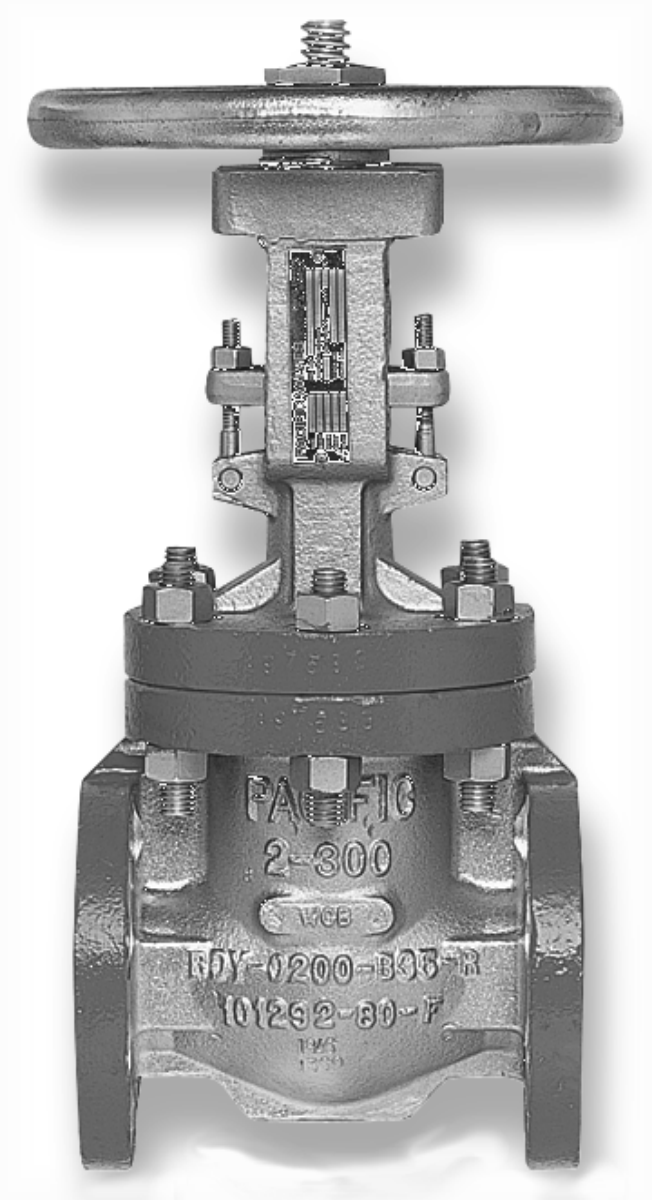
**CRANE**

Energy Flow Solutions

# Pacific Valves
## Operation and Maintenance Manual




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . cranevalve.com**

O&M Manual
Revision date
2-2011

CRANE

Energy Flow Solutions

# Revisions

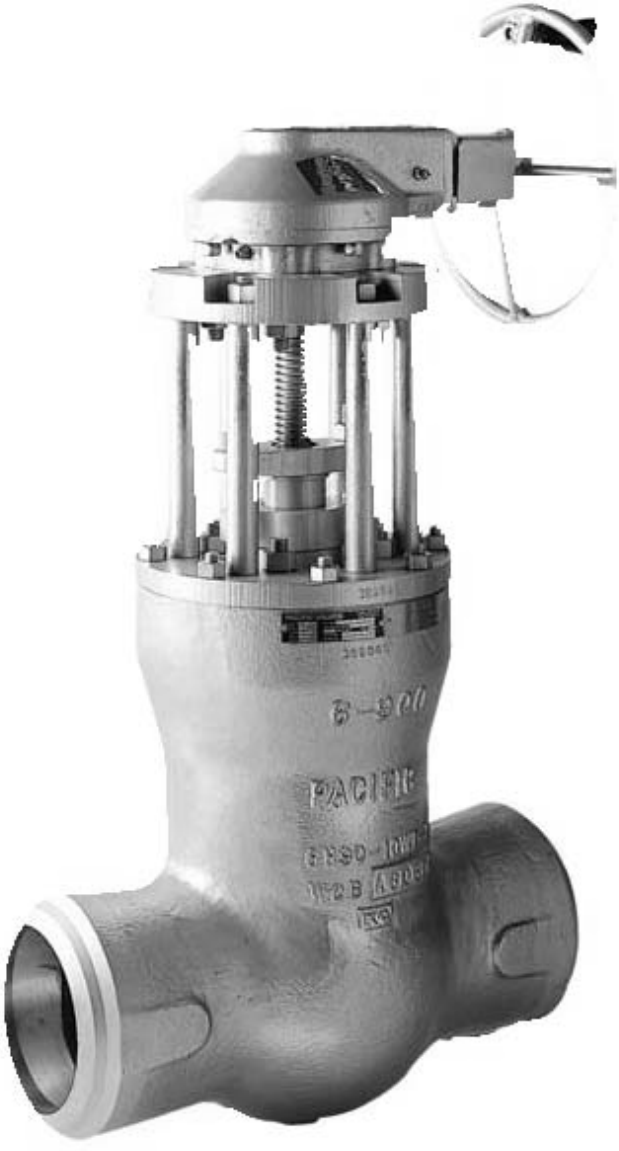
| Rev. No | Description | Document Date | Eng. | Sales |
|---|---|---|---|---|
| 7-2010 | Recomposed entire document , added revision page, restarted revisions as date. | 7-15-2010 | Jerry Martin 7-15-2010 Andrew Jung 8-31-10 | NA |
| 2-2011 | REV SECS A, D, E, H, ADDING ORIENTATION WARNING, REV SEC S ADDING ILLUSTRATION | 2-11-11 | Jerry Martin 2-11-11 | NA |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Table of Contents

CRANE

Energy Flow Solutions

# Section A
# Pacific Valves
## Warnings and General Valve Operation & Maintenance



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
www . cranevalve.com

*O&M Manual*
*Revision date*
*2-2011*

# Warnings

- All Pacific Valves are designed and manufactured to be installed in applications where no more than 1g of force in excess of gravity is applied to the valve in any direction. This 1g force can be an effect of Traffic, Wind or Earthquake. Pacific Valves should not be used in applications that exceed 1g.
- All piping system components are subject to certain levels of erosion and corrosion. As the valve wall thickness is the governing variable in overall service life, care should be taken to ensure that all valves and related piping components are of a suitable wall thickness for the given application. Periodic inspections should also be made as valves/components may wear over time. As a minimum, annual inspection of valve body and bonnet wall should be performed with calibrated measuring devices such as micrometers and/or ultrasonic thickness gauges. Severe applications may require additional inspection types and/or frequency. Additionally, valves should be inspected for general signs of component wear and/or damage caused by process media, i.e. steam cutting. This may include the removal of insulation and/or other coverings to ensure a proper inspection. All valves should also be cycled completely during these inspections to ensure proper operability. Care should be taken to ensure that this will not affect the operating system.
- With the exception of the Wedgeplug, all Pacific valves are designed for operation in clean media. These media should be free of all debris and particulate matter. Debris in the media may cause damage and/or reduced performance to the valve.
- The style, size, pressure class and material selection of all valves is the responsibility of the piping system designer. Pacific Valves may offer suggestions in this area, however the selection process is solely the responsibility of plant designers. Plant designers should also take into account the specific effects that the process media will have on the valve wall thickness and corresponding service life and ensure that the selected material is compatible with the process media. This material selection should be based on reputable corrosion resistance data and used in conjunction with the valve's corrosion allowance in order to maintain the minimum wall thickness. See Table 1 for wall thickness and corrosion allowance data. It is also the responsibility of the piping designer to ensure that valves are equipped with any necessary venting and/or draining capabilities.
- Do not exceed 100% of the maximum pressure rating of the valve at any time during its operation. Pressure spikes beyond the valve's pressure rating are solely the responsibility of the user.
- When operating any valve stand clear of any moving parts such as the stem and/or disc assembly.
- All manually operated Pacific valves are designed for hand input. Do not apply excessive input torque via pipe wrenches "cheater bars" or other devices.
- Motor operated valves should be left in their factory set condition, unless the system operating parameters dictate a change. If changes are necessary, they should be performed in small increments and then the valve operation inspected. When adjusting these settings, use only the lightest/lowest setting possible to achieve the desired performance. Excess torque and/or thrust in the motor settings, may damage or lockup the valve. Never remove a motor operator, gear operator or manual operating assembly from a valve while it is pressurized. The valve must be completely relieved of all pressure prior to this disassembly.
- Care should be taken to ensure that electrical motors are wired correctly to the power source. Incorrect phasing of 3-phase wiring may cause valve/motor damage.
- Motorized Parallel disc gate valves are position seated and should never be torque seated. Do not use the motor torque settings to seat the valve.
- The operator of any valve should have an understanding of the effects of opening/closing the valve with regards to its role in the overall piping system. Operators of valves under pressure should take caution to ensure that the valve is in good operating condition prior to operating it under pressure.

- Certain valve applications take place at elevated temperatures. Care should be taken in these instances to ensure that an operator does not touch any portion of the valve other than the handwheel. In severe temperature applications (300 degrees F and above), insulation may be required on the valves to protect operators from the heat.
- Certain processes utilize flammable, caustic and/or otherwise unstable media. Care should be taken in these circumstances to ensure the operator is aware of the specific health and safety risks associated with that medium.
- All Pacific valves should be operated within the pressure and temperature ranges listed in Table 2 of ANSI B16.34. Under no circumstances should the valves be operated at conditions outside these tables.
- All piping systems should contain independent support mechanisms and should not utilize the valve as a sole means of support.
- The estimated total lifespan of a Pacific valve when installed within ideal boundary conditions is 20 years.
- All valve actuators shall be sized by referring to the specific relevant valve torque and thrust data published by Pacific Valves. Generic or standard valve information shall not be used.
- It is the ultimate responsibility of the piping designer to ensure that each valve is sized appropriately for the given system parameters of pressure, temperature, flow rate, velocity, pressure drop, etc. Additionally it is the responsibility of the piping designer to ensure that the corresponding actuator sizing data is correct for the given application.
- Valves other than globes should not be used for throttling applications. Severe damage may occur to other valve styles. When using globe valves for throttling, do not operate the valve continuously at less than 10% open.
- All valves shall only be used within their defined boundary conditions. All standard materials of construction, including bolting are suitable for operation within the boundary conditions listed in section 8.0 of this document. Care should be taken to ensure that all valves are not operated at conditions that exceed or deviate from the defined boundary conditions. The boundary conditions must be adhered to regardless of the piping system status, including but not limited to: Start-up, hydro-testing, chemical cleaning, system flushing, etc.
- Valves are not suitable to serve as block valves during system hydrostatic pressure tests that exceed 1.1 times the cold working pressure.
- Care should be taken around all valves as injury or damage may occur from the leakage of hot, high pressure and/or caustic materials from a gasket and/or packing joint. Additionally, packing and/or gasket leaks may cause external corrosion damage to the valve.
- When possible, gate valves should be relieved of maximum seating force when left in the closed position. By relieving this force, it may help prevent damage caused by excessive thermal stem expansion. Care should be taken however to ensure that the valve is not opened, only that the torque/thrust has been removed from the stem.
- It is the responsibility of the user/owner of a plant to ensure that all valve operators are ordered to meet all applicable requirements and specifications.
- Only valves that have been certified as fire safe shall be used in piping systems that may be exposed to fire.
- Standard graphitic packing is suitable for 500ppm VOC emissions. Consult the factory if lower emissions are required. Crane Pacific meets API-622 / Method 21 emissions standards.
- When operating manual valves, gloves should be worn to minimize the risk of injury to the hands.
- In situations where manual valves are difficult to operate due to substantial torque requirements, it is recommended that the valve be supplied with a gear or motor operator.
- All valves should be mounted with the stem vertical and the pipeline horizontal. Swing check and tilt disc valves may be installed in vertical pipelines only when the normal flow is in the upward direction. For other valve types and any other orientation, please contact the factory.
- Depending upon the specific application, normal lubricants may not be sufficient for higher temperature applications. In this case, higher temperature lubricants should be used in place of the standard type.

- All valve packing glands should be tightened in an even manner. Care should be taken to ensure that the packing gland and/or gland flange do not contact the valve stem or stuffing box during tightening.

Table 1

| MINIMUM WALL THICKNESS FOR ALL PRODUCTS BY PRESSURE CLASS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Size | Class 150 | Class 300 | Class 600 | Class 800 | Class 900 | Class 1500 | Class 2500 |
| 0.5 | 0.11 | 0.11 | 0.13 | 0.14 | 0.16 | 0.19 | 0.25 |
| 0.75 | 0.12 | 0.12 | 0.13 | 0.14 | 0.18 | 0.23 | 0.29 |
| 1 | 0.16 | 0.17 | 0.18 | 0.21 | 0.22 | 0.26 | 0.35 |
| 1.25 | 0.19 | 0.19 | 0.19 | 0.24 | 0.25 | 0.31 | 0.44 |
| 1.5 | 0.19 | 0.19 | 0.21 | 0.27 | 0.29 | 0.38 | 0.50 |
| 2 | 0.22 | 0.25 | 0.25 | 0.29 | 0.31 | 0.44 | 0.62 |
| 2.5 | 0.22 | 0.25 | 0.28 | | 0.34 | 0.50 | 0.75 |
| 3 | 0.22 | 0.28 | 0.31 | | 0.41 | 0.62 | 0.88 |
| 4 | 0.25 | 0.31 | 0.38 | | 0.50 | 0.75 | 1.09 |
| 6 | 0.28 | 0.38 | 0.50 | | 0.72 | 1.09 | 1.59 |
| 8 | 0.31 | 0.44 | 0.63 | | 0.88 | 1.41 | 2.06 |
| 10 | 0.34 | 0.50 | 0.75 | | 1.06 | 1.72 | 2.59 |
| 12 | 0.38 | 0.56 | 0.90 | | 1.25 | 2.00 | 3.03 |
| 14 | 0.41 | 0.62 | 0.97 | | 1.38 | 2.19 | 3.34 |
| 16 | 0.44 | 0.69 | 1.09 | | 1.56 | 2.50 | 3.81 |
| 18 | 0.47 | 0.75 | 1.22 | | 1.75 | 2.81 | 4.27 |
| 20 | 0.50 | 0.81 | 1.34 | | 1.91 | 3.04 | 4.69 |
| 24 | 0.57 | 0.94 | 1.59 | | 2.28 | 3.72 | 5.63 |
| 30 | 0.66 | 1.14 | 1.96 | | | | |
| 36 | 0.75 | 1.31 | 2.33 | | | | |

| CORROSION-EROSION ALLOWANCE FOR ALL PRESSURE CLASSES BY PRODUCT | | | | |
|---|---|---|---|---|
| Size | Bolted Bonnet | Wedgeplug | Pressure Seal | Compact Pattern |
| 0.5 | | 0.12 | | 0.12 |
| 0.75 | | 0.12 | | 0.12 |
| 1 | | 0.12 | | 0.14 |
| 1.25 | | 0.12 | | 0.15 |
| 1.5 | 0.06 | 0.12 | | 0.17 |
| 2 | 0.12 | 0.12 | 0.11 | 0.21 |
| 2.5 | 0.16 | 0.19 | 0.12 | |
| 3 | 0.19 | 0.19 | 0.13 | |
| 4 | 0.19 | 0.19 | 0.14 | |
| 6 | 0.19 | 0.19 | 0.14 | |
| 8 | 0.19 | 0.19 | 0.14 | |
| 10 | 0.22 | 0.22 | 0.16 | |
| 12 | 0.25 | 0.25 | 0.17 | |
| 14 | 0.25 | 0.25 | 0.19 | |
| 16 | 0.25 | 0.25 | 0.21 | |
| 18 | 0.25 | 0.25 | 0.24 | |
| 20 | 0.25 | 0.25 | 0.27 | |
| 24 | 0.24 | 0.24 | 0.34 | |
| 30 | 0.13 | 0.13 | | |
| 36 | 0.02 | | | |

All valves will have a wall thickness in the new condition at least equal to the minimum wall thickness plus the corrosion-erosion allowance.
If the wall thickness is reduced to less than the minimum value in the table after usage, the valve must be repaired or replaced.

## 1.0 THEORY OF OPERATION

**Gate Valves.** Gate valves are designed to close off or open up the flow in a pipeline. The wedge is designed to completely stop flow and form a tight seal against pressure in either direction. In the open position, the wedge is completely out of the flow stream. Gate valves are **not** recommended for throttling use.

**Globe Valves.** Globe valves are designed to close off, open up or throttle the flow in a pipeline. The disc is designed to completely stop flow and form a tight seal with pressure under the disc. In the 10% open position to full open position, globe valves are effective in throttling line pressure.
*NOTE:* Continuous throttling at less than 10% open may cause excessive vibration, noise, wear and damage to discs and seats. The lift check version has pipe orientation limitations. Refer to the warnings section “A” above.

**Y-Globe Valves.** Y-Globe valves are designed to close off, open up or throttle the flow in a pipeline. The disc is designed to completely stop flow and form a tight seal with pressure under the disc. In the 10% open position to full open position, globe valves are effective in throttling line pressure. These valves typically offer better flow characteristics than standard globe valves.
*NOTE:* Continuous throttling at less than 10% open may cause excessive vibration, noise, wear and damage to discs and seats.

The Y-Globe is also available in a stop-check configuration. Stop check valves (sometimes called non-return valves) are designed to be opened by the flow of system pressure in one direction and close automatically when the system flows in the opposite direction. In addition, stop check valves can throttle the flow in the open direction or close the flow off completely. The lift check version has pipe orientation limitations. Refer to the warnings section “A” above.

**Swing Check & Tilt Disc Valves.** Check valves are designed to open by the system pressure in a line. The desired direction of flow in the line will open the valve, and any attempt by the flow to reverse will close the valve completely. The check valve typically does not require any outside force or signal to operate properly. Check valves allow flow in one direction only. The swing check and tilt disc checks has pipe orientation limitations. Refer to the warnings section "A" above.

**Stop and Lift Check Valves.** Lift check valves and stop check valves are designed to be opened by the flow of system pressure in one direction and close automatically when the system flows in the opposite direction. Stop check valves (sometimes called non-return valves) have the additional feature of throttling the flow in the open direction or closing the flow off completely.
*NOTE:* Continuous throttling at less than 10% open may cause excessive vibration, noise, wear and damage to disc and seat ring. The stop and lift check version have pipe orientation limitations. Refer to the warnings section "A" above.

**Pressure Seal Valves.** Pressure seal valves use internal line pressure to seal the bonnet joint. These valves are available in Gate, Globe, Check and Y-Globe configurations.

**Parallel Disc Gate Valves.** Parallel disc valves utilize a special free-floating disc arrangement to provide positive shutoff. Unlike standard wedge gates, the parallel disc valve is seated by position and not input torque. This system uses upstream pressure to effect a positive seal on the downstream seat, these valves are not for double block and bleed type service.

**Wedgeplug Valves.** Wedgeplug valves are highly specialized non-lubricated plug valves, which operate as both a quarter turn and rising stem valve. Wedgeplug valves are designed to close off or open up the flow in a pipeline. The Wedgeplug is designed to completely stop flow and form a tight seal against pressure in either direction. Wedgeplug valves are not recommended for throttling use and are not intended for high pressure service.

## 2.0 DESCRIPTION

This manual covers all Pacific bolted bonnet, pressure seal and Wedgeplug valves. These valves are designed within the limits of ANSI B16.34. For the operator and mounting topworks of these valves, the user is referred to the applicable appendix in this manual. See Section 5.0 for operation of valves. This manual is for reference purposes only. Disassembly and maintenance of valves should only be performed by qualified personnel. Consult Pacific Valves for specific technical support.

For Specific information regarding a particular style of valve, please refer to the corresponding detailed section.

## 3.0 INSTALLATION

When unpacking, care should be exercised in lifting and handling to avoid damage to valves or injury to personnel. Do not lift any valve by the handwheel or stem. Use lifting lugs or straps around the valve body. For specific installation information, please refer to section "O" of this manual.

When installing, ensure that all foreign material is removed from the interior of the valve, including desiccants. ***Note:*** Do not remove protective end coverings until immediately prior to valve installation.

***Note:*** Do not disassemble or modify a Pacific Valve in any way prior to installation. This will void the factory warranty if it occurs.

When installing weld-end, flex wedge gate or globe valves into the line, it is advisable to have the valve slightly open to prevent the wedge from becoming "stuck" due to thermal expansion and to discourage damage to the seating surfaces.

A protective paint has been applied to the weld ends on some valves and it should be removed before welding.

For soft-seated valves, the temperature of the valve body should not exceed 200°F during welding to avoid damaging the soft seals. Check the temperature of surrounding areas to avoid heating valve body excessively, especially with small sizes, where a heat sink may be necessary.

Use the smallest electrodes and the minimum amperage possible consistent with approved welding procedures. This will help to minimize warpage in the seat areas. Tack welds should be ground out before completing the root pass in that area.

Valves of carbon steel should be allowed to cool slowly. The valve may be covered with a heat-insulating blanket to promote slow cooling and limit the heat-affected zone. Appropriate industry standards should be followed for all PWHT.

Certain valve types are designed to function in a single direction (check valves, etc.) All markings should be noted on the valves. Arrows on the valves indicating flow direction should correspond with the system flow direction.

***Note:*** Ensure that all foreign material (dirt, weld slag, etc.) has been removed from the valve prior to and after installation. Foreign material is the primary cause of premature seat failures.

## 4.0 WARRANTY

All Pacific Valves are backed by a full manufacturer's warranty against defects in materials or workmanship. It should be noted that any work or modification performed on a Pacific Valve must be authorized by Pacific Valves in order to retain the original factory warranty.

## 5.0 OPERATING INSTRUCTIONS

Pacific valves are designed for simplicity and ease of operation. To open a gate, globe, Wedgeplug or stop check valve, turn the handwheel in a counterclockwise direction; continue turning until interference is felt; at this point, the valve will be fully open. To close the valve, turn the handwheel in a clockwise direction; continue turning until interference is felt; at this point, the valve will be fully closed. On Wedgeplug valves it is imperative to verify that the position indicator has lowered into the final seating position. Note that Parallel disc valves are not seated by torque. The disc is position seated and will stop when it contacts the factory set travel limits. Further tightening will not improve the seal and could lead to valve damage if excessive torque is applied.

Swing, Lift and tilting disc check valves are designed to be operated by line pressure only. When the upstream line is pressurized, flow will open the disc. When the pressure is reduced upstream, or if there is backpressure, the disc will close.

With some larger valves under conditions of high pressure, a rim pull of more than 250 lbs. may be required to achieve proper seating.

**CAUTION! - These valves were designed to operate within the pressure and temperature limits of ANSI B16.34. Do not exceed these limits.**

## 6.0 MAINTENANCE

*6.1* Preventative Maintenance and Periodic Inspection

Pacific Valves recommends that periodic inspections be made of all valves. The frequency of these inspections will vary, depending upon the severity of service and frequency of operation of the valve. As

a minimum, all valves should be checked quarterly to ensure proper operation and discourage the damage compounding effects of leakage. The following list details the specific valve types and areas requiring inspection and maintenance.

| Item to inspect | | GATE | GLOBE | CHECK | WEDGEPLUG | Y-GLOBE | STOP CHECK | PARALLEL DISC GATE |
|---|---|---|---|---|---|---|---|---|
| Check Stem threads for wear | | XXX | XXX | XXX | | XXX | XXX | XXX |
| Check for Packing leaks | | XXX | XXX | | XXX | XXX | XXX | XXX |
| Check body/bonnet joint for leaks, re-tighten all bolting (a) | | XXX | XXX | XXX | XXX | XXX | XXX | XXX |
| If conditions permit, operate valve. | | XXX | XXX | | XXX | XXX | XXX | XXX |
| Inspect all external connections | | XXX | XXX | XXX | XXX | XXX | XXX | XXX |
| Ensure Stem and seal areas are free from debris | | XXX | XXX | | XXX | XXX | XXX | XXX |
| Check all lubrica-tion points | | XXX | XXX | | XXX | XXX | XXX | XXX |
| Inspect condition of motor and/or gear operators (when used) | | XXX | XXX | | XXX | XXX | XXX | XXX |
| Inspect valve for obvious damage | | XXX | XXX | XXX | XXX | XXX | XXX | XXX |

**Warning!** Do not remove or loosen the packing gland or bonnet bolts while the valve is pressurized.
(a) The pressure seal draw bolting must be periodically tightened during service to prevent gasket loosening.

*6.2* Maintenance of valve under pressure

If the above listed inspections reveal any indications, the following procedures are recommended:

***Note: Extreme care should be taken when working on any pressurized system!***

*6.2.1* If the stem packing is leaking, the eyebolt nuts on the gland flange should be tightened uniformly until the leakage stops. If the leakage continues or there is no adjustment remaining, additional packing must be installed or the packing must be replaced. (See disassembly procedure for appropriate valve or Packing and Gasket maintenance section ”P”) It should also be noted that the valve should be able to operate freely at all times. If the valve cannot operate due to excessive packing force, the packing has become worn and must be replaced during a system shutdown.

*6.2.2* The stem threads that are exposed to atmosphere should be periodically lubricated

to reduce wear, operating torque, and to deter corrosion. Care should be taken to ensure that only the threaded portion of the stem is lubricated. Pacific Valves does not recommend the practice of lubricating the sealing area of the stem. This practice tends to attract debris and foreign material, which can lead to stem or stuffing box damage.

*6.2.3* The yoke sleeve should be lubricated periodically through the grease fitting to ensure smooth operation. Lubrication should be inspected and revised at each application. Each installation may have specific requirements/ specifications regarding lubrication.

*6.2.4* If leakage develops at the body/bonnet joint of a bolted bonnet valve, the bonnet stud nuts should be tightened uniformly. This tightening should be done in accordance with the bolting torque section “M” of this manual.

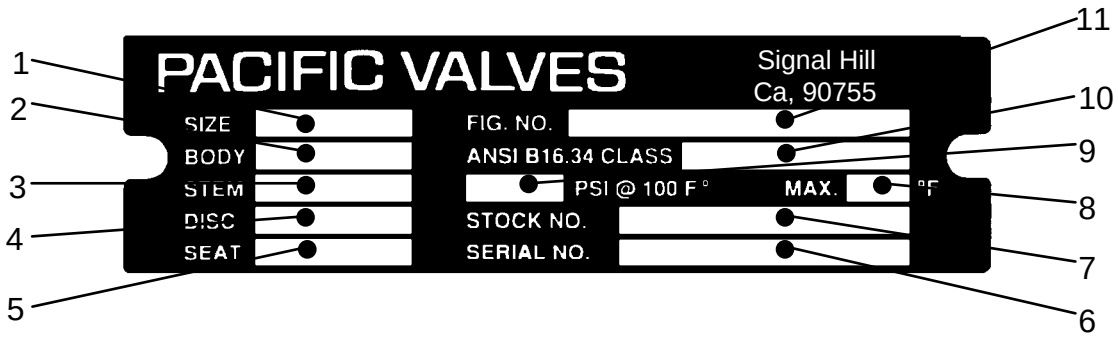
**<u>CAUTION!</u> Do not overstress the bolting. If leakage continues, the gasket should be replaced. (See the bolting torque section “M” or the appropriate valve disassembly procedure )**

*6.2.5* If normal inspection reveals a binding or galling action of valve operating parts, it is advisable to dismantle and inspect the valve parts during a system shutdown. Contact Pacific Valves prior to disassembling any valve.

