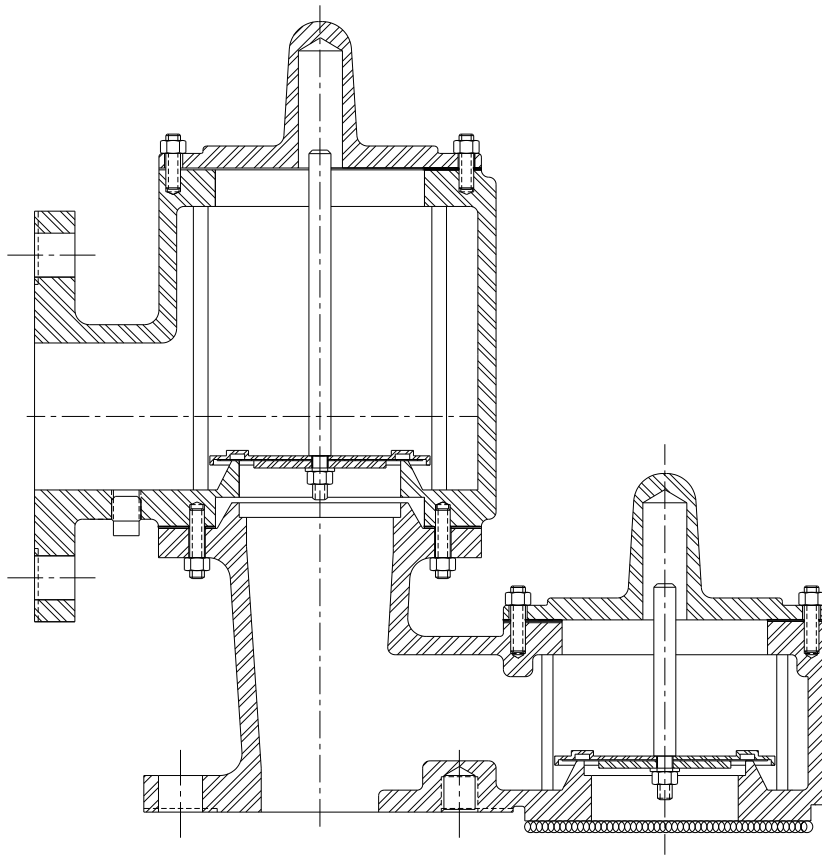

Installation, Operation and Maintenance

Models 1720A / 1760A



IOM 1700A
January 2006



IOM 1700A
REV. B 13056

TABLE OF CONTENTS:

DESCRIPTION	PAGE
Introduction	2
Valve Design & Function	3
Safety Warnings	4
Inspection and Storage	4
Installation	4 & 5
Maintenance	6 & 7
Test Procedure & Weight Blocks	8 & 9

Bill of Materials & Submittal Drawings	
Model 1720A	10
Model 1760A	11
Abbreviations	11
Model Identification	12
Product Limited Warranty	12

LIST OF FIGURES	
Fig. 1- Typical Tank Installation	3
Fig. 2- Pressure Relief - Operation	3
Fig. 3- Vacuum Relief - Operation	3
Fig. 4- Pallet Assembly Detail/ Valve Cross Section	7

LIST OF TABLES	
Table 1 - Bolt Torque (Installation)	5
Table 2 - Valve Weights (Maximum)	5
Table 3 - Stem Length (Maintenance)	6
Table 4 - Spare Parts P/N	7
Table 5 - Pallet Assembly Weights	8
Table 6 - Maximum settings	8
Table 7 - Weight Block Dimensions	9

INTRODUCTION:

Pressure and/or vacuum relief valves are used on liquid storage tanks and other process vessels or systems to prevent structural damage due to excess internal pressure or vacuum.

Storage tanks are pressurized when liquid is pumped in, compressing the existing vapor or when rising temperatures cause increased evaporation or expansion of existing vapor. Conversely, a vacuum condition may be created when pumping out or due to falling temperature. To prevent tank damage, vapor must be allowed into or out of the tank at specified pressure/vacuum conditions. The volume rate of venting depends upon the tank size, volatility of the tank contents, the

pumping rates and the temperature. Refer to API Standard 2000 for the procedures to determine venting requirements.

A relief valve must be carefully maintained by a qualified valve technician. It should only be assembled under clean conditions, preferably in a service shop environment. Carefully read and understand this manual before installing or attempting to repair a valve. Groth Corporation or a factory authorized repair center offers repair services for all products manufactured by the Tank Protection Division.


The table below shows the two different valve Models covered in this manual and indicates their Pressure (P) and/or Vacuum (V) relief capabilities.

