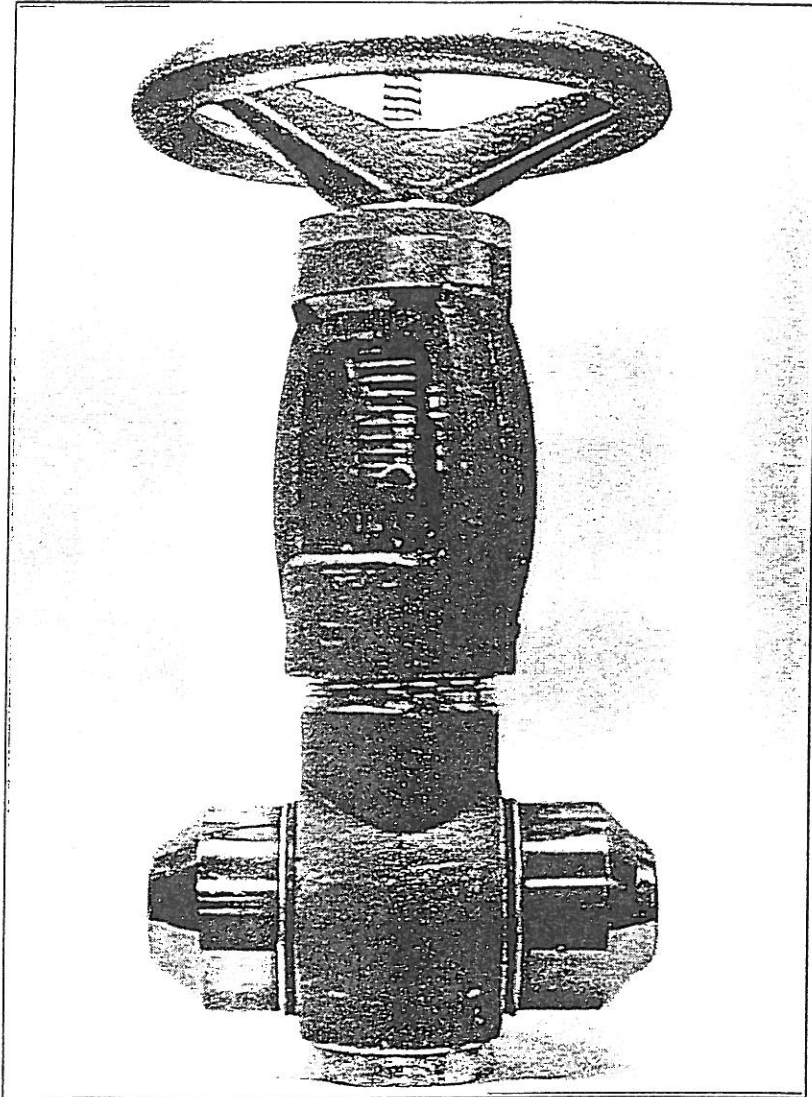


Conval Gate Valve



Conval INC.

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I. Introduction

Conval's CLAMPSEAL[®] Gate Valve is a flexible wedge gate valve designed for tight shut-off in high pressure, high temperature service. Its features include a gasketless pressure actuated bonnet seal, a pressure actuated backseat, a cartridge type-packing chamber and a single piece-packing gland. The components of the valve are shown and named in Figure A.

II. Installation

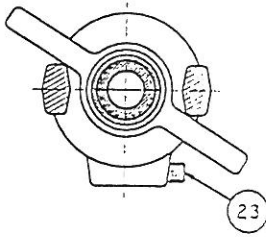
Installation welding should be done in accordance with ASME Boiler and Pressure Vessel Code, Section I, Part PW, or ANSI B31.1 PARA 127.

