE8853735A0	NE8853714A0

**Table 7. 450 and 550 Series Vacuum Relief Valve Seats Part Number**

SERIES	DESCRIPTION	PART NUMBER		
		Aluminum	Carbon Steel	Stainless Steel
450 and 550	2 in.	NE8853757A0	NE8853736A0	NE8853715A0
	3 in.	NE8853758A0	NE8853737A0	NE8853716A0
	4 in.	NE8853759A0	NE8853738A0	NE8853717A0
	6 in.	NE8853760A0	NE8853739A0	NE8853718A0
	8 in.	NE8853761A0	NE8853740A0	NE8853719A0
	10 in.	NE8853762A0	NE8853741A0	NE8853720A0
	12 in.	NE8853763A0	NE8853742A0	NE8853721A0

**Table 8. 450 and 550 Series Pallet Assembly<sup>(1)</sup> Part Number**

MODEL	VALVE SIZE		PART NUMBER	
	In.	mm	Pressure (Pallet Location)	Vacuum (Pallet Location)
450	2 x 3	51 x 76	NE8850401A0	NE8850401A0
	3 x 4	76 x 102	NE8850402A0	NE8850402A0
	4 x 6	102 x 152	NE8850404A0	NE8850403A0
	6 x 8	152 x 203	NE8850406A0	NE8850405A0
	8 x 10	203 x 254	NE8850408A0	NE8850407A0
	10 x 12	254 x 305	NE8850410A0	NE8850409A0
	12 x 14	305 x 356	NE8850412A0	NE8850411A0
550	2	51	NE8850401A0	NE8850401A0
	3	76	NE8850402A0	NE8850402A0
	4	102	NE8850403A0	NE8850403A0
	6	152	NE8850405A0	NE8850405A0
	8	203	NE8850407A0	NE8850407A0
	10	254	NE8850409A0	NE8850409A0
	12	305	NE8850411A0	NE8850411A0

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

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# 450 and 550 Series

**Table 9. 450 and 550 Series Gasket Sets<sup>(1)</sup> Part Number**

MODEL	VALVE SIZE		MATERIAL	PART NUMBER
	In.	mm		
450	2 x 3	51 x 76	Compressed Fiber	NE6105022A0
			Teflon®	NE6105024A0
	3 x 4	76 x 102	Compressed Fiber	NE6105025A0
			Teflon®	NE6105027A0
	4 x 6	102 x 152	Compressed Fiber	NE6105028A0
			Teflon®	NE6105030A0
	6 x 8	152 x 203	Compressed Fiber	NE6105031A0
			Teflon®	NE6105033A0
	8 x 10	203 x 254	Compressed Fiber	NE6105034A0
			Teflon®	NE6105036A0
	10 x 12	254 x 305	Compressed Fiber	NE6105037A0
			Teflon®	NE6105039A0
	12 x 14	305 x 356	Compressed Fiber	NE6105040A0
			Teflon®	NE6105042A0
550	2	51	Compressed Fiber	NE6105001A0
			Teflon®	NE6105003A0
	3	76	Compressed Fiber	NE6105004A0
			Teflon®	NE6105006A0
	4	102	Compressed Fiber	NE6105007A0
			Teflon®	NE6105009A0
	6	152	Compressed Fiber	NE6105010A0
			Teflon®	NE6105012A0
	8	203	Compressed Fiber	NE6105013A0
			Teflon®	NE6105015A0
	10	254	Compressed Fiber	NE6105016A0
			Teflon®	NE6105018A0
	12	305	Compressed Fiber	NE6105019A0
			Teflon®	NE6105021A0

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

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