7.0 <u>IDENTIFICATION</u>

All Pacific Valves are identified with a metal Tag that is riveted to the valve. This tag is usually found on the body/bonnet joint area, or on the top plate area near the handwheel.

When performing any work, ordering spare parts, or requesting technical support, please refer to this tag. The Serial number (6), Figure number (11) and Stock number (7) are the keys to proper valve identification.




| EXPLANATION OF TAG MARKINGS | | |
|---|---|---|
| 1 | **SIZE** | Nominal pipe size (NPS) of the valve |
| 2 | **BODY** | Body ASTM material grade designation |
| 3 | **STEM** | Stem material |
| 4 | **DISC** | Disc or Wedge trim material |
| 5 | **SEAT** | Seat trim material |
| 6 | **SERIAL NO.** | Unique number identifying a single valve |
| 7 | **STOCK NO** | Number identifying a group of like valves |
| 8 | **MAX °F** | Maximum temperature at which the valve may be operated within the limits of pressure allowed by ASME B16.34, Table 2. |

| | | |
|---|---|---|
| 9 | **PSI @ 100 °F** | Pressure in psig at which the valve is rated to operate when the temperature does not exceed 100 °F |
| 10 | **ANSI B16.34 CLASS** | Pressure class rating of the valve as defined in ASME B16.34 Section 2. |
| 11 | **FIG. NO.** | Number identifying the valve's main features including material, class, trim, end connections, and operator type. See the following sections for classification of Figure Numbers. |

**Following is the figure number definition for Pacific Bolted Bonnet Gate, Globe and Check valves (7.1)**

| 55515 | Z | 7 | WC6 | WE( ) | BG | X |
|---|---|---|---|---|---|---|
| 1 FIGURE NUMBER | 2 SPECIAL FEATURE SUFFIX | 3 TRIM DESIG-NATION | 4 BODY MATERIAL | 5 END CONNECTIONS | 6 ACTUATOR TYPE | 7 SPECIAL FEATURES |

| | | |
|---|---|---|
| 1 | Figure Number | Basic valve figure number. (See section 7.3 for details) |
| 2 | Special Feature Suffix | Special features are identified by this letter suffix. The most popular features are:<br>B Ball type disc<br>G Grease injector with lantern ring<br>H 309 stainless steel inlay in body neck<br>J Standard single valve by-pass as defined by Pacific Valves catalog<br>K Vent in upstream side of wedge<br>L1 Lantern ring and pipe plug in stuffing box<br>L2 Sleeve & bonnet stem bushing in stuffing box<br>M K-monel body-bonnet bolting<br>N Meets NACE MR01-75 requirements<br>S Stop check (API 600 valves only)<br>T Teflon© stem packing<br>U() Drill, tap and plug—Location specified within the parentheses()<br>W() Bleed valve as defined by the Pacific Valves catalog or UOP specification for HF valves. Location specified within the parentheses ().<br>Z Valve assigned to a "Z" sale order. (Usually designates additional N.D.E.) |
| 3 | Trim Designations | Kind of trim material used. The most common trims are:<br>U 13% chrome stem and disc facing with CoCr-A faced seat rings.<br>1 13% chrome stem, disc facing and seat ring facing<br>7 13% chrome stem and CoCr-A disc and seat ring facing.<br>8H Monel stem and disc facing with CoCr-A faced seat rings<br>10H 304 stainless stem, disc facing and CoCr-A faced seat rings<br>12H 316 stainless stem, disc facing and CoCr-A faced seat rings<br>HF8 Monel trim parts for Hydrofluoric Alkylation Service<br>HF8T Monel trim parts with Teflon© disc insert for globe valves and Teflon© seat insert for gate and check valves for Hydrofluoric Alkylation service. |
| 4 | Body Material | Material of construction for the body. Left blank for Carbon Steel (WCB). For other materials, the ASTM material grade designation i.e., WC6, WC9, C5, C12, C12A etc. is used. |

| | | |
|---|---|---|
| 5 | End Connections | The most common type of ends furnished on the valve body are as follows:<br>WE() Butt weld ends. Schedule of mating pipe defined within parentheses (). When the schedule is special, it will be signified by "X".<br>RJ Ring joint type flange ends<br>FF Flat faced flanged ends |
| 6 | Actuator | Type of Valve actuator.<br>A Hydraulic cylinder actuator<br>BG Bevel gear actuator<br>C Pneumatic cylinder actuator (fail as-is)<br>CC Pneumatic cylinder actuator (fail closed)<br>CO Pneumatic cylinder actuator (fail open)<br>D() Chainwheel with amount of chain in feet defined within the parentheses.<br>E Electric motor actuator<br>HB Hammer blow handwheel<br>MTG Valve supplied without actuator for mounting by user. |
| 7 | Special Features | "X" indicates special requirements have been imposed. This may include N.D.E. or other special handling as required by the purchaser. |

**The following is the newer figure number system for the pressure seals.**

# Pressure Seal Valves

## Enhanced Pressure Seal Figure Number System

1 2 - 4 5 6 7 8 - 10 11 12 13 - 15 - 17 - 19 20 21 - 23 24 25 26 27 28 29 30

**1 - 2 = Size of Connection**
- 2H = 2 ½" Valve
- 03 = 3" Valve

**4 - 6 = Valve Type**
- 554 = Parallel Disc
- 555 = Flex Wedge
- 560 = T-Globe Stop
- 565 = T-Globe Stop Check (non return)
- 580 = Swing Check
- 586 = Lift Check - Globe
- 588 = Tilting Disc Check
- 590 = Y Globe Stop Valve
- 595 = Y Globe Stop Check
- 596 = Y Globe Life Check

**7 - 8 = Pressure Class**
- 06 = 600
- 6C = 600 Intermediate Class (see sales order notes)
- 09 = 900
- 9C = 900 Intermediate Class (see sales order notes)
- 15 = 1500
- 1C = 1500 Intermediate Class (see sales order notes)
- 25 = 2500
- 2C = 2500 Intermediate Class (see sales order notes)
- 45 = 4500

**10 = Valve Port Size**
- *S = Standard port
- R = Reduced port
- E = Expanded port

**11 - 12 = By Pass, Drain & Bleed Arrangements**
- * NN = N.A.
- EA = Equalizing Line from body neck to A
- EB = Equalizing Line from body neck to B
- KW = Bonnet Vent in upstream side of wedge
- J1 = Single valve bypass from A to B
- J2 = Double valve bypass from A to B
- J3 = Triple valve bypass from A to B and body neck
- JA = Single valve equalizing line from body neck to A
- JB = Single valve equalizing line from body neck to B
- VV = 6" socket weld nipples with globe style drain valves at locations C&D
- PP = 6" socket weld nipples capped at locations C&D
- V? = 6" socket weld nipple with globe style drain valve at location? (A-G)
- P? = 6" socket weld nipple capped at location? (A-G)

**13 = Custom Feature**
- *N = N.A.
- X = See sales order notes

**15 = Special Processing**
- *S = No special processing
- Z = See sales order notes

**17 = Body Material**
- 1 = WCB
- 2 = WCC
- 4 = C12A
- 5 = C5
- 6 = WC6
- 9 = WC9

**19 = Customer Pipe Schedule**
- A = 10
- B = 20
- C = 30
- D = 40
- E = STD
- F = 60
- G = 80
- H = XS
- J = 100
- K = 120
- L = 140
- M = 160
- N = XXS
- X = Custom (see sales order notes)

**20 - 21 = Valve Weld End Prep Figure (per ASME B16.25)**

Pipe wall thickness .1875" to .88"
- *2B = For use with no backing ring or split rectangular backing ring
- 2C = For use w/continuous rectangular backing ring
- 2D = For use w/continuous tapered backing ring

Pipe wall thickness greater than .88"
- *3B = For use with no backing ring or split rectangular backing ring
- 3C = For use with continuous rectangular backing ring
- 3D = For use with continuous tapered backing ring

For use w/GTAW root pass or consumable insert ring
- 5B = Pipe wall thickness from .38" to 1.0"
- 6B = Pipe wall thickness over 1.0"

XX= Custom weld ends (see sales order notes)

RF= Raised face flanged end connections

**23 = Manual Operation**
- N = N.A.
- H = Handwheel
- L = Handwheel with locking device (closed)
- R = Handwheel with locking device (open)
- J = Handwheel with chain
- G = Manual Bevel Gear Operator
- C = Manual Bevel Gear Operator with Chainwheel
- A = Manual Bevel Gear with Air Wrench
- P = Manual Bevel Gear with position indicator
- M = Manual Bevel Gear Operator with locking device (closed)
- R = Manual Bevel Gear Operator with locking device (open)
- B = Hammerblow Handwheel

**24 = Valve Actuator**
- N = N.A.
- E = Direct mount Electric Motor Operator
- T = Direct mount Electric Motor Operator w/thermal compensating device
- F = Electric Motor Operator with Bevel Gear
- P = Pneumatic Operator
- H = Hydraulic Operator
- M = Operator mounted by customer

**25 = Gear & Actuator Mounting Dimensions (per MSS SP-102)**

| | |
|---|---|
| N = N.A. | 5 = FA25 |
| 1 = FA7 | 6 = FA30 |
| 2 = FA10 | 7 = FA35 |
| 3 = FA14 | 8 = FA40 |
| 4 = FA16 | 9 = Other |

**Denotes Standard Offering*

Revision date
2-2011

**Following is the figure number definition for Pacific Wedgeplug valves (7.2):**

| G | A | 0 | 6 | OR | RF |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| TYPE OF OPERATOR | PLUG/STEM ARRANGEMENT | PORT OPENING | PRESSURE CLASS | OPTIONAL FEATURES | END CONNECTIONS |

| | | | |
|---|---|---|---|
| 1 | Type of operator | W | Wrench |
| | | H | Handwheel |
| | | G | Gear |
| | | M | Motor (Electric or Air) |
| | | C | Cylinder (Air or Hydraulic) |
| 2 | Plug/Stem Arrange-ment | A | Standard Design |
| | | B | Balanced Stem |
| | | T | Trunnion Mounted |
| 3 | Port Opening | 4 | 40% |
| | | 7 | 70% |
| | | 9 | 90% |
| | | 0 | 100% |

| | | | |
|---|---|---|---|
| 4 | Pressure Class | 1 | 150 |
| | | 3 | 300 |
| | | 6 | 600 |
| | | 9 | 900 |
| | | 15 | 1500 |
| | | 25 | 2500 |
| 5 | Optional Features | OR | O-Seal |
| | | EB | Extended Bonnet |
| | | HD | Heat dissipating Fins |
| | | S | Standard steam jacket |
| | | J | Steam jacket with oversized flanges and long face to face. |
| | | Z | Flangeless Design |
| | | — | No optional features |
| | | T3 | Pipeline Standard Trim |
| | | T6 | Pipeline NACE Standard |
| | | T7 | Pipeline NACE (Highly Corrosive) |
| | | XX | Other Pipeline Trims upon application |
| 6 | End Connections | RF | Raised face |
| | | RJ | Ring Joint |
| | | FF | Flat face |
| | | SF | Special serrated finish |
| | | BW | Buttweld |
| | | SE | Screwed ends |
| | | SW | Socket weld ends |
| | | GH | Grayloc© Hub |

7.3 The following charts denotes the appropriate maintenance manual section for a given valve figure number/style. Please note that the sections listed are the specialized sections only and pertinent general valve information is contained in other sections of this manual. Please refer to table of contents for total listings.

| API 600 BOLTED BONNET-GATE VALVE, OS&Y | | Manual Section |
|---|---|---|
| 150 | Class 150, solid wedge gate valve | G |
| 2150 | Class 150, split wedge gate valve | G |
| 2155 | Class 150, flexible wedge gate valve | G |
| 350 | Class 300, solid wedge gate valve | G |
| 357 | Class 300, solid wedge gate valve w/double ball grease injector in seat and stuffing box | G |
| 2350 | Class 300, split wedge gate valve | G |
| 2355 | Class 300, flexible wedge gate valve | G |
| 2357 | Class 300, flexible wedge gate w/double ball grease injector in seat and stuffing box | G |
| 650 | Class 600, solid wedge gate valve | G |
| 2650 | Class 600, split wedge gate valve | G |
| 2655 | Class 600, flexible wedge gate valve | G |
| 950 | Class 900, solid wedge gate valve | G |
| 2950 | Class 900, split wedge gate valve | G |
| 2955 | Class 900, flexible wedge gate valve | G |
| 1550 | Class 1500, solid wedge gate valve | G |
| 21555 | Class 1500, flexible wedge gate valve | G |

| API 600 BOLTED BONNET-GLOBE VALVE, OS&Y | | |
|---|---|---|
| 160 | Class 150, plug type disc globe valve | H |
| 161 | Class 150, V-port disc globe valve | H |
| 163 | Class 150, plug type disc globe valve w/extra deep stuffing box | H |
| 360 | Class 300, plug type disc globe valve | H |
| 361 | Class 300, V-port disc globe valve | H |
| 363 | Class 300, plug type disc globe valve w/extra deep stuffing box | H |
| 366 | Class 300, plug type disc globe with double ball grease injector in stuffing box and seat | H |
| 660 | Class 600, plug type disc globe valve | H |
| 661 | Class 600, V-port disc globe valve | H |
| 960 | Class 900, plug type disc globe valve | H |

| API 600 BOLTED BONNET-SWING CHECK VALVE | | |
|---|---|---|
| 180 | Class 150, swing check valve | I |
| 183 | Class 150, swing check valve w/outside lever & weight | I |
| 184 | Class 150, swing check valve w/internal hinge pin | I |
| 187 | Class 150, severe service swing check valve | I |
| 380 | Class 300, swing check valve | I |
| 383 | Class 300, swing check valve w/outside lever & weight | I |
| 384 | Class 300, swing check valve w/internal hinge pin | I |
| 387 | Class 300, severe service swing check valve | I |
| 680 | Class 600, swing check valve | I |
| 683 | Class 600, swing check valve w/outside lever & weight | I |
| 684 | Class 600, swing check valve w/internal hinge pin | I |
| 687 | Class 600, severe service swing check valve | I |
| 984 | Class 900, swing check valve w/internal hinge pin | I |
| 987 | Class 900, severe service swing check valve | I |
| 1584 | Class 1500, swing check valve w/internal hinge pin | I |
| 1587 | Class 1500, severe service swing check valve | I |

| | | |
|---|---|---|
| API 602 COMPACT GATE VALVE, OS&Y | | |
| 3354 | Class 300, solid wedge gate valve, flanged ends | G |
| 3654 | Class 600, solid wedge gate valve, flanged ends | G |
| 3655 | Class 800, solid wedge gate valve, threaded ends | G |
| 3656 | Class 800, solid wedge gate valve, socket weld ends | G |
| 31550 | Class 1500, solid wedge gate valve, flanged ends | G |
| 31551 | Class 1500, solid wedge gate valve, threaded ends | G |
| 31552 | Class 1500, solid wedge gate valve, socket weld ends | G |

| | | |
|---|---|---|
| API 602 COMPACT GLOBE VALVE, OS&Y | | |
| 3367 | Class 300, globe valve, flanged ends | H |
| 3667 | Class 600, globe valve, flanged ends | H |
| 665 | Class 600, globe valve w/double ball grease injector in seat and stuffing box, flanged ends | H |
| 666 | Class 800, ditto except threaded ends | H |
| 667 | Class 800, ditto except socket weld ends | H |
| 3668 | Class 800, globe valve, threaded ends | H |
| 3669 | Class 800, globe valve, socket weld ends | H |
| 31560 | Class 1500, globe valve, flanged ends | H |
| 31561 | Class 1500, globe valve, threaded ends | H |
| 31562 | Class 1500, globe valve, socket weld ends | H |

| | | |
|---|---|---|
| API 602 COMPACT LIFT CHECK VALVE | | |
| 3380 | Class 300, check valve, flanged ends | I |
| 3680 | Class 600,check valve, flanged ends | I |
| 3681 | Class 800, check valve, threaded ends | I |
| 3682 | Class 800, check valve, socket weld ends | I |
| 31580 | Class 1500, check valve, flanged ends | I |
| 31581 | Class 1500, check valve, threaded ends | I |

| | | |
|---|---|---|
| ANSI B16.34 PRESSURE SEAL GATE VALVE, OS&Y | | |
| 55006 | Class 600, solid wedge gate valve | B |
| 55406 | Class 600, parallel seat gate valve | C |
| 55506 | Class 600, flexible wedge gate valve | B |
| 55009 | Class 900, solid wedge gate valve | B |
| 55409 | Class 900, parallel seat gate valve | C |
| 55509 | Class 900, flexible wedge gate valve | B |
| 55015 | Class 1500, solid wedge gate valve | B |
| 55415 | Class 1500, parallel seat gate valve | C |
| 55515 | Class 1500, flexible wedge gate valve | B |
| 55025 | Class 2500, solid wedge gate valve | B |
| 55425 | Class 2500, parallel seat gate valve | C |
| 55525 | Class 2500, flexible wedge gate valve | B |

| | | |
|---|---|---|
| ANSI B16.34 PRESSURE SEAL GLOBE and STOP-CHECK VALVE, OS&Y | | |
| 59006 | Class 600, Y-globe stop valve, plug type disc | E |
| 59506 | Class 600, Y-globe stop-check valve (non-return) | E |
| 56009 | Class 900, globe stop valve, plug type disc | D |
| 56509 | Class 900, globe stop-check valve (non-return) | D |
| 59009 | Class 900, Y-globe stop valve, plug type disc | E |
| 59509 | Class 900, Y-globe stop-check valve (non-return) | E |
| 56015 | Class 1500, globe stop valve, plug type disc | D |

| | | |
|---|---|---|
| 56515 | Class 1500, globe stop-check valve (non-return) | D |
| 59015 | Class 1500, Y-globe stop valve, plug type disc | E |
| 59515 | Class 1500, Y-globe stop-check valve (non-return) | E |
| 56025 | Class 2500, globe stop valve, plug type disc | D |
| 56525 | Class 2500, globe stop-check valve (non-return) | D |
| 59025 | Class 2500, Y-globe stop valve, plug type disc | E |
| 59525 | Class 2500, Y-globe stop-check valve (non-return) | E |

ANSI B16.34 PRESSURE SEAL CHECK VALVE

| | | |
|---|---|---|
| 58609 | Class 900, lift check valve | F |
| 58809 | Class 900, tilting disc check valve | F |
| 59609 | Class 900 Y-globe lift check valve | E,F |
| 58615 | Class 1500, lift check valve | F |
| 58815 | Class 1500, tilting disc check valve | F |
| 59615 | Class 1500 Y-globe lift check valve | E,F |
| 58625 | Class 2500, lift check valve | F |
| 58825 | Class 2500, tilting disc check valve | F |
| 59625 | Class 2500 Y-globe lift check valve | E,F |

WEDGEPLUG VALVE

| | | |
|---|---|---|
| All | All figure number designations | K |

## 8.0 Boundary Conditions

The following three charts denote the defined boundary conditions for all Pacific Valve products.

**Boundary conditions for Pressure Seal products**

| | |
|---|---|
| Scope of product: | 2 ½" through 36" Class 600 through 2500 |
| Service fluid: | • Water, steam, gas, or hydrocarbon compounds.<br>• No suspended solid material greater than 100 microns |
| Service Life: | 20 years or when corrosion allowance is depleted whichever is less. This excludes normal maintenance parts such as packing, seals, gaskets and parts that move relative to each other e.g. seats, stems and bushings. |
| Allowable pressure and temperature: | Per Table 2 ASME B16.34 |
| Materials for pressurized parts: | Only materials approved under PMA by Accredited Notified Body may be used. See approved CE materials list. Appropriate material for service conditions to be based upon the following criteria:<br>1. The design pressure and temperature<br>2. An acceptable service life consistent with the corrosion rate of the material at design conditions.<br>3. Expected operating conditions within the defined pressure cycles, thermal cycles and flow velocity limits. |
| Packing and gasket materials | To be compatible with expected operating conditions |
| Corrosion/erosion allowance: | Varies by valve size and pressure class. See valve wall thickness calculation in Table 1 of this section. |
| Method of operation: | • Gate and Globe: Handwheel, Manual Gear, Motor Actuator, Air or Hydraulic cylinder Actuator<br>• Check: self-actuation |
| Frequency of operation: | • Gate and Globe valves: not to exceed once per week or 50 per year |

| | |
|---|---|
| | • Check: N/A |
| Installation orientation: | • Gate and Globe: Stem vertical up in a horizontal pipe run.<br>• Check: Flow horizontal in a horizontal pipe run or Vertical up in a vertical pipe run. |
| Flow velocity.<br>• To keep noise and erosion at or below reasonable levels, valves are not to be used for throttling service, and velocity is not to exceed the values shown in table to right.<br>• Check valves should operate at or above the velocity indicated to stabilize the disc and avoid premature wear. | Maximum flow velocity for gate, globe and check valves<br>Gate $300\sqrt{\overline{V}}$ T-globe $180\sqrt{\overline{V}}$<br>Y-globe $200\sqrt{\overline{V}}$ Check $200\sqrt{\overline{V}}$<br>Minimum flow velocity for check valves is $55\sqrt{\overline{V}}$<br>Where $\overline{V}$ =Specific volume of flowing medium |
| Hydrostatic test: | 1.5 times the 100 °F rating pressure in ASME B16.34 for the body material |
| Pressure cycles: | Unlimited cycles < Design Pressure/3 |
| Thermal cycles: | Unlimited cycles < 30 °F |
| Heat up/cool down rate: | Not to exceed 100 °F per hour for 2000 cycles |
| Pipe & support reactions: | All reaction loads transmitted through valve ends. Cross section and Moment of Inertia of valve ends to be greater than that of the connecting pipe. |
| External fire capability: | Valve seats of standard product contain no plastic or low-temperature materials. Not suitable for sustained external heat source greater than 1500 °F. |
| Wind and Earthquake rating: | 1 g load in any direction. |
| Vent or drain method: | None |

**Boundary conditions for Bolted Bonnet products**

| | |
|---|---|
| Scope of product: | ½" through 36" Class 150 through 1500 |
| Service fluid: | • Water, steam, gas, or hydrocarbon compounds.<br>• Corrosive or toxic fluids when used within the parameters defined herein.<br>• No suspended solid material greater than 100 microns |
| Service Life: | 20 years or when corrosion allowance is depleted whichever is less. This excludes normal maintenance parts such as packing, seals, gaskets and parts that move relative to each other e.g. seats, stems and bushings. |
| Allowable pressure and temperature: | Per Table 2 ASME B16.34 |
| Materials for pressurized parts: | Only materials approved under PMA by Accredited Notified Body may be used. See approved CE materials list. Appropriate material for service conditions to be based upon the following criteria:<br>1. The design pressure and temperature<br>2. An acceptable service life consistent with the corrosion rate of the material at design conditions.<br>3. Expected operating conditions within the defined pressure cycles, thermal cycles and flow velocity limits. |
| Packing and gasket materials | To be compatible with expected operating conditions |
| Corrosion/erosion allowance: | Varies by valve size and pressure class. See valve wall thickness calculation in Table 1 of this section |
| Method of operation: | • Gate and Globe: Handwheel, Manual Gear, Motor Actuator, Air or Hydraulic cylinder Actuator<br>• Check: self-actuation |
| Frequency of operation: | • Gate and Globe valves: not to exceed once per week or 50 per year<br>• Check: N/A |
| Installation orientation: | • Gate and Globe: Stem vertical up in a horizontal pipe run.<br>• Check: Flow horizontal in a horizontal pipe run or Vertical up in a vertical pipe run. |
| Flow velocity.<br>• To keep noise and erosion at or below reasonable levels, valves are not to be used for throttling service, and velocity is not to exceed the values shown in table to right.<br>• Check valves should operate at or above the velocity indicated to stabilize the disc and avoid premature wear. | Maximum flow velocity for gate, globe and check valves<br>Gate $300\sqrt{\overline{V}}$ T-globe $120\sqrt{\overline{V}}$<br>Std check $200\sqrt{\overline{V}}$ Clear way Check $240\sqrt{\overline{V}}$<br>Minimum flow velocity for check valves is $55\sqrt{\overline{V}}$<br>Where $\overline{V}$ =Specific volume of flowing medium in $ft^3/lb$ |
| Hydrostatic test: | 1.5 times the 100 °F rating pressure in ASME B16.34 for the body material |
| Pressure cycles: | Unlimited cycles < Design Pressure/3 |
| Thermal cycles: | Unlimited cycles < 30 °F |
| Heat up/cool down rate: | Not to exceed 100 °F per hour for 2000 cycles |
| Pipe & support reactions: | All reaction loads transmitted through valve ends. Cross section and Moment of Inertia of valve ends to be greater than that of the connecting pipe. |
| External fire capability: | Valve seats of standard product may be solid metal or may contain plastic inserts. Solid metal seats are not suitable for a sustained external heat source greater than 1500 °F. Plastic inserted seats are not suitable for temperatures greater than 450 °F. |
| Wind and Earthquake rating: | 1 g load in any direction. |
| Vent or drain method: | None |

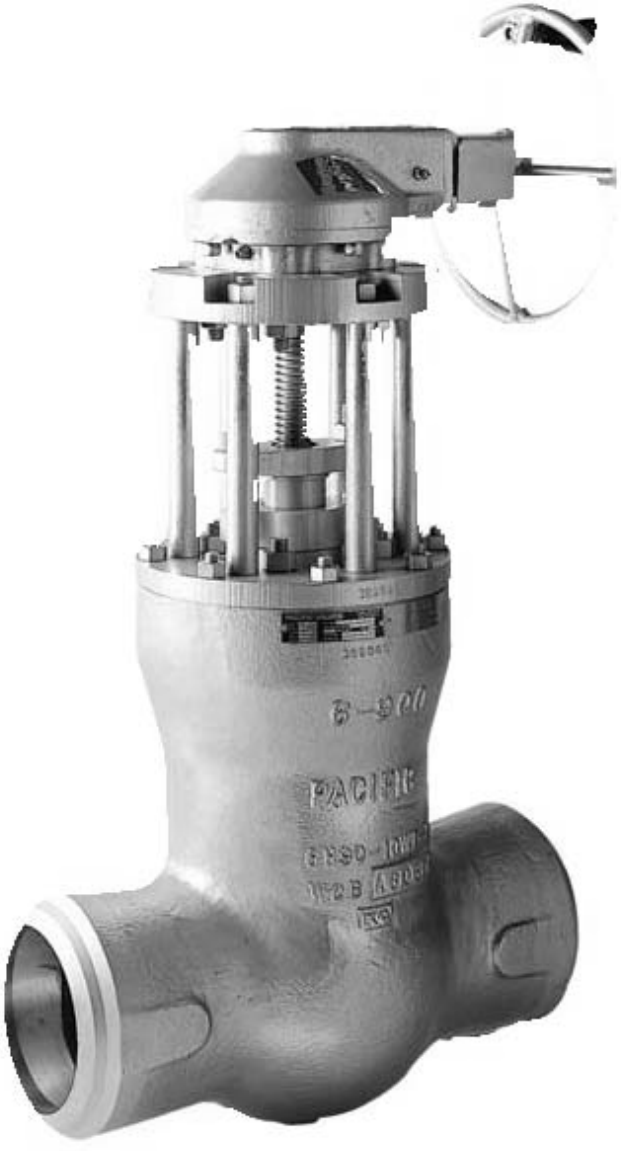
## Boundary conditions for Wedgeplug products

| | |
|---|---|
| Scope of product: | ½" through 30" Class 150 through 1500 |
| Service fluid: | Water, steam, gas, or hydrocarbon compounds. |
| Service Life: | 20 years or when corrosion allowance is depleted whichever is less. This excludes normal maintenance parts such as packing, seals, gaskets and parts that move relative to each other e.g. seats, stems and bushings. |
| Allowable pressure and temperature: | Per Table 2 ASME B16.34 |
| Materials for pressurized parts: | Only materials approved under PMA by Accredited Notified Body may be used. See approved CE materials list. Appropriate material for service conditions to be based upon the following criteria:<br>1. The design pressure and temperature<br>2. An acceptable service life consistent with the corrosion rate of the material at design conditions.<br>3. Expected operating conditions within the defined pressure cycles, thermal cycles and flow velocity limits. |
| Packing and gasket materials | To be compatible with expected operating conditions |
| Corrosion/erosion allowance: | Varies by valve size and pressure class. See valve wall thickness calculation in Table 1 of this section. |
| Method of operation: | Handwheel, Manual Gear, Motor Actuator, Air or Hydraulic cylinder Actuator |
| Frequency of operation: | Not to exceed once per week or 50 per year |
| Installation orientation: | Stem vertical in a horizontal pipe run. |
| Flow velocity. | To keep noise and erosion at or below reasonable levels, valves are not to be used for throttling service and velocity is not to exceed $120\sqrt{\overline{V}}$<br>Where $\overline{V}$ =Specific volume of flowing medium |
| Hydrostatic test: | 1.5 times the 100 °F rating pressure in ASME B16.34 for the body material |
| Pressure cycles: | Unlimited cycles < Design Pressure/3 |
| Thermal cycles: | Unlimited cycles < 30 °F |
| Heat up/cool down rate: | Not to exceed 100 °F per hour for 2000 cycles |
| Pipe & support reactions: | All reaction loads transmitted through valve ends. Cross section and Moment of Inertia of valve ends to be greater than that of the connecting pipe. |
| External fire capability: | Valve seats of standard product may be solid metal or may contain plastic inserts. Solid metal seats are not suitable for a sustained external heat source greater than 1500 °F. Plastic inserted seats are not suitable for temperatures greater than 450 °F. |
| Wind and Earthquake rating: | 1 g load in any direction. |
| Vent or Drain method | None |

CRANE

Energy Flow Solutions

# Section B
# Pacific Valves
## Pressure Seal Gate Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
www . cranevalve.com

*O&M Manual*
*Revision date*
*2-2011*

## PRESSURE SEAL GATE VALVES

1.0 General Information

For general operation & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual.