1. Close valve tightly before welding to protect seat from heat distortion and weld splatter.
2. Allow 1/16" gap between bottom of socket, or butt weld end, and end of pipe (PW 41.5.7. or ANSI B31.1 PARA 127).
3. Preheat and postweld heat treat as required. (see TABLE I)

| TABLE I | | |
|---|---|---|
| PREHEAT AND POSTWELD HEAT TREAT REQUIREMENTS | | |
| P-1 SA-105 | P-5 SA-182 GR. F22 | P-8 SA-182 GR. F316 |
| PREHEAT 50°F (A100.4.1) * | PREHEAT 400°F (A100.4.4) * | PREHEAT NONE REQUIRED (A100.4.7) * |
| POSTWELD HEAT TREAT NONE REQUIRED (PW-39) | POSTWELD HEAT TREAT REQUIRED WHEN NOMINAL WALL THICKNESS EXCEEDS 5/8": 1250°F 1¼ HR MIN (PW-39) | POSTWELD HEAT TREAT NONE REQUIRED (PW-39) |
| * ASME BOILER AND PRESSURE VESSEL CODE, SECTION I, PART PW-38 | | |

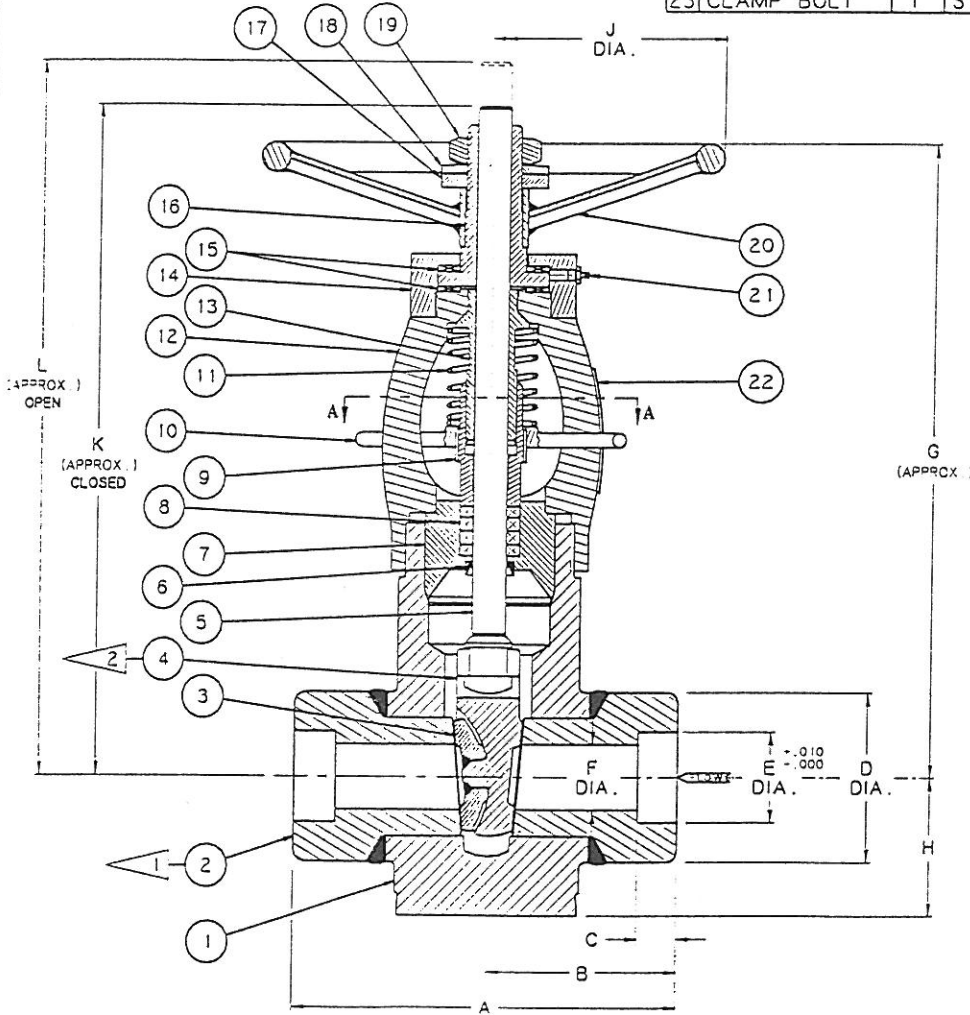
III. Operation

Conval Gate Valves are designed for on-off service and should normally be either fully opened or fully closed. The valve stems have single pitch left hand threads with clockwise rotation of the handwheel to close.



