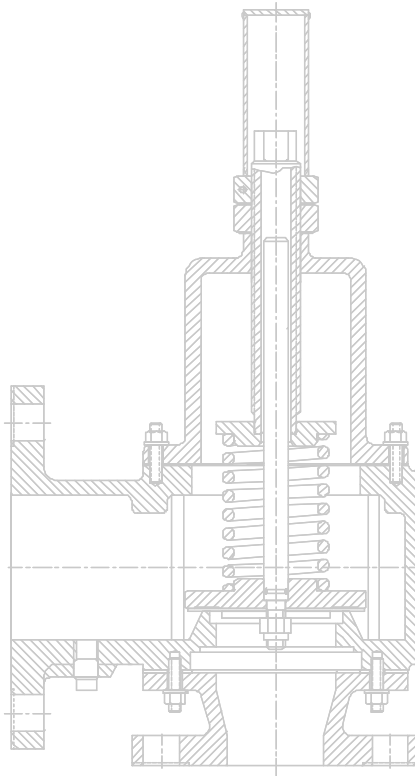

INSTRUCTION MANUAL

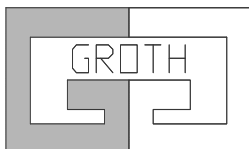
Installation, Operation and Maintenance



PRESSURE / VACUUM RELIEF VALVES

Spring Loaded
Fiberglass

MODELS 1201B/2301A/1261A/1361A



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INTRODUCTION

Groth's spring loaded Pressure/Vacuum Relief Valves are designed to protect your tank from damage created by over-pressuring or excessive vacuum. Costly product evaporation losses due to normal tank "breathing" are greatly reduced. Because the valves retain toxic vapors, atmospheric contamination is minimized.

All pallets include Groth's special "cushioned air" seating. Teflon® seating diaphragms are standard; they minimize sticking caused by resinous vapors and atmospheric moisture. The valve has a self draining housing body and drip rings to protect seating surfaces from condensate and freezing. This design also avoids dangerous pressure or vacuum buildup due to binding or clogging of the vent. Diaphragms are available in Buna-N, Viton and other elastomers; metal-to-metal seat can be provided when required.

To insure the proper alignment of seating surfaces, there is both peripheral and stem pallet guidance. As with all Groth products, every spring loaded valve is factory inspected and tested.

Pressure and Vacuum Relief Valves (P-V) are preset at the factory in accordance with the purchase order. These settings are printed on the stainless steel name tag.

All P-V valves require regular inspection and maintenance, the frequency depending upon actual conditions. The gasket between the vent and the nozzle flange should also be regularly inspected.

The valve must be maintained by a knowledgeable valve technician. It should only be assembled under clean conditions - preferably in a shop environment. Carefully read and understand this Manual before installing or repairing this valve. Groth Corporation offers repair services for all products manufactured by the Tank Protection Division.

For information not contained in this manual, please contact:

Groth Corporation
13650 N. Promenade Blvd.
Stafford, Texas 77477
281-295-6800(Phone)
281-295-6995(Fax)

INSTALLATION:

Typical valve installation on a tank or vessel is illustrated in Fig.1 on the next page using a Model 1221A Pressure/Vacuum Relief Valve. Most tanks will have provision for an operating relief valve, an emergency relief valve, and a blanketing regulator that maintains a positive gas pressure in the tank.

The combination of these valves and regulator are designed to ensure that the tank is protected from both excess vacuum and pressure conditions.

spring loaded P-V Valves are designed to provide tank protection for set-pressures to 15 PSIG and vacuum to 12 PSIG. The valves provide full rated flow capacity at 100% over-pressure. Consult factory for performance under other conditions or low over-pressure.

The valve should be installed in a vertical position as shown in Fig. 1 on the next page.

This series of valves all have 150# ANSI flange drilling compatibility. Please follow the torque guidelines listed in Table 2. The valves are NOT rated for full flange pressure and do not require high bolting torque. Consult factory for special applications; torque values assume a maximum MAWP of 30 PSIG.

The following guidelines should be observed at installation:

1. Remove any flange protectors and discard all packing material.
2. Inspect the gasket seating surface of the tank nozzle flange. It must be clean, free of scratches, corrosion, tool marks, and flat.
3. Fiberglass valves are furnished with flat face flanges; they should only be installed on a mating flat faced flange with a full faced gasket.
4. Inspect the gasket; make sure that the material is suitable for the application.
5. Lubricate all studs and nuts with an appropriate thread lubricant. If the valve will see high temperature service or stainless steel

fasteners are used, select an anti-seize compound such as moly-disulfide.

