



YARWAY HIGH PRESSURE GLOBE VALVE, WELBOND MODEL 5600

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Before installation these instructions must be fully read and understood



FIGURE 1

Welbond valves are designed for high pressure, high temperature service in modern steam power plants and related installations as required by the ASME boiler code.

- Fully guided stem; special high temperature packing.
- Flexible disc; compensates for wear, pipe line bending and thermal distortion giving longer seat life.

NOTE:

For applications with pneumatic actuators valves always should be installed with flow entering above the seat.

DESIGN FEATURES (FIGURE 1)

- Unique six-bladed Yarway reseating tool cuts the seating surface and throat of the valve seat without removing the valve body from the line, producing a completely new sealing edge on the valve seat.
- All working parts are removable through yoke.
- The heavy solid stellite seat ring is permanently fused to the valve body.
- Disc is solid stellite for extra wear resistance.
- Secondary, disc-body orifice protects disc-seat orifice during opening and closing.
- Swing gland bolts eliminate need to remove gland nuts during repair.
- Loose backseat offers maximum accessibility because the stuffing box bushing is not fastened to the valve body. The threaded-in backseat design is also available. Since each valve body is machined to accept either bushing the designs are interchangeable and can easily be converted from one to the other.
- Full compliance with all requirements of the ASME Boiler Code; proper drainage in any line.
- All wetted parts suitable for acid wash operations.

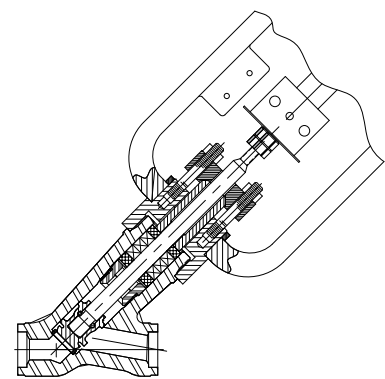
INSTALLATION

Valves are normally installed with flow entering below the seat. They may also be installed with flow entering above the seat, when required, but this exposes the stuffing box to full-line pressure.

Valve should be welded in the line with the disc in the closed position in order to protect sealing surfaces from debris and deposits, to prevent current arcing between disc and seat, and provide added heat sink capacity. Since welding procedure is dependent upon various codes established by customers, contractors and/or government rulings, qualification to the specific code involved should be followed.

Standard material for forged Welbond valves is ASME SA 182 Grade F22 steel. Welbond valves on special order can be forged in ASME SA 182 Grade F316 or ASME SA 105 steel. Suggested AWS-ASTM welding rod for F22 valve body materials is:

Valve body material: ASME SA 182 Grade F22
 Welding rod: AWS-ASTM E9016 B3



Flow direction entering above the seat

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OPERATION

Welbond valves should be opened and closed rapidly and completely to insure maximum service life. Although not specifically a throttling valve, the Welbond valve will withstand moderate throttling service due to the heavy duty stellite seating surfaces and a 'secondary orifice' feature. This feature absorbs some of the pressure drop, thus minimizing erosion of the primary seating surfaces. When opening a valve, additional leverage may be applied only when the valve is first opened to take the disc off the seat. The valve should then be opened without additional leverage until firm resistance is felt when the disc contacts the backseat.

Valves with a threaded-in backseat should be given a small additional torque after contact with the backseat. Additional leverage must not be used when the valve disc is on the backseat.

The handwheel (or 'T' handle on smaller sizes) allows for ample closing force, thus use of additional leverage is not recommended. An impactor handwheel is furnished on the NPS 2½ and 3 Welbond valve. When applied to steam gage and water column line service, the valve should be locked open in accordance with the Boiler Code. Welbond valves can be fitted with a lock-open device, or a lock-closed device, per Figure 2.

CARE OF VALVE

Although the solid stellite disc and the flexible design minimize the effect of debris in the flow stream, the valve should not be closed against debris which traps particles between seating surfaces. This can lead to leakage requiring reseating and restoring of the surfaces.