For specific information pertaining to Parallel Disc Gate Valves, please refer to section “C” of this manual.

For specific information pertaining to the Fabricated Yoke Assembly, please refer to section “R” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves prior to disassembling any valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.3.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*2.3.2 Crane* requires that the pressure seal bonnet gasket 55 be replaced when servicing any valve.

*2.3.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.3.4* When reassembling the valve it should be noted that in certain cases it may be necessary to e-tighten the bonnet draw bolts 16C after the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

For all other bolting, excluding gland studs, torque bolts per section M.

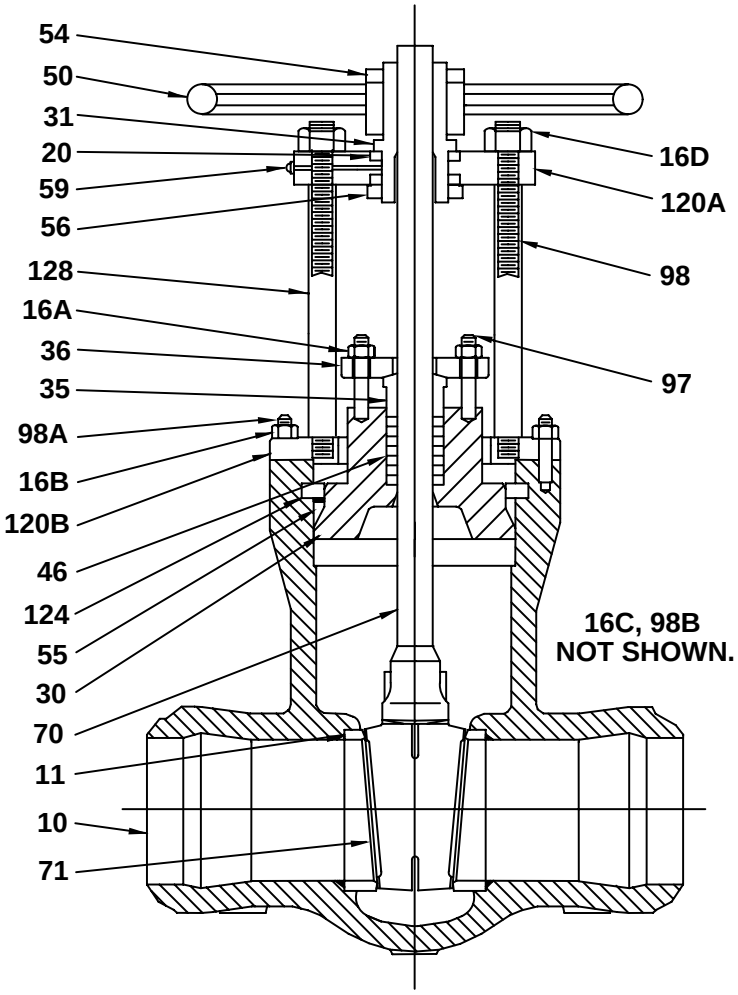
# PRESSURE-SEAL GATE VALVES

## CLASS 600, 900, 1500, & 2500

## ALL SIZES

DISASSEMBLY

- Read the warning notice listed in section 2.0 of these instructions.
- Loosen gland stud nuts 16A. Loosen and remove bonnet nuts 16C and yoke nuts 16B.
- Install rigging to support weight of the yoke assembly and the handwheel or actuator if present.
- Turn the handwheel to closed position. The yoke and handwheel will back off of the stem 70. Temporarily remove yoke assembly.
- Remove the gland flange 36, gland 35, and all packing material 46.
- Using a block of wood or similar soft material, drive the bonnet 30 down until there is sufficient clearance above the bonnet to remove the segment rings 124. Care should be taken to ensure that bonnet does not become cocked during this process.
- Using a brass bar, tap the top of each segment ring to loosen, using lubricants as necessary. Remove the segments by prying, with a screwdriver or similar tool, out away from the body until the segments are free to be lifted out. ***Clean all surfaces of foreign matter prior to next step.***
- Replace the yoke and turn the handwheel to open valve. After backseating, continue to raise the bonnet until the pressure seal gasket 55 is free. Pull the yoke assembly, bonnet 30 stem 70, and the wedge 71 from the body 10.
- Use extreme caution to not scratch or damage the seating surfaces of the body, gasket, bonnet, or wedge. Match mark the wedge to the body for re-assembly.
- Remove the gasket 55 from the bonnet. Remove the stem from the bonnet.
- Clean the stuffing box and stem.




**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 54 | WHEEL NUT |
| 11 | SEAT RING | 55 | GASKET |
| 16A | NUT | 56 | JAM NUT |
| 16B | NUT | 59 | GREASE FITTING |
| 16C | NUT | 70 | STEM |
| 16D | NUT | 71 | WEDGE |
| 20 | BEARINGS | 97 | STUD |
| 30 | BONNET | 98 | STUD |
| 31 | YOKESLEEVE | 98A | STUD |
| 35 | GLAND | 98B | STUD |
| 36 | GLAND FLANGE | 120A | TOP PLATE |
| 46 | PACKING | 120B | BASE PLATE |
| 50 | HANDWHEEL | 124 | SEGMENT RING |
| | | 128 | YOKE COLUMN |

NOTE: After system pressure has been reestablished, retighten all bolting in accordance with this manual.

## REASSEMBLY

- Clean all parts thoroughly. Polish gasket seating surface in the body 10 and the bonnet 30 with fine emery cloth. Lubricate the gasket seating surfaces with a light oil to prevent galling during assembly. Replace gasket 55 with a new factory supplied part.
- Insert the wedge 71 and the stem 70 into the body 10 following the match marks previously made.
- Install the gasket 55 onto the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 into the body groove and backseat the bonnet to seat the gasket and install the bonnet bolting. Torque per the values listed in section "M" of this manual.
- Install the yoke assembly. Install new packing, and reinstall the gland, gland flange and tighten the eyebolt nuts.

3.0 Maintenance of disassembled valves

*3.1* Following the above listed disassembly procedures, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat rings 11 and wedge 71 for wear.

*3.3* Examine stem 70, seal area and threads for excessive wear.

*3.4* If excessive wear is evident, worn parts, or if necessary, the entire valve should be reconditioned or replaced.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.6* Crane also offers complete re-manufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will re-manufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yoke sleeve threads 70, 31, entire gasket 55, and under all nuts 16 before torquing. Bonnet draw studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance. However, in certain large valve styles, the use of a hydraulic torque device may be necessary to achieve optimum bolt torque.

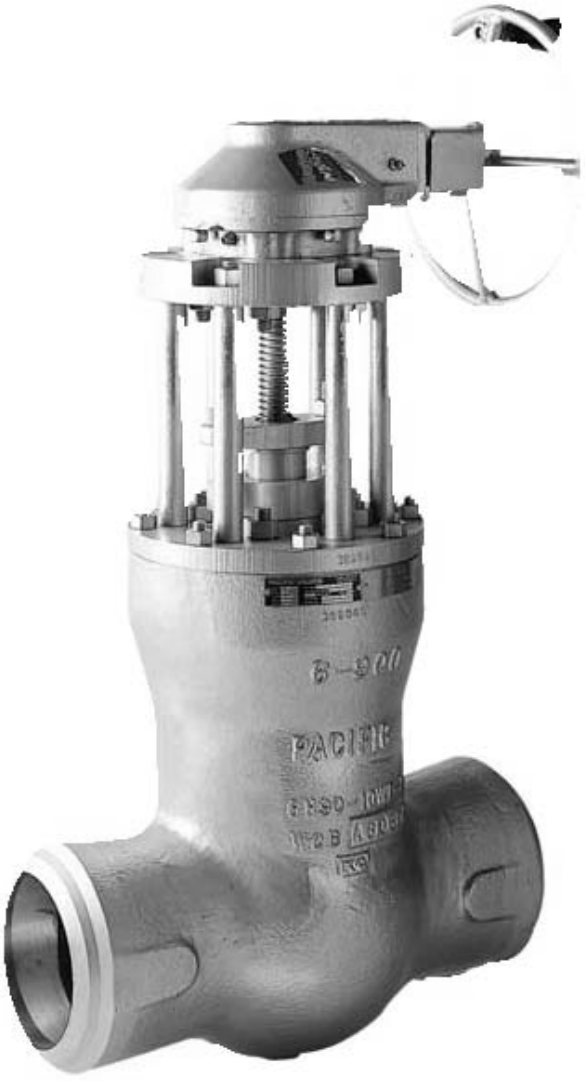
6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

CRANE

Energy Flow Solutions

# Section C
# Pacific Valves
## Pressure Seal Parallel Disc Gate Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*O&M Manual*
*Revision date*
*2-2011*

1.0 General Information

For general operation & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual.

For specific information pertaining to the Fabricated Yoke Assembly, please refer to section “R” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information. **Note that this valve is position seated. Do not use motor torque switch settings to close this valve.**

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.3.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*2.3.2 Crane* requires that the pressure seal bonnet gasket 55 be replaced when servicing any valve.

*2.3.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.3.4* When reassembling the valve it should be noted that it is necessary to re- tighten the bonnet draw bolts 16C after the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

For all other bolting, excluding gland studs, torque per section M.

# PRESSURE-SEAL PARALLEL DISC GATE VALVES

## CLASS 600, 900, 1500, & 2500

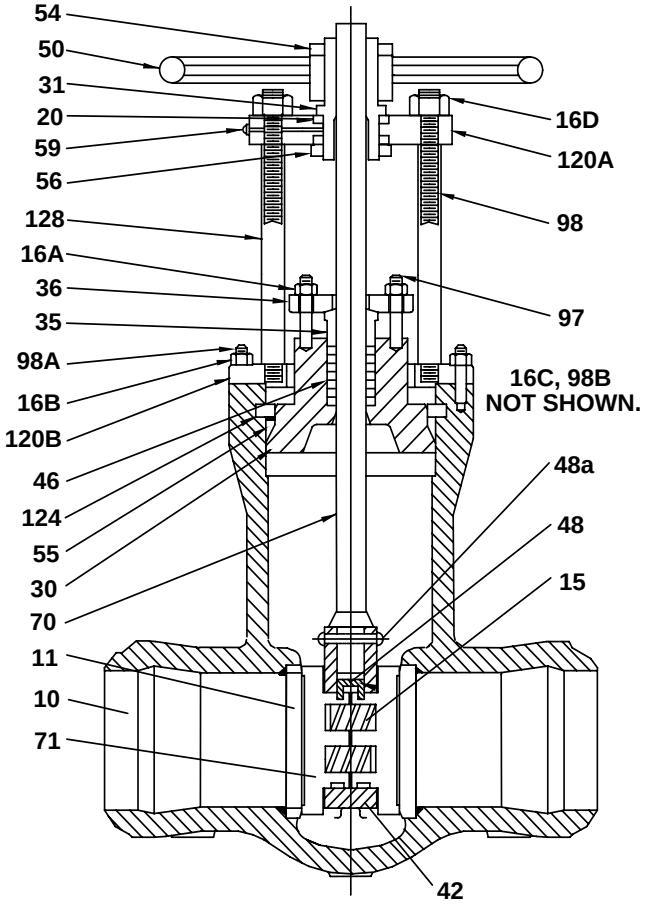
## ALL SIZES

DISASSEMBLY

- Read the warning notice listed in section 2.0 of these instructions
- Loosen gland stud nuts 16A. Loosen and remove bonnet nuts 16C and yoke nuts 16B.
- Install rigging to support weight of the yoke assembly and the handwheel or actuator if present.
- Turn the handwheel to closed position. The yoke and handwheel will back off of the stem 70.
- Remove the gland flange 36, gland 35, and all packing material 46.
- Using a block of wood or similar soft material, drive the bonnet 30 down until there is sufficient clearance above the bonnet to remove the segment rings 124. Care should be taken to ensure that bonnet does not become cocked during this process.
- Using a brass bar, tap the top of each segment ring to loosen, using lubricants as necessary. Remove the segments by prying, with a screwdriver or similar tool, out away from the body until the segments are free to be lifted out. ***Clean all surfaces of foreign matter prior to next step.***
- Replace the yoke and turn the handwheel to open valve. After backseating, continue to raise the bonnet until the pressure seal gasket 55 is free. Pull the yoke assembly, bonnet 30 stem 70, and the discs 71 from the body 10. Use caution while lifting the stem/disc assembly off the seats as the disc will "pop" open at the bottom when free of the seatrings.
- Use extreme caution to not scratch or damage the sealing surfaces of the body, gasket, bonnet, discs or seat rings.
- Remove the gasket 55 from the bonnet. Remove the bonnet over the end of the stem.
- Clean the stuffing box and stem.

**REASSEMBLY**

- Clean all parts thoroughly. Polish gasket-seating surface in the body 10, and on the bonnet 30. Replace gasket 55 with a factory supplied part. Lubricate the gasket seating surfaces with a light oil or other suitable material to prevent galling during reassembly.
- Insert the disc 71 / stem 70 assembly into the body 10 noting that it is necessary to clamp the bottom of the discs together so they will fit between the seatrings. Once between the rings the clamp can be removed and assembly completed.
- Install the new gasket 55 and packing to the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 into the body groove and backseat the bonnet to seat the gasket and install the bonnet bolting. Torque per the values in section "M".
- Install the yoke and bolting. Install new packing and replace the gland, and gland flange and tighten the eyebolt nuts.




**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 48A | PIN |
| 11 | SEAT RING | 50 | HANDWHEEL |
| 15 | SPRINGS | 54 | WHEEL NUT |
| 16A | NUT | 55 | GASKET |
| 16B | NUT | 56 | JAM NUT |
| 16C | NUT | 59 | GREASE FITTING |
| 16D | NUT | 70 | STEM |
| 20 | BEARINGS | 71 | DISCS |
| 30 | BONNET | 97 | STUD |
| 31 | YOKESLEEVE | 98A | STUD |
| 35 | GLAND | 98B | STUD |
| 36 | GLAND FLANGE | 120A | TOP PLATE |
| 42 | CARRIER | 120B | BASE PLATE |
| 46 | PACKING | 124 | SEGMENT RING |
| 48 | CLIP | 128 | YOKE COLUMN |

NOTE: After system pressure has been reestablished, re-tighten all bolting to the TORQUE values given in section "M" of this manual.

3.0 Maintenance of disassembled valves

*3.1* Following the above listed disassembly procedures, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat rings 11 and discs 71 for wear.

*3.3* Inspect disc 71 spring holes for wear.

*3.4* Examine carrier 42 guide surfaces for wear.

*3.5* Examine stem 70, seal area and threads for excessive wear.

*3.6* Inspect springs 15 , pin 48A and clip 48 for signs of wear

*3.7* If excessive wear is evident, worn parts, or if necessary, the entire valve should be reconditioned or replaced.

*3.8* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.9* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary the Crane Valve Service Center will re-manufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yoke sleeve threads 70, 31, entire gasket 5, and under all nuts 16 before torquing. Bonnet draw studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* A clamping device is recommended to prevent the disc halves from springing open during installation/removal. This clamp can be a commercially available unit, or contact Pacific Valves for more information. Certain large valve styles may require the use of a hydraulic torque device to achieve optimum bolt torque.
When final stroking set up is done note that correct disc position in the closed position is @ .25 in. off the body stops. This is achieved by closing the valve until the carrier hits the stops, then backing the disc off by opening the valve @ .25 in. or 1 stem turn.

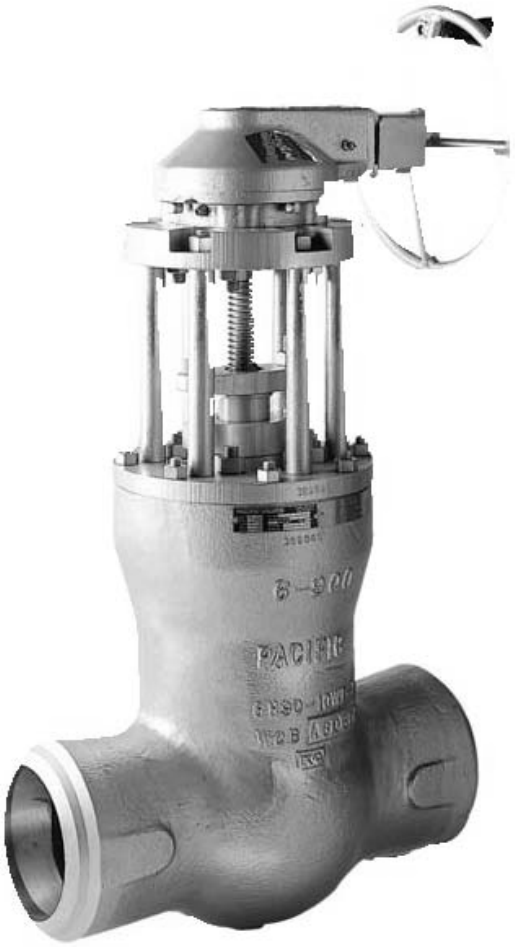
6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

**CRANE**

Energy Flow Solutions

# Section C1
# Pacific Valves
## Pressure Seal Parallel Disc
## "Belt Eye"
## Gate Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*O&M Manual*
*Revision date*
*2-2011*

1.0 General Information

For general operation & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information. **Note that this valve is position seated. Do not use motor torque switch settings to close this valve.**

*2.2* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.2.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*2.2.2 Crane* requires that the pressure seal bonnet gasket 55 be replaced when servicing any valve.

*2.2.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.2.4* When reassembling the valve it should be noted that it is necessary to re- tighten the bonnet draw bolts 16C after the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

For all other bolting, excluding gland studs, torque per section M.

# PRESSURE-SEAL PARALLEL DISC GATE VALVES

## CLASS 2500

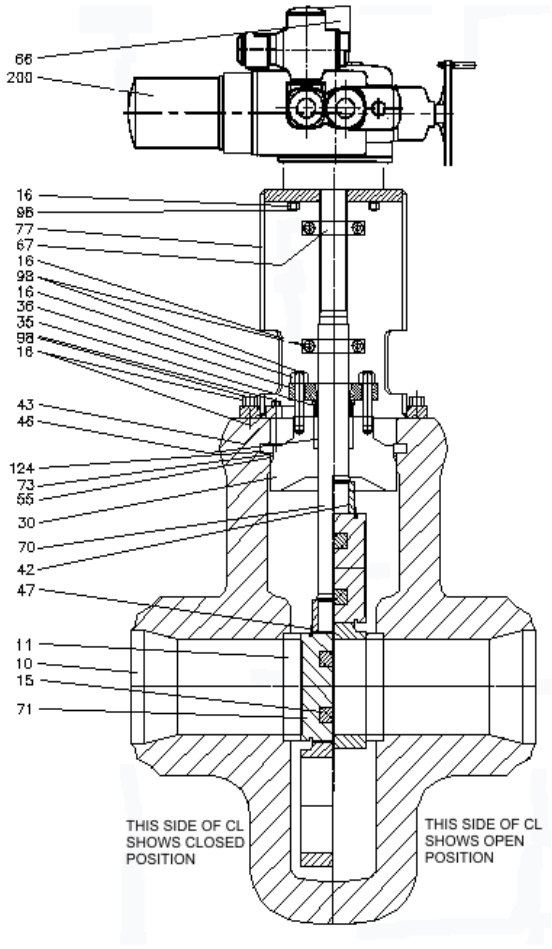
## ALL SIZES

DISASSEMBLY

- Read the warning notice listed in section 2.0 of these instructions
- Loosen gland stud nuts 16A. Loosen and remove bonnet nuts 16C and yoke nuts 16B.
- Install rigging to support weight of the yoke assembly and the handwheel or actuator if present.
- Turn the handwheel to closed position. The yoke and handwheel will back off of the stem 70.
- Remove the gland flange 36, gland 35, and all packing material 46.
- Using a block of wood or similar soft material, drive the bonnet 30 down until there is sufficient clearance above the bonnet to remove the segment rings 124. Care should be taken to ensure that bonnet does not become cocked during this process.
- Using a brass bar, tap the top of each segment ring to loosen, using lubricants as necessary. Remove the segments by prying, with a screwdriver or similar tool, out away from the body until the segments are free to be lifted out. ***Clean all surfaces of foreign matter prior to next step.***
- Replace the yoke and turn the handwheel to open valve. After backseating, continue to raise the bonnet until the pressure seal gasket 55 is free. Pull the yoke assembly, bonnet 30 stem 70, and the discs 71 from the body 10. Use caution while lifting the stem/disc assembly off the seats as the disc will "pop" open at the bottom when free of the seatrings.
- Use extreme caution to not scratch or damage the sealing surfaces of the body, gasket, bonnet, discs or seat rings.
- Remove the gasket 55 from the bonnet. Remove the bonnet over the end of the stem.
- Clean the stuffing box and stem.

**REASSEMBLY**

- Clean all parts thoroughly. Polish gasket-seating surface in the body 10, and on the bonnet 30. Replace gasket 55 with a factory supplied part. Lubricate the gasket seating surfaces with a light oil or other suitable material to prevent galling during reassembly.
- Insert the disc 71 / stem 70 assembly into the body 10 noting that it is necessary to clamp the bottom of the discs together so they will fit between the seatrings. Once between the rings the clamp can be removed and assembly completed.
- Install the new gasket 55 and packing to the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 into the body groove and backseat the bonnet to seat the gasket and install the bonnet bolting. Torque per the values in section "M".
- Install the yoke and bolting. Install new packing and replace the gland, and gland flange and tighten the eyebolt nuts.




**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 200 | ACTUATOR |
| 11 | SEAT RING | 55 | GASKET |
| 15 | SPRINGS | 70 | STEM |
| 16 | NUTS | 71 | DISCS |
| 98 | STUDS | 124 | SEGMENT RINGS |
| 77 | YOKE | | |
| 67 | STEM GUIDE | (PARTS NOT SHOWN) | |
| 43 | CARRIER | NS | DISC RETAINER STUDS & NUTS |
| 30 | BONNET | NS | LOCKING PINS |
| 47 | DISC RETAINER | | |
| 35 | GLAND | | |
| 36 | GLAND FLANGE | | |
| 42 | DISC CARRIER | | |
| 46 | PACKING | | |
| 66 | STEM COVER | | |

NOTE: After system pressure has been reestablished, re-tighten all bolting to the TORQUE values given in section "M" of this manual.

3.0 Maintenance of disassembled valves

*3.1* Following the above listed disassembly procedures, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat rings 11 and discs 71 for wear.

*3.3* Inspect disc 71 spring holes for wear.

*3.4* Examine carrier 42 guide surfaces for wear.

*3.5* Examine stem 70, seal area and threads for excessive wear.

*3.6* Inspect springs 15 & retainers 47 for signs of wear

*3.7* If excessive wear is evident, worn parts, or if necessary, the entire valve should be reconditioned or replaced.

*3.8* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.9* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary the Crane Valve Service Center will re-manufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yoke sleeve threads 70, 31, entire gasket 5, and under all nuts 16 before torquing. Bonnet draw studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* A clamping device is recommended to prevent the disc halves from springing open during installation/removal. This clamp can be a commercially available unit, or contact Pacific Valves for more information. Certain large valve styles may require the use of a hydraulic torque device to achieve optimum bolt torque.
When final stroking set up is done note that correct disc position in the closed position is @ .25 in. off the body stops. This is achieved by setting the actuator limit switches at the open and close position indication marks located on the yoke near the stem guide slot.