6. Center the gasket within the bolt circle.

7. Set the valve carefully on the nozzle. Install the studs and tighten nuts hand tight. For stud selection for blind tapped holes see table below :

STUD SELECTION TABLE

| Inlet Flange | Thread UNC | Recommended Stud Length |
|--------------|------------|-------------------------|
| 2" 150# | 5/8" - 11 | 2.25" |
| 3" 150# | 5/8" - 11 | 2.50" |
| 4" 150# | 5/8" - 11 | 2.50" |
| 6" 150# | 3/4" - 10 | 3.00" |
| 8" 150# | 3/4" - 10 | 3.00" |
| 10" 150# | 7/8" - 9 | 3.50" |
| 12" 150# | 7/8" - 9 | 3.50" |

Table 1

8. Torque all fasteners to half the value listed in the table below in a staggered, alternating pattern.

9. Make sure that the flanges are not distorted and that the gasket is evenly compressed.

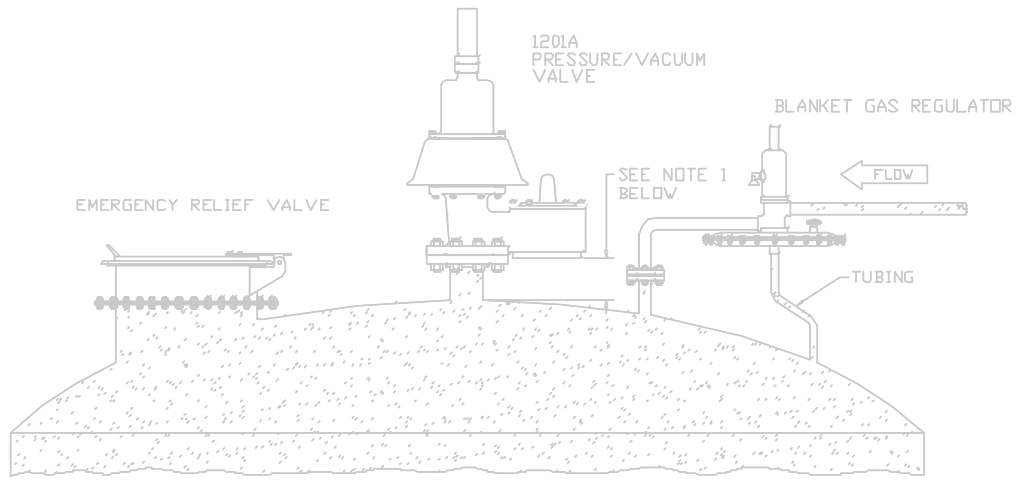
10. Make up the final torque and check that no further nut rotation occurs at the specified torque value.

BOLT TORQUE CHART [Lb. In.] *

| Inlet Flange | Torque | Number Bolts |
|--------------|--------|--------------|
| 2" 150# | 30 | 4 |
| 3" 150# | 54 | 4 |
| 4" 150# | 42 | 8 |
| 6" 150# | 90 | 8 |
| 8" 150# | 126 | 8 |
| 10" 150# | 138 | 12 |
| 12" 150# | 186 | 12 |

Table 2

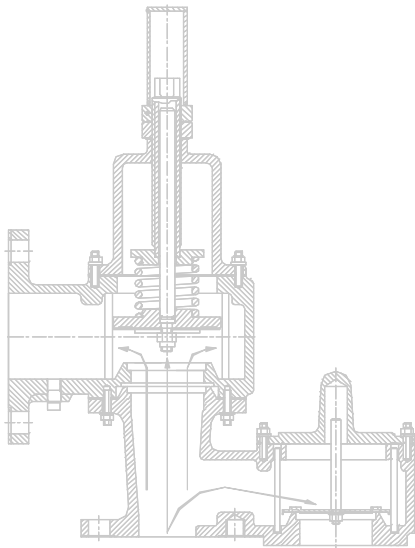
* Average values based on nitrile binder synthetic gasket, 1/32" thick and lubricated threads.