LUBRICATION

Stem lubrication is not required due to non-galling properties of the bronze yoke bushing and stainless steel stem.

PACKING

Packing must be sufficiently compressed by the split gland bushing to prevent stem leakage. Excessive packing compression will shorten packing life and may cause abnormal operating torque. When packing adjustments are required, compression should be no more than that required to stop the leakage. When packing can no longer be adjusted, it must be replaced.

When it is necessary to remove all packing from the stuffing box proceed as outlined in 'Disassembly'. Repack using the procedure outlined under 'Packing installation'. These instructions apply only to packing sets supplied by Yarway.

DISASSEMBLY

Before attempting disassembly:

CAUTION

Make certain that all line pressure is relieved and the pipeline is secured against pressurization.

Determine valve backseat design from valve nameplate. A threaded-in backseat design will contain the letter 'B' in the valve figure number. A 'loose' backseat design will have no letter 'B' in the valve figure number.

All internal parts of the Welbond valve may be removed without disconnecting the body from the line. When the inside of the valve must be cleaned or if a foreign body lodged in the valve prevents proper seating of the disc, proceed as follows:

LOOSE BACKSEAT DESIGN (FIGURE 3)

1. Free the swing bolts to remove the split gland bushing.
2. Turn handwheel counterclockwise past the fully open position to force the packing and the 'loose' stuffing box bushing out of the stuffing box.
3. Remove tack weld on yoke and unscrew yoke bushing to remove all internal parts through the gland and top of the yoke, and remove the gland.
4. Disassemble handwheel (or 'T' handle), yoke bushing, packing, and stuffing box bushing.

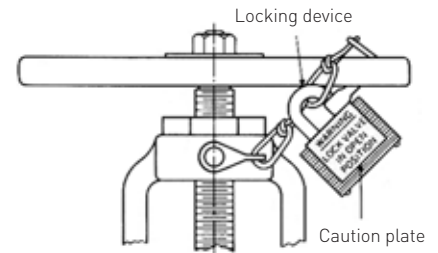


FIGURE 2

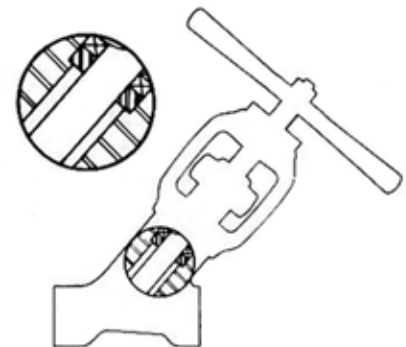


FIGURE 3
Loose backseat

- Fig no. 5617 Class 1700 (117 bar)
- Fig no. 5627 Class 2700 (186 bar)
- Fig no. 5645 Class 4500 (310 bar)

THREADED-IN BACKSEAT DESIGN (FIGURE 4)

This design requires a backseat removal tool in order to remove all internal valve parts. The packing and backseat removal tool number is on the valve identification plate, or the tool can be selected from the chart on the opposite page which also gives the tool part number.

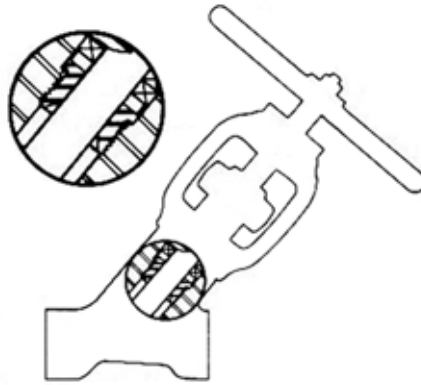


FIGURE 4
 Threaded-in backseat

- Fig no. 5617B Class 1700 (117 bar)
- Fig no. 5627B Class 2700 (186 bar)
- Fig no. 5645B Class 4500 (310 bar)