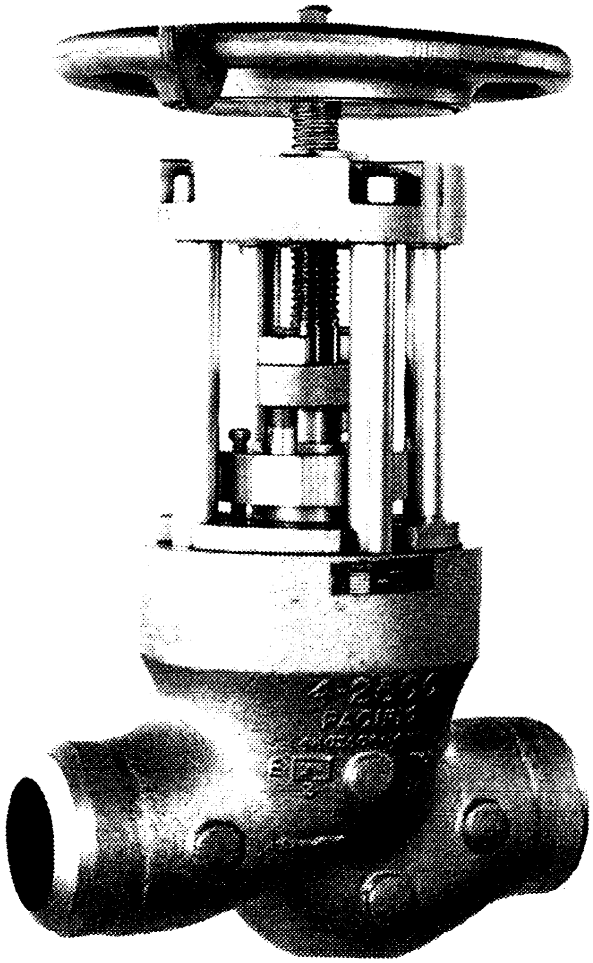
6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

**CRANE**

Energy Flow Solutions

# Section D
# Pacific Valves
## Pressure Seal Globe Valves Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
www . cranevalve.com

Revision date
2-2011

PRESSURE SEAL GLOBE VALVES

1.0 General Information

For general operation and maintenance information regarding this or any other valve please refer to section “A” of this manual. Note, the lift check and stop check versions of the globe valves have pipe orientation limitations. Refer to the warnings section “A” of this manual.

For specific information pertaining to the Fabricated Yoke Assembly, please refer to section “R” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.3.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*2.3.2 Crane* recommends to replace the pressure seal bonnet gasket 55 when servicing any valve.

*2.3.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.3.4* When reassembling the valve it should be noted that in certain cases it may be necessary to tighten the bonnet draw bolts as the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

# PRESSURE-SEAL GLOBE VALVES

## CLASS 600, 900, 1500, & 2500, ALL SIZES

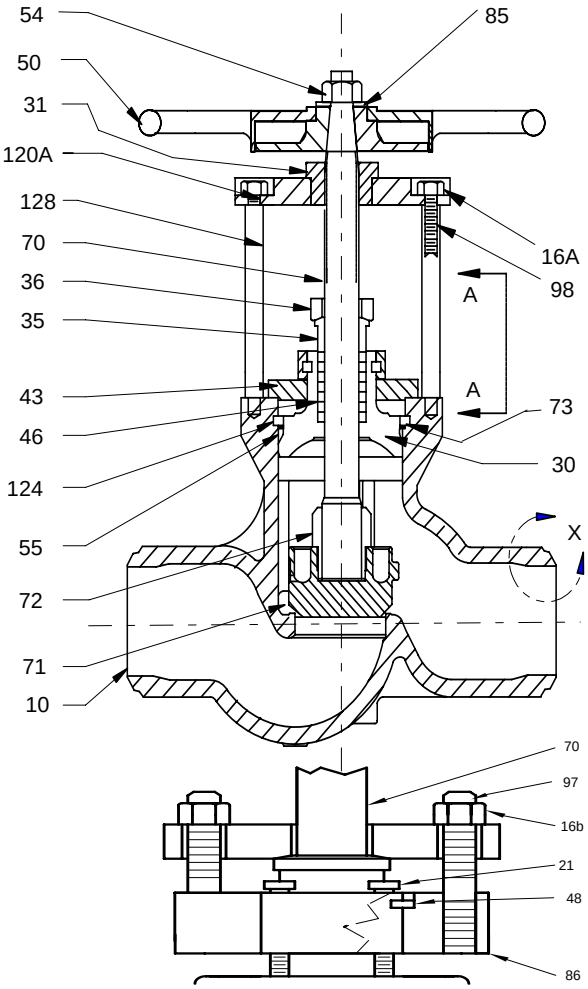
### DISASSEMBLY

- Read the warning notice in section 2.0 of these instructions.
- Remove operator 200 (if used) and upper plate 120.
- Remove the yoke columns 128 but do not remove the yoke studs.
- Remove the gland flange 36, gland 35, and all packing material 46.
- Screw in the jack bolts 21 sufficiently to loosen the collar plate 86.
- Remove the retainer clips 48.
- Remove the collar plate 86 and lower plate 43.
- Replace the upper plate 120 on the exposed yoke studs and push plate down until it contacts the bonnet 30.
- Reinstall the yoke nuts 16B and run the nuts down until they contact the upper plate. Tighten the nuts until they lower the bonnet 30 sufficiently enough to remove the segment rings 124 .
- Remove upper plate 120 and yoke nuts 16B
- Using a brass bar, tap the top of each segment ring to loosen, using lubricants as necessary. Remove the segments by prying out with a screwdriver or similar tool.
- Clean off all debris prior to next step.
- Remove gland studs 97 and reinstall them upside down. These studs may be tack welded.
- Reinstall collar plate 86 & retainer clips 48.
- Screw in the gland studs 97 to raise the entire bonnet assembly.
- Use extreme caution to not scratch or damage the seating surfaces of the body, gasket, bonnet, or disc.
- Remove disc retention system. (May be tack weld or retainer pin)
- Remove the gasket 55 (and thrust ring 73 if used) from the bonnet.
- Remove the bonnet over the end of the stem.
- Clean the stuffing box and stem.

### REASSEMBLY

- Clean all parts thoroughly. Polish gasket seating surface in the body 10 and bonnet 30 with fine emery cloth. Lubricate the gasket seating surfaces with a light oil to prevent galling during assembly. Replace gasket 55 with a new factory supplied part.
- Reassemble the bonnet in reverse order.
- Insert the disc 71 and the stem 70 into the body. Replace the disc retention system.
- Install the gasket 55 onto the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 into the body groove.
- Install the yoke and bolting. Replace the packing, gland, gland flange and tighten the jacking bolts.
- Backseat the bonnet to seat the gasket and adjust jacking bolts 21. Torque per the values in section “M” of this manual.

3.0




**VIEW A-A**

| PART IDENTIFICATION | | | |
|---|---|---|---|
| 10 | BODY | 55 | GASKET |
| 11 | SEAT RING | 70 | STEM |
| 16A | NUT | 71 | DISC |
| 16B | NUT | 72 | DISC NUT |
| 21 | JACKING BOLT | 73 | THRUST RING |
| 30 | BONNET | 85 | IMPACTOR |
| 31 | YOKESLEEVE | 86 | COLLAR PLATE |
| 35 | GLAND | 97 | GLAND STUD |
| 36 | GLAND FLANGE | 98 | YOKE ROD |
| 43 | LOWER PLATE | 120A | UPPER PLATE |
| 46 | PACKING | 124 | SEGMENT RING |
| 48 | RETAINER CLIP | 128 | YOKE COLUMN |
| 50 | HANDWHEEL | | |
| 54 | HANDWHEEL NUT | | |

SPECIAL NOTE: After system pressure has been reestablished, retighten all bolting to the Torque values given in section “M” of this manual.

Revision date
2-2011

Maintenance of disassembled valves

*3.1* Following disassembly procedures in Section 2.0, examine body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear. If soft seats are provided, the insert may need replacement, if it shows any signs of damage.

*3.3* Examine stem 70, seal area and threads for excessive wear.

*3.4* If excessive wear is evident, worn parts, or if necessary, entire valve should be reconditioned or replaced.

*3.5* Crane requires replacing the pressure seal bonnet gasket when servicing any valve.

*3.6* It should be noted that the Pacific pressure seal globe valve is available in a standard globe and stop check (non return) configuration. Each configuration utilizes a specific disc retention system.

*3.7* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve, the body material, as well as the quantity desired.

*3.8* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will re-manufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yokesleeve 70, 31, entire gasket 55, and under all nuts 16 before torquing. Bonnet draws studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance. However, in certain large valve styles, the use of a hydraulic torque device may be necessary to achieve optimum bolt torque.

6.0 Preventative maintenance

*6.1* Refer to section “A” for general maintenance data

CRANE

Energy Flow Solutions

# Section E
# Pacific Valves
## Pressure Seal Y-Globe Valves

Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

*Revision date*
*2-2011*

PRESSURE SEAL Y-GLOBE VALVES

1.0 General Information

For general operation & maintenance information regarding this or any other valve please refer to section "A" of this manual. Note, the lift check and stop check versions of the globe valves have pipe orientation limitations. Refer to the warnings section "A" of this manual.

For specific information pertaining to the Fabricated Yoke Assembly, please refer to section "R" of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

**Note:** Certain Pacific pressure seal Y-globe valves utilize a gate style bonnet configuration. If the Y-globe valve does not have the bonnet shown in figure A-A below, then the bonnet disassembly procedures from section "B" of this manual should be used.

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section "S" of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.3.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*Note:* Due to the special orientation of Y-Globe bonnets, it is especially important to ensure that the bonnet does not become misaligned during disassembly or reassembly. Whenever possible, to further facilitate disassembly, the Y-Globe valve should be removed from the pipeline and place in an angled fixture. This will orient the bonnet vertically and discourage misalignment.

*2.3.2 Crane* requires replacing the pressure seal bonnet gasket 55 when servicing any valve.

*2.3.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.3.4* When reassembling the valve it should be noted that in certain cases it is necessary to re-tighten the bonnet draw bolts 16C after the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

For all other bolting, excluding gland studs, torque bolts per section M.

# PRESSURE-SEAL Y-GLOBE VALVES

## CLASS 600, 900, 1500, & 2500

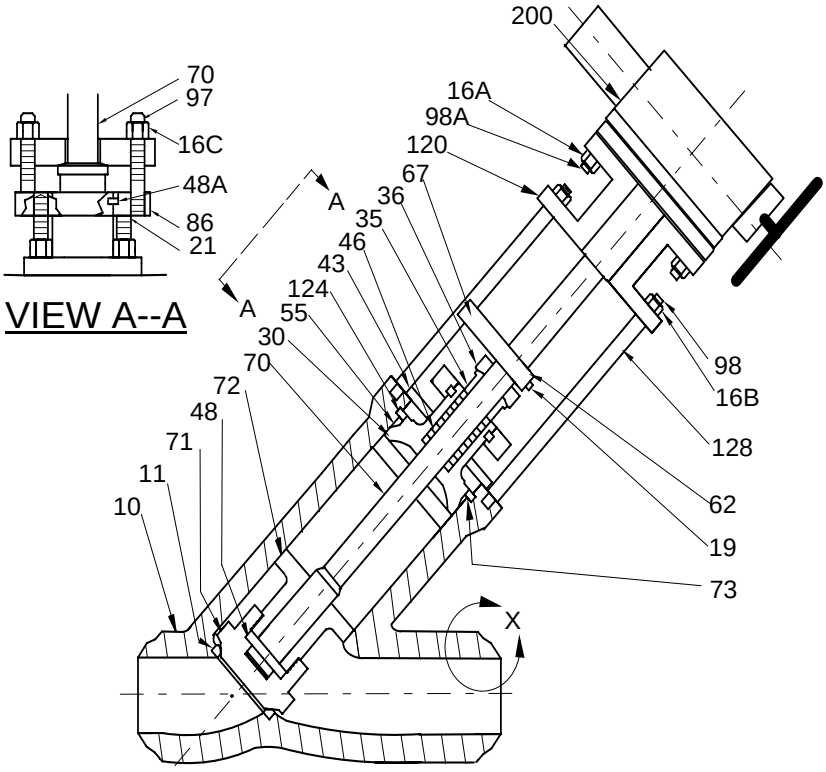
## ALL SIZES

DISASSEMBLY

- Read the warning notice in section 2.0 of these instructions.
- Remove the gland flange 36, gland 35, and all packing material 46.
- Remove operator 200 and upper plate 120.
- Remove the yoke columns 128 but do not remove the yoke studs.
- Screw in the jack bolts 21 sufficiently to loosen the collar plate 86.
- Remove the retainer clips 48.
- Remove the collar plate 86 and lower plate 43.
- Replace the upper plate 120 on the exposed yoke studs and push plate down until it contacts the bonnet 30.
- Reinstall the yoke nuts 16B and run the nuts down until they contact the upper plate. Tighten the nuts until they lower the bonnet 30 sufficiently enough to remove the segment rings 124.
- Remove upper plate 120 and yoke nuts 16B
- Using a brass bar, tap the top of each segment ring to loosen, using lubricants as necessary. Remove the segments by prying out with a screwdriver or similar tool.
- Clean off all debris prior to next step.
- Remove gland studs 97 and reinstall them upside down. These studs may be tack welded.
- Replace collar plate 86 & retainer clips 48.
- Screw in the gland studs 97 to raise the entire bonnet assembly.
- Use extreme caution to not scratch or damage the seating surfaces of the body, gasket, bonnet, or disc.
- Remove disc retention system. (May be tack weld or retainer pin)
- Remove the gasket 55 (and thrust ring 73 if used) from the bonnet.
- Remove the bonnet over the end of the stem.

**REASSEMBLY**

- Clean all parts thoroughly. Polish gasket seating surface in the body 10 and bonnet 30 with fine emery cloth. Lubricate the gasket seating surfaces with a light oil to prevent galling during assembly. Replace gasket 55 with a new factory supplied part.
- Reassemble the bonnet in reverse order.
- Insert the disc 71 and the stem 70 into the body. Orient anti rotation arm between yoke columns. Replace the disc retention system.
- Install the gasket 55 onto the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 (and thrust ring) into the body groove.
- Install the yoke and bolting. Replace the packing, gland, gland flange and tighten the jacking bolts.
- Backseat the bonnet to seat the gasket and adjust jacking bolts 21. Torque per the values in section "M" of this manual.




| PART IDENTIFICATION | | | |
|---|---|---|---|
| 10 | BODY | 55 | GASKET |
| 11 | SEAT RING | 67 | ANTI ROTATION |
| 16A | NUT | 70 | STEM |
| 16B | NUT | 71 | DISC |
| 21 | JACK BOLT | 72 | DISC NUT |
| 30 | BONNET | 73 | THRUST RING |
| 31 | YOKESLEEVE | 85 | IMPACTOR |
| 35 | GLAND | 86 | COLLAR PLATE |
| 36 | GLAND FLANGE | 97 | GLAND STUD |
| 43 | LOWER PLATE | 98 | YOKE ROD |
| 46 | PACKING | 120 | UPPER PLATE |
| 48 | RETAINER CLIP | 124 | SEGMENT RING |
| 50 | HANDWHEEL | 128 | YOKE COLUMN |
| 54 | HANDWHEEL NUT | 200 | OPERATOR |

SPECIAL NOTE: After system pressure has been re-established, re-tighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

3.0 Maintenance of disassembled valves

*3.1* Following disassembly procedures in Section 2.0, examine body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear. If soft seats are provided, the insert may need replacement, if it shows any signs of damage.

*3.3* Examine stem 70, seal area and threads for excessive wear.

*3.4* If excessive wear is evident, worn parts, or if necessary, entire valve should be reconditioned or replaced.

*3.5* Crane requires replacing the pressure seal bonnet gasket when servicing any valve.

*3.6* It should be noted that the Pacific pressure seal globe valve is available in a standard globe and stop check (non return) configuration. Each configuration utilizes a specific disc retention system

*3.7* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve, the body material, as well as the quantity desired.

*3.8* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will re-manufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yokesleeve 70, 31, entire gasket 55, and under all nuts 16 before torquing. Bonnet draws studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance. However, in certain large valve styles, the use of a hydraulic torque device may be necessary to achieve optimum bolt torque.

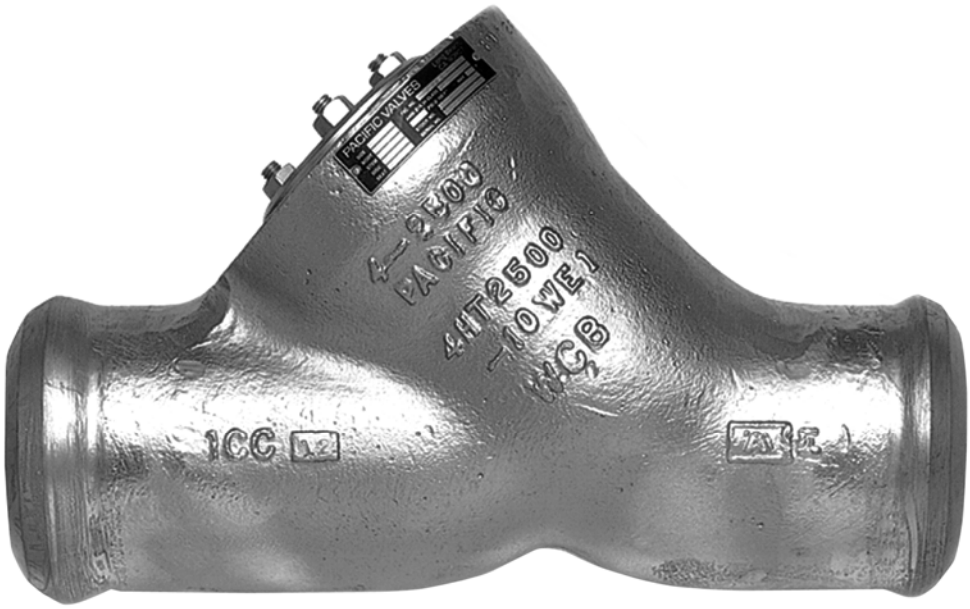
6.0 Preventative maintenance

*6.1* Refer to section “A” for general maintenance data

CRANE

Energy Flow Solutions

# Section F
# Pacific Valves
## Pressure Seal Tilt Disc Check Valves




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
www . cranevalve.com

*Revision date*
*2-2011*

PRESSURE SEAL CHECK VALVES

1.0 General Information

For general operations & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*2.1.1* Extreme care should be taken to ensure that the sealing surfaces of the gasket area do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seal area.

*Note:* Due to the special orientation of Check Valve bonnets, it is especially important to ensure that the bonnet does not become misaligned during disassembly or reassembly. Whenever possible, to further facilitate disassembly, the Check valve should be removed from the pipeline and place in an angled fixture. This will orient the bonnet vertically and discourage misalignment.

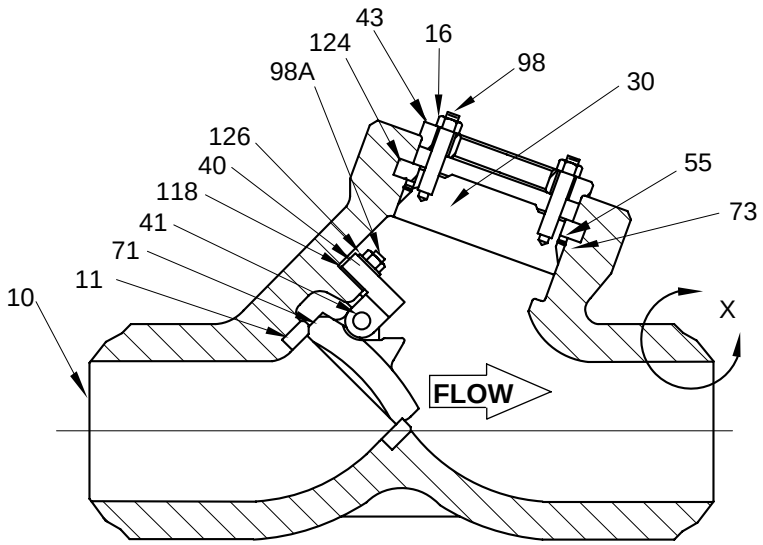
*2.1.2 Crane* requires the replacement of the pressure seal bonnet gasket 55 when servicing any valve.

*2.1.3* Caution should be exercised in handling the new bonnet gasket 55 to avoid scratching its surfaces.

*2.1.4* When reassembling the valve it should be noted that in certain cases it may be necessary to tighten the bonnet draw bolts 16C as the system pressure is built up. This process will ensure a positive seal for the pressure seal gasket.

# PRESSURE-SEAL CHECK VALVES

## CLASS 600, 900, 1500, & 2500, ALL SIZES




**DISASSEMBLY:**

- Read the warning notice in section 2.0 of these instructions.
- Loosen and remove the draw nuts 16 and studs 98.
- When a tapped hole is provided, Install an eyebolt or similar lifting device in center of bonnet 30.
- Using a block of wood or similar soft material, drive the bonnet 30 down until there is sufficient clearance above the bonnet to remove the segment rings 124.
- Using a brass bar, tap the top of each segment ring to loosen using lubricants as necessary. Remove the segments by prying, with a screwdriver or similar tool, out away from the body until the segments are free to be lifted out. Clean all surfaces of foreign matter prior to next step.
- Using the lifting device in the center of the bonnet, lift the bonnet and gasket from the valve body.
- Use extreme caution to not scratch or damage the seating surfaces of the body, gasket, and bonnet.
- Remove the hinge mounting nut 98A.
- Remove the hinge and disc assembly from the valve. Note the position, quantity and thickness of all shims 118.

**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 55 | THRUST RING (2500#ONLY) |
| 11 | SEAT RING | 71 | DISC |
| 16 | NUT | 73 | GASKET |
| 16A | NUT | 98A | STUD |
| 30 | BONNET | 98 | STUD |
| 40 | HINGE | 118 | SHIM |
| 41 | HINGE PIN | 124 | SEGMENT RINGS |
| 43 | BONNET CARRIER CAP | 126 | SHIM |

## REASSEMBLY

- Clean all parts thoroughly. Polish gasket seating surface in the body 10 ,and on the bonnet 30 with fine emery cloth. Lubricate the gasket seating surfaces with a light oil to prevent galling during assembly.
- Install the gasket 55 onto the bonnet. Insert the bonnet into the body 10. Install the segment rings 124 into the body groove. Torque per the values in section “M”.

NOTE: After system pressure has been reestablished, re-tighten all bolting to the TORQUE values given in section “M” of this manual.

*Revision date*
*2-2011*

3.0 Maintenance of disassembled valves

*3.1* Following disassembly procedures listed above, examine body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear. If soft seats are provided, the insert may need replacement, if it shows any signs of damage.

*3.3* Inspect hinge assembly 40 and hinge pin 41 for wear.

*3.3* If excessive wear is evident, worn parts, or if necessary, entire valve should be reconditioned or replaced.

*3.4* Crane requires the replacement of the pressure seal bonnet gasket when servicing any valve.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve, the body material, as well as the quantity desired.

*3.6* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are; entire gasket 55, and under all nuts 16 before torquing. Bonnet draw studs should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance.

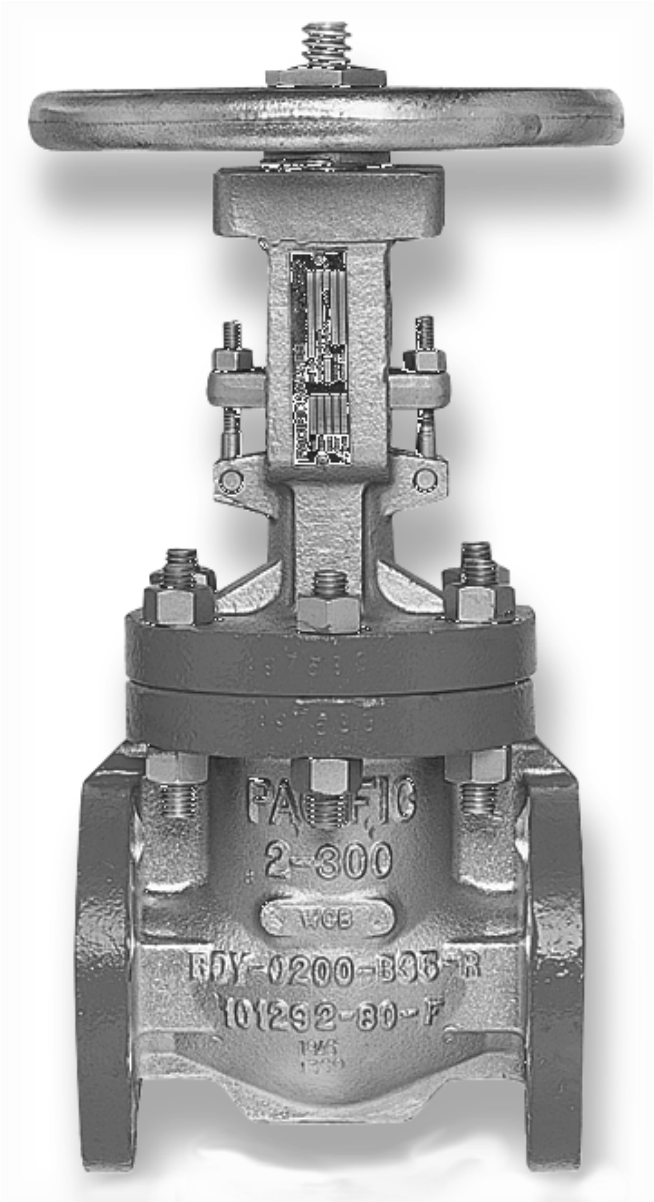
6.0 Preventative maintenance

*6.1* Refer to section “A” for general maintenance data

CRANE

Energy Flow Solutions

# Section G
# Pacific Valves
## Bolted Bonnet Gate Valves




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . cranevalve.com**

*Revision date*
*2-2011*

BOLTED BONNET GATE VALVES

1.0 General Information

For general operation & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, for specific information regarding general valve information, actuators, packing and gaskets, etc., please refer to the appropriate section.

3.0 Maintenance of disassembled valves

*3.1* Following the disassembly procedures listed below, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat rings 11 and wedge 71 for wear.

*3.3* Examine stem 70, seal area and threads for excessive wear. If excessive wear is evident, worn parts, or if necessary, the entire valve should be reconditioned or replaced.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.6* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are stem and yokesleeve threads 70,31, entire gasket 55, and under all nuts 16 before torquing. Bonnet studs and nuts should be lubricated with an antisieze lubricant.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance.