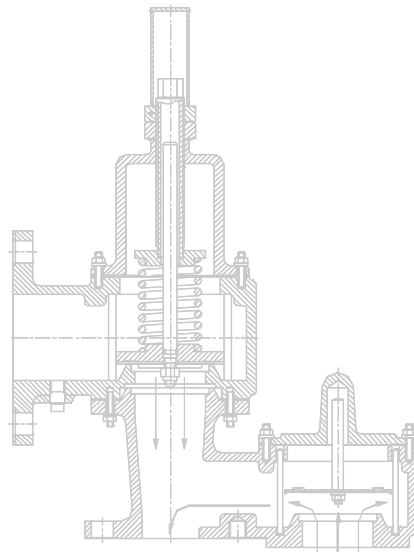
Typical Tank Installation
Fig. 1

OPERATION:

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 a header (or to atmosphere if it is not a pipe away valve).



NOTE 1: Minimum recommended clearance between vacuum inlet port and tank roof is nominal flange bore of valve.



Vacuum Relief : As a vacuum is drawn on 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 and flows into the tank.

MAINTENANCE: WEIGHT LOADED PALLET ASSEMBLY

If the valve is equipped with a weight loaded port it is important to regularly inspect and clean the diaphragm, guides and seating surfaces for the most effective valve performance. Frequency of valve inspection and maintenance should be based on the experience gained in each application. It is recommended that the valve be removed for inspection of wetted components at least once per year. Refer to Fig. 5 which illustrates a typical Pressure/Vacuum relief valve to disassemble the unit.

1. Loosen and remove all hex bolts, nuts and washers (#13, 14, 15 & 31).

CAUTION: Before disassembling valve consult Material Safety Data Sheets (MSDS) for all products that the valve was exposed to in service. Valve should be cleaned according to MSDS procedure. Take appropriate safety precautions regarding eye protection, respiration & skin contact.

2. Lift off the vent cover (#22).
3. Remove the pallet assembly by firmly grasping the stem (#25) and lifting up. Depending on the pressure/vacuum settings of the particular valve, weight plates may have been added to the pallet assembly. The weights and pallets must be reinstalled in their original locations. Make sure that all weight plates stay with the appropriate pallet assembly. If working with more than one valve tag the assemblies as they are removed from the valves. (See Warning #4 on the next page).
4. Carefully inspect all guides for corrosion, damage or product build up. Also inspect the guide hole in the vacuum cover (#22). Check

the seating surfaces for pitting or build up. It is recommended to replace all soft goods including diaphragm (#26) and cover gasket (#30).

NOTE: If the seat is damaged it must be lapped using a ground flat metal disc and a fine grit emery cloth attached to the disc. Wipe seating surface clean before proceeding.

NOTE

Illustrations shown in the body of this document are typical of spring loaded, fiberglass, pressure/vacuum relief valves and are for reference only. See attached drawings C-87359 and C-87301 for actual details and parts identification of Model 1201B and 2301A valves.

5. Prior to final assembly, verify that the pallet and weights are back in their proper location. Assemble in reverse order. Make sure that pallet assembly is flat on the seat and that the stem (#25) is not cocked when the cover (#22) is installed. Oil, grease or other lubricant are *not* required on guides or other metal surfaces of valves, and can hinder free movement. If the valve is in high temperature service or stainless steel external fasteners are used, apply an anti-seize compound such as moly-disulfide to all threaded components. Tighten all hex nuts firmly. (See Warning #3 on the next page).

Note: Please specify model number, size and serial number as shown on the equipment tag when ordering replacement parts.