Model	P	V	Description
1720A	✓	✓	Vent to Header
1760A	✓		Vent to Header

For a list of abbreviations used in this manual, refer to page 11. For information not contained in this manual, please contact:

Groth Corporation
13650 N. Promenade Blvd.
Stafford, Texas 77477, USA
(281) 295-6800 (Office)
(281) 295-6999 (Fax)

The nameplate below shows the basic information that is listed for each relief valve:

 GROTH CORPORATION STAFFORD TEXAS USA	MD: 1760A-03-355-TOO		
	S/N: 117405-10-1		
	TAG: PSV-440		
	FLANGE: 3" X 3" 150# RF		
SETTING	TYPE	% OP	FLOW [SCMH]
2 OSI	PRESS.	100	26,600
		30	15,694
1 OSI	VAC.	100	14,500
A CONTINENTAL DISC COMPANY			

VALVE DESIGN AND FUNCTION:

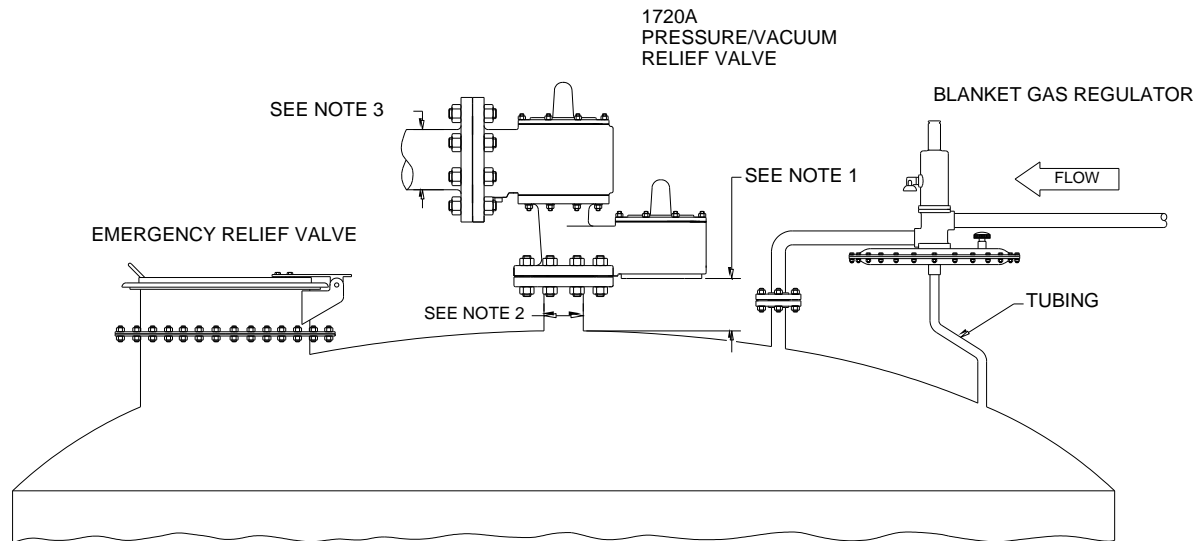


Fig. 1 - Typical Tank Installation

Tank protection equipment typically includes an operating valve which is designed to provide pressure/vacuum relief under normal pump in/out and thermal breathing conditions. An emergency relief valve can also provide both pressure and vacuum relief and normally it is sized to provide pressure relief if there is a fire in the immediate vicinity of the tank. It may also be sized by the tank designer to provide protection in the event of equipment failure (such as the rupture of a process steam line or an inert gas blanketing system failing “wide open”) or operator error.

A typical tank installation is shown in Fig. 1 which includes the following Groth products:

- Model 1720A ‘P/V’ Weight Loaded Valve
- Model 3000 Gas Blanketing Regulator
- Model 2400 Emergency ‘P’ Relief Valve

Pressure Relief: As the pressure in the storage tank increases, the vacuum pallet is held shut. When the set pressure is reached, the pressure pallet lifts and relieves to atmosphere (or to a header if it is a pipe away valve). See Fig. 2.

Vacuum Relief: As a vacuum is drawn in the storage tank (for example, when fluid is being pumped out), the pressure pallet is held shut by atmospheric pressure. When the vacuum setting is reached, the pallet lifts and air is drawn in from the atmosphere. See Fig. 3.

Installation Notes: (See Fig. 1 above)

1. Minimum clearance between tank roof and vacuum inlet port must be at least equal to the valves’ nominal flange bore.
2. Tank nozzle bore must be $>$ or $=$ valve inlet flange bore.
3. Inlet and outlet piping loads must be supported by appropriate structural supports, NOT by the valve body.

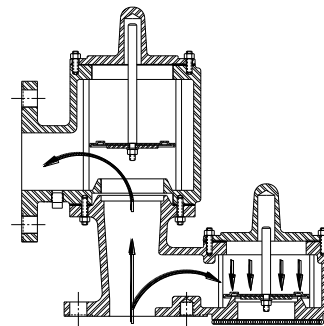


Fig. 2- Pressure Relief

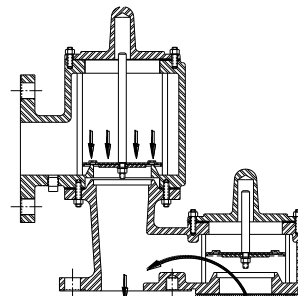


Fig. 3 - Vacuum Relief

SAFETY WARNINGS:

This section is an overview of safety guidelines that should be followed during the installation, operation and maintenance of Groth Pressure/ Vacuum Relief Valves. To understand the context of these instructions and warnings, it is necessary to completely read and understand the contents of this manual.