1. Make certain the backseat tool assembly number corresponds with the valve size number appearing in selector chart.
2. Before disassembly, be sure valve is not under pressure.
3. Disassembly of valve:
 - a. Remove hex nut and handwheel.
 - b. Remove weld on yoke bushing and remove bushing.
 - c. Loosen hex nuts on gland bolts and swing the bolts free of gland.
 - d. Lift gland and remove split gland bushing.
4. Packing remover insertion (Figure 5):
 - a. Insert remover over stem.
 - b. Thread sleeve into yoke until handle holes are aligned.
 - c. Insert handle through sleeve and packing remover.
 - d. Turn handle clockwise to cut packing. Remove cut packing materials from the tool teeth and repeat cutting.
 - e. Remove tool by turning handle counterclockwise.
 - f. The backseat bushing is covered by a flat washer to keep packing out of the slots in the bushing. This must be hooked out.
5. Backseat tool insertion (Figure 5):
 - a. Insert shaft over stem and fully engage slot of backseat bushing.
 - b. Thread sleeve into yoke until handle holes are aligned with shaft firmly pressed downward.
 - c. Insert handle through sleeve and shaft.
 - d. Turn handle counter-clockwise to remove backseat bushing. When backseat bushing is completely unthreaded, remove backseat tool. (If bushing will not move, heat body).
6. Lift out stem assembly including backseat bushing. Be sure backseat gasket is removed also. Remove gland.