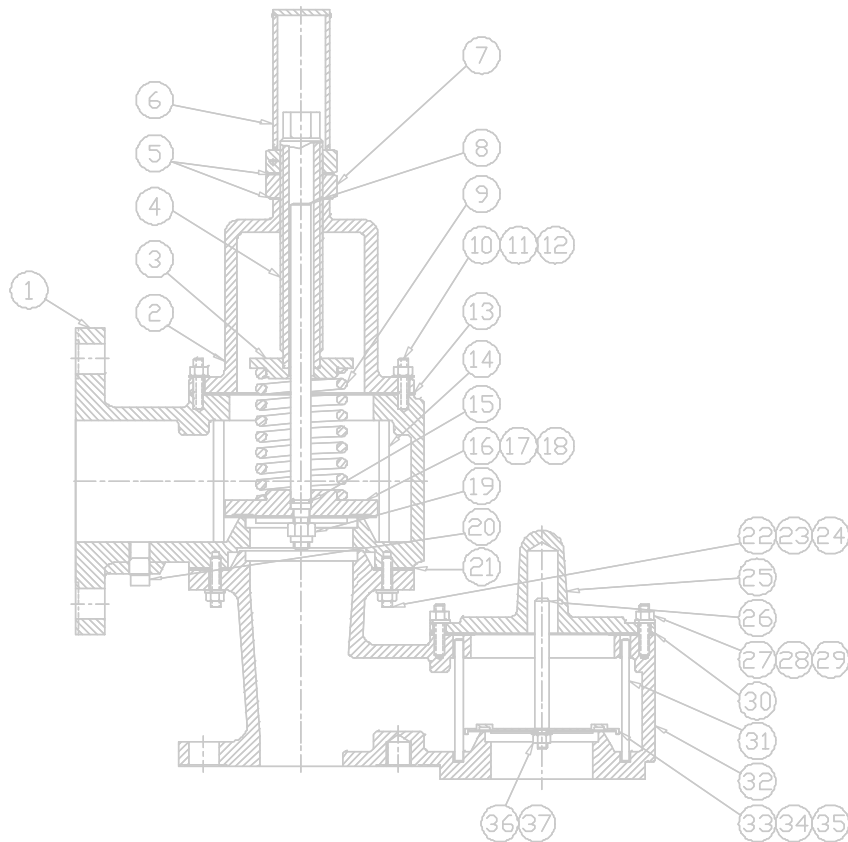


Fig. 5- Typical Spring Loaded P-V Valve

WARNINGS

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Pressure/Vacuum conservation valves are designed to provide full rated capacity at 100% over-pressure. If the valve is to be operated at a reduced over-pressure, consult factory for actual flow capacity under specified conditions. 2. Do <u>NOT</u> change pressure rating by adding additional weights to pallet assembly or adjusting spring compression without consulting factory. Adding weights or adjusting spring compression to a valve may restrict pallet lift and reduce flow capacity. 3. When installing the weight loaded pallet assembly in the valve, make sure that the stem is straight and fits into the | <p>guide in the cover. If the stem is cocked, the pallet assembly may not open fully and the tank can be over-pressured. Under these conditions, the valve will not protect the tank from rupturing due to changes in internal pressure. Tank failure can cause material damage and loss and result in severe personal injury or death.</p> <ol style="list-style-type: none"> 4. Do <u>NOT</u> mix weight loaded pallet assemblies from different valves. Failure to ensure that the weight loaded pallet assemblies are installed in the original and correct location can change the pressure or vacuum relief settings. This can cause a tank failure. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

MAINTENANCE: SPRING LOADED PALLET ASSEMBLY

Groth Corporation strongly recommends that all service performed on a spring loaded 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. Flow capacity can be measured at the specified over-pressure condition, if specified on the purchase order.

Set pressure is dependent on the spring force pushing the plate pallet against the valve seat. Incorrect spring compression can restrict pallet lift and result in reduced flow capacity.

WARNING: *Failure to properly set a spring loaded valve can result in a valve that is either set too high or has insufficient lift to attain rated flow capacity. Under these conditions, the valve will not protect the tank from rupturing due to changes in internal pressure. Tank failure can cause material damage and loss and result in severe personal injury or death.*

CAUTION: *Before disassembling valve consult Material Safety Data Sheets (MSDS) for all products that the valve was exposed to in service. Valve should be cleaned according to MSDS procedure. Take appropriate safety precautions regarding eye protection, respiration and skin contact.*

If an emergency field repair is required, please carefully follow the procedure listed below. Refer to Fig. 5 which illustrates a typical Pressure/Vacuum relief valve to disassemble the unit.

1. Remove cap (#21) and hex jam nut (#20).
2. Carefully measure and record the distance from the top of the adjustment screw (#19) to the top of the spring chamber (#17). (Dimension "D" - See Fig.9).

3. Relieve all spring compression by turning the adjustment screw (#19) counterclockwise.

WARNING: *Do NOT loosen hex nuts (#13) until all spring compression has been released. Spring pre-load is substantial and could cause severe personal injury if fasteners were removed with the spring compressed.*

4. Loosen and remove all hex nuts (#13) and washers (#14 & 15).
5. Lift the spring chamber (#17) from the body.
6. Remove the upper spring button (#18) and spring (#10). Remove the pallet assembly by firmly grasping the stem (#8) and lifting up. If more than one valve is being disassembled, tag the assemblies as they are removed from the valves.
7. Carefully inspect all guides (#12) for corrosion, damage or product build up. Also inspect the adjustment screw (#19) and spring chamber (#17) for thread damage or galling. Check the metal seating surfaces for pitting or build up. It is recommended that all soft goods including diaphragms (#6) and O-Ring (#9) be replaced.