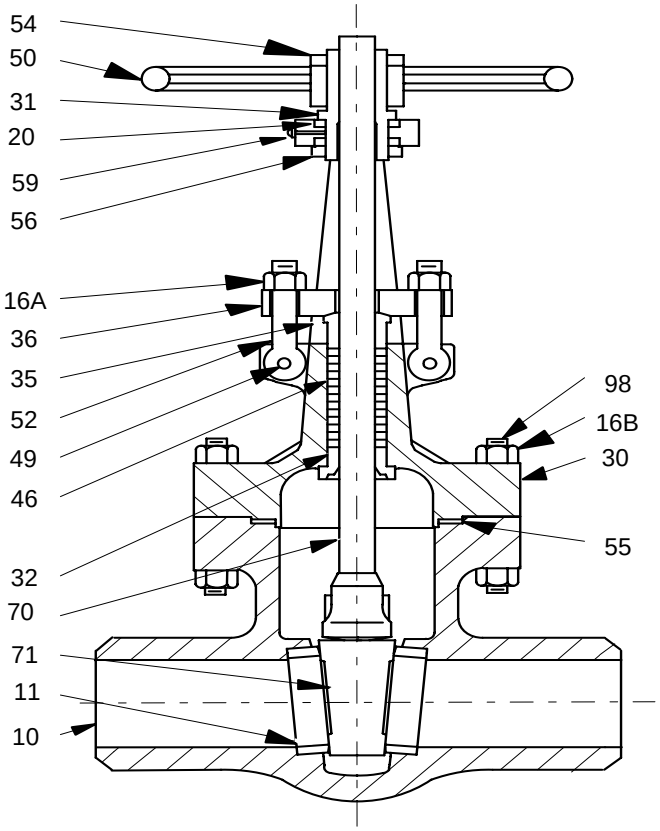
6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

# BOLTED BONNET GATE VALVES
# CLASS 150, 300, 600 & 900, ALL SIZES

## DISASSEMBLY

- Read the warning notice in section 2.0 of these instructions.
- Loosen and remove the packing gland bolts 16A
- Loosen and remove the bonnet nuts 16B and studs 98.
- Using a strap or similar device (when necessary) lift the bonnet assembly 30 up and away from the valve body 10. Note and mark the orientation of the wedge to the valve body.
- Remove the wedge 71 from the stem 70.
- While holding the stem 71 , turn the handwheel 50 in a clockwise direction to draw out the stem.
- Once the stem has been removed, the gland 35 and the gland flange 36 may be removed.
- Remove the packing 46 using a packing hook or similar tool. Care should be taken to ensure that there is no damage to the stuffing box surface.
- Remove the gasket 55 from the valve body.
- If necessary, remove the wheel nut 54 and the handwheel 50.
- Remove the jam nut 56. This may require the removal of set screws or the removal of tack welds, depending upon the valve configuration.
- Remove the yokesleeve 31 and bearings 20.
- Unless there is significant damage, the bonnet stem bushing 32 should not be removed.




## REASSEMBLY

- Clean all parts thoroughly. Lubricate the seating surfaces with a light oil to discourage galling during reassembly.
- Install a new gasket 55.
- Install new packing 46 , if necessary. Also install gland 35 and gland flange 36.
- Install stem 70 into bonnet assembly.
- Reinstall the packing gland nuts 16A..
- Replace wedge 71 onto stem.
- Install bonnet and wedge assembly into valve body 10, noting the previously made marks to indicate the wedge orientation in the body.
- Reinstall bonnet studs 98 and nuts 16B.
- Tighten the bonnet studs to the values listed in section “M” of this manual.

**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 49 | EYEBOLT PIN |
| 11 | SEAT RING | 50 | HANDWHEEL |
| 16A | NUT | 52 | EYEBOLT |
| 16B | NUT | 54 | WHEEL NUT |
| 20 | BEARINGS | 55 | GAKSET |
| 30 | BONNET | 56 | JAM NUT |
| 31 | YOKESLEEVE | 70 | STEM |
| 32 | BONNET STEM BUSHING | 71 | WEDGE |
| 35 | PACKING GLAND | 98 | STUD |
| 36 | GLAND FLANGE | | |
| 46 | PACKING | | |

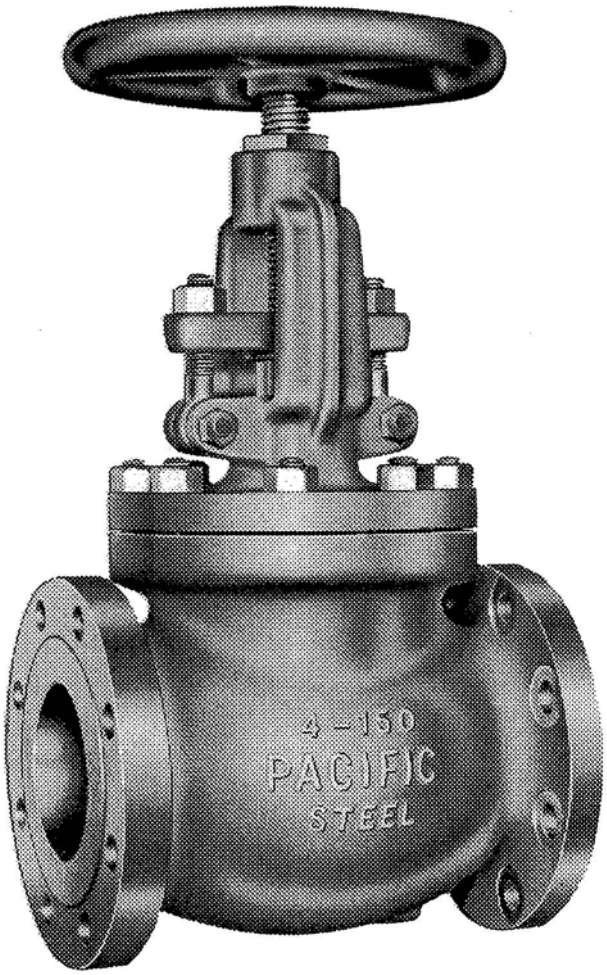
NOTE: After system pressure has been reestablished, retighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

CRANE

Energy Flow Solutions

# Section H
# Pacific Valves
## Bolted Bonnet Globe & Stop Check Valves




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . cranevalve.com**

*Revision date*
*2-2011*

BOLTED BONNET GLOBE VALVES

1.0 General Information

For general operation & maintenance information regarding this or any other Pacific valve please refer to section “A” of this manual. Note, the lift check and stop check versions of the globe valves have pipe orientation limitations. Refer to the warnings section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, for specific information regarding general valve information, actuators, packing and gaskets, etc., please refer to the appropriate section.

3.0 Maintenance of disassembled valves

*3.1* Following the disassembly procedures listed below, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear.

*3.3* Examine stem 70, seal area and threads for excessive wear.

*3.4* If excessive wear is evident, worn parts, or if necessary, the entire valve should be reconditioned or replaced.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.6* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications. **Crane Valve Services is the only authorized repair facility for Pacific Valves**

4.0 Lubrication

*4.1* Parts requiring lubrication are stem threads 70, entire gasket 55, and under all nuts 16 before torquing. Bonnet studs and nuts should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance.

6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

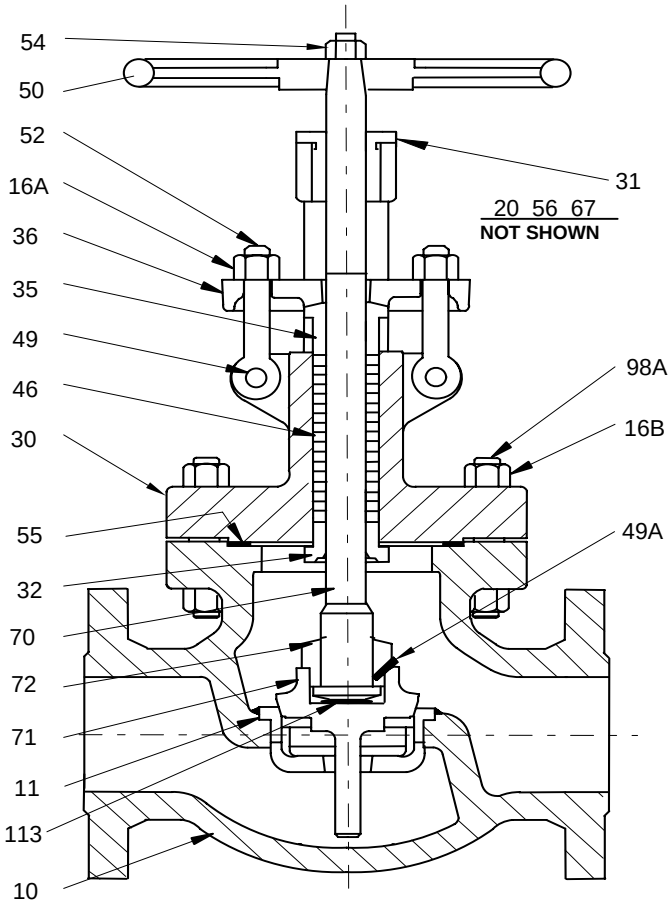
# BOLTED BONNET GLOBE VALVES
# CLASS 150, 300, 600 & 900
# ALL SIZES

## DISASSEMBLY

- Read the warning notice in section 2.0 page of these instructions.
- Loosen and remove the packing gland bolts 16A
- Loosen and remove the bonnet nuts 16B and studs 98A.
- Using a strap or similar device (when necessary) lift the bonnet assembly 30 up and away from the valve body 10.
- Remove the disc 71 from the stem 70 by grinding off the tack welds 49 on the lock nut 72 or by removing the disc pin 49A.
- Remove the wheel nut 54 and the handwheel 50.
- Remove the stem 70 by turning it until it is free of the yokesleeve 31.
- Once the stem has been removed, the gland 35 and the gland flange 36 may be removed.
- Remove the packing 46 using a packing hook or similar tool. Care should be taken to ensure that there is no damage to the stuffing box surface.
- Remove the gasket 55 from the valve body.
- If necessary, remove the yokesleeve 31 by unscrewing it counterclockwise. Note it may be necessary to remove set screws, depending upon valve configuration.
- The bonnet stem bushing 32 should not be removed unless damaged.

## REASSEMBLY

- Clean all parts thoroughly. Lubricate the seating surfaces with a light oil to discourage galling during reassembly.
- Install a new gasket 55.
- Install new packing 46 , if necessary. Also install gland 35 and gland flange 36.
- Install stem 70 into bonnet assembly.
- Reinstall the packing gland nuts 16A..
- Replace disc 71 and lock nut 72 on to stem.
- Replace disc pin 49A , if provided
- Install bonnet and disc assembly into valve body 10.
- Reinstall bonnet studs 98A and nuts 16B.
- Tighten the bonnet studs to the values listed in section “M” of this manual.




**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 10 | BODY | 49 | EYEBOLT PIN |
| 11 | SEAT RING | 49A | DISC PIN |
| 16A | NUT | 50 | HANDWHEEL |
| 16B | NUT | 52 | EYEBOLT |
| 30 | BONNET | 54 | WHEEL NUT |
| 31 | YOKESLEEVE | 55 | GASKET |
| 32 | BONNET STEM BUSHING | 70 | STEM |
| 35 | PACKING GLAND | 71 | DISC |
| 36 | GLAND FLANGE | 72 | LOCK NUT |
| 46 | PACKING | 113 | THRUST WASHER |

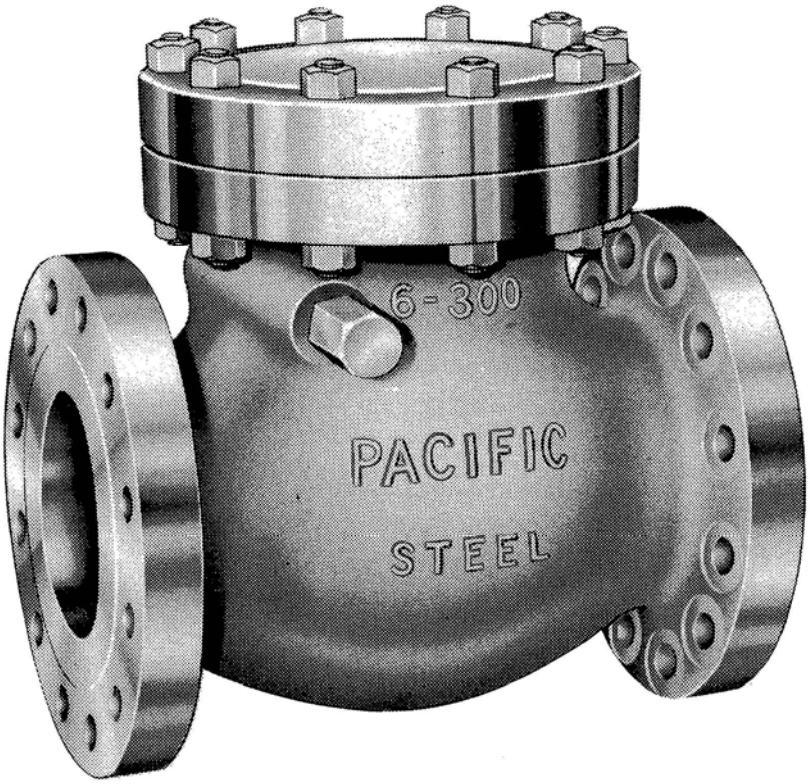
SPECIAL NOTE: After system pressure has been re-established, re-tighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

CRANE

Energy Flow Solutions

# Section I
# Pacific Valves
## Bolted Bonnet Swing Check Valves




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . cranevalve.com**

*Revision date*
*2-2011*

BOLTED BONNET CHECK VALVES

1.0 General Information

For general information regarding this or any other valve please refer to section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* Handwheel operated valves

Upon completion of the disassembly procedure listed below, the handwheel 50 may be separated from the yokesleeve 31, by removing the handwheel nut 54.

*2.2* Gear and motor operated valves

Refer to section “S” of this manual for specific gear and motor information.

*2.3* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, for specific information regarding general valve information, actuators, packing and gaskets, etc., please refer to the appropriate section.

3.0 Maintenance of disassembled valves

*3.1* Following the disassembly procedures listed below, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear.

*3.3* Examine hinge 40 and hinge pin 41 for wear.

*3.4* If excessive wear is evident, worn parts, or if necessary the entire valve should be reconditioned or replaced.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.6* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are; entire gasket 55, and under all nuts 16 before torquing. Bonnet studs and nuts should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance.

6.0 Preventative maintenance*6.1* Refer to section “A” of this manual for general valve maintenance information.

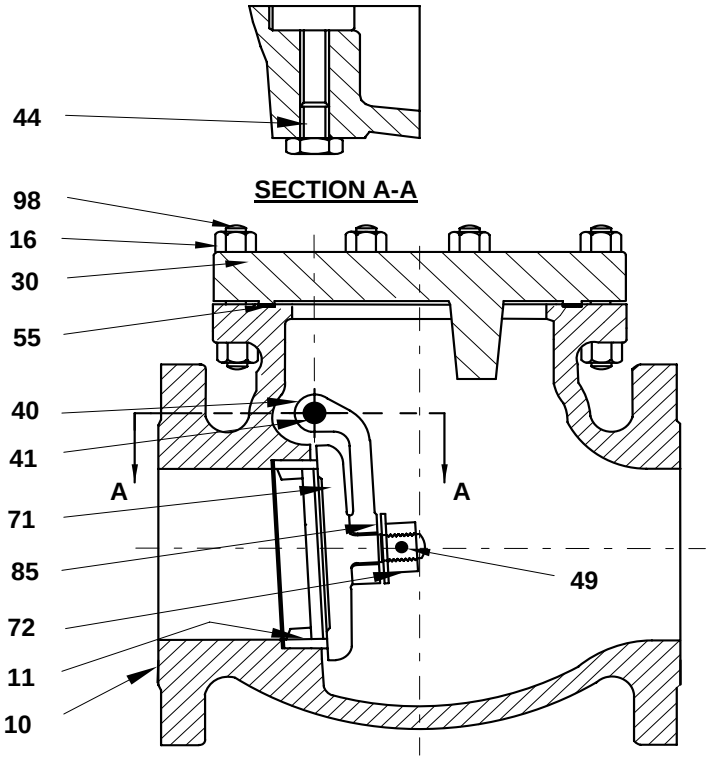
# BOLTED BONNET CHECK VALVES
# CLASS 150, 300, 600 & 900
# ALL SIZES

## DISASSEMBLY

- Read the warning notice in section 2.0 of these instructions.
- Loosen and remove the bonnet nuts 16 and studs 98..
- Remove and discard the gasket 55.
- Remove the disc nut retention system 49. This may include the disc nut pin and or a tack weld.
- bonnet.
- Remove the disc nut 72 disc washer 85 and disc 71. Care should be taken to ensure that the disc is not damaged upon removal.
- Remove the hinge mount 44.
- Remove the hinge and disc assembly from the valve. Note the position and quantity of any shims or spacers (when used).
- If necessary, remove the hinge pin 41 from the hinge 40.

## REASSEMBLY

- Clean all parts thoroughly.
- Reinstall hinge/disc assembly in reverse order
- Care should be taken to reinstall/apply any lock devices on the disc to disc nut connection.
- Install a new gasket 55.
- Tighten bonnet fasteners to the values listed in section “M” of this manual.




| PART IDENTIFICATION | | | |
|---|---|---|---|
| 10 | BODY | 49 | DISC NUT PIN |
| 11 | SEAT RING | 55 | GASKET |
| 16 | NUT | 71 | DISC |
| 30 | BONNET | 72 | DISC NUT |
| 40 | HINGE | 85 | DISC WASHER |
| 41 | HINGE PIN | 98 | STUD |
| 43 | BONNET CARRIER CAP | | |
| 44 | HINGE MOUNT | | |

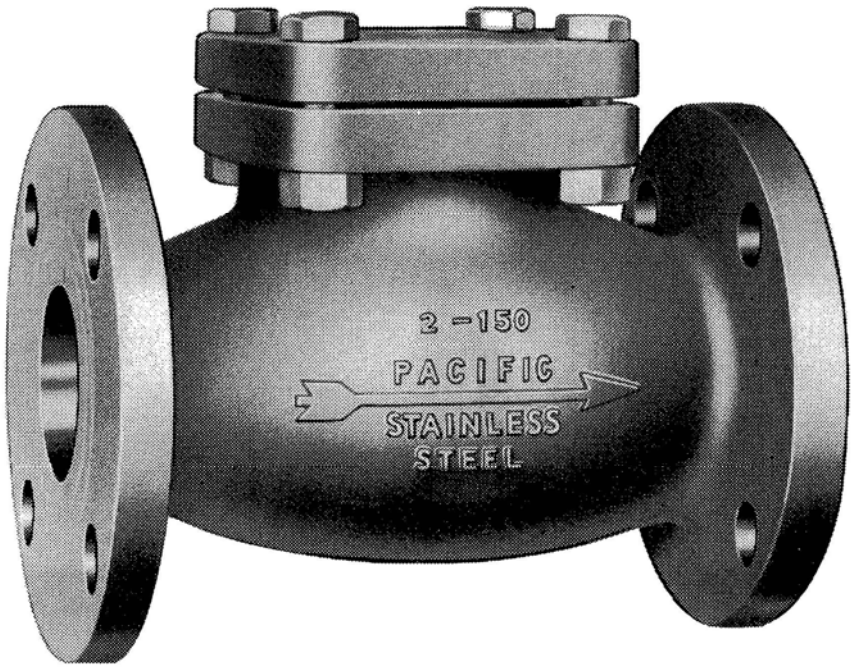
SPECIAL NOTE: After system pressure has been re-established, re-tighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

CRANE

**Energy Flow Solutions**

# Section J
# Pacific Valves
## Bolted Bonnet Lift Check Valves




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

*Revision date*
*2-2011*

BOLTED BONNET LIFT CHECK VALVES

1.0 General Information

For general information regarding this or any other valve please refer to section “A” of this manual.

2.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

*2.1* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

2.1.1 Extreme care should be taken to ensure that the sealing surfaces do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the gasket seal or disc seating areas.

3.0 Maintenance of disassembled valves

*3.1* Following the disassembly procedures listed below, examine the body cavity 10 for deposits of foreign material.

*3.2* Examine seating surfaces of seat ring 11 and disc 71 for wear.

*3.3* Examine hinge 40 and hinge pin 41 for wear.

*3.4* If excessive wear is evident, worn parts, or if necessary the entire valve should be reconditioned or replaced.

*3.5* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve and the body material.

*3.6* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications.

4.0 Lubrication

*4.1* Parts requiring lubrication are; entire gasket 55, and under all nuts 16 before torquing. Bonnet studs and nuts should be lubricated with an antisieze lubricant to promote ease of future disassembly.

5.0 Special tools and instructions

*5.1* Recommended bolting torques are shown in section “M” of this manual

*5.2* No special tools are required for general valve maintenance.

6.0 Preventative maintenance

*6.1* Refer to section “A” of this manual for general valve maintenance information.

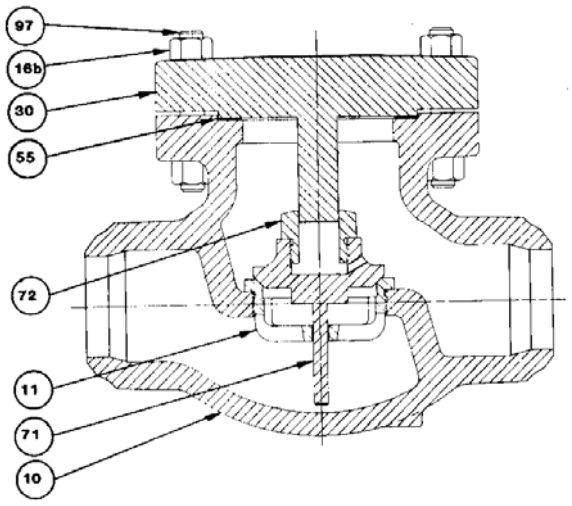
# BOLTED BONNET STOP & LIFT CHECK VALVES
# CLASS 150, 300, 600 & 900
# ALL SIZES

## DISASSEMBLY

- Read the warning notice in section 2.0 page of these instructions.
- Loosen and remove the bonnet studs and nuts 97 & 16B.
- Remove the bonnet 30.
- If necessary, remove the disc nut 72.
- Remove the disc 71 from the valve.
- Use extreme caution to not scratch or damage the seating surfaces of the disc, seat ring, body, gasket, or bonnet.

## REASSEMBLY

- Clean all parts thoroughly.
- Install a new gasket 55 onto the bonnet.
- Reinstall disc 71
- Torque bonnet fasteners to values listed in section ”M” of this manual.




| PART IDENTIFICATION | |
|---|---|
| 10 | BODY |
| 11 | SEAT RING |
| 16b | NUT |
| 30 | BONNET |
| 55 | GASKET |
| 71 | DISC |
| 72 | DISC NUT |
| 97 | STUD |

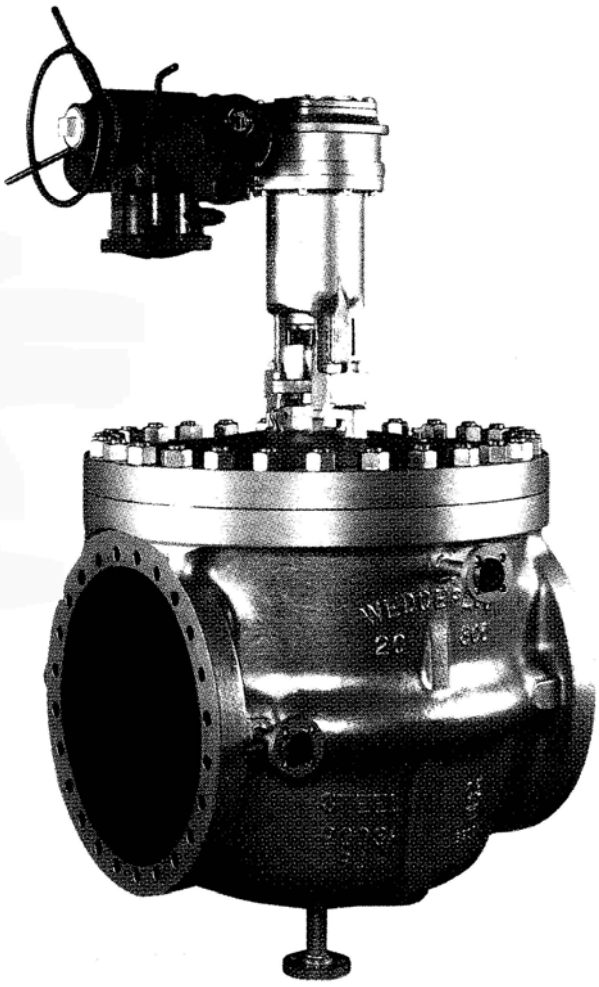
SPECIAL NOTE: After system pressure has been re-established, re-tighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

CRANE

Energy Flow Solutions

# Section K
# Pacific Valves
## Wedge Plug Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . cranevalve.com**

*Revision date*
*2-2011*

## 1.0 General Information

For general information regarding this or any other valve please refer to section "A" of this manual.

*1.1* Wedgeplug valves have a unique operator and position indicator system. Wedgeplug valves when operated: lift, rotate a quarter turn and then reseat. It is critical that when operating a Wedgeplug valve that the position indicator completes it's initial lift, 90 degree turn as well as **reseating or dropping the plug back into position.** A Wedgeplug valve is **not** completely opened or closed unless the position indicator has shown this reseating movement. The lift and subsequent reseating of the plug (as shown by the position indicator) is very slight, usually less than ½". Care should be taken to ensure that the valve is **completely** opened or closed. The lifting and reseating process takes place regardless of whether the valve is being opened or closed.

*1.2* Wedgeplug valves are **torque seated in both the open and closed positions**.

*1.3* Prior to installation verify that the Wedgeplug valve will be installed with the stem in the vertical position. For stem positions other than vertical, consult the factory prior to installation.

*1.4* It is recommended that Wedgeplug valves be insulated when line media temperatures are above 600 degrees F.

*1.5* The Wedgeplug valve closes by turning the handwheel (or wrench, etc.) clockwise.

## 2.0 Purging and Flushing

Wedgeplug valves in certain applications require purging and flushing to properly operate and maintain the valve. The purging and flushing function is performed automatically, every time the Wedgeplug valve opens or closes.

*2.1* Purge lines should be connected to the factory supplied purge ports.

*2.2* Purge media should be compatible with the process media and should be introduced into the Wedgeplug valves typically at 25psi greater pressure than the process media.

Consult Pacific Valves for process specific purging and flushing recommendations.

## 3.0 Adjusting the Wedgetorque operator

Wedgeplug valves are adjusted at the factory for working pressures at ambient temperature unless otherwise specified on the order.

*3.1* When Wedgeplug valves are correctly adjusted, they will operate as follows:

1. All wrench and handwheel operated valves should operate between 1 and 1 ¼ turns of the wrench or handwheel.
2. All gear operated valves, which have a 52 to 1 gear ratio, should operate between 52 and 86 turns of the handwheel.

Note: Complete operation(cycle) is defined in section 1.1 above

**Adjusting the Wedgetorque operator (cont.)**

*3.2* If a Wedgeplug valve is in high temperature service, over 600 degrees F. and the wrench, handwheel or gear will not turn the minimum number of turns as listed above, adjustment may be required.

*3.3* To compensate for the expansion due to high temperature service, it is necessary to effectively shorten the stem (increase the lift). Valves with a trunnion mount should be set for a minimal lift. This is done as follows:

*3.3.1* Cycle the valve to the lifted position, open side, where the position indicator almost touches the yoke leg. Note that this procedure should be done manually. Do not use electric motors, etc. If a motor is installed, the handwheel may be declutched for this operation. Remember to re-set the torque and limit switches.

*3.3.2* Mark the position of the position indicator on the yoke leg.

*3.3.3* Tighten the packing and/or clamp the stem to prevent the stem from turning.

*3.3.4* Drive out the position indicator pin, retain, and let the position indicator drop.

