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Storage, Installation and  
Maintenance Procedures ..... 50-59

Material & Trim Specifications ..... 60

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# INSTALLATION SPECIFICATIONS

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## GATE VALVE "O.S." & "Y"

### 1.0 Periodic Inspections

**1.1** The valve stem packing should be inspected at least monthly. If the stem packing shows signs of leakage, simply tighten the adjusting nuts to compress the packing. Do not over-tighten the adjusting nuts as this will make operation of the valve more difficult. If, after tightening the adjusting nuts to their fullest extent, the leakage does not stop, it is then necessary to replace the stem packing. It is not recommended that additional packing rings be added to the stuffing box as this may cause damage to the stem sealing system. Please contact Bonney Forge or its distributor for new stem packing sets. For packing replacement see paragraphs 2.2 and 2.3.

**1.2** The lubrication of the yokenut should be inspected at least monthly. A high pressure grease gun should be used for valves supplied with ball type grease fittings. For valves supplied with a Stauffer type grease cup, the cup should be checked to assure that it is full so that the grease can be injected by turning the screw cap.

**1.3** Bonnet bolt tension should be checked periodically when valves are used in high temperature applications where creep may occur. Although leaks through ring joints are rare, erosion or corrosion could cause rings to fail. In these cases, a new ring gasket is required.

### 2.0 Extraordinary Maintenance or Replacement of Damaged Parts

**2.1 Stem.** If the stem locks or "freezes", causes can generally be attributed to dry worn packing or a dry yoke nut. In either of these cases, the following service is required:

- \*a) Unscrew gland nuts, remove the gland flange and bushing to expose stem packing and lantern ring. Replace stem packing if it is damaged. If the lantern ring is seized, completely disassemble the stem and replace the lantern ring.
- b) Check lubrication of yoke nut. If it is dry, remove the yoke nut and determine if there is evidence of seizure marks. If so, replace it with a new yoke nut.

#### \*2.2 Disassembly of Stem Packing.

- a) In those cases where the valve can not be removed from the piping system, it is important that prior to servicing, the valve be opened to its fullest extent. Partially unscrew nuts to reduce the compression load on the stuffing box. Next, if so equipped, remove the plug to check that there is no leakage. Remove the stem packing and, if so equipped, the lantern and bottom set of stem packing then replace with new set(s) of packing. Finally, tighten nuts sufficiently while allowing the stem to operate smoothly.
- b) To replace the stem when the valve is completely disassembled for general maintenance follow this procedure:
  - Open valve half way then remove bonnet bolts and nuts.
  - Lift up the bonnet to remove wedge.
  - With the bonnet removed, unscrew the gland bolts then lift up gland flange exposing the stem packing.
  - Remove stem packing above the lantern ring (if so equipped) and then turn the handwheel to force the stem down.
  - Remove the stem through the stuffing box. Turn the bonnet up-side-down and remove lantern ring.
  - If so equipped, remove stem packing below the lantern ring.

**\*CAUTION:** Always be sure that the valve is de-pressurized and isolated prior to performing any maintenance work.

### **2.3 The procedure to re-assembly the valve is as follows:**

Re-insert the stem through the stuffing box taking special care to reassemble parts in sequence. If so equipped, avoid allowing the lantern ring to slide into the stuffing box. If the valve is equipped with a lantern ring, first insert 3 packing rings into the stuffing box followed by a lantern ring. Next, insert the remaining packing rings into the stuffing box and compress using the gland and flange. Then, reassemble nuts and tighten. Note, the stem must slide freely through the stuffing box without applying excessive force. Finally, install the bonnet gasket making sure it is not damaged. The gasket should be replaced if there is any question as to its performance.

**2.4** Raise the bonnet, making sure the stem is in a half open position, then connect disc to stem. Lower bonnet on to the valve body making sure that the disc fits exactly into body guides and the bonnet gasket is properly seated. Align holes and tighten bonnet nuts taking care that excessive force is not used, possibly damaging the gasket. Hydrostatically test the valve to assure that there is no leakage.