The purpose of a weight loaded pressure/vacuum relief valve is to prevent excessive pressure or vacuum in a tank or process system. The valve must be designed for the proper MAWP and flow requirements of the system. Consult API Standard 2000 for tank protection sizing procedures. An improperly specified or functioning relief valve may result in structural damage to the tank or system, and can cause severe personal injury or death.

Valves are set at the factory according to purchase specifications. Do NOT change pressure ratings by adding additional weights to the pallet assembly without consulting the factory or your local Groth representative. Adding weights to a valve may restrict pallet lift and reduce the valves' rated flow capacity.

DO NOT mix pressure/vacuum pallet assemblies. Failure to ensure that both pallet assemblies are installed in the correct location can change the pressure and vacuum relief settings. This can cause a tank failure.

DO NOT attempt to remove the valve from the tank or process vessel without first bleeding all pressure from the system. ALTERNATIVE MEANS OF PRESSURE RELIEF MUST BE PROVIDED WHEN THE VALVE IS OUT OF SERVICE.

If the valve has been exposed to process vapors while in service. Observe all plant procedures and Material Safety Data Sheets (MSDS) for the products in the system when inspecting, adjusting or servicing the valve. Take appropriate safety precautions regarding eye protection, respiration and skin contact.

The tank pressure required to discharge the normal or emergency venting requirements of the tank will be increased by the amount of back pressure in the discharge header, on a pipe away valve configuration. Maximum possible discharge header pressure must be considered when sizing the pressure relief valve.

INSPECTION AND STORAGE:

The pressure/vacuum relief valve is carefully packaged to prevent damage or contamination during shipping. Inspect all equipment when it is received; report any damage to the carrier immediately. The valve should be protected during handling and storage. Keep all the ports plugged to prevent intrusion of foreign materials. Before installation, inspect the unit for indications of physical damage or internal contamination. If these are observed, the valve must be disassembled, cleaned and repaired before installation.

INSTALLATION:

A typical valve installation on a tank or vessel is illustrated in Fig.1 on Page 3 using a Model 1720A Pressure/Vacuum Relief Valve.

Groth's weight loaded Pressure/Vacuum Relief Valves are designed to provide tank protection for both pressure and/or vacuum to +/-1 PSIG settings. The valves provide full rated flow capacity at 100% over-pressure. Consult factory for performance under other conditions.

WARNING: *The valve must be installed in a vertical position as shown in Fig 1. To achieve nominal flow capacity, the tank nozzle bore must be at least the same nominal dimension as the relief valve inlet body.*

This series of valves all have 150# ANSI flange drilling compatibility. Torque guidelines are listed in Table 1. The valves are NOT rated for full flange pressure and do not require high bolting torque. Consult factory for special applications.

The following guidelines should be observed at installation:

1. Inspect the gasket seating surface of the tank nozzle flange. It must be clean, free of scratches, corrosion, tool marks, and flat.
2. Aluminum valves are furnished with flat face flanges; they should only be installed on a mating flat face flange with a full faced gasket.
3. Inspect the gasket; make sure that the material is suitable for the application.
4. Lubricate all studs and nuts with an appropriate thread lubricant. If the valve will see high temperature service or stainless steel fasteners are used, apply an anti-seize compound such as moly-disulfide.
5. Center the gasket within the bolt circle.
6. Set the valve carefully on the nozzle. Install the studs and tighten nuts hand tight. For studs selection for blind tapped holes see Table 1.
7. Torque all fasteners to half the value listed in Table 1 in a staggered, alternating pattern.
8. Make sure that the flanges are not distorted and that the gasket is evenly compressed. Make up the final torque and check that no further nut rotation occurs at the torque value specified on Table 1 below:

TABLE 1 - Bolt Torque & Stud Specifications - ANSI #150 Flange Connections

Mounting Flange	Stud Torque - Lb.In.(kg.m)		Number of Studs	Special Stud Specifications*		
	Raised Face	Flat Face		Thread UNC*	Stud Length *	Qty *
2"	30 (0.35)	60 (0.69)	4	5/8" - 11	2.25"	2
3"	54 (0.62)	108 (1.24)	4	5/8" - 11	2.50"	2
4"	42 (0.48)	78 (0.89)	8	5/8" - 11	2.50"	4

(*) - Blind tapped holes only (1720A). Use standard ANSI stud length for other holes.

TABLE 2 - Valve Weights @ Maximum Settings (Carbon Steel) - Lb. (kg)

Valve Size	1720A	1760A
2"	91 (41)	57 (26)
3"	128 (58)	86 (39)
4"	190 (86)	119 (54)

MAINTENANCE:

Groth Corporation recommends that all service performed on a pressure/vacuum relief valve be done at the factory or a factory authorized repair center. Trained mechanics with specialized test equipment will ensure that the valve is accurately set.

It is important to regularly inspect the diaphragm, guides and seating surfaces to ensure the valve can open freely. Refer to Fig. 4 on the next page that illustrates a typical Pressure/Vacuum relief valve when disassembling the unit.

WARNING: Before disassembling valve carefully read and understand the Safety Warnings listed on page 3.