*3.3.5* To increase the lift, the nut must be threaded further onto the stem. Mark the nut and the stem in line. Rotate the handwheel clockwise, forcing the nut to start and continue threading on the stem. One full revolution must be made! Use a hex wrench, pin, etc to force the nut to rotate if it does not rotate with the operator. NOTE: Watch carefully that the nut does NOT start to move down (index) prior to the complete revolution. If this happens, back up the handwheel and then force the nut past the index position. When the nut has made one revolution, the lift has been increased by .08".

*3.3.6* Adjustment for normal wear is not required. In the vent of excessive wear, the operator may turn more than the maximum number of turns listed in item 3.1 above.

*3.3.7* To compensate for excessive seat wear, perform items 3.3.1 through 3.3.4 above. Item 3.3.5 should then be performed however the wrench or handwheel should be operated in the counterclockwise direction. This will screw the stem out of the operator, effectively lengthening the stem/travel. **Note:** Care should be taken when attempting this operation. Minimum thread engagement is necessary. Consult Pacific Valves with questions regarding this procedure. Note: It is possible that while turning the Wedgetorque operator, the indexing nut (lower portion of operator) will not continue to rotate along with the operator. In this situation use a wrench to simultaneously turn the indexing nut and operator.

*3.3.8* The position indicator and indicator pin should then be reasssembled.

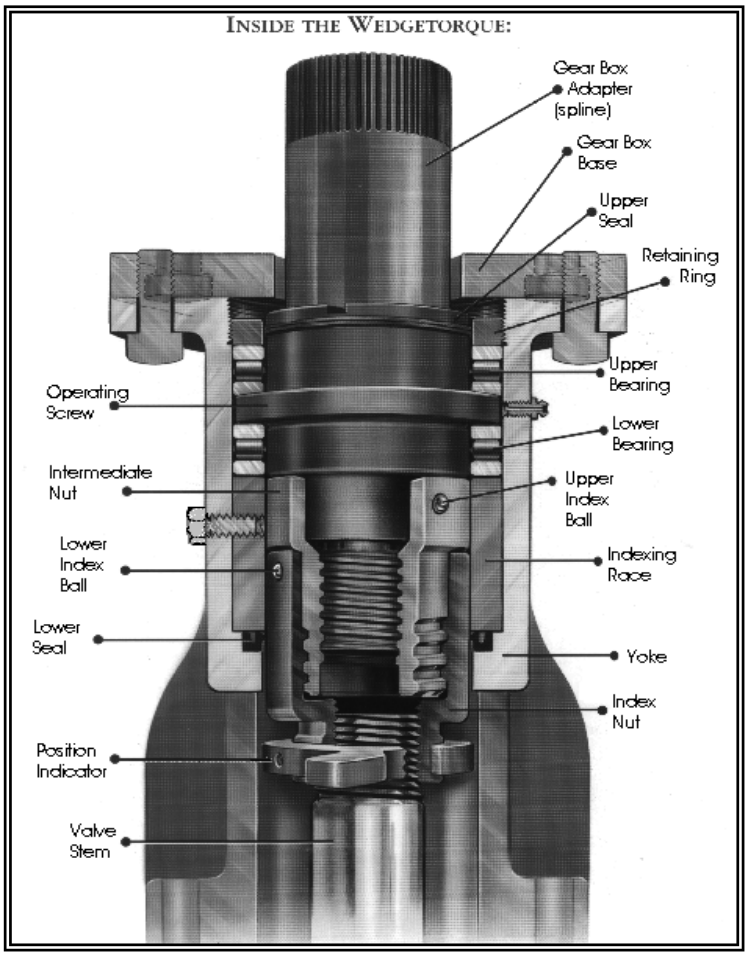
3.3.9 Cycle the valve noting the marks made in stem 3.3.2 to assure the proper lift is obtained as follows:

| | Group 2 | Group 3 | Group 4 | Group 5 & 5-1/2, 5.5A | Group 7, 7A |
|---|---|---|---|---|---|
| 'Minimum' lift | .188 in. | .188 in. | .313 in. | .438 in. | .438 in. |
| Practical Maximum lift | .313 in. | .313 in. | .438 in. | .500 in. | .500 in. |

## 4.0 Wedgetorque

The following instructions apply to the installation of a Wedgetorque Retrofit kit. It applies to all Group 3, 4, 5, and 5-1/2 Operators. The Wedgetorque lifts the plug, rotates it 90 degrees, and re-seats (torque seats) the plug.

1. Check the operation and set the lift of the retrofit kit prior to installation. Consult this manual for additional valve information.
   a. With the Position Indicator pin in the new Position indicator, slip the indicator onto the index nut's mating slot on the side of the yoke with the grease fitting (and OPEN/CLOSE marks). In the proper position, 'UP' should be next to the index nut.
   b. Rotate the handwheel clockwise, then counter-clockwise (clockwise to close) and check the travel of the indicator within the limits of the yoke (90 degrees) and assure that the indicator begins downward travel after contacting the yoke legs. NOTE: Do **NOT** exceed downward travel per chart below.
   c. With the indicator fully raised (operator in rotation) **and** on the open side of the yoke, scribe a line on the index nut at the bottom of the yoke. Rotate the operator (handwheel) counter-clockwise, screwing out the index nut to obtain the lift desired. Do **NOT** exceed the lift given below; this will damage the Wedgetorque operator and cause dis-assembly of the parts. Scribe another line on the index nut at the bottom of the yoke. The distance between two lines is the lift. Refer to paragraph 3.3.9.
   d. Mark the operator assembly and yoke, to note this position, in order to assure that it does not rotate while being assembled on the stem.
   e. The gearbox and powered actuator (if any) may be removed prior to installation to ease handling. Retain all bolting, lockwashers, etc.
   f. The retrofit kit is now ready for installation.
2. The valve should be in the open and seated position with any powered actuator removed. System pressure must be off the valve!
3. Remove the position indicator pin from the valve. The stem should be secured to prevent turning.
4. Remove the yoke bolting and discard.
5. Remove gland nuts and lift the packing gland clear.
6. Unscrew the yoke and operator assembly as a unit from the stem (counter-clockwise).
7. Remove the pin from the position indicator of the retrofit kit. Place the position indicator on the stem.
8. Screw the Wedgetorque retrofit assembly onto the stem of the valve until it contacts and aligns with the yoke mounting surface and the bolt holes are lined up. Make sure the stem does not rotate. Watch the mark made in step #1.d and assure that the operator and yoke rotate together. Assure that the position indicator pointer is on the side of the yoke with the grease fitting.
9. Line up the position indicator hole on the indicator, operator assembly, and stem.




10. Drive in the position indicator pin from the pointer side of the indicator. Line up carefully.
11. Place the new yoke bolts through the flanges and install the nuts (or bolts) loosely.
12. Rotate the operator clockwise just enough to seat the yoke flanges and tighten the yoke bolting.
13. Re-install and tighten the packing gland assembly. Cycle the valve without pressure to check operation.
14. Mount manual gearbox and / or powered actuator. All bolting should be secured prior to operation. Check for tight connections at the gearbox adapter (spline) to the Wedgetorque operator (socket head capscrew through the adapter), at all flange connections such as between the gearbox and the yoke and between any actuator, between the yoke and bonnet, and the locking nut(s) on the outside of the yoke.

## 5.0 **"O Seal" valves**

Certain Wedgeplugs are supplied in the O-Seal configuration. This valve style incorporates a soft elastomer type insert in the plug seating area. Special procedures are necessary for proper O-Seal removal and/or installation.

*5.1* Removal of O-ring (valve must be disassembled. Follow procedures in this manual)

5.1.1 Cut O-ring at the top center of the plug

5.1.2 Pry one end of the O-ring up with an awl or similar device and pull the O-ring out.

**Note**: Care should be taken to not damage the machined edges of the O-ring groove in the plug. Any scratches or burrs should be removed with a fine emery cloth.

### ***5.2*** **Installation of new O-ring**

5.2.1 The cross section of the O-ring is larger than the width of the groove. It is therefore necessary to flatten the O-ring prior to installation.

5.2.2 The O-ring should be flattened using a smooth faced vise or similar fixture. Flatten the O-ring to a consistent thickness slightly more than .080"

5.2.3 Use blunt nosed pliers with smooth jaws to insert the O-ring into the plug groove. Start the O-ring at the two top corners of the plug.

5.2.4 Stretch the O-ring evenly to conform to the outline of the groove, then insert it into the two lower corners of the plug.

5.2.6 After the O-ring is in place it may be tapped in with a soft mallet or similar tool. Never force an unflattened O-ring into the plug groove.

5.2.7 When reassembling the valve, ensure that the position indicator is half way between the "Open" and "Closed" positions. This will indicate that the plug is in the raised position.

5.2.8 After the valve has been reassembled, seat the plug in the closed position. This will set the O-ring into the groove.

## 6.0 Complete Disassembly

**CAUTION! Before disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve.**

**Caution! Wedgeplug valves are frequently purged with steam or other high pressure/ temperature media. Prior to disassembling any Wedgeplug, ensure that the purge system has been turned off and that appropriate lock-out/tag-out procedures have been followed.**

*6.1* The following page contains a general disassembly and reassembly procedure. These procedures cover the bulk of the disassembly and reassembly process, however special attention should be paid to the following:

*6.1.1* Extreme care should be taken to ensure that the sealing surfaces of the plug and body seats as well as the gasket seal areas do not become damaged during disassembly or reassembly. This includes scratches caused by misalignment and/or by debris in the seating area.

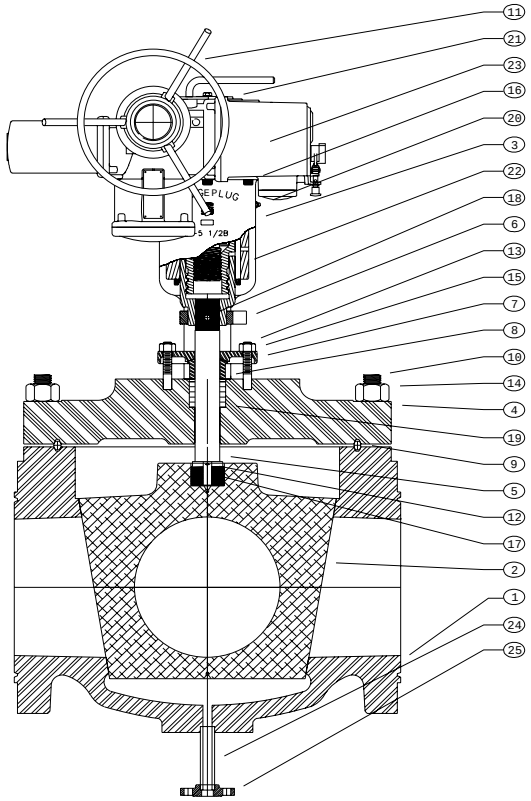
# Wedgeplug Valves
# CLASS 150, 300, 600 & 900
# ALL SIZES

## DISASSEMBLY

- Read the warning notice in section 2.0 page of these instructions.
- Match mark all components prior to disassembly.
- Remove mounting bolts 16 and motor/gear operator .
- Remove indicator pin 18.
- Remove gland nuts 13 and loosen or remove packing 19. Lift flange 7 clear of bolts 15.
- Two piece bonnet/yoke: Remove yoke to bonnet mounting bolts. Spin yoke assembly to unthread from stem 5. Remove gland flange 7, gland 8 and packing 19. Remove bonnet nuts 14. Lift bonnet assembly away from body. Remove stem and plug assembly. Remove plug key pin 12 and plug keys 17. Unthread stem 5 from plug 2. (Remove pin on Group 3).
- One piece bonnet/yoke: Remove bonnet nuts 14. Lift bonnet/stem and plug assembly away from body. Remove plug pin 12. Remove stem 5 from plug 2. Remove gland flange 7, gland 8 and packing 19.
- Use extreme caution to not scratch or damage the seating surfaces of the body or plug seats.
- Consult section 4.0 for specific instructions regarding the Wedgetorque operator.

## REASSEMBLY

- Clean all parts thoroughly. Ensure that all foreign material has been removed from the plug and body seats.
- Line up all match marks previously made.
- Reassemble plug 2 and stem 5 assembly, with plug keys and plug key pin.
- Insert plug/stem assembly into valve body.
- Replace gasket 9 and reinstall valve bonnet 4.
- Reinstall gland 8, gland flange 7 and position indicator 6.
- Reinstall yoke assembly 3 and motor/gear operator when supplied.
- Tighten all bolts to values listed in section "M" of this manual.




**PART IDENTIFICATION**

| | | | |
|---|---|---|---|
| 1 | BODY | 14 | NUT |
| 2 | PLUG | 15 | NUT |
| 3 | YOKE | 16 | BOLT |
| 4 | BONNET | 17 | PLUG KEYS |
| 5 | STEM | 18 | INDICATOR PIN |
| 6 | POSITION IND. | 19 | PACKING |
| 7 | GLAND FLANGE | 20 | SET SCREW |
| 8 | GLAND | 21 | OPERATOR* |
| 9 | GASKET | 22 | WEDGETORQUE |
| 10 | STUD | 23 | MOTOR |
| 11 | HANDWHEEL* | 24 | PURGE PIPE |
| 12 | PLUG KEY PIN | 25 | PURGE FLANGE |
| 13 | STUD | | |

NOTE: After system pressure has been reestablished, retighten all bolting in accordance with this manual.

*Revision date*
*2-2011*

7.0 **Maintenance of disassembled valves**

*7.1* Following disassembly procedures in Section 6.0, examine body cavity 10 for deposits of foreign material.

*7.2* Examine seating surfaces of body seats 1 and plug 2 for wear. If soft seats are provided, the insert may need replacement, if it shows any signs of damage.

*7.3* Examine stem 5, seal area and threads for excessive wear.

7.4 Inspect condition of position indicator, indicator pin, plug keys and plug key pin. Replace any part that shows excessive wear and/or damage.

*7.4* If excessive wear is evident, worn parts, or if necessary, entire valve should be reconditioned or replaced.

*7.5* Crane requires the replacement of the bonnet gasket when servicing any valve.

*7.6* Crane offers complete replacement seal kits and spare parts for reconditioning. When ordering, always state the figure number (or stock number) of the valve, the body material, as well as the quantity desired.

*7.7* Crane also offers complete remanufacturing services to rework your valve. If you find this necessary, the Crane Valve Service Center will remanufacture your valve to factory specifications. **Crane Valve Services is the only authorized repair facility for Pacific Valves**

8.0 **Lubrication**

*8.1* Parts requiring lubrication are: all nuts before torquing. Occasional lubrication of the yoke grease injector is recommended. Use a high quality lithium complex grease such as Mobilith AW-2.

*8.2* Yoke operator lubrication should be done at any planned plant maintenance. As a minimum, the operator should be lubricated every 1,000 cycles.

9.0 **Special tools and instructions**

*9.1* Recommended bolting torques are shown in section “M” of this manual

*9.2* No special tools are required for general valve maintenance.

10.0 **Preventative & Routine maintenance & Start up**

**Operation and maintenance of Pacific Wedgeplug valves** should only be performed by personnel adequately trained to do so. The following is suggested routine maintenance practices. We at Crane accept no liability for any injury, damages or lost profits caused by execution and or observance of the following practices.

**LUBRICATION;**

Pacific Wedgeplug valves are relatively maintenance free excepting for a few periodical precautions. In general the only operational maintenance required is to ensure the Gearhead and yoke assembly remain lubricated. The grease used to lubricate the assembly should be a high temperature lithium/moly based grease. Post 1995 Wedgeplug Yoke and Gearhead assemblies are equipped with grease seals to contain the lubricants. They do not need to be greased as often as pre- 95 valves. Frequency of lubrication depends on the frequency of valve operation. In units such as Delayed Coking units where these valves are often cycled every 6-16 hours Lubrication may be necessary once every six months for newer valves. Pre-95 valves whose yokes are not equipped with seals should be lubricated monthly. In less severe service conditions the valves should be lubricated on a yearly cycle. Modern Wedgeplug yoke assemblies are equipped with 1-2 grease zerts located on the indicator side of the yoke. When applying lubricant a hand held manual pump grease gun should be used. Grease should be added

until tightness is felt in the hand pump. In the case of older valves when seen coming out the bottom of the unit. Warning, if excessive pressure is applied by grease injection damage to the grease seals could occur. The Gearhead is equipped with 1-3 zerts depending on the size. The same cautions used when lubricating the yoke should be observed.

**COLD UNIT PRE-START UP;**

If Wedgeplug valves are utilized in service temperatures above 500 F the following pre-stat up precautions should be observed;

- The valves should be thoroughly insulated prior to the service product being introduced.
- The valves should be unseated, (open or closed position) during purge warm up.
- The valve lifts should be verified per the following requirements. Lifts are determined by the Yoke Assembly designation marked on the yoke housinq:
- If so equipped all purge connections should be opened to the valve and the purge media allowed to flush the valve body and plug. If steam is used this will pre-heat the plug and body. Purge steam should be on to the valves at least 6 hours prior to unit start in order to preheat the valves. During this warm up the valve plugs should be unseated to allow for steam flow and expansion of the plug. The valve can be in either the open or closed position.
- Verify that all purge supply valves are fully open at the main header.
- Verify that the purge and if used, blocking steam pressures are correct, in most cases the purge and blocking media pressure should be maintained at **20-25 psig above process pressure.** If higher purge pressures are used, it may be necessary to utilize orifice plates to regulate volume to the valve and if applicable the spools.
-

The above measures will allow Wedgeplug valves to preheat prior to the introduction of the hot process.

Failure to observe the above measures could result in the valves seizing in place.

If so equipped with automatic actuators the Limit and Torque switches should be checked for proper adjustment. Both the Limit and Torque switches should be utilized together in both the open and closed positions. The Torque switch should be set the same in open and closed position and set at the manufactures recommended setting. The Limit switch should be set 10-15% less the torque setting. l/E if the Torque switch is set at 70% then the limit switch should be set at the point where torque output in the seated positions are at 55-60% output. Once the valves have been subjected enough to process media to get the body within 200 degrees F of the service temperature the valves may be seated fully.

**IN PROCESS OPERATION;**

During day to day operation of Wedgeplug valves personnel assigned to do so should get a general a feel for the travel and or duration of stroke time. Wedgeplug valves are factory set to lift and reseat a specified travel distance before and after rotation. Maintenance should be notified if operations personnel notice that the travel seated to unseated is shortening over time. This could indicate a possible mechanical failure or the valve body is coking up.
Purge and blocking steam has a direct effect of the operation of Wedgeplug valves. Pressure gauges should be installed in the purge stem lines as well as the blocking steam lines so these pressures can be constantly monitored.
Purge steam should be left on to the valve body at all times.
Historical data has shown that the minimum steam purge pressure to remove Coker fluid should be about 20 psig above the working pressure. It also shows that the nominal pressure should be about 25 psig. This number was arrived at by observing in service applications over time, so the pressure should be 25 psig +1- 5 psig. This limits the maximum pressure to 30 psig, and one reason for this is to not waste steam and thus money. Also, even it will take more than 30 psig to inhibit operation, it should be understood that at some higher pressure the plug will be pushed too hard onto downstream seat, and proper operation will not be possible. These maximum pressures will vary with size, pressure class, and whether the valve has a trunnion or not.

**Bolting tightness must be checked at a minimum of once a year, more frequently if possible. Refer to section M for recommended bolt torques.**

**TROUBLE SHOOTING AND DIAGNOSTIC'S;**

The following are the most common failures and fixes associated with Wedgeplug valves.

**Valve Closed will lift but will not turn or continuously breaks indicator pin.**

Purge and or blocking steam pressure is to high, check pressure gauges to ensure correct pressure and Lower or close 1-2 of the purge steam valves and pinch back on the blocking steam to prove issue. Reopen purge and blocking steam isolation valves after Wedgeplug operation.

**Valve closed or open does not lift and is very difficult to operate during rotation or breaks indicator pin.**

Valve body is probably coked up due to inadequate purge steam supply or the process pressure variations. The valve plug may be in the Open or Closed position but should be up off the seats or "UNSeated". Loosen the 4 yoke bolts or nuts that secure the yoke to the bonnet approximately ¼". Separate the yoke from the bonnet by turning the handwheel to push the plug down into the seats, either open or closed what ever position the plug is in. Instead of pushing the plug down onto the seats the yoke will be pushed up and away from the bonnet. Insert a 1/8" or 3/16" shim between the yoke feet and bonnet. Again using the handwheel move the yoke down onto the bonnet and shim thus lifting the plug. Re-tighten the yoke bolts and operate the valve. The shims will allow the plug to move up off the coke build up further and should alleviate the pressure on the gearing assembly. Note coke up of the body will probably continue and more in-depth maintenance should be considered in the immediate future. NOTE: If so equipped with an electric actuator it would probably be necessary to reset the limit switches since the valve has a longer lift the limits would not let it travel to the fully seated position and leakage could occur. If the valve Yoke is secured to the bonnet via socket head cap bolts check the thread length engagement after the shims are installed. It may be necessary to replace the bolts with longer bolts due to the added thickness of the spacers.

**Valve does not lift or seat down only turns from open to closed position, operates easily.**

Either the race lock screw has broken and allowed the Screw Gear Race to turn or the indicator pin has been improperly installed. Remove the race lock screw and check to see if the tip is broken off. If so then the race has turned and the yoke will have to be disassembled to reposition the race. If the race lock screw is ok then put the valve in the open up, un-seated position. Remove the stem indicator pin lock down the stem to prevent the plug from moving and using the valve handwheel rotate the index nut 180 degrees. Re-position the indicator pin and attempt operation.

**Valve lifts and seats in open or closed position but not the other, rotates easily.**

One part of the screw gear mechanism is seized to the intermediate nut. Using the handwheel position the indicator in the position the plug will not seat down in. Using the handwheel put the indicator in a bind with the yoke leg. Tap on the side of the yoke, sometimes the concussion will allow the two seized parts to break loose. This is usually a symptom of improper or lack lubrication. If this technique will not free the seized parts the screw gear shall have to be replaced.
Valve leaks by otherwise operates well.
Remove and check the indicator pin. If the pin is bent even a few thousands of an inch the plug will misalign with the body seats. If the pin is straight then the valve is coked up or has damage to both seats.

**Electric actuator settings:**

When electric actuators are used to operate Wedge plug type valves the logic should make use of both the Limit switches and the torque switches in conjunction. The motor should trip if either switch is satisfied at its setting, to properly set the electric actuator follow the below instructions:

1. Verify that the electric motor is wired correctly and not reverse phase.

2. Ensure that the actuator is set to trip on either or Torque Switch or Limit switch.

3. Set the Torque switch at the setting specified by the factory. This is expressed as a percent setting and varies by actuator and valve size. In most cases the torque setting should be between 55-65°h.

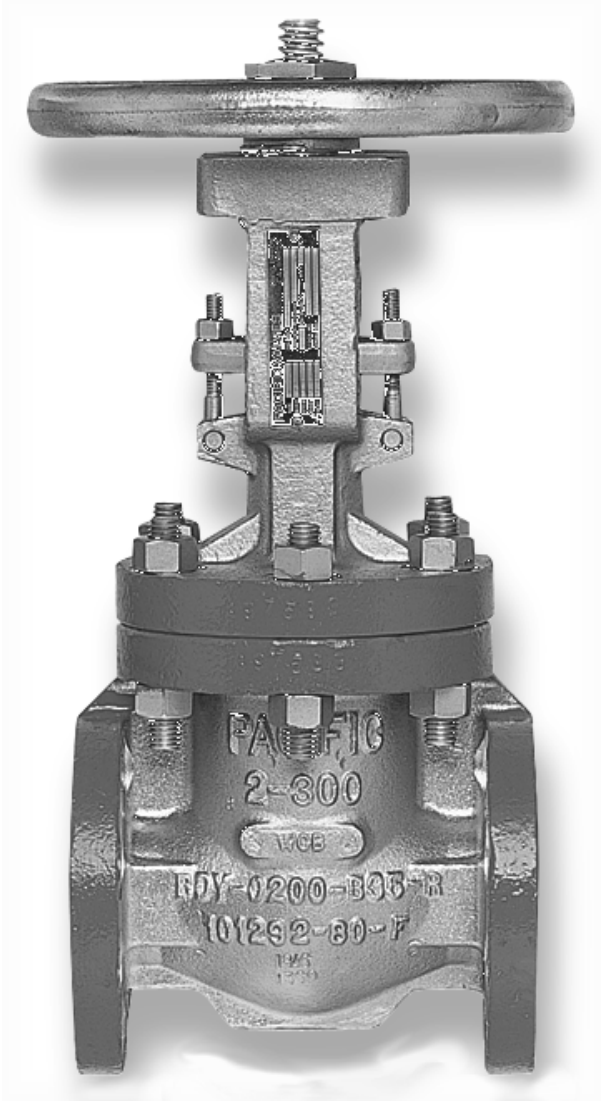
4. Run the unit to the open position up, and unseated. Using the declutch lever and handwheel seat the valve into the open seated position manually. Set the open limit switch as previously noted.

5. Repeat the steps outlined in 3 but in the closed position.

CRANE

Energy Flow Solutions

# Section L
# Pacific Valves
## Bolted Bonnet Valves
### FOR HYDROFLUORIC ACID SERVICE




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717

**www . crane**

*Revision date*
*2-2011*

# HYDROFLUORIC ACID SERVICE VALVES

1.0 General Information

*1.1* The intent of this section is to detail specific issues regarding HF Acid Service Valves
For general information regarding this or any other valve please refer to section “A” of this manual.

*1.2* HF Acid valves are available in Gate, Globe and check configurations.
**Please refer to the appropriate section of this manual for specific information (Sections G,H,I,J).**

*1.3* HF Acid Service valves are required to have the periphery of all flanges coated with an HF Acid detecting paint. Pacific utilizes two types of acid detecting paint. Continental (orange color) will turn a rusty brownish color in the presence of HF Acid. On-guard (yellow color) will turn bright red in the presence of HF Acid.

2.0 Maintenance

**CAUTION! HF Acid is extremely dangerous. Follow all industry, local and internal safety procedures when dealing with any valve or valve part that is intended for HF Acid service. Maintenance work must be performed by trained, qualified personnel.**

**CAUTION! Before performing any work and/or disassembling any valve, ensure that all pressure has been removed from the line and from any cavities within the valve. Contact Pacific Valves before disassembling any valve.**

**CAUTION! Prior to commencing with any internal work on HF Acid service valves, ensure that the entire valve has been properly neutralized.**

*2.1* Visually examine the entire valve, looking for any difference from the last examination. Make sure all bolted fasteners are in place and secure. Be sure the acid indicating paint shows no signs of discoloration.

*2.2* As with any mechanical device, it is desirable to operate the valve at some regular frequency to keep moving parts free and operable. The frequency of operation depends on the condition of the system, but should generally be not less than once every (3) months or when system parameters allow.

*2.3* On valves that are operated frequently (generally more than once per day), the stem threads should be examined regularly for signs of wear. Stem threads on all Pacific HF Acid valves are of the "ACME" thread form, which means that the top (or crest) of a new thread will have a flat surface. On a worn thread the flat surface tends to become pointed (knife edged) as the thread wears. Stems having sharply pointed or edged threads should be replaced.