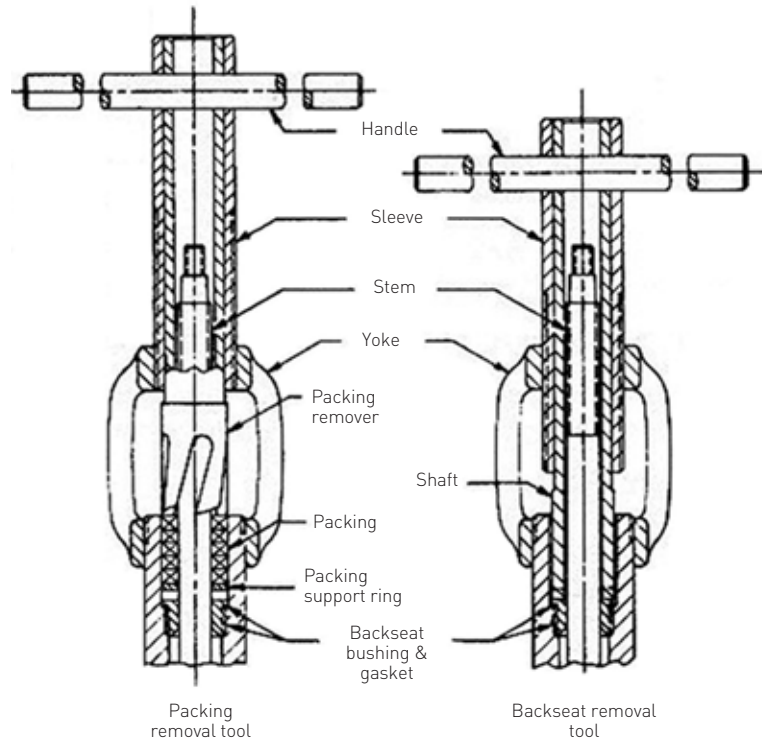


FIGURE 5

YARWAY HIGH PRESSURE GLOBE VALVE, WELBOND MODEL 5600

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PACKING AND BACKSEAT REMOVAL TOOL SELECTION

Valve size NPS	Valve fig No.	Pressure class	Indent tool No.	Tool part No.
1/2	5617B	1700	60	962781-01
	5627B	2700	61	962781-02
	5645B	4500	66	962781-07
	5645BR	4500	68	962781-09
	W5617B	1700	66	962781-07
	W5627B	2700	66	962781-07
3/4	5617B	1700	60	962781-01
	5627B	2700	61	962781-02
	5645B	4500	66	962781-07
	5645BR	4500	68	962781-09
	W5617B	1700	66	962781-07
	W5627B	2700	66	962781-07
1	5617B	1700	40	956040-01
	5627B	2700	40	956040-01
	5645B	4500	66	962781-07
	5645BR	4500	68	962781-09
	W5617B	1700	66	962781-07
	W5627B	2700	66	962781-07
1 1/2	5617B	1700	62	962781-03
	5627B	2700	63	962781-04
	5645B	4500	67	962781-08
	W5617B	1700	62	962781-03
	W5627B	2700	63	962781-04
2	5617B	1700	42	956040-03
	5627B	2700	64	962781-05
	5645B	4500	67	962781-08
	W5617B	1700	42	956040-03
	W5627B	2700	64	962781-05
2 1/2	5617B	1700	65	962781-06
	5627B	2700	65	962781-06
	W5627B	2700	65	962781-06
3	W5617B	1700	65	962781-06
	W5627B	2700	65	962781-06

INSPECTION AND REPAIR

It is normally considered good practice to replace the packing when the valve is completely disassembled.

Inspect the stem and disc assembly. Stem threads must be free of burrs to assure free operation, and stem shaft should be smooth and free of gouges, grooves or burrs to insure a tight valve shutoff.

Replace the entire stem and disc assembly if either is damaged.

Examine the condition of the valve seat.

When there is evidence of gouges, grooving, ('wiredrawing') or a discontinuous wear pattern indicating seat ovality, the solid satellite seat should be reconditioned by recutting. Welbond valve seats should not be lapped to the disc.

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RESEATING TOOL SELECTION

Valve fig No.	Valve size NPS	Tool No.	Tool part No.	Cutter No.	Cutter part No.
5617	1/2	50	972996-03	26	107969
	3/4	50	972996-11	26	107969
	1	20	972996-01	20	100971
	1 1/2	52	972996-05	23	100974
	2	22	972996-02	29	108710
	2 1/2	54	972996-07	28	107971
5627	3	54	972996-07	28	107971
	1/2	51	972996-04	26	107969
	3/4	51	972996-04	26	107969
	1	20	972996-01	20	100971
	1 1/2	53	972996-06	27	107970
	2	54	972996-07	29	108710
5645	2 1/2	54	972996-07	28	107971
	3	54	972996-07	28	107971
	1/2	55	972996-08	26	107969
	3/4	55	972996-08	26	107969
	1	55	972996-08	26	107969
5645R	1 1/2	56	972996-09	21	100972
	2	56	972996-09	21	100972
	1/2	55	962774-08	20	100971
5645R	3/4	55	962774-08	20	100971
	1	55	962774-08	20	100971

RESEATING

Specially designed Yarway reseating tools allow recutting of worn or damaged seats without removing the valve body from the line. Cutters of various sizes assure that all Welbond valve seats are cut at the correct angle.

The reseating tool number is on the valve identification plate - or the tool can be selected from the following chart which also gives the tool and cutter part numbers. The solid stellite seat is a very hard material requiring carbide cutters. Handle carbide cutters with great care to prevent edge chipping. Jamming the carbide cutters against the valve seat can cause cutter chipping or fracturing of the hard stellite seat. Proceed with caution as follows:

1. Insert tool assembly, engaging feed screw threads with yoke threads per Figure 6.
2. Rotate feed screw carefully until cutter lightly contacts valve seat. When contact is felt, hand tighten feed screw using moderate force. Lock feed screw in this position with lock nut.
3. Cut valve seat by slowly turning handwheel clockwise while applying a steady pressure. Rotate the handwheel as smoothly as possible through at least three revolutions to finish the cutting action.
4. Backout feed screw, remove tool assembly and clean cutter of chips.
5. Inspect seat for smooth, bright, continuous surface.