1. Loosen and remove all nuts (#1).
2. Lift off the pressure (#2) and vacuum (#3) covers.
3. Remove the vacuum and pressure pallet assemblies by firmly grasping the stems (#4 & #5) and lifting up. Depending on the pressure/vacuum settings of the particular valve, weight plates may have been added to the pallet assemblies. The weights and pallets must be reinstalled in their original locations. Make sure that all weight plates stay with the appropriate pallet assembly. Tag the assemblies "Pressure" and "Vacuum" as they are removed from the valve.
4. Carefully inspect all guides (#6 & #7) for corrosion, damage or product build up. Also inspect the guide hole in the pressure (#2) and vacuum (#3) covers. Check the metal seating surfaces for pitting, corrosion or product build up. It is recommended to replace all soft goods including diaphragms (#8 & #9), O-Ring (#10) and cover gasket (#11). For a list of recommended spare parts see Table 4.

NOTE: If the seats are damaged they must be lapped using a perfectly flat ground metal

disc and fine grit lapping compound attached to the disc. Wipe the seating surface clean before proceeding.

5. If the stems are being replaced, check Table 3 to ensure that the correct length is being used in both the pressure and vacuum ports.

TABLE 3 - Stem Length - In. (cm)

Valve Size [In]	Valve Model	
	Pressure Port	Vacuum Port
2	6.81 (17.3)	4.63 (11.8)
3	7.81 (19.8)	5.50 (14.0)
4	8.63 (21.9)	5.50 (14.0)

6. Verify that the pallets and weights are back in their proper location. Assemble in reverse order, observing the maximum dimensions for the weight blocks as listed in Table 7 on Page 8. Make sure that pallet assemblies sit flat on the seat and that the stem is not cocked when the pressure (#2) and vacuum (#3) covers are installed. Tighten all nuts (#1) firmly.

WARNING: When assembling a P/V valve, always use the correct length stem (as specified in Table 3), put the pressure and vacuum pallet assemblies back in their original location and ensure that the stem is straight and fits into the guide in the cover.

1. If the stem length is too long, pallet lift will be restricted and the valve will not attain its full rated flow capacity.
2. If the pressure and vacuum pallet assemblies are mixed at assembly, the settings will be changed.

If the stem is cocked at an angle, pallet lift may be completely blocked. An over-pressure can occur if any of these three conditions happens. This can cause a tank failure, severe personal injury and material damage.

TABLE 4: Part Numbers - Spare Parts *

Component	Valve Size		
	2"	3"	4"
FEP Diaphragm, 10 mil	80040162	80040362	80040562
FEP Diaphragm, 20 mil	80040154	80040357	80040568
Gasket, Outlet (bottom)	93158001	93158002	93158003
Gasket, Cover (top)	93158008	93158009	93158010
O-Ring (plate pallet) -FKM	89107010 (#010 70 durometer)		

Setting	< 4 OSI		4 - 8 OSI		8 - 12 OSI		12 - 16 OSI	
Diaphragm	10 mil	20 mil	10 mil	20 mil	10 mil	20 mil	10 mil	20 mil
Quantity	1	---	---	1	1	1	---	2

* Please provide the valve serial number and pressure/vacuum settings when ordering replacement parts.