*2.4* Valves should be lubricated as necessary to maintain lubrication in the required areas. This includes the stem threads, external yoke sleeve area (accessed through the grease fitting provided on

the yoke) and any other lubrication points provided on the valve. As a minimum, these points should be inspected and/or lubricated every 3 months.

*2.5* Any packing leaks must be attended to immediately. On non-leaking valves, plan to repack at the next opportunity after gland adjustment is found to be 1/4" or less. When adjusting packing, take care to tighten the gland bolts evenly. Uneven gland adjustment could result in the packing gland flange contacting the stem. The result could be a scored stem and packing leakage.

*2.6* Bonnet bolts are stressed during assembly at the factory, to the proper level to prevent leakage under any operating conditions within the valve rating. However where conditions of extreme temperature fluctuations, heavy mechanical cycles or excessive vibration are present, retightening of the bonnet bolts may be necessary. If bolt tightening is necessary please refer to section “M” of this manual.

*2.7* Other threaded parts that should be checked regularly include the handwheel nut and yoke sleeve jam nut. The handwheel nut is especially important when the valve is mounted with the stem in a non-vertical orientation, because a missing wheel nut could result in the handwheel falling from the valve. The yoke sleeve jam nut is locked to the yoke sleeve by one or more tack welds. Be sure that the jam nut is screwed down tight and the tack welds are secure.

## 3.0 High Integrity Shutoff valves (H.I.S.)

*3.1* Certain Pacific gate valves utilize the H.I.S. style wedge. This configuration utilizes a pressure energized Teflon (PTFE) insert in the wedge as well as metal to metal (Monel) seats. These valves can be identified by the presence of the suffix “BTT” in the figure number.

*3.2* Although no special maintenance of the H.I.S. valve is required, care should be taken during the handling and fitting of wedges to ensure that damage does not occur to the PTFE insert.

*3.3* The PTFE insert is retained in the valve wedge by the retainer plate. This plate is retained by Monel set screws. Care should be taken to ensure that these set screws are only torqued to a maximum of 14 ft/lbs. See section “M” of this maintenance manual.

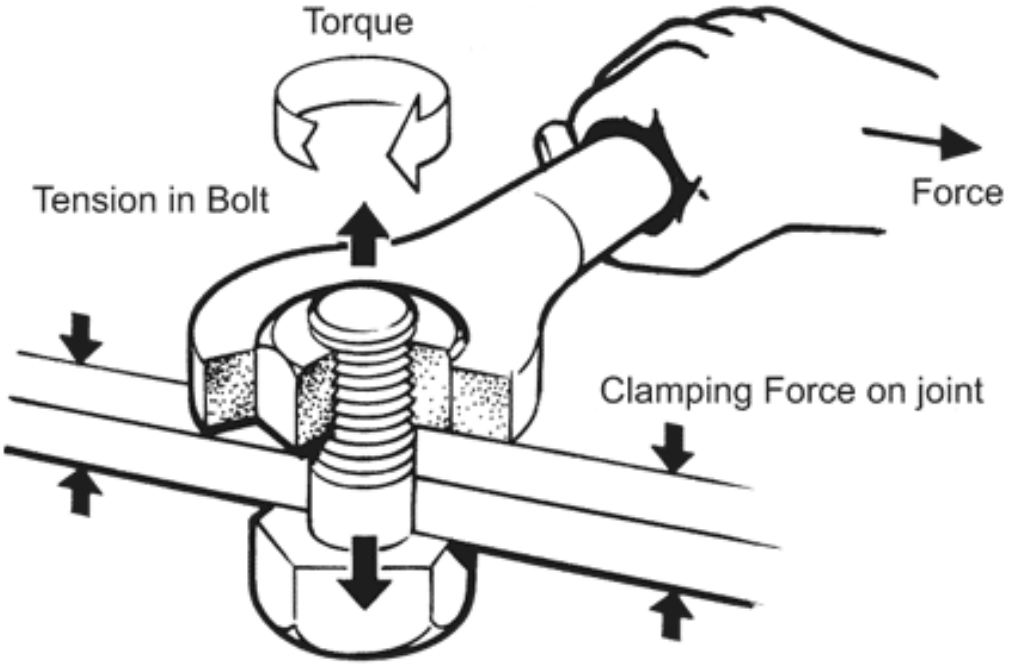
## 4.0 Monel Sleeve

*4.1* Certain Pacific valves incorporate a solid monel stuffing box sleeve. The presence of this sleeve is designated by an L(2) in the figure number.

*4.2* No special maintenance of the Monel sleeve is required, however care should be taken during packing removal/installation to prevent scratching the internal machined surfaces.

**CRANE**
Energy Flow Solutions

# Section M
# Pacific Valves
## Bolting Torque Values




Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

BOLTING TORQUE VALUES

1.0 General Information

For general valve operation & maintenance information please refer to section “A” of this manual.

This section details the specific torque values recommended by Pacific Valves for bolting used in all Pacific products.

2.0 Standard Procedures

2.1 Always use new bolting materials.

2.2 Verify that the materials are compatible with the process system as well as any temperature or pressure requirements. Note that bolting materials can have minor identification changes which may have a substantial impact on performance, ie. B7M vs. B7.

2.3 Whenever allowed by system and process parameters, use appropriate lubrication to ensure even tightening of the bolting materials. For higher temperature applications, the use of an “Antisieze” compound may be necessary to promote future disassembly.

3.0 Torque Values

All values are listed in foot/pounds (ft/lbs.)

| **Bolt Dia.** | **TPI** | ***ASTM A193 GR B7,B16, & K-500 monel*** with a bolt stress of 60,000 psi | ***ASTM A193 GR B8 class 2, & B8M*** with a bolt stress of 45,000 psi |
|---|---|---|---|
| 1/4 | 20 | 20 | 16 |
| 5/16 | 18 | 30 | 22 |
| 3/8 | 16 | 45 | 34 |
| 7/16 | 14 | 60 | 47 |
| ½ | 13 | 90 | 65 |
| 9/16 | 12 | 120 | 90 |
| 5/8 | 11 | 160 | 120 |
| ¾ | 10 | 270 | 200 |
| 7/8 | 9 | 500 | 300 |
| 1 | 8 | 700 | 450 |
| 1 1/8 | 8 | 875 | 650 |
| 1 ¼ | 8 | 1200 | 900 |
| 1 3/8 | 8 | 1625 | 1200 |
| 1 ½ | 8 | 2100 | 1590 |
| 1 5/8 | 8 | 2750 | 2000 |
| 1 ¾ | 8 | 3400 | 2570 |
| 1 7/8 | 8 | 4250 | 3200 |
| 2 | 8 | 5200 | 3880 |
| 2 ¼ | 8 | 7400 | 5575 |
| 2 ½ | 8 | 10000 | 7685 |
| 2 5/8 | 8 | 11800 | 8900 |
| 2 ¾ | 8 | 13700 | 10200 |
| 3 | 8 | 17750 | 13350 |

3.1 Fabricated Yoke Torque Values

# FABRICATED YOKE POST BOLT TORQUES, FT/LBS

## PRESSURE SEAL GATE VALVES

| VALVE SIZE | 900# | 1500# | 2500# |
|---|---|---|---|
| 2.5” | *PV* | 60 | *PV* |
| 3” | 62 | 53 | 123 |
| 4” | 138 | 53 | 214 |
| 6” | 128 | 208 | 602 |
| 8” | 217 | 202 | 534 |
| 10” | 208 | 428 | 440 |
| 12” | 155 | 540 | 360 |
| 14” | 427 | 492 | 606 |
| 16” | 352 | 622 | 2,889 |
| 18” | 727 | 1,282 | 1,356 |
| 20” | 628 | 588 | 1,200 |
| 24” | 642 | 1,155 | 1,271 |
| | | | |

## PRESSURE SEAL “T” GLOBE VALVES

| VALVE SIZE | 900# | 1500# | 2500# |
|---|---|---|---|
| 2.5” | *PV* | *PV* | *131* |
| 3” | 115 | 218 | 168 |
| 4” | 184 | 141 | 111 |
| 6” | 364 | 352 | 594 |
| 8” | *PV* | *PV* | *PV* |
| 10” | 1,627 | *PV* | *PV* |
| 12” | 1,292 | *PV* | *PV* |
| 14” | *PV* | | |
| | | | |

## PRESSURE SEAL “Y” GLOBE VALVES

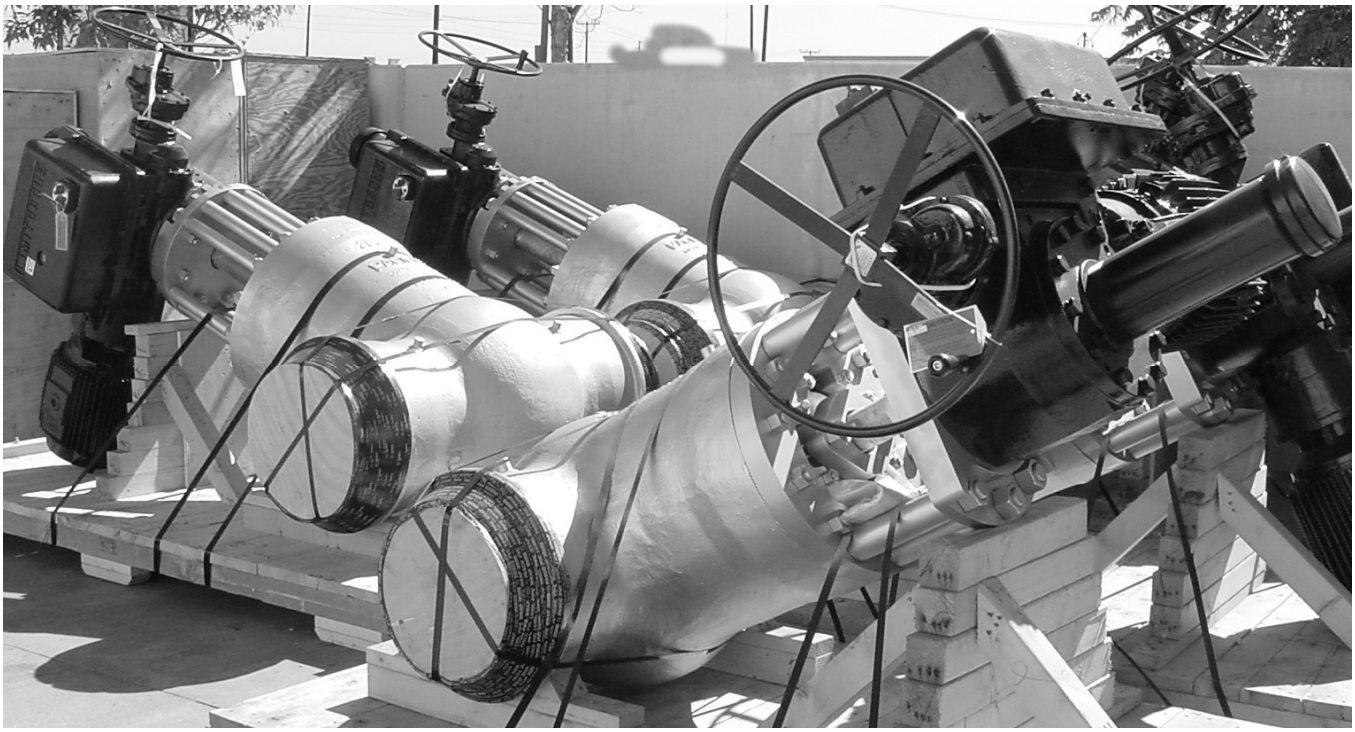
| VALVE SIZE | 600# | 900# | 1500# | 2500# |
|---|---|---|---|---|
| 2.5” | *PV* | *PV* | *PV* | *PV* |
| 3” | *PV* | *PV* | *PV* | *PV* |
| 4” | *PV* | *PV* | *PV* | *PV* |
| 6” | *PV* | *PV* | *PV* | *PV* |
| 8” | *PV* | 543 | 543 | *PV* |
| 10” | *PV* | 1,025 | 1,025 | 2,782 |
| 12” | *PV* | 2,772 | 2,772 | 2,508 |
| 14” | *PV* | 2,772 | 2,772 | 2,401 |
| 16” | 1,209 | 2,772 | 2,772 | 2,401 |
| 18” | 1,209 | 2,503 | 2,503 | *PV* |
| 20” | *PV* | 1,869 | 1,869 | *PV* |
| 24” | *PV* | 2,515 | 2,515 | *PV* |

- When *PV* is entered for a value, please contact Pacific Valves for Specific information regarding this valve.

CRANE

Energy Flow Solutions

# Section N
# Pacific Valves
## Long Term Storage of Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

LONG TERM STORAGE OF VALVES

1.0 General Information

For general operation & maintenance information regarding for valves, please refer to section “A” of this manual.

2.0 Storage

The following recommendations are for preparing valves and their accessories for Long Term Storage. They are necessary to maintain the valves in proper condition prior to installation into the pipeline. By following these procedures, abrasive and corrosive substances can be prevented from affecting valve performance.

It is the purchaser’s responsibility to take the necessary precautions for the protection of valves in storage.

2.1 As shipped condition

Valves are packaged with a moisture resistant closure on the valve ends. Where size permits, plastic plugs or caps are used. On larger size valves, wood covers are sealed with tape and securely attached with metal bands. On valves with pipe flanges the wooden covers are secured with bolts. All other openings are covered with plastic caps or plugs.
Parts packaged separately are secured in packaging from the factory to prevent damage during handling and storage. These parts are to be stored off the ground in an area protected from the weather. If it is anticipated that the valve will be in storage for more than 4 months the packing should be removed and shipped dry.

2.2 Recommended storage facilities

The following are a list of storage types in order of most preferred to least preferred:

- Enclosed weather tight building with a concrete floor.
- Enclosed building with a dirt floor. Valves must be on pallets.
- Open air, valves on pallets on a concrete floor covered with a tarpaulin (this is not recommended for more than six months)
- Open air, valves on pallets on a dirt floor and covered with a tarpaulin (this is not recommended for more than six months)

2.3 Inspection

Periodic inspections should be performed on all stored valves and parts. The frequency of these inspections should be determined by the type of storage facilities and weather conditions. At a minimum, all parts and valves should be inspected every 4-6 months. Inspect for dirt, moisture or any other type of contamination. If any is found the valve is to be thoroughly cleaned and dried. Repeat the above listed packaging procedure to ensure the valve is weather tight. Slight external rusting may occur on valves stored outside. This will have little or no effect on their performance. Heavy internal rust however, may be harmful and must be corrected. If stored longer than 4 months the packing must be replaced.

2.4 Preparation for installation into the pipeline

Inspect valves as per the above instructions and remove any contamination, assuring that the valve is clean and dry. Re-torque all bolting to factory specifications to compensate for possible bolt relaxation, which may occur during long storage. Ensure that all foreign material has been removed from the valve and that it is dry. If stored longer that 4 months the packing must be replaced.

CRANE

Energy Flow Solutions

# Section O
# Pacific Valves
## Valve Installation


Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

VALVE INSTALLATION

## 1.0 General Information

For general valve information, please refer to section “A” of this manual.

## 1.0 Introduction

By exercising proper care in the installation of Pacific valves, the probability of trouble-free service will be enhanced. It is important to recognize that in the transport, handling and storage of a valve between the time of manufacture and the time of installation, there are numerous possibilities for accident or error, which may affect valve performance.

All valves should be handled/installed in such a manner as to comply with all applicable state, local and federal safety regulations including, but not limited to OSHA regulations. Personal Protective Equipment (PPE) should also be used in compliance with all regulations.

## 2.0 Inspection and handling

Before installation of the valve, it is important to determine that the valve is in satisfactory condition. It may be helpful to observe the following points, in order to avoid subsequent valve problems:

2.1 Carefully unpack valve and note any special warning tags or identification plates attached to the valve; take appropriate action.

2.2 Check valve for any markings indicating flow direction. If flow direction is indicated, appropriate care should be exercised to install the valve in the proper flow orientation. Check valves and non-return valve are uni-directional and must be installed in the proper orientation.

2.3 Inspect the valve interior through the end ports to determine that it is clean and free from foreign matter and/or harmful corrosion. Remove any special packing materials (blocks to prevent disc movement) or packages of desiccant. The wedge/discs of weld end gate/globe valves should be slightly open during welding of the valves into the pipeline.

2.4 Check the pipeline to ensure that it is properly aligned and supported. Expansion joints or bends should be installed in the pipeline to compensate for expansion and contraction.

2.5 Only qualified riggers should handle the valves. The pick up point for all Pacific valves is by the use of a strap or chain around the neck area of the valve body. Do not pick up Pacific valves by use of straps or chains on or around the handwheels, yoke, bevel gear, motor or cylinder operator, or any override attachment. Do not pick up a valve by the packing bolting or other interior connections. After the weight of the valve is supported by a strap or chain around the neck of the valve body, other lines may be attached for steadying the valve in place during installation.

2.6 Immediately prior to valve installation the interior of the piping (to which the valve is to be attached) should be checked for cleanliness and freedom from foreign materials.

## 3.0 Installation

All valves should be installed in such a manner as to prevent exposure to excessive vibration and process flow turbulence. Check valves specifically are subject to increased turbulence and wear due to their position in a piping system. At a minimum, bolted bonnet check valves should have 10 pipe diameters of straight pipe immediately upstream of the valve. Pressure seal check valves shall have a minimum of 5 pipe diameters of straight pipe upstream.

When Pacific valves with bevel gear, motor or air cylinder operators are mounted in a position other than with the valve stem in a vertical position, contact Pacific Valves for specific instructions.

3.1 Weld End Valves

Welded joints when properly made, provide a structural and metallurgical continuity between the pipe and the valve body. For socket weld joints it is usually required that the weld fillet have more cross sectional area that the pipe. Butt welds usually require full penetration and thickness at least equal to that of the pipe. If a pipe of a high strength alloy is welded to a valve with body material of lower mechanical strength, the weld usually must taper to a compensating greater thickness at the valve end, or the valve must have a matching high strength welded-on extension or "pup".

**CAUTION! All welding should be in accordance with any Code or jurisdictional regulations applicable to the piping system construction and with complete and approved welding procedures, and inspected as required by applicable specification.** The following items are a general overview of sound welding practice:

*3.1.1*Check material markings on pipe and valve to confirm they are as specified.
*3.1.2* Inspect welding end surfaces, dimensions, and cleanliness. Correct any condition that might interfere with assembly and satisfactory welding.
*3.1.3* If backing rings are to be used, check to confirm that ring material is compatible with pipe and valve materials, check individual rings for fit and cleanliness.
*3.1.4* Determine that the prescribed welding parameters including preheating and post weld heat treating if required, are in accordance with the approved welding procedure.
*3.1.5* Inspect valve-pipe end alignment; adjust if and as required.
*3.1.6* Securely tack weld.
*3.1.7* Complete weld, using approved welding procedure.

3.2 Flanged Valves

Pipe flanged joints depend on tight sealing and compressive deformation of gasket material between facing flange surfaces. The bolting must provide the mechanical force necessary to maintain the necessary compressive stresses on the gasket, as well as resist the normal pressure forces tending to separate the joint. It should be recognized that bolting force used for "brute force" alignment of misaligned flanges will not be available to sustain gasket loading and pressure force loading, and the result may be a joint leakage problem.

*3.2.1*Check mating flange facings. If a condition is found which might cause leakage, (e.g. a deep radial groove or cut), do not attempt to assemble until the condition is corrected.
*3.2.2* Check bolting for proper size, length and material.
*3.2.3* For flange bolting for steel flanges ANSI Class 400 or higher, high strength material (usually B - 7) is required. The proper matching of flanges, bolting and gaskets is important.
*3.2.4* Check gaskets for obvious defects or damage.
*3.2.5* Use care to provide good alignment of flanges being assembled. Use suitable lubricants on bolt threads. When assembling, sequence the bolt tightening (in a star pattern) to make initial contact of flanges and gaskets as flat and parallel as possible. Tighten gradually and uniformly to avoid tendency to twist one flange relative to the other. Use of torque wrench is important to assure correct and uniform final tightening of flange bolting.
*3.2.6* Parallel alignment of flanges is especially important in the case of assembly of a valve into an existing system. It should be recognized that if the flanges are not parallel, in such instances, it would be necessary to bend something to make the flange joint tight. Simply forcing the flanges together with the bolting may bend the pipe, or it may bend the valve. In large diameter piping particularly, such conditions should always be brought to the attention of someone capable of evaluating the bending conditions, and corrective measures taken as needed.

3.2.7 **CAUTION! As indicated above, torque wrenches should be used for flange bolting. If, in the tightening process, the torque on a given bolt has been increasing with each part turn, and then**

**is observed to remain unchanged or increase a much lesser amount with an additional part turn, that bolt is yielding. Such bolt should be replaced and scrapped.**

3.3 Threaded Valves

For tight sealing, threaded pipe joints depend on a good fit between the male and female pipe threads, and, usually, the presence of a special soft or viscous material between the assembled threads. For best assurance of a leak-free system the following points should be observed:

*3.3.1* Check the threads on both the valve and the mating pipe for form and cleanliness. Inspect for obvious dents, deformation of the thread or out-of-round areas. Ensure that no chips or grit are present.

*3.3.2* Note internal length of threads in valve ends, and proximity of valve internal seat or wall. Observe any need for care regarding how far pipe is threaded into valve. If there appears to be a possibility of a problem, carefully check the pipe end thread, to make sure there is no extended straight portion beyond the standard tapered sections.

*3.3.3* Use care to align threads at point of assembly. Tapered pipe threads are inherently loose fit at entry; substantial wrenching force should not be applied until it is apparent that threads are properly engaged.

*3.3.4* Apply appropriate tape or thread compound to the external pipe threads (except when dry seal threading is specified).

*3.3.5* Assemble joint wrench-tight. Wrench on valve should be on the valve end into which the pipe is being threaded. **CAUTION! Because there is no clear limit on the torque that may be developed in a tapered thread joint, it is possible to damage valves by applying excessive twisting forces through the body.**

3.3.6 Repeat the process at second valve end. Again apply wrench at end of valve to which pipe is being assembled.

4.0 TESTING AND ADJUSTMENT

*4.1* When a valve has been properly inspected and installed, it is reasonable to assume it will be in good condition and ready to operate. Nevertheless, it is at this time that the valve is at the end point of its more vulnerable phase. Operability can be proven only by test.

*4.2* At this point valves having adjustable stem seals should be checked to determine that packing has been properly installed and gland bolting has its initial adjustment. Additional adjustment should be determined according to need as valve operability is checked and as system pressure is introduced.

*4.3* A first observation can be made by actuating the valve through an open-close, or close-open cycle. If no obvious problems are observed, an actual test at pressure may be applied while tightness and operability are checked.

*4.4* It is a fairly common practice after the installation of piping systems to clean the systems by blowing with gas or steam or flushing with a liquid to remove debris and/or internal protective films and coatings. It should be recognized that valve cavities may form a natural trap in a piping system and material not dissolved in or carried out by the flushing fluid may settle in such cavities and adversely affect valve operation. Also, abrasive material carried by a high velocity fluid stream may cause serious damage to seating surfaces. Again, great care should be taken to ensure that the valve is free of all debris prior to operation.

*4.5* Upon installation, new valve lubrication should be applied to all lubrication points.

**CRANE**

Energy Flow Solutions

# Section P
# Pacific Valves
## Packing & Gasket Maintenance

Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

PACKING & GASKET MAINTENANCE AND VALVE LUBRICATION

1.0 General Information

For general valve operation & maintenance information please refer to section “A” of this manual.

2.0 Packing Maintenance

1.1 Inspection of the valve stem/bonnet seal should be an essential part of routine monthly valve maintenance inspections.

2.2 If inspection indicates the seal is leaking, the bolts holding the gland flange should be tightened uniformly (one-quarter of a turn at a time) until leakage stops. **CAUTION!!** Extreme care should be taken when working on or around any pressurized equipment. Tightening of bolting beyond this point results in over-compression of the packing against the stem, thereby producing excessive wear and loss of packing material. If difficulty is experienced in achieving satisfactory sealing without producing excessive stem friction, it may be desirable to increase or to replace the packing material.

2.3 If gland travel is fully taken up and leakage does not stop, a careful examination of the stem should be undertaken. Operation of a valve on a regular basis will minimize corrosion between the stem and packing material. Any deterioration of the stem surface which is in contact with the stem seal or packing (such as dents, scratches, pitting or general corrosion) must be recognized as a probable cause of leakage problems. The valve stem should be examined to determine if it has become bent or misaligned. If any of the above conditions exist, the stem must be refinished or replaced. If the stem is undamaged and the valve continues to leak, addition to or replacement of the packing is necessary.

2.4 Replacement packing should be dry and free of all types of contamination prior to installation in the stuffing box. The new packing should also be compatible with both the valve stem material and the material in the piping system, at operating temperatures and pressures. **CAUTION! It is extremely dangerous to remove the bolting, gland flange and gland to replace the packing with pressure in the pipeline. Always depressurize the valve/pipeline before dismantling the stuffing box. Although specific procedures may vary with specific valve and packing designs, the following rules always must be considered.**

3.0 Packing Installation and Instructions

*3.1* Remove/drain system pressure from the valve.
*3.2* Loosen and remove nuts holding gland flange in place. At this time, the gland flange and the gland will be free to move up the stem and the stem packing is exposed (refer to appropriate valve section for identification of parts).
*3.3* Remove old packing. Use caution to ensure that tools used to remove packing do not scratch either the stem shaft or the inside of the stuffing box. Clean shaft and box thoroughly.
*3.4* Replace original packing with packing indicated on the applicable spare parts listing. (In most cases, the packing will be a die-formed graphite/ braided carbon set). Use all new packing. Never install used rings.
*3.4.1* To open split ring joints, twist the open ends in opposite directions (the packing ring should resemble an “S”. Install each new packing ring separately, tamping each one before installing the next. Ensure that rings are not cocked and that air is not entrapped between adjacent rings.
*3.4.2* The joints of split packing rings should be staggered 90 degrees to 120 degrees from the joints of adjacent rings.
*3.4.3* If the valve has a lantern ring, make sure it is replaced in its original position.
*3.4.4* The gland may be used to set the packing in the bottom of the stuffing box.
*3.5* Replace the gland and gland flange and hand tighten the gland nuts. Then tighten the gland nuts to approximately 40 ft. lbs.

*3.6* Manually open and close valve several times to ensure all parts are working smoothly under pressure and to help “set” the packing.
*3.7* After several days, inspect valve for leakage. Slight adjustment may be required.

*3.8* The following suggestions apply if Chevron type Teflon Packing is used:
*3.8.1* Ensure that sections of the lips of the rings (see Figure 3) are not turned over.
*3.8.2* Ensure that the packing rings are facing in the direction of the medium being sealed - whether it is liquid or gas.