SECTION A - A

| LIST OF MATERIALS | | | | |
|-------------------|-----------------------|-----|--------------------|------------------------|
| NO. | NAME | QTY | MATERIAL | SPECIFICATION |
| 1 | BODY | 1 | CAST ALLOY STEEL | ASME SA-217 Gr. WC9 |
| 2 | HUB | 2 | FORGED ALLOY STEEL | ASME SA182-F22 |
| 3 | DISC | 1 | ULTIMET | ASTM B815 |
| 4 | GATE | 1 | STAINLESS | ASME SA479 TYPE 410 |
| 5 | STEM | 1 | NITRONIC 50 | ASME SA479 TYPE XM-19H |
| 6 | BACKSEAT | 1 | NITRONIC 60 | ASME SA479 UNS S21800 |
| 7 | BONNET | 1 | NITRONIC 50 | ASME SA479 TYPE XM-19H |
| 8 | PACKING SET | 2 | END/WIPER RINGS | BRAIDED CARBON YARN |
| | | 2 | DIE FORMED RINGS | FLEXIBLE GRAPHITE |
| 9 | GLAND | 1 | STAINLESS | ASME SA479 TYPE 416 |
| 10 | INTEGRAL GLAND WRENCH | 1 | CAST STAINLESS | MFR. STD. |
| 11 | SPRING | 1 | STAINLESS | MFR. STD. |
| 12 | YOKE | 1 | FORGED ALLOY STEEL | ASME SA182-F22 |
| 13 | YOKE BUSHING | 1 | ALUMINUM BRONZE | ASME SB-150 UNS C64200 |
| 14 | BEARING CAP | 1 | STEEL | MFR. STD. |
| 15 | BEARING SET | 2 | COMMERCIAL | MFR. STD. |
| 16 | STEM NUT | 1 | ALUMINUM BRONZE | ASME SB-150 UNS C64200 |
| 17 | FLAT WASHER | 1 | STEEL | MFR. STD. |
| 18 | BELLEVILLE WASHER | 1 | STEEL | MFR. STD. |
| 19 | JAM NUT | 1 | STEEL | MFR. STD. |
| 20 | HANDWHEEL | 1 | STEEL | MFR. STD. |
| 21 | GREASE FITTING | 1 | STEEL | STD. 1/4" DRIVE |
| 22 | I.D. TAG | 1 | STAINLESS | MFR. STD. |
| 23 | CLAMP BOLT | 1 | STAINLESS | MFR. STD. |



NOTE:
 1 - SEAT FACING ON HUBS TO BE COBALT ALLOY #6
 2 - SEAT FACING ON GATE TO BE COBALT ALLOY #21

| REVISIONS | |
|-----------|--|
| C | |
| B | |
| A | |

| NO. | DESCRIPTION | DATE | BY |
|-----|-------------|------|----|
| | | | |

Conval
SOMERS, CONNECTICUT

CLASS 1500 STD
CAST ALLOY STEEL

SERVICE 3750 PSI - 100 DEG F
RATING 550 PSI - 1100 DEG F

GATE VALVE

| | | |
|------------|------------------|-----------|
| DRAWN: CJR | SCALE: NONE | 1/2" - 2" |
| CHECK: [] | SHEET: 1 of 1 | 53F2J-F22 |
| APPY: [] | FILE No: GVFIG-A | |

| SIZE | VALVE OUTLINE DIMENSIONS | | | | | | | | | | | FLOW Cv | APPROX. WT. LBS. | SIZE CODE |
|--------|--------------------------|-------|-----|--------|-------|-------|----------|-------|----|---------|----------|---------|------------------|-----------|
| | A | B | C | D | E | F | G | H | J | K | L | | | |
| 1/2" | 5 1/2 | 2 3/4 | 3/8 | 2 1/16 | .855 | .818 | 9 1/4 | 1 3/4 | 6 | 10 | 10 31/32 | 23 | 18 | 2E |
| 3/4" | 5 1/2 | 2 3/4 | 1/2 | 2 1/16 | 1.065 | .818 | 9 1/4 | 1 3/4 | 6 | 10 | 10 31/32 | 23 | 18 | 2E |
| 1" | 5 1/2 | 2 3/4 | 1/2 | 2 1/16 | 1.330 | .818 | 9 1/4 | 1 3/4 | 6 | 10 | 10 31/32 | 23 | 18 | 2E |
| 1 1/4" | 7 1/4 | 3 5/8 | 1/2 | 3 | 1.675 | 1.341 | 12 7/8 | 2 1/8 | 8 | 13 9/32 | 14 7/8 | 81 | 38 | 3G |
| 1 1/2" | 7 1/4 | 3 5/8 | 1/2 | 3 | 1.915 | 1.341 | 12 7/8 | 2 1/8 | 8 | 13 9/32 | 14 7/8 | 81 | 38 | 3G |
| 2" | 8 1/2 | 4 1/4 | 5/8 | 3 3/4 | 2.406 | 1.627 | 15 11/16 | 2 7/8 | 10 | 16 | 18 1/32 | 157 | 65 | 4J |