### **2.5 Disassembly of yoke nut**

When necessary use the following procedure for disassembling and replacing yoke nut:

- a) direct hand-operated valves (handwheel)
  - remove set screw;
  - unscrew handwheel nut;
  - remove handwheel;
  - unscrew yoke nut retaining nut, removing spot welds if necessary;

Reverse the procedure for re-assembly.

- b) bevel gear operated valves
  - to remove the bevel gear from the valve, unscrew nuts and turn the handwheel in the open direction indicated by the arrow until the drive nuts are disengaged from the stem.
  - to check the condition of the drive nut or bearing, unscrew the retainer ring and remove drive the nut and bearing. If damaged, a new drive nut or bearing is necessary.

### **2.6 Wedge and Seats**

Leakage through seats and wedges are not always easy to spot when valves are in service. However, when leaks are identified, immediate action is necessary. Any delay can permanently damage seat or wedge seal surfaces.

To repair or replace wedges or seats, the valve must be removed from line then use the following procedure:

- make sure that the valve is not under pressure before unscrewing bonnet nuts;
- remove bonnet, being careful not to damage the gasket;
- remove bonnet when wedge is in half open position;
- lift up bonnet until wedge is disconnected from guides;
- release wedge from stem.

If seat surfaces show signs of seizing, pitting, grooves or other defects not deeper than 0.8 mm (1/32") it is possible to repair seating surfaces to its original conditions by relapping the surface with fine grain abrasive paste, creating a perfect tightness once again.

Defects having a depth exceeding 0.8 mm (1/32") cannot be repaired by lapping. In this case, parts must be replaced.

It is recommended that the face of the disc be blued to check for contact of seating surface after final lapping. For re-assembly of valves use the procedure outlined under para. 2.4.



## GLOBE VALVES - "O.S." & "Y"

### 1.0 Periodic Inspections

**1.1** The valve stem packing should be inspected at least monthly. If the stem packing shows signs of leakage, simply tighten the adjusting nuts to compress the packing. Do not over-tighten the adjusting nuts as this will make operation of the valve more difficult. If, after tightening the adjusting nuts to their fullest extent, the leakage does not stop, it is then necessary to replace the stem packing. It is not recommended that additional packing rings be added to the stuffing box as this may cause damage to the stem sealing system. Please contact Bonney Forge or its distributor for new stem packing sets. For packing replacement see paragraphs 2.2 and 2.3.

**1.2** The lubrication of the yokenut should be inspected at least monthly. A high pressure grease gun should be used for valves supplied with ball type grease fittings. For valves supplied with a Stauffer type grease cup, the cup should be checked to assure that it is full so that the grease can be injected by turning the screw cap.

**1.3** Bonnet bolt tension should be checked periodically when valves are used in high temperature applications where creep may occur. Although leaks through ring joints are rare, erosion or corrosion could cause rings to fail. In these cases, a new ring gasket is required.

### 2.0 Extraordinary Maintenance or Replacement of Damaged Parts

**2.1 Stem.** If the stem locks or freezes, causes can generally be attributed to dry worn packing or a dry yoke nut. In either of these cases, the following service is required:

- \*a) Unscrew gland nuts, remove gland flange and bushing to expose stem packing and lantern ring. Replace stem packing if it is damaged. If the lantern ring is seized, completely disassemble the stem and replace the lantern ring.
- b) Check lubrication of yoke nut. If it is dry, remove the yoke nut and determine if there is evidence of seizure marks. If so, replace it with a new yoke nut.

#### \*2.2 Disassembly of Stem Packing.

- a) In those cases where the valve cannot be removed from the piping system, it is important that prior to servicing, the valve be opened to its fullest extent. Partially unscrew nuts to reduce the compression load on the stuffing box. Next, if so equipped, remove the plug to check that there is no leakage. Remove the stem packing and, if so equipped, the lantern and bottom set of stem packing then replace with new set(s) of packing. Reassemble plug and gland flange. Finally, tighten nuts sufficiently while allowing the stem to operate smoothly.
- b) To replace the stem when the valve is completely disassembled for general maintenance follow this procedure:
  - Open valve fully then remove bonnet bolts and nuts.
  - With the bonnet removed, unscrew the gland bolts then lift up gland flange exposing the stem packing.
  - Remove stem packing above the lantern ring (if so equipped).
  - Remove handwheel then turn stem to release it from yoke nut and remove from stuffing box.
  - Check condition of back-seat bushing for seizure marks. If apparent, order replacement parts.
  - If required, turn the bonnet up-side-down and remove lantern ring.
  - If so equipped, remove stem packing below the lantern ring.