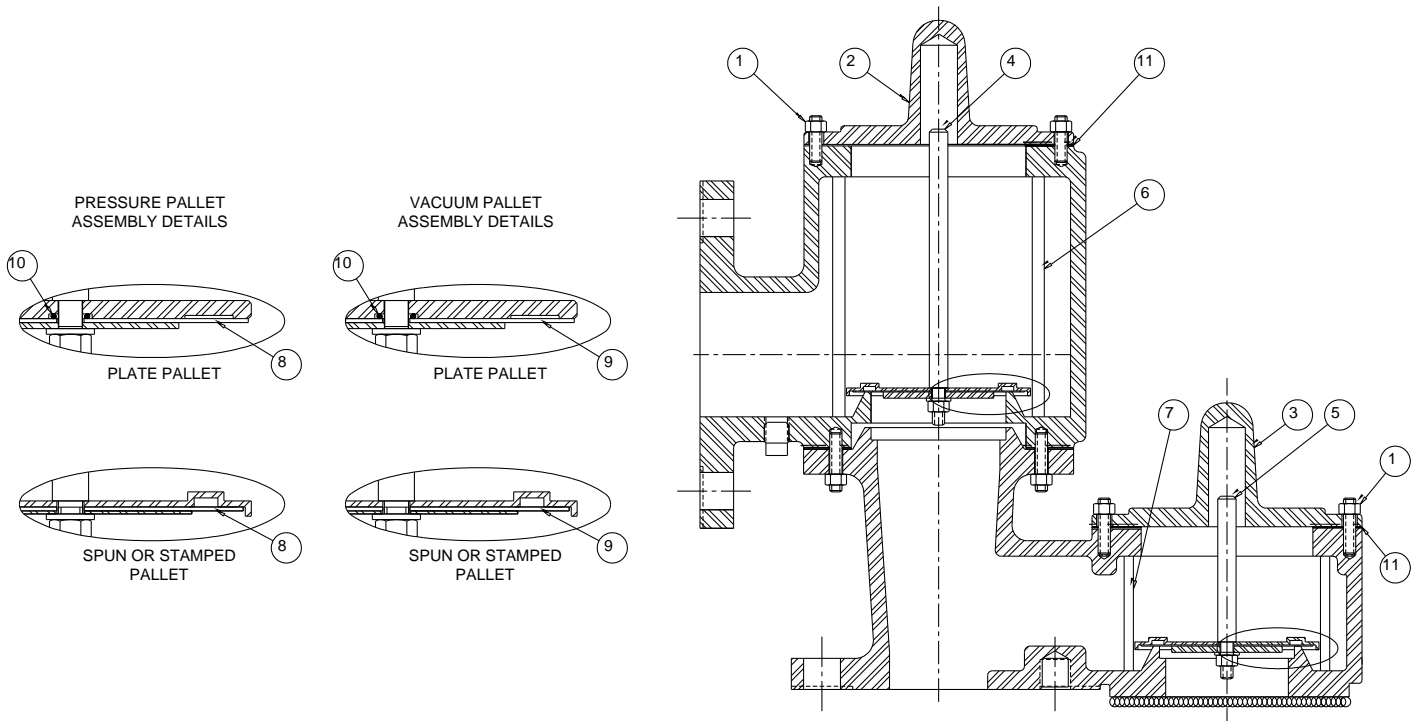


Fig. 4 - Pallet Assembly Details/ Valve Cross Section

TEST PROCEDURE:

1. A chart showing nominal pallet assembly weights for three common units of pressure is shown below in Table 5. Before starting to reassemble a valve, calculate the nominal pressure and vacuum pallet assembly weights. Weigh both pallet assemblies to ensure the correct settings.

2. After final assembling, mount the valve on a Tank Vent Test Stand (TVTS) and slowly raise the pressure to achieve a flow rate of .5 SCFH.

ACCEPTANCE CRITERIA: The pressure gauge shall maintain a pressure equal to or greater than 75% of set pressure for a one-

minute period while the specified flow rate is maintained.

3. If the valve fails to meet the 75% criteria, it must be disassembled and the seat, pallet, and or diaphragms repaired or replaced.

4. Complete a Test Report indicating the actual pallet assembly weight and the peak pressure achieved at the specified Test Flow Rate.

5. A copy of the Test Report shall be maintained with the Valve Maintenance Records.

TABLE 5 - Nominal Pallet Assembly Weight Per Unit of Pressure (*)

SET	Valve Size					
	2"		3"		4"	
	[Lb.]	[kg]	[Lb.]	[kg]	[Lb.]	[kg]
1.0 OSI	0.41	0.18	0.84	0.38	1.42	0.64
1.0 IN WC	0.24	0.11	0.48	0.22	0.82	0.37
1.0 mbar	0.09	0.04	0.19	0.09	0.33	0.15

Example: Pallet Assembly Weight Calculation (PAW)

4" Valve set at 7.5 OSI Read weight at 1.0 OSI from table Weight = 1.42 Lb.
 Multiple weight by set pressure PAW (*)= 1.42 x 7.5 = 10.7 Lb.

(*) = Includes pallet, retainer plate, stem, diaphragm, weight plates and fasteners.

The following Table shows the maximum pressure and vacuum settings for the weight loaded 1720A relief valve that can be achieved without the use of special spacer rings between the cover and body. Consult the factory for higher settings.

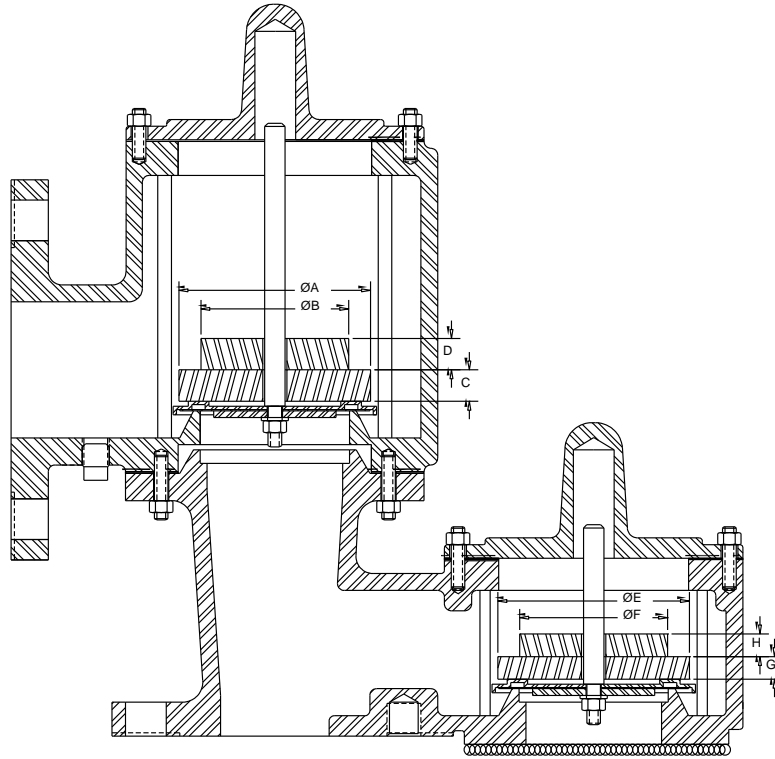
TABLE 6- Maximum Vacuum Settings With Lead Weights & No Spacer Ring

	Valve Size	OSI	IN WC	mbar
Vacuum	2"-3"-4"	10	17	43
Pressure	2"-3"-4"	33	57	142

WARNING: Table 7 on Page 9 shows the maximum envelope dimensions for the weight blocks to ensure that a valve will achieve rated flow capacity. DO NOT exceed these dimensions as pallet lift could be restricted. Pallet lift restriction can cause the tank to be over-pressured to achieve the valves' rated flow capacity.