FIGURE A

Conval GATE VALVE

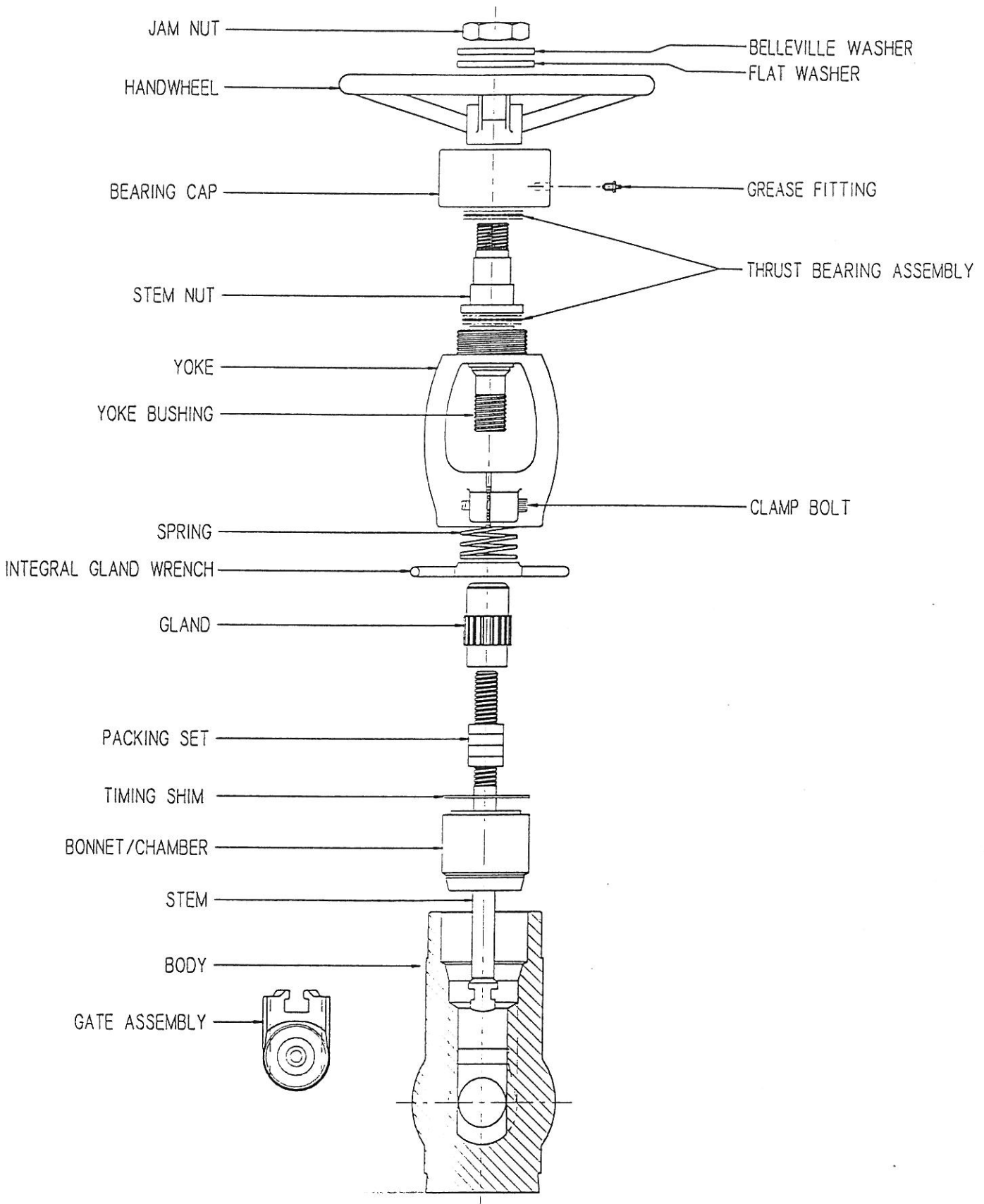


FIGURE B

The Conval Gate Valves has a backseat features which, in the fully open position, isolates the packing from line pressure thereby increasing packing life. This backseat is pressure actuated and requires only a light torque to effect sealing.

The recommended assembly and operating torques for the Conval Gate Valve are given in Table II.

| TABLE II | | | | | |
|---------------|---|-----|-------------------|----------------|------------------|
| VALVE SIZE | ASSEMBLY AND OPERATING TORQUES (FT-LBS) | | | | |
| | YOKE | | BACKSEAT (MAX) | GLAND (MAX) | SEATING (MAX) |
| | MAX | MIN | | | |
| ½ | 150 | 70 | 4 | 20 | 30 |
| 1 | 150 | 70 | 4 | 20 | 30 |
| 1 ½ | 250 | 100 | 6 | 35 | 60 |
| 2 | 450 | 170 | 12 | 60 | 160 |
| 2 ½ | 650 | 220 | 12 | 60 | 300 |
| 3 | 750 | 275 | 18 | 90 | 350 |
| 4 | 900 | 325 | 25 | 145 | 500 |

Note: Always check packing gland tightness prior to taking valve off of backseat.

IV. Packing Gland Adjustment

Packing gland must be tightened periodically to stop the leakage caused by normal packing shrinkage and wear. Also, newly installed valves are likely to require packing adjustment and should be checked during hydrotest and start-up. Packing compression is adjusted by rotating the captive gland wrench clockwise and tighten or counter-clockwise to loosen. The wrench is limited by the yoke arms to approximately 120° of rotation. It is re-positioned by lifting it above the gland splines, rotating it and re-engaging the splines. It is recommended that after packing adjustment the wrench be left in the fully counter-clockwise position so that the gland can be immediately tightened.

V. Maintenance

All components of the Conval Gate Valve are shown in Figures A & B.

A. Routine Maintenance

Routine maintenance consists of an occasional tightening of the gland to stop leakage. No other routine maintenance is required.

B. Adding a Ring of Packing Under Pressure

When, after repeated adjustment, the gland has bottomed on the chamber shoulder, it is possible to add packing rings without removing the valve from service. Use the following procedure:

1. If possible, isolate the valve and allow pressure to bleed off.
2. Open the valve fully and torque onto backseat. (See TABLE II for allowable torque).

When the valve is pressurized, the valve backseat provides pressure enhanced positive sealing. This does not provide the two valve protection which some safety standards call for, proceed only as a last resort.

3. Check to see that leakage has stopped.

Caution: If leakage persists, do not proceed without isolating valve from system pressure.

4. Remove the handwheel to prevent loss of backseat seal due to accidental movement of the stem.
5. Unscrew the gland to full open height on the yoke bushing.
6. Open ring at split for insertion around the stem.
7. Slide ring into the chamber and compress it by tightening down the gland. *Do not add more than one packing ring at a time.* Rotate rings so that splits are 90° apart. Do not add more rings than can be accommodated by the straight bore portion of the chamber I.D. (See TABLE II for allowable gland torque).
8. Reassemble handwheel and rotate the handwheel several times in both directions to "seat" packing. Tighten gland again, if necessary, to complete the seal. *Note: The stems are rising, non-rotating type and do not turn.*

VI. Repair

A. Disassembly of Gate Valves for Inspection and Repair

Caution: Before any attempt is made to disassemble the valve, verify that the valve is isolated from system pressure and secured against accidental pressurization.

1. Position the stem at mid-travel.
2. Completely remove the clampbolt from the yoke and screw into the opposite (threaded) side of clampbolt lug. Place a metal flat, like a washer, into the yoke and tighten the clampbolt, like a jackscrew, until the yoke split expands by about 1/32" for a ½" valve and up to 1/16" for a 4" valve.
3. Loosen the yoke by applying force in a counter-clockwise direction. Using a yoke wrench or pipe wrench, unscrew and carefully remove the yoke and all valve internals. Once the gate has been cleared of its guides, it can slide off the stem. Be careful to insure that this does not happen inadvertently.
4. Slide the gate off the stem, then rotate the handle clockwise to unscrew the stem out of the yoke. *Note: Use caution to avoid damage to bonnet or stem during disassembly.*
5. Carefully slide the bonnet from the stem by holding the stem vertically on a bench with the threaded end down and pressing down on bonnet. This process can be facilitated by using a light lubricant like WD/40 on the stem.
6. Remove gland, gland wrench and spring.
7. Inspect the condition of the following sealing surfaces for damage:

Body – seats, bonnet seal surface
Stem – packing sealing surface, backseat
Bonnet – backseat, bonnet seal lip
Gate – seating surfaces

If the stem or bonnet surfaces identified above are damaged, the part should be replaced. If the body or gate sealing surfaces are damaged, please consult the factory or repair instructions.

In general, further disassembly will not be necessary. However, if access to the stem nut or bearings is required, proceed as follows:

8. Remove the handwheel.
9. Remove the cap screws securing the bearing cap.
10. Remove the bearing cap, stem nut and thrust bearings.

B. Repacking

It is recommended that valves be repacked by replacing the bonnet with a prepacked spare. When the original bonnet is going to be used, repack as follows:

1. Place the bonnet on a flat surface with the seal lip up.
2. Insert a wooden dowel or brass rod into the stem opening and remove the lowest ring by pressing down around its circumference. Repeat until all packing is removed. Removal of the old packing from the bonnet can be made easier by first soaking the packed bonnet in a light oil or solvent.
3. Clean the chamber wall and inspect the finish. If the surface is badly pitted or scored, the bonnet should be replaced.

Note: Do not use a standard packing puller to remove packing.

4. Replace the bonnet over the stem.
5. Add rings individually and manually depress them into the chamber using the packing gland. Be very careful not to damage the stem with the gland while repacking.

Note: Use only dieformed flexible graphite seal rings and woven graphite wiper rings for best packing performance.

C. Reassembly

1. Clean all parts thoroughly with clean solvent, and lubricate threads. A recommended thread lubricant is Never-Seez Pure Nickel Special.
2. If the bearing housing has been disassembled, reassemble the stem nut, bearing cap and handwheel as shown in Figure A and fill the housing with grease.
3. For a prepacked bonnet, hold the gland against the packing to prevent movement of the rings, and slide the bonnet onto the stem until the backseat position is achieved. Remove the gland.
4. Reassemble the gland wrench and spring and screw the gland onto the yoke bushing all the way up. It is important that the gland be

screwed all the way on since it may otherwise prevent a proper bonnet seal.

5. Screw the stem into the stem nut until the bonnet is just short of contact with the yoke.

Note: Stem has left hand thread.

6. Slide the gate onto the stem. Exercise care to prevent the gate from sliding off.
7. Align the gate grooves with the gate guides and screw the yoke onto the body. Apply torque as specified in TABLE II. *Do not over torque.*
8. Return clampbolt to normal position and tighten per TABLE II.
9. Screw the gland down onto the packing and apply torque as specified in TABLE II.
10. Cycle the valve open and closed several times to seat the packing. Reapply proper torque to gland.

VII. Handling and Storage

All valves shipped from Conval have been treated with a rust preventative and have been capped and packaged to preclude moisture intrusion. CLAMPSEAL[®] Valves are ruggedly constructed for their intended service. However, care must be taken in handling them. Dropping any valve may cause internal damage which will interfere with correct operation.

The handwheel should not be used for lifting the valve. The yoke arms and/or body should be used.

Actuator equipped valves may be lifted by the actuator has been provided with a lifting lug or if properly positioned slings are utilized. Handles, levers, etc. should not be used.

Valves should be stored in a weatherproof enclosure on pallets or similar method, which allows free airflow around the valves. The valve end covers provided by the factory should not be removed.

Carbon steel valves, which may have been subjected to moisture intrusion should be protected further as follows:

Remove from polyethylene bags and take off end covers and other organic materials.

Place in oven at 300° for about 2 hours.

After cooling to room temperature, replace materials removed and reseal in polyethylene bags.

Note: Normal system flushing with water will remove any preservative used on non-plated ferrectic steel parts. Conval Gate Valves will not be adversely affected by standard piping system chemical cleaning solutions.

VIII. Ordering Information

When ordering tools or spare parts, give the part number or specify (1) the name of the tool or part, (2) the valve size and (3) the valve figure number.