Repeat steps 1 through 4 if necessary to obtain a satisfactory reconditioned seat.

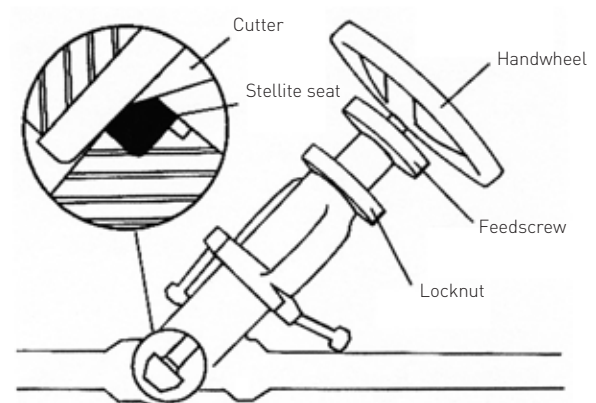


FIGURE 6

YARWAY HIGH PRESSURE GLOBE VALVE, WELBOND MODEL 5600

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REASSEMBLY, THREADED-IN BACKSEAT DESIGN

1. Thread new gasket on backseat bushing and apply Never-Seez No. 165 (Pure Nickel Special) or equal to threads. Place bushing on stem assembly. Position gland in yoke. Insert stem assembly through yoke and gland into valve.
2.
 - a. Insert shaft over stem and fully engage slot of backseat bushing. Turn shaft clockwise, by hand, to start thread engagement.
 - b. Thread sleeve into yoke until handle holes are aligned with sleeve firmly pressed downward.
 - c. Insert handle through sleeve and shaft and turn clockwise until gasket is seated, using torque values given below:
3. Remove handle and tool.
4. Replace packing support ring.
5. Repack the valve using the procedure outlined under 'Packing installation'.
6. Install split gland bushing and turn it 90° then evenly tighten gland bolts.
7. Install yoke bushing. Make certain disc is clear of valve seat. Redeposit sufficient weld nugget on yoke, adjacent to yoke bushing hex head, to prevent yoke bushing rotation.
8. Reassemble handwheel.

LOOSE BACKSEAT DESIGN

1. Place stuffing box bushing on stem assembly, position gland in yoke and insert stem assembly through yoke and gland and into valve body.
2. Repack valve using the procedure outlined under 'Packing installation'.
3. Install split gland bushing and turn it 90° then evenly tighten gland bolts.
4. Install yoke bushing. Make certain disc is clear of valve seat. Redeposit sufficient weld nugget on yoke, adjacent to yoke bushing hex head, to prevent yoke bushing rotation.
5. Reassemble handwheel.

PACKING INSTALLATION

1. Completely remove old packing including any spacers, washers or lantern rings, if any. Make sure that surfaces contacting packing are clean. Inspect the stuffing box and stem for straightness, wear, scratches, pitting and other abnormalities which would prevent establishment of a good seal around the packing. Repair or replace as necessary.
2. For threaded-in backseat design, be sure to reinstall flat washer before packing.
3. **IMPORTANT:** Packing is supplied as a complete set and rings should be installed in same order as packaged in the set. Rings are either one piece solid or in a split form. The solid rings may be cut (one cut per ring) to facilitate installation. Rings should be cut using a razor blade or other similar thin sharp tool. Use a sawing action to cut a 45° slit as shown in Fig. 7a. Do not apply any type of lubrication to the stem, stuffing box or packing.

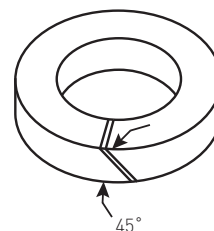


FIGURE 7A

TORQUE VALUES

Valve size	Class	Backseat bushing	
		ft-lb (Nm)	
1/2, 3/4	1500/2500-1700/2700	70 (95)	
1	1500/2500-1700/2700	75 (102)	
1 1/2	1500-1700	75 (102)	
1 1/2	2500-2700	200 (271)	
2	1500/2500-1700/2700	210 (285)	
2 1/2, 3	1500/2500-1700/2700	270 (366)	
1/2, 3/4, 1	4500	100 (136)	
1 1/4, 1 1/2, 2	4500	140 (190)	

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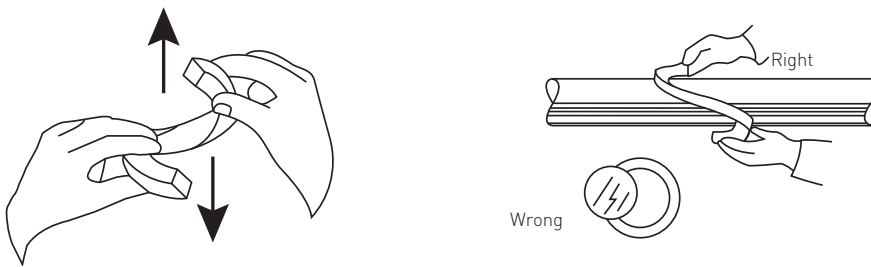


FIGURE 7B
 Install rings over the stem by twisting open. Never open rings with hinge-like action.

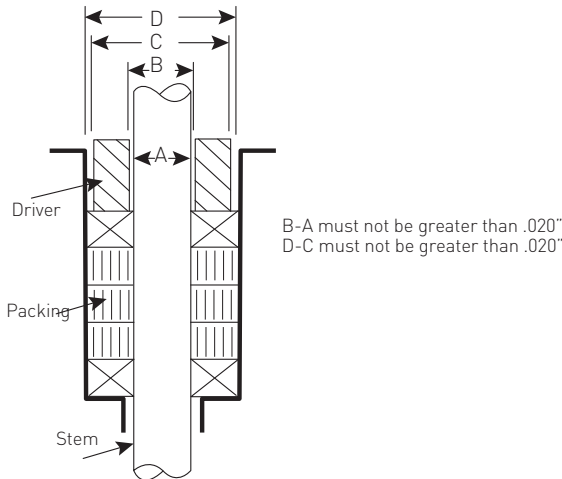


FIGURE 7C

4. If the split form is used and it is not possible to slip the rings over the stem without opening the rings, install the rings over the stem by twisting open in an 'S' fashion. Never open rings with hinge-like action. See Fig. 7b.
5. Check packing rings for proper fit. They should be push fit into the stuffing box.
6. Install one ring at a time, in the proper sequence, using a packing driver or gland bushing. Each ring must be seated individually with a packing driver.

CAUTION:

do not use a screw driver or other sharp object to seat the packing. This could damage the packing and/or stem. If a packing driver is used, make sure the diametrical clearances between the I.D. of the driver and O.D. of the stem and, the O.D. of the driver and I.D. of the stuffing box do not exceed 0.20". See Fig. 7c.

7. Stagger the joints (if present) on each successive ring 90° apart. If only two rings (with joints) are used, stagger 180° apart.
8. Filling of the stuffing box with the correct number of rings may require some compression of the rings already installed. Do not over compress the packing. The amount of compression should be only that which is required to install the correct number of rings into the stuffing box.

Compression of the packing in a partially filled stuffing box, to make room for the rest of the packing, can be accomplished using the gland bushing and taking up on the gland nuts.

9. When all the packing has been installed in the stuffing box and the gland bushing and packing flange are in place, take up on the gland nuts evenly with a wrench to seat and form the complete packing set to the stuffing box and stem. Compress the packing only enough to cause the packing to slightly grip the stem. Now loosen the nuts, and let the packing expand. If possible, move the stem to insure no binding is present. Re-tighten gland nuts finger tight plus ¼ turn.
10. Slight adjustment of the gland nuts may be necessary after a few hours of service.

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