TABLE 7 - Weight Blocks Maximum Envelope Dimensions - In. (cm)

Warning:
See Page 7



Dimensions: A,B,C & D
Apply to Models:
1720A and 1760A

Dimensions: E,F,G & H
Apply to Model:
1720A

Model	1720A/1760A Outlet - Pressure				1720A Body - Vacuum			
SIZE	"A" DIA.	"B" DIM.	"C" DIA.	"D" DIM.	"E" DIA	"F" DIM.	"G" DIA.	"H" DIM.
2"	3.00" (7.6)	2.75 " (70)	2.56" (6.5)	1.00" (2.5)	3.25" (8.2)	0.56" (1.4)	3.06" (7.8)	1.00" (2.5)
3"	4.25" (11)	3.75 " (9.5)	2.75" (7.0)	1.00" (2.5)	4.50" (11)	0.56" (1.4)	4.00" (10)	1.00" (2.5)
4"	5.25" (13)	4.75" (12)	3.38" (8.6)	1.00" (2.5)	5.50" (14)	0.69" (1.7)	5.00" (13)	1.00" (2.5)

Groth Model 1720A Pressure/Vacuum Relief Valve

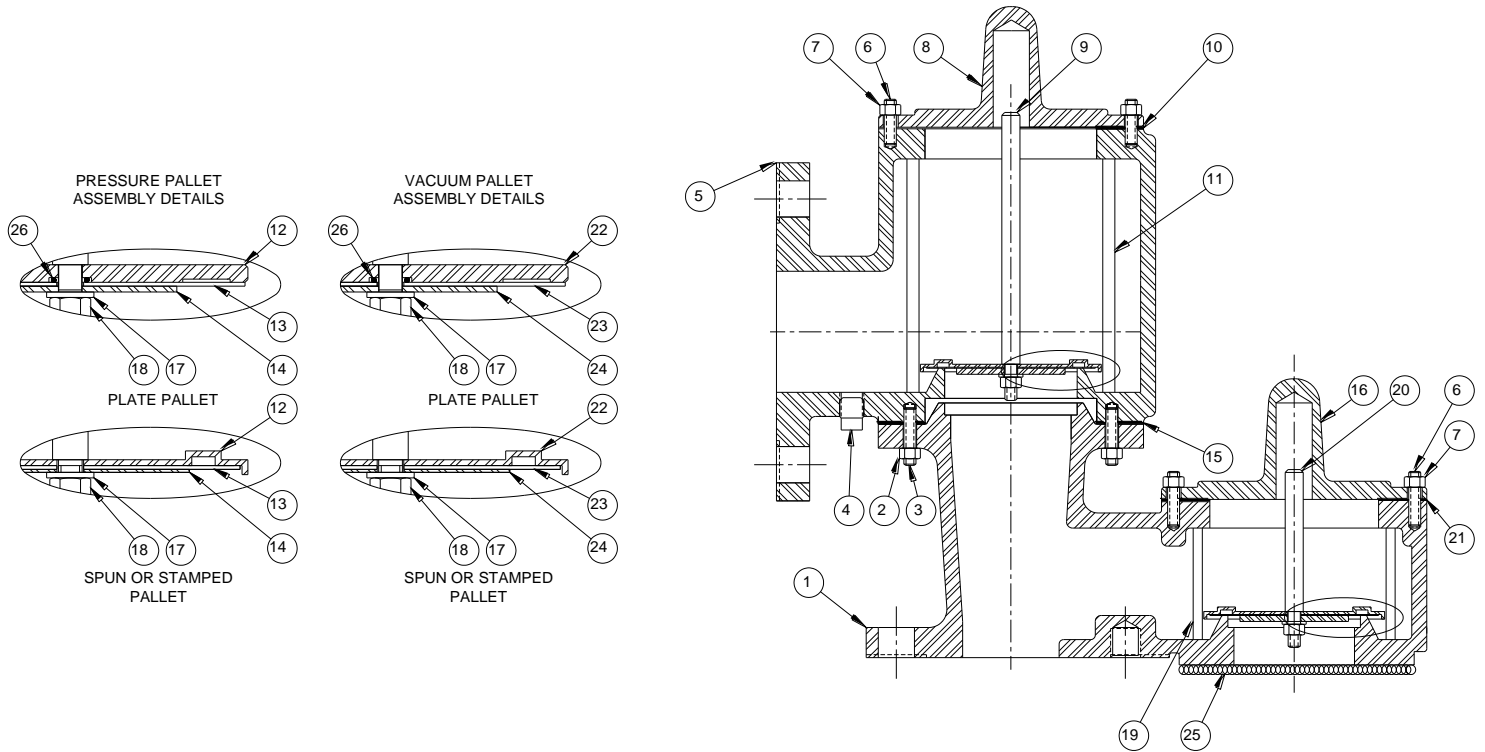


Fig. 7

ITEM	DESCRIPTION	CARBON	ALUMINUM	STAINLESS
1	Body	CS	Aluminum	316 SS
2	Nut, Hex	316 SS	316 SS	316 SS
3	Stud	316 SS	316 SS	316 SS
4	Plug, Pipe	CS	CS	316 SS
5	Outlet	CS	Aluminum	316 SS
6	Stud	316 SS	316 SS	316 SS
7	Nut, Hex	316 SS	316 SS	316 SS
8	Cover, Pressure	CS	Aluminum	316 SS
9	Stem, Pressure	316 SS	316 SS	316 SS
10	Gasket, Cover *	Fluoropolymer	Fluoropolymer	Fluoropolymer
11	Rod, Guide	316 SS	316 SS	316 SS
12	Pallet, Pressure	316 SS	316 SS	316 SS
13	Diaphragm, Pressure *	Fluoropolymer	Fluoropolymer	Fluoropolymer
14	Plate, Retainer (Pressure)	316 SS	316 SS	316 SS
15	Gasket, Inlet *	Fluoropolymer	Fluoropolymer	Fluoropolymer