NOTE: If the seat is damaged it must be lapped using a ground flat metal disc and a fine grit emery cloth attached to the disc. Wipe seating surface clean before proceeding.

8. Prior to final assembly, verify that the pallet and spring are back in their proper location. Assemble in reverse order. Make sure that pallet assembly is flat on the seat and that the stem (#8) is not cocked when the spring chamber (#17) is installed. Oil, grease or other lubricant are *not* required on guides or other metal surfaces of valves, and can hinder free

movement. Lubricate the adjustment screw threads with an appropriate thread lubricant. If the valve is in high temperature service or stainless steel external fasteners are used, apply an anti-seize compound such as molydisulfide to all threaded components. Tighten all hex nuts firmly.

9. If the spring is being re-used, compress it by turning the adjustment screw (#4) clockwise until the distance from the top of the adjustment screw to the top of spring chamber matches the distance "D" measured in Step 2; proceed to Step 11.
10. If the spring is replaced, use only original springs supplied by Groth Corporation and follow the Procedure illustrated below: (See next page for replacement spring Part Numbers).

Step A)

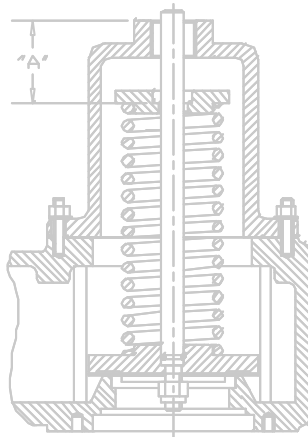


Fig. 6- Spring Installation

After removing the adjustment screw (#19) measure the distance from top of spring chamber to counter bore on spring button for the dimension "A".

Step B)

Measure overall length of adjustment screw for dimension "B".

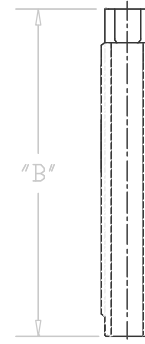


Fig. 7- Adjustment Screw Length

Step C)

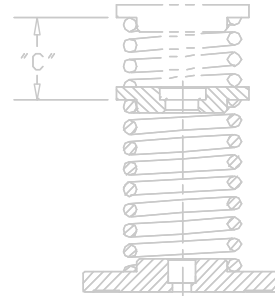


Fig. 8- Spring Compression

Check spring compression specification supplied by factory, dimension "C". This is the required compression to achieve the design set pressure.

Step D)

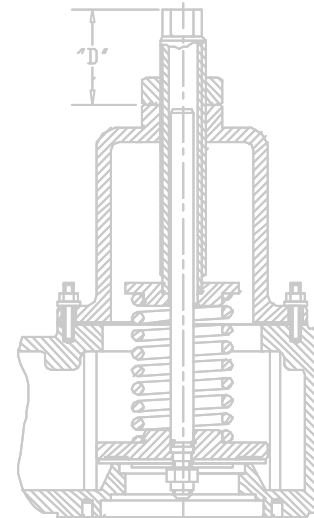


Fig. 9- Adjustment Screw Location

Use the following calculation to obtain the "D" dimension. Compress the spring by turning the adjustment screw clockwise accordingly.

| |
|-----------------|
| $D = B - A - C$ |
|-----------------|

WARNING: Failure to properly set a spring loaded valve may cause a tank failure. This can cause severe personal injury or death and material damage.

11. Replace and tighten hex jam nut (#20) firmly. Replace cap (#21).
12. Mount valve on a calibrated Test Stand and check for proper setting.

Note : Please specify model number, size and serial number as shown on the equipment tag when ordering replacement parts.

Replacement Springs

To order original Groth replacement springs, find the desired pressure range from the tables below and select the corresponding part number for the valve size:

| Pressure Range PSIG | Stainless Steel Spring Part Numbers (*) | | | | | | |
|---------------------|-----------------------------------------|----------|----------|----------|----------|----------|----------|
| | 2" | 3" | 4" | 6" | 8" | 10" | 12" |
| 1.0 to 1.3 | 0204P01F | 0304P01F | 0404P01F | 0604P01F | 0804P01F | 1004P01F | 1204P01F |
| 1.4 to 1.8 | 0204P02F | 0304P02F | 0404P02F | 0604P02F | 0804P02F | 1004P02F | 1204P02F |
| 1.9 to 2.4 | 0204P03F | 0304P03F | 0404P03F | 0604P03F | 0804P03F | 1004P03F | 1204P03F |
| 2.5 to 3.2 | 0204P04F | 0304P04F | 0404P04F | 0604P04F | 0804P04F | 1004P04F | 1204P04F |
| 3.3 to 4.2 | 0204P05F | 0304P05F | 0404P05F | 0604P05F | 0804P05F | 1004P05F | 1204P05F |
| 4.3 to 5.5 | 0204P06F | 0304P06F | 0404P06F | 0604P06F | 0804P06F | 1004P06F | 1204P06F |
| 5.6 to 7.2 | 0204P07F | 0304P07F | 0404P07F | 0604P07F | 0804P07F | 1004P07F | 1204P07F |
| 7.3 to 9.4 | 0204P08F | 0304P08F | 0404P08F | 0604P08F | 0804P08F | 1004P08F | 1204P08F |
| 9.5 to 12.2 | 0204P09F | 0304P09F | 0404P09F | 0604P09F | 0804P09F | 1004P09F | 1204P09F |
| 12.3 to 15.0 | 0204P10F | 0304P10F | 0404P10F | 0604P10F | 0804P10F | 1004P10F | 1204P10F |

| Pressure Range PSIG | Hastelloy C-276 Spring Part Numbers (*) | | | | | | |
|---------------------|-----------------------------------------|----------|----------|----------|----------|----------|----------|
| | 2" | 3" | 4" | 6" | 8" | 10" | 12" |
| 1.0 to 1.3 | 0208P01F | 0308P01F | 0408P01F | 0608P01F | 0808P01F | 1008P01F | 1208P01F |
| 1.4 to 1.8 | 0208P02F | 0308P02F | 0408P02F | 0608P02F | 0808P02F | 1008P02F | 1208P02F |
| 1.9 to 2.4 | 0208P03F | 0308P03F | 0408P03F | 0608P03F | 0808P03F | 1008P03F | 1208P03F |
| 2.5 to 3.2 | 0208P04F | 0308P04F | 0408P04F | 0608P04F | 0808P04F | 1008P04F | 1208P04F |
| 3.3 to 4.2 | 0208P05F | 0308P05F | 0408P05F | 0608P05F | 0808P05F | 1008P05F | 1208P05F |
| 4.3 to 5.5 | 0208P06F | 0308P06F | 0408P06F | 0608P06F | 0808P06F | 1008P06F | 1208P06F |
| 5.6 to 7.2 | 0208P07F | 0308P07F | 0408P07F | 0608P07F | 0808P07F | 1008P07F | 1208P07F |
| 7.3 to 9.4 | 0208P08F | 0308P08F | 0408P08F | 0608P08F | 0808P08F | 1008P08F | 1208P08F |
| 9.5 to 12.2 | 0208P09F | 0308P09F | 0408P09F | 0608P09F | 0808P09F | 1008P09F | 1208P09F |
| 12.3 to 15.0 | 0208P10F | 0308P10F | 0408P10F | 0608P10F | 0808P10F | 1008P10F | 1208P10F |

Table 3

(*)= For other material options, please consult factory.

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:

| MODEL | SIZE | MATERIAL | OPTIONS |
|-------------------------|-----------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1201B 2301A 1361A | 02" 03" 04" 06" 08" 10" 12" | Pallet Seat Body 6 = Vinyl Ester 7 = Furan Z = Special | Z = Special Options O = No Specials O = Steam Jacket Not Applicable |
| | | | DIAPHRAGM MATERIAL |
| | | | B = Buna-N T = Teflon® V = Viton Z = Special |

Teflon↓ is the registered trademark of the Du Pont Company.

EXAMPLE: 1201B-02-666-TOO indicates a 2" Model 1201B with Vinyl Ester body, seat and pallet, Teflon® seat diaphragm 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.
- 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.

Seller makes no warranties, either express or implied, except as provided herein, including without limitation thereof, warranties as to