## 4.0 Gasket Maintenance

*Note: The following information refers primarily to valves that have been repaired/reconditioned previously. It is always a sound practice to inspect and maintain all sealing areas.*
Inspection of the valve body/bonnet joint should be a part of routine maintenance inspection after installation and start-up. Flanged valves should have the flange ends inspected at the same time. In addition to improper gasket installation procedure, thermal changes, pressure changes, vibrations etc also may cause leakage. If re-torquing of the bolting does not stop the leakage, the flanged joint should be unbolted and the gasket carefully examined.

| Observation | Possible Remedies |
|---|---|
| Gasket corroded | Select replacement material with improved corrosion resistance. |
| Gasket extruded excessively. | Select replacement material with better cold flow properties, select replacement material with better load carrying capacity - i.e., more dense. |
| Gasket grossly crushed | Select replacement material with better load carrying capacity, provide means to prevent crushing the gasket by use of a stop ring or redesign of flanges. |
| Gasket mechanically damaged due to overhang of raised face or flange bore. | Review gasket dimensions to insure gaskets are proper size. Make certain gaskets are properly centered in joint. |
| No apparent gasket compression visible | Select softer gasket material. Select thicker gasket material. Reduce gasket area to allow higher unit sealing load. Inspect flange dimensions. |
| Gasket substantially thinner on O.D. than I.D. | Indicative of excessive "flange rotation" or bending. Alter gasket dimensions to move gasket reaction closer to bolts to minimize bending movement. Provide stiffness to flange by means of back-up rings. Select softer gasket material to lower required seating stresses. Reduce gasket area to lower seating stresses. |
| Gasket unevenly compressed around circumference. | Improper bolt-up procedure followed. Make certain proper sequential bolt up procedures are followed. |
| Gasket thickness varies periodically | Indicative of "flange bridging" between bolts or warped flanges. Provide reinforcing rings for flanges to better distribute bolt load. Select gasket material with lower seating stress. Provide additional bolts if possible to obtain better load distribution. If flanges are warped, re-machine or use softer gasket material. |

## 5.0 Gasket Installation Procedures

Regardless of the type of gasket being used or the materials of construction, certain basic procedures must be followed during assembly to ensure proper operation.

While these comments may seem elementary, they are extremely important in achieving a satisfactory seal and minimizing the time required to successfully make up joints. The procedures should be followed whether bolt stresses will be achieved with ordinary stud wrenches, preheating studs, using tensioning devices, using torque wrenches, or using hydraulic wrenches.

*5.1* Inspect the gasket seating surfaces. Look for tool marks, cracks, scratches or pitting by corrosion and make sure that the gasket seating surface is proper for the type of gasket being used. Radial tool marks on a gasket seating surface are virtually impossible to seal regardless of the type gasket being used, therefore every attempt must be made to minimize them.

*5.2* Inspect the gasket. Make sure the material is as specified, look for any possible defects or damage in the gasket.

*5.3* Inspect and clean each stud or bolt, each nut, each washer, and the facing on the flanges against which the nuts will rotate. Look for severe galling, pitting, etc. If any of the above mentioned items are damaged beyond repair, replace the damaged item.

*5.4* Lubricate all thread contact areas and nut facings. The importance of proper lubrication cannot be over-stressed. No joint should be made up without the proper lubricant being applied to the threaded surfaces and to the nut facings. When flanges will be subjected to high temperatures, the use of an anti-seize compound should be considered to facilitate subsequent disassembly.

*5.5* With raised face and flat face installation, loosely install the stud bolts on the lower half of the flange. Insert the gasket between the flange facing to allow the bolts to center the gasket on the assembly. Install the balance of the bolts and nuts and bring all to a hand-tight or snug condition.

*5.6* If the gasket is being installed in a recess or a groove, center the gasket midway into the recess or the groove. If the joint is vertical it may be necessary to use some cup grease or a few dabs of gasket cement or some other adhesive compatible with the process fluids, to keep the gasket in position until the flanges are tightened.

*5.7* Torque the bolts up to a maximum of thirty percent of the final torque value required following the sequence recommended. (See charts for bolting sequence). Number bolts so that torquing requirements can be followed. With any gasket material, it is extremely important to follow a proper bolting sequence. If this sequence is not followed, the flanges can be cocked. Then, regardless of the amount of subsequent torquing, they cannot be brought back parallel. This problem, of course, is maximized on metallic gaskets more so than on non-metallic.

*5.8* Repeat step 5.7, increasing the torque to approximately 50 to 60 percent of the final torque required.

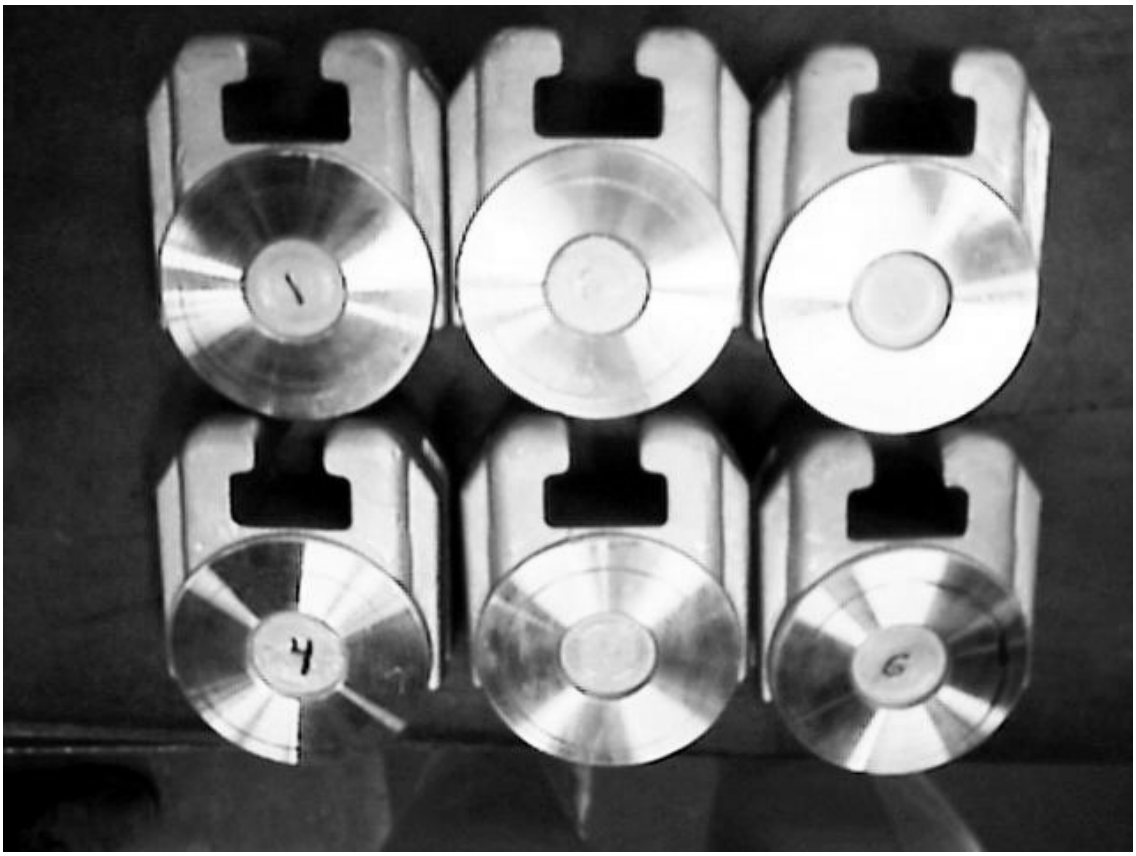
*5.9* Continue with a star pattern of re-torquing all studs or bolts to the desired amount until no further rotation of the nuts can be achieved. This may require several re-torquings since as one stud is torqued it will relieve the stress on the adjacent stud until such time as equilibrium is achieved.

*5.10* On high-pressure, high-temperature applications, it is recommended that the flanges be re-torqued to the required stress after 24 hours at operating pressures and temperatures to compensate for any relaxation or creep that may have occurred.

CRANE

Energy Flow Solutions

# Section Q
# Pacific Valves
## Fitting of Wedge Gate Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

# FITTING OF WEDGE GATE VALVES

## 1.0 GENERAL INFORMATION

For general information regarding this or any other valve please refer to section “A” of this manual.

## 2.0 INTRODUCTION

Fitting of gate valve wedges has a direct effect on the overall performance and longevity of the valve. Occasionally, wear or damage may facilitate the need to refit a gate valve. It is recommended that this operation be entrusted only to an experienced valve mechanic. Although it is recommended that this operation be performed in the shop, with correct equipment and proper care, it can be done with the valve in place. The following are suggested procedures and inspection points:

## 2.0 PROCEDURE

*2.1* New gate valve wedges are furnished with material left on each side to allow for custom fitting. The amount varies with valve sizes from .025" to .050" per side. Insert the wedge into the body after body seats have been finished and check the following points.

*2.1.1* Adequate finish for fitting. Wedge rides high in body seats. If this is not convenient, use inside calipers to check minimum distance between seats in the body and outside calipers to measure minimum distance across seats of wedge at the toe (bottom). Wedges should be polished/lapped to a minimum of 32 rms. Preferred finish is approx. 12 rms.

*2.1.2* Adequate guide clearance to permit seat face contact. Some valves are designed to allow the wedge to be inserted one way only (wide and narrow guides). Otherwise, select the most advantageous orientation of the wedge in the body. Match mark the body and wedge to ensure proper orientation.

*2.1.3* Check that the centerline of the wedge and body seats are oriented such that the stem T-head has proper clearance to align itself at assembly.

*2.1.4* Mount the wedge in a machine (grinder, boring mill or lathe), on a 10º angle face plate (adjustable or not). Centerline of the seat face must be parallel to the guides.

*2.1.5* By trial and error, plus minute adjustments of the wedge angle and the orientation of its centerline, fit the wedge to the body seats, by removing small amounts of surface material from the wedge.

*2.1.6* To check the fit, hang the wedge on a dummy stem (or appropriate fixture), insert it into the body, noting any lean of the wedge relative to the body guides and the guide clearance. Hit the end of the dummy stem with a hammer to seat the wedge and mark the body seat on the wedge. A sharp blow on the bottom of the body will free the wedge from the body seats. To emphasize the position of the seal, a thin film of Prussian Blue can be put on the wedge seat face prior to inserting into the body.

*2.1.7* When the wedge is finally fitted to the body and is resting between the seats (not hammered into place), there should be a small clearance at the toe (bottom), depending on the size and pressure class of the valve (body flexibility).

| | Valve Size | | |
|---|---|---|---|
| Suggested Toe Clearance | 150 | 300 and 400 | 600 and up |
| .0005 - .001 | Up to 4" | Up to 6" | 1 1/2 - 2 |
| .0015 - .003 | 5 - 12 | 8 - 16 | All |
| .003 - .005 | 14"- 16” | 18" up | -- |
| .005 - .007 | 18” up | | |

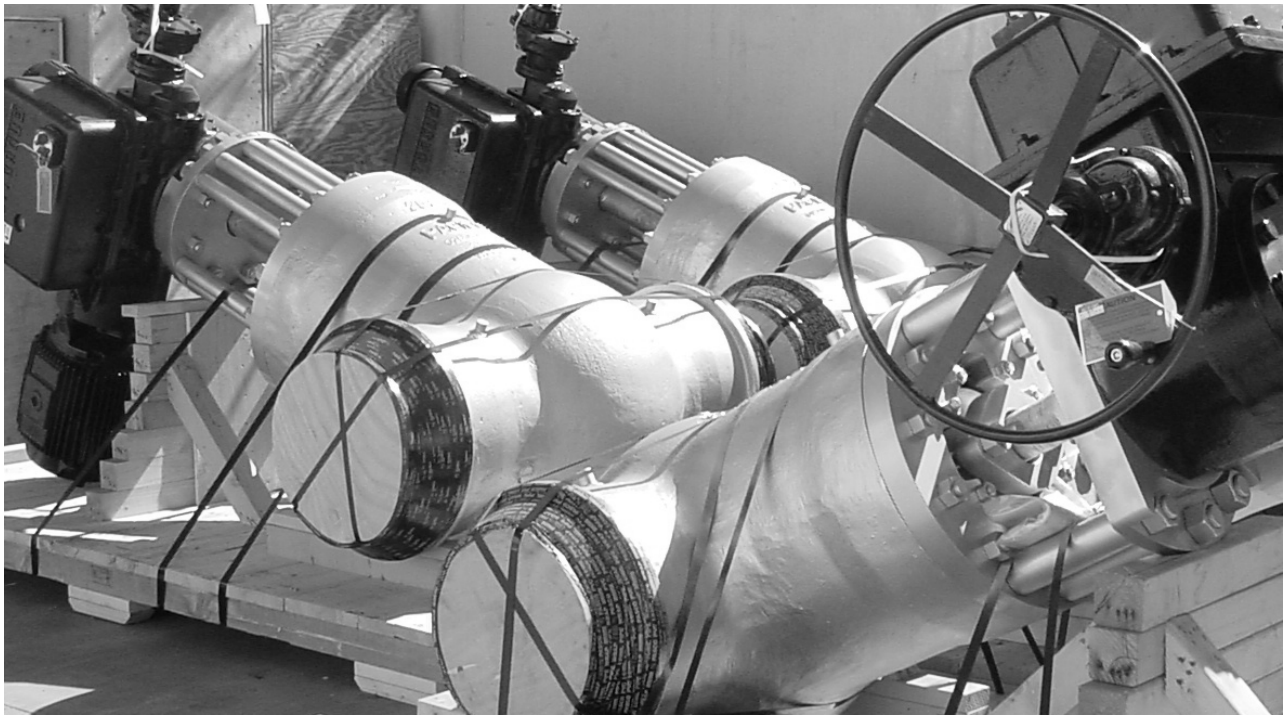
*2.1.8* The ideal fit is with the wedge seal uniform and narrow (approx. 1/8") all around. The seal on the wedge should be below the center of the wedge face (wedge riding high). See Figure 1 below. There should be sufficient guide clearance so that the wedge can seat on both sides. Also, there should be adequate T-head clearance to permit the wedge and stem to be self-aligning.

*2.2* Note on Parallel disc valves. Parallel disc halves must be polished or lapped as listed in 2.1.1 above. Due to their constructions however, it is critical that these disc halves be as flat as possible. When lapping or polishing the parallel disc halves, ensure that there are no low spots in the seating areas.

CRANE

Energy Flow Solutions

# Section R
# Pacific Valves
## Fabricated Yoke Assemblies



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

FABRICATED YOKE ASSEMBLY

1.0 General Information

For general valve operations & maintenance information please refer to section “A” of this manual.

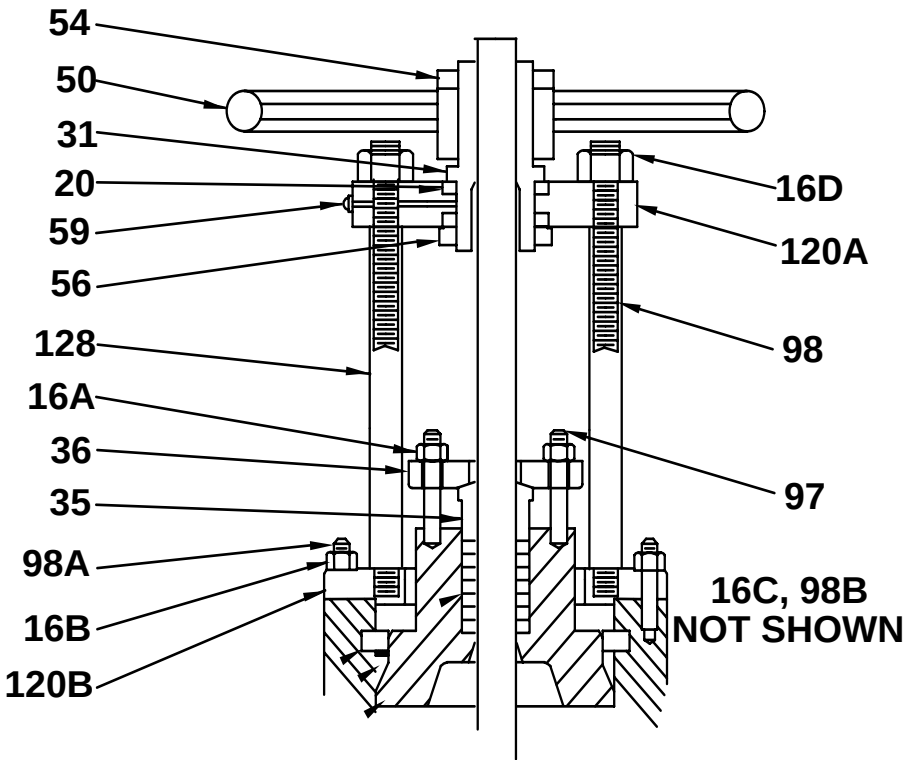
This section covers the design, disassembly and use of the Pacific Fabricated Yoke assembly. This yoke configuration is typically used on pressure seal valves, but may also be applied to bolted bonnet valves.

2.0 Disassembly

2.1 In addition to the disassembly procedures listed in the appropriate valve sections of this manual, the fabricated yoke assembly may also be used to assist in pressure seal valve disassembly. Specifically the fabricated yoke assembly can be used to aid in the “dropping” of the bonnet.

DISASSEMBLY

- Refer to the corresponding valve section for valve specific information.
- Remove the handwheel nut 54 and handwheel 50.
- Remove the Yokesleeve jam nut 56.
- Remove the yokesleeve 31.
- Remove the rod column nuts 16D.
- Remove the top adapter plate 120A.
- Remove all of the rod columns 128.
- Replace the top adapter plate 120A over the exposed rod studs 98.
  Note: It may be necessary to remove the packing gland bolts 97 and nuts 16A to provide clearance for the adapter plate.
- Thread the rod column nuts 16D onto the rod studs and run the nuts all the way down until they contact the adapter plate
- Tighten the column nuts 16D until the bonnet has dropped sufficiently to remove the segment rings.
- Reassemble the Fabricated yoke assembly and draw out the bonnet and gasket by opening the valve handwheel.




**Gate valve shown above**

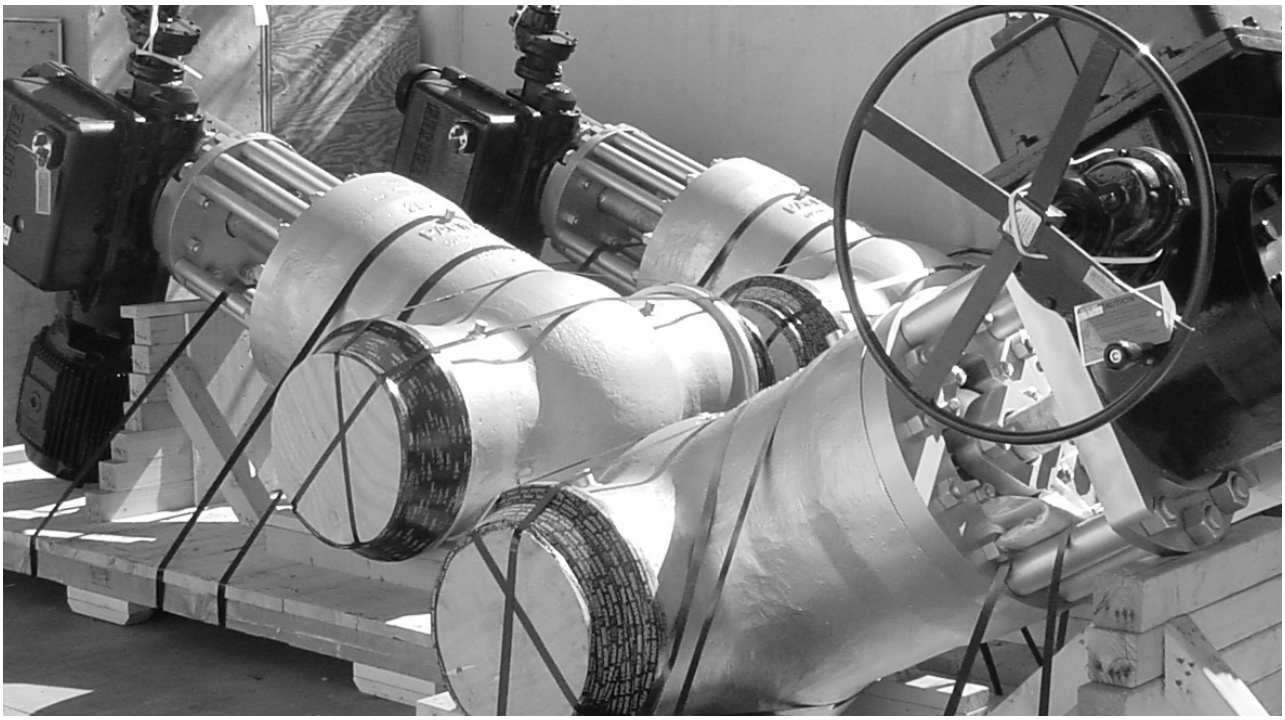
REASSEMBLY

- Tighten the column nuts 16D in accordance with section M.

CRANE

Energy Flow Solutions

# Section S
# Pacific Valves
## Gear & Motor Actuated Valves



Pacific Valves, 3201 Walnut Ave., Signal Hill, Ca., 90755
PH. (562) 426-2531
Fax. (562) 595-9717
**www . cranevalve.com**

*Revision date*
*2-2011*

GEAR AND MOTOR OPERATORS

## 1.0 THEORY OF OPERATION

Most valves, which are located in an accessible environment, are operated by a manual hand-wheel mounted directly on top of the valve. When the valve size or differential pressure is so great that the handwheel size cannot keep the operating handwheel pull within customer reasonable limits, then a bevel gear should be mounted on the top-works. In addition, many customers require remote operation or operating times that are not possible with manual handwheels, in this case Electric Motor Operators (EMO's) can be used. **Note! Operator limit and torque settings are factory set during valve testing for ANSI cold working pressure tests. Additional adjustment may be required in the field. Contact Pacific Valves with any questions.**

**WARNING! Do not use excessive air wrench torque or snipes on handwheels as the gearing or valve stem could be damaged!**

## 2.0 INSTALLATION

**Warning! Ensure that the electric motor operator is wired correctly and phased properly prior to operation. Do not allow the valve to travel in the wrong direction (when phased is reversed). This can result in damage to the valve and void all valve warranties.**

## 3.0 MAINTENANCE

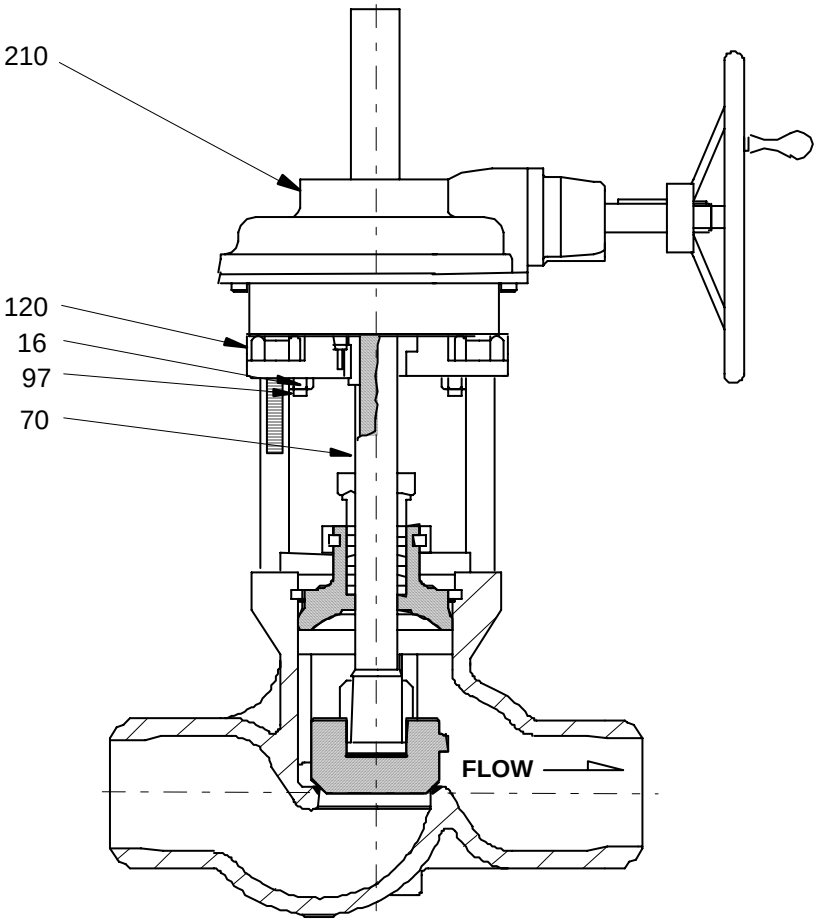
The gear or electric operator itself should never require disassembly and it is recommended that this be done only by the operator manufacturer. If it becomes necessary to disassemble the valve, the operator assembly must be removed first.

### 3.1 Preventive Maintenance

The preferred orientation for Pacific gear and motor operated valves is in horizontal pipelines with the stem in a vertical position. When installed in any other position, motor operated valves should be supported by means of a support clamp around the motor mounting plate. Please contact Pacific Valves when specifying an operated valve with an orientation different than that listed above.

*3.1.1* With the operator removed from the valve, and operator drive nut for thread wear, galling or binding.

*3.1.2* If excessive wear is evident, worn parts should be replaced.




PRESSURE SEAL GLOBE EXAMPLE

4.0 DISASSEMBLY

*4.1* Remove operator mounting bolts 97 from mounting plate 119 or mounting adapter 120.

*4.2* Attach a support sling around operator 210 and prevent rotation.

*4.3* Turn handwheel closed to turn operator off from stem and then lift gear operator off. In the case of an Electric Motor operator it may be necessary to disengage or "declutch" the motor before using the manual handwheel. The Electric Motor Operator manufacturer's manual should detail this procedure.

*4.4* Remove spacer 64 (when used) and coupling 45.

*4.5* Proceed with disassembly instructions given in the appropriate valve maintenance instructions.

**Note: Prior to the disassembly of any valve equipped with an Electric Motor Operator, ensure that all electrical sources have been disconnected and the appropriate lockout/tagout procedures have been used.**

5.0 ASSEMBLY

*5.1* Install spacer 64, if used, and coupling 45.

*5.2* Lift gear operator carefully over valve stem and while preventing operator from rotating, turn handwheel open until operator aligns over mounting holes.

*5.3* Loosely install mounting bolts 97 on mounting plate 119 or mounting adapter 120 and then check that stem 70 operation does not bind.

*5.4* Torque mounting bolts 97 while valve is in open position.

*5.5* Set torque and limit switches in accordance with the instruction manual for the applicable operator.

*5.6* For all gate and globe style valves (excluding the Parallel Disc Gate Valve) upon valve closing, the torque switch should be set to trip first.

5.7 For Parallel Disc gate valves upon valve closing, only the limit switch should be utilized. The torque switch should not be utilized. Care should be taken to ensure that the torque switch is not engaged as this may apply excessive operator thrust/torque to the Parallel Disc gate valve.

*5.8* Upon valve opening, the limit switch should be the only switch set to trip. The torque switch should not be utilized. The valve can be backseated only by turning the operator handwheel further passed this limit position. Do not allow the motor operator to drive the stem into the backseat position. This operation should be done manually.