16	Cover	CS	Aluminum	316 SS
17	Washer, Lock	316 SS	316 SS	316 SS
18	Nut, Hex	316 SS	316 SS	316 SS
19	Rod, Guide	316 SS	316 SS	316 SS
20	Stem, Vacuum	316 SS	316 SS	316 SS
21	Gasket, Cover *	Fluoropolymer	Fluoropolymer	Fluoropolymer
22	Pallet, Vacuum	316 SS	316 SS	316 SS
23	Diaphragm, Vacuum *	Fluoropolymer	Fluoropolymer	Fluoropolymer
24	Plate, Retainer (Vacuum)	316 SS	316 SS	316 SS
25	Screen (Optional)	SS	Aluminum	SS
26	O-Ring, (Plate Pallet) *	FKM	FKM	FKM

* = Recommended Spare Parts

Groth Model 1760A Pressure/Vacuum Relief Valve

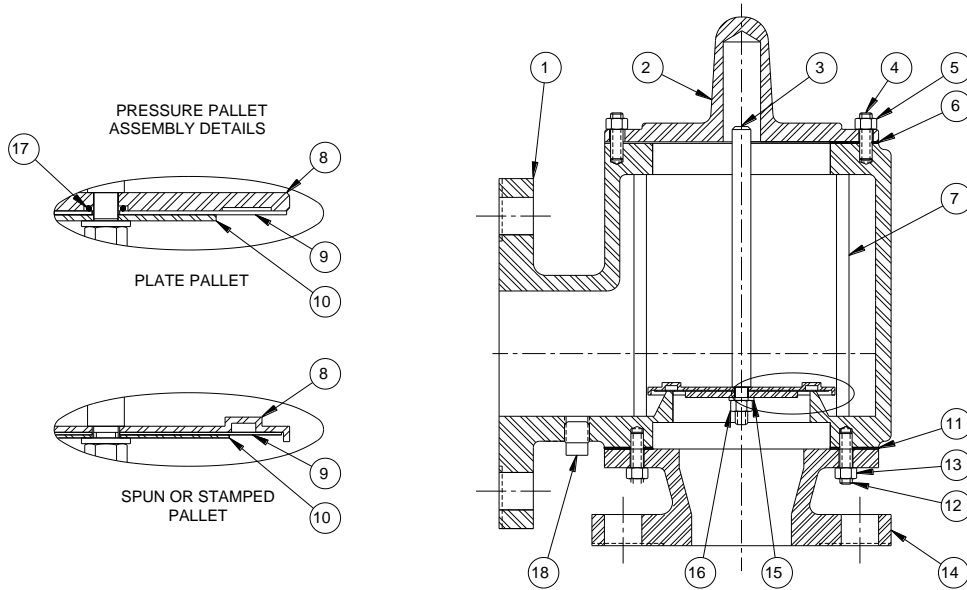


Fig 8

ITEM	DESCRIPTION	CARBON	ALUMINUM	STAINLESS
1	Outlet	CS	Aluminum	316 SS
2	Cover	CS	Aluminum	316 SS
3	Stem	316 SS	316 SS	316 SS
4	Stud	316 SS	316 SS	316 SS
5	Nut, Hex	316 SS	316 SS	316 SS
6	Gasket, Cover *	Fluoropolymer	Fluoropolymer	Fluoropolymer
7	Rod, Guide	316 SS	316 SS	316 SS
8	Pallet, Pressure	316 SS	316 SS	316 SS
9	Diaphragm, Pressure *	Fluoropolymer	Fluoropolymer	Fluoropolymer
10	Plate, Retainer (Pressure)	316 SS	316 SS	316 SS
11	Gasket, Inlet *	Fluoropolymer	Fluoropolymer	Fluoropolymer
12	Stud	316 SS	316 SS	316 SS
13	Nut, Hex	316 SS	316 SS	316 SS
14	Inlet	CS	Aluminum	316 SS
15	Washer, Lock	316 SS	316 SS	316 SS
16	Nut, Hex	316 SS	316 SS	316 SS
17	O-Ring (Plate Pallet) *	FKM	FKM	FKM
18	Plug, Pipe	CS	CS	316 SS