\*CAUTION: Always be sure that the valve is de-pressurized and isolated prior to performing any maintenance work.

### **2.3 The procedure to re-assembling the valve is as follows:**

Re-insert the stem through the stuffing box, taking special care to reassemble parts in sequence. If so equipped, avoid allowing the lantern ring to slide into the stuffing box. If the valve is equipped with a lantern ring, first insert 3 packing rings into the stuffing box. Next, insert the remaining packing rings into the stuffing box and compress using the gland ring and flange. Then, reassemble nuts and tighten. Note, the stem must slide freely through the stuffing box without applying excessive force. Finally, install the bonnet gasket making sure it is not damaged. The gasket should be replaced if there is any question as to its performance.

**2.4** Raise the bonnet assembly, making sure the stem is in the fully open position. Lower bonnet on to the valve body making sure that the disc fits exactly into body guides and the bonnet gasket is properly seated. Align holes and tighten bonnet nuts taking care that excessive force is not used, possibly damaging the gasket. Hydrostatically test the valve to assure that there is no leakage.

### **2.5 Disassembly of yoke nut**

When necessary use the following procedure for disassembling and replacing yoke nut:

a) direct hand-operated valves (handwheel)

- remove set screw;
- unscrew handwheel nut;
- remove handwheel;
- unscrew yoke nut retaining nut, removing spot welds if necessary;
- Reverse the procedure for re-assembly.

b) bevel gear operated valves

- to remove the bevel gear from the valve, unscrew nuts and turn the handwheel in the open direction indicated by the arrow until the drive nuts are disengaged from the stem.
- to check the condition of the drive nut or bearing, unscrew the retainer ring and remove drive the nut and bearing. If damaged, a new drive nut or bearing is necessary.

### **2.6 Disk and Seats**

Leakage through disk and seats are not always easy to spot when valves are in service. However, when leaks are identified, immediate action is necessary. Any delay can permanently damage seat or wedge seal surfaces.

To repair or replace the disk or seats, the valve must be removed from line, then use the following procedure:

- make sure that the valve is not under pressure before unscrewing bonnet nuts;
- remove bonnet, being careful not to damage the gasket;
- remove bonnet when disk is in full open position;
- lift up bonnet

If seat surfaces show signs of seizing, pitting, grooves or other defects not deeper than 1.5 mm (1/16") it is possible to repair seating surfaces to its original conditions by relapping the surface with line grain abrasive paste, creating a perfect tightness once again. Defects having a depth exceeding 1.5 mm (1/16") cannot be repaired by lapping. In this case, parts must be replaced.

It is recommended that the face of the disc be blued to check for contact of seating surface after final lapping. For re-assembly of valves use the procedure outlined under para. 2.4.



## SWING CHECK VALVES

No periodic maintenance is necessary. If gasket leaks are detected, correct using the following procedure.

**1** - Disassemble all cover bolts and nuts.

**2** - For check valves in sizes 16" and larger, lift up the cover by using a lever inserted into the drilled and tapped cover hole. For valves in sizes 14" and smaller, use one or two bolts and nuts inserted into cover holes and, using adequate force, move the cover upwards.

**3** - Check that the hinge, nut, and pin are in good condition and firmly connected. Replace damaged parts as necessary.

**4** - Lift and remove the disc-hinge assembly. Movement should be free and not hindered by any malfunction of the hinge pin. Where disc travel is not sufficiently smooth, remove plugs or blind flanges and then remove hinge pin. Check surface for seizure marks. If marks are deeper than 1.5 mm (1/16"); re-machine hinge pin and re-assemble. If defect depth is greater than 1.5 mm (1/16") a new hinge pin is necessary. When reassembling hinge pin, it is recommended that the disc be removed by loosening nut.

**5** - When leakage is due to deterioration of seal surfaces caused by corrosion or foreign substances, it must be determined whether the disc or seat seal are the cause.

