

Conval Gate Valve

Servicing Instructions



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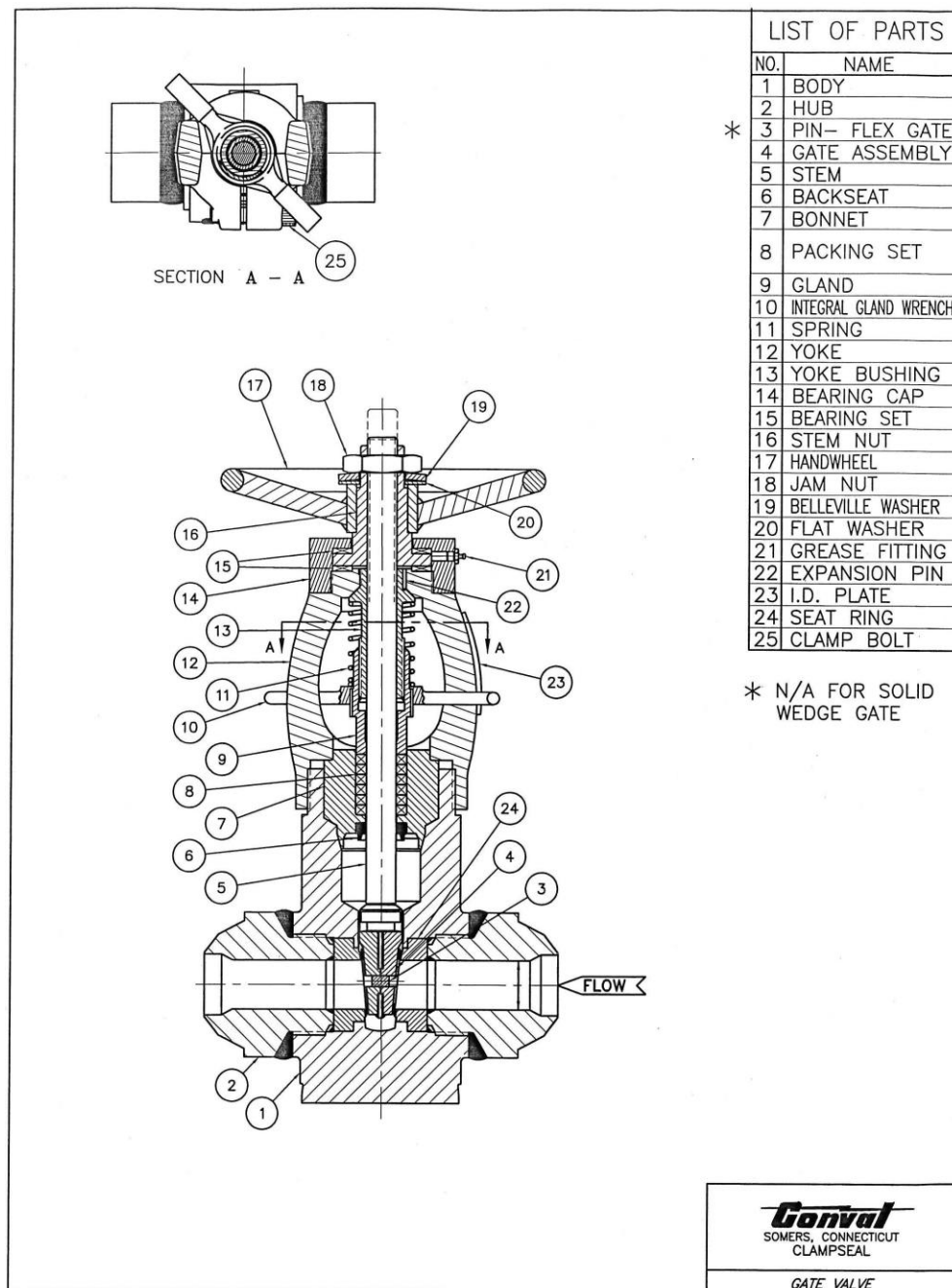
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I. Introduction

The Conval® Gate Valve is a flexible wedge 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 the drawing provided.



TYPICAL GATE VALVE

II. Installation

Installation welding should be done in accordance with ASME Boiler and Pressure Vessel Code, Section III, ND-4000 (Class 2) or ND-4000 (Class 3).

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.
3. Preheat and postweld heat treat are required (see TABLE 1).

TABLE 1	
PREHEAT AND POSTWELD HEAT TREAT REQUIREMENTS	
P-1 SA216-WCB / SA 696-Gr. C	P-8 SA 351-CF8M / SA 479-316
PREHEAT None required*	PREHEAT None required
POSTWELD HEAT TREAT None required*	POSTWELD HEAT TREAT None required

*ASME Section III Table NC-4622.7(b)-1

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.

The Conval Gate Valve has a backseat feature which, in the fully open position, isolates the packing from line pressure, thereby increasing packing life. This backseat is pressure activated 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					
ASSEMBLY AND OPERATING TORQUES (FT-LBS)					
SIZE	CLAMPBOLT	YOKE	BACKSEAT	GLAND	SEATING
2E	8 max	70-150	4 max	11 max	30 max
4J	21 max	170-450	12 max	63 max	160 max
6N	42 max	275-750	18 max	131 max	350 max
8R	77 max	Tighten until snug, then turn 60-70 degrees	25 max	164 max	500 max

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 hydrostatic test and start-up. Packing compression is adjusted by rotating the integral gland wrench (item 10 in the provided drawing) clockwise to tighten or counter-clockwise to loosen.

The wrench is limited by the yoke arms to approximately 120° of rotation. It is repositioned 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 the provided drawing.

A. Routine Maintenance

Routine maintenance consists of an occasional tightening of the gland to stop leakage. The only other routine maintenance is adding grease to the bearing kit through the grease fitting. High temperature grease such as Lubriko LC23K is recommended. Grease should be added every 9 months and as needed for the handle to turn smoothly.

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 new packing ring at split for insertion around the stem.
7. Slide packing 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.

YOU MAY USE 2 OR 2A BELOW, BUT NOT BOTH.

2. Completely remove the clambolt (item 25 in provided drawing) from the yoke and screw it into the opposite (threaded) side of the clambolt lug. Place a metal flat (like a fender washer) into the yoke split to stop the clambolt. Tighten clambolt, using it as a jacking screw, until the yoke split expands by 1/16” to 1/4” (this is to relieve yoke thread friction).
- 2A. Completely remove the clambolt (item 25 in provided drawing) from the yoke and keep the clambolt for reassembly. Drive a small wedge (similar to a wood chisel) straight down into the split in the clambolt lug until the yoke split expands by 1/16” to 1/4” on large valves. **CAUTION: When using method 2A, always drive the wedge straight down, never drive the wedge toward the body threads or thread damage could occur.**

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 ensure that this does not happen inadvertently.
4. Slide the gate off the stem, then rotate the handwheel clockwise to unscrew the stem out of the yoke.

Note: Use caution to avoid damage to bonnet or stem during disassembly.

Once the stem has traveled to the point where the handle needs to be removed, remove the handwheel nut (item 18 in the provided drawing) and the flat washer and spring washer (items 19 and 20 in the provided drawing).

Note: it is possible to remove the stem without removing the handle, but this is not recommended.

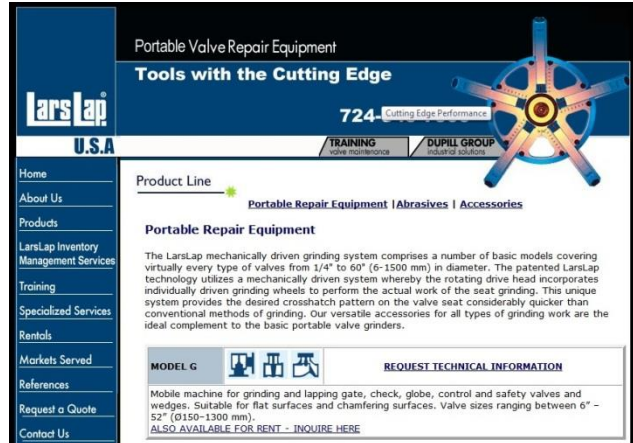
Hold all parts for use on reassembly.

5. Timing shims may be provided with this valve. (If timing shims are provided, they would be positioned on the top of the bonnet—item 7 in drawing provided.) 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 approved lubricant, such as WD-40, on the stem.
6. Inspect the condition of the following seal 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.

7. If the body/hub sealing surface is damaged, a special tool such as a LarsLap is required to grind the seats to renew the 5° angle sealing surface.



If the gate is damaged, lapping of the gate is recommended. For significant sealing surface imperfections, start by lapping the gate on a grinding cloth of 180 grit until the imperfections are removed, then lap again using a 320 grit grinding cloth to provide a smooth sealing finish.

If the gate is damaged beyond the point where lapping is practical, then replacing the gate is necessary. Replacement gates are often sent out oversized and are required to be fit to the seats. Fitting a gate requires that you drop the gate into a valve body to determine if machining is necessary, and if so how much. When machining a gate to fit the valve, machine .001 off the face of the gate to drop the gate .008 at a 5° angle. Use a 2 or 4 jaw chuck, indicate face and machine as required. After machining, lap with 320 grit cloth to polish the sealing surface.

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 (see section VI, number 4).
9. Grind the tack weld off of the bearing cap.
10. Remove the bearing cap, stem nut and thrust bearings. Examine parts and replace as necessary.

B. Repacking

It is recommended that valves be repacked by replacing the bonnet with a pre-packed 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 die-formed flexible graphite seal rings and woven graphite wiper rings for best packing performance.

C. Reassembly

1. Clean all parts thoroughly with cleaning solvent. Wire brush out any metal shavings or dirt. Lubricate all threads (body, yoke bushing, clampbolt, and bearing cap). A recommended lubricant is Never-Seez Pure Nickel Special.
2. If the bearing housing has been disassembled, reassemble the stem nut, bearing cap and handwheel and fill the housing with grease.
3. Lubricate and replace timing shims on bonnet, if they were originally supplied. For a pre-packed bonnet, hold the packing to prevent movement of the rings, and slide the bonnet onto the stem until the backseat position is achieved.
4. Screw the stem with bonnet and shims on the stem into the stem nut until the bonnet is just short of contact with the yoke.

Note: Stem has left hand thread.

5. Slide the gate onto the stem. Exercise care to prevent the gate from sliding off.

6. Apply torque by turning the yoke as specified in TABLE II. Do not over turn/torque. There is a match mark provided on the body of the valve just below the body threads at the yoke split. This match mark can be used as a guide to check that the yoke is tight, provided the internal valve parts have not changed.
7. Lubricate and return clampbolt to normal position, tighten per TABLE II.
8. Screw the gland down onto the packing and apply torque as specified in TABLE II.
9. 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 that 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°F 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 ferretic 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, please give the part number or specify:

- (1) name of the tool or part
- (2) valve size
- (3) valve figure number.

We may be reached at:

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