* = Recommended Spare Parts

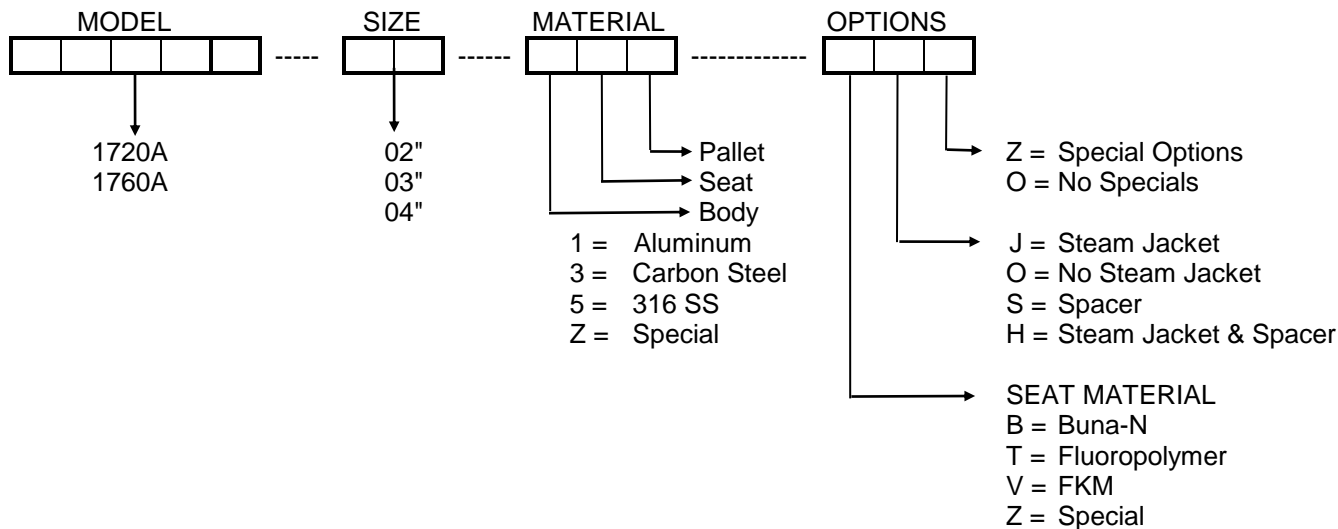
LIST OF ABBREVIATIONS

ANSI	American National Standard
API	American Petroleum Institute
cm	Centimeter
ERV	Emergency Relief Valve
In.	Inches
In. WC	Inches Of Water Column
kg	Kilogram
kg.m	Kilogram-meter
Lb.	Pound
Lb.In.	Pound Inch

MAWP	Max Allowable Working Press.
Max.	Maximum
MD	Model
mil	Thousands Of An Inch
Min.	Minimum
mm	Millimeter
MSDS	Material Safety Data Sheet
OP	Over Pressure
OSI	Ounces Per Square Inch
OZ	Ounces

P	Pressure
P/N	Part Number
POV	Pilot Operated Valve
PSIG	Pounds Per Square Inch
S/N	Serial Number
SCFH	Standard Cubic Ft Per Hour
SLV	Spring Loaded Valve
TVTS	Tank Vent Test Stand
V	Vacuum
WLV	Weight Loaded Valve

The nameplate on the Valve contains the Model Number, Serial Number, set pressures and flow capacity at a specified over-pressure. The Model Number contains additional information about materials of construction, soft goods and options. The following chart will assist in relating the Model Number to the characteristics of your valve:



EXAMPLE: 1720A-02-355-TOO indicates a 2" x 2" Model 1720A with Carbon Steel body and 316 SS seat, 316SS pallet, Fluoropolymer seat diaphragms and no special options.

PRODUCT LIMITED WARRANTY

- A. Seller warrants that products which are manufactured by Seller, are manufactured in accordance with published specifications and free from defects in materials and/or workmanship for a period of (12) twelve months. Seller, at its option, will repair or replace any products returned intact to the factory, transportation charges prepaid, which Seller, upon inspection, shall determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Seller's warranty.
- B. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES, EXPRESS OR IMPLIED, (INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING PRODUCTS) UNLESS SPECIFIED IN THE SALES CONTRACT. THIS CONTRACT STATES THE ENTIRE OBLIGATION OF SELLER.
- Seller makes no warranties, either express or implied, except as provided herein, including
- without limitation thereof, warranties as to marketability, merchantability, for a particular purpose or use, or against infringement of any patent of products. In no event shall Seller be liable for any direct, incidental or consequential damages of any nature, or losses or expenses resulting from any defective new product or the use of any such product, including any damages for loss of time, inconvenience, or loss of use of any such product.
- C. The original Manufacturer shall be solely responsible for the design, development, supply, production, and performance of its products hereunder, and the protection of its trade name or names, if any. It assumes no responsibility, for products modified or changed in any way by its agent or customer. Any such modifications or changes to products sold by Seller hereunder shall make the product limited warranty null and void.
- D. The Manufacturer shall be under no obligation to manufacture, sell, or supply, or to continue to manufacture, sell or supply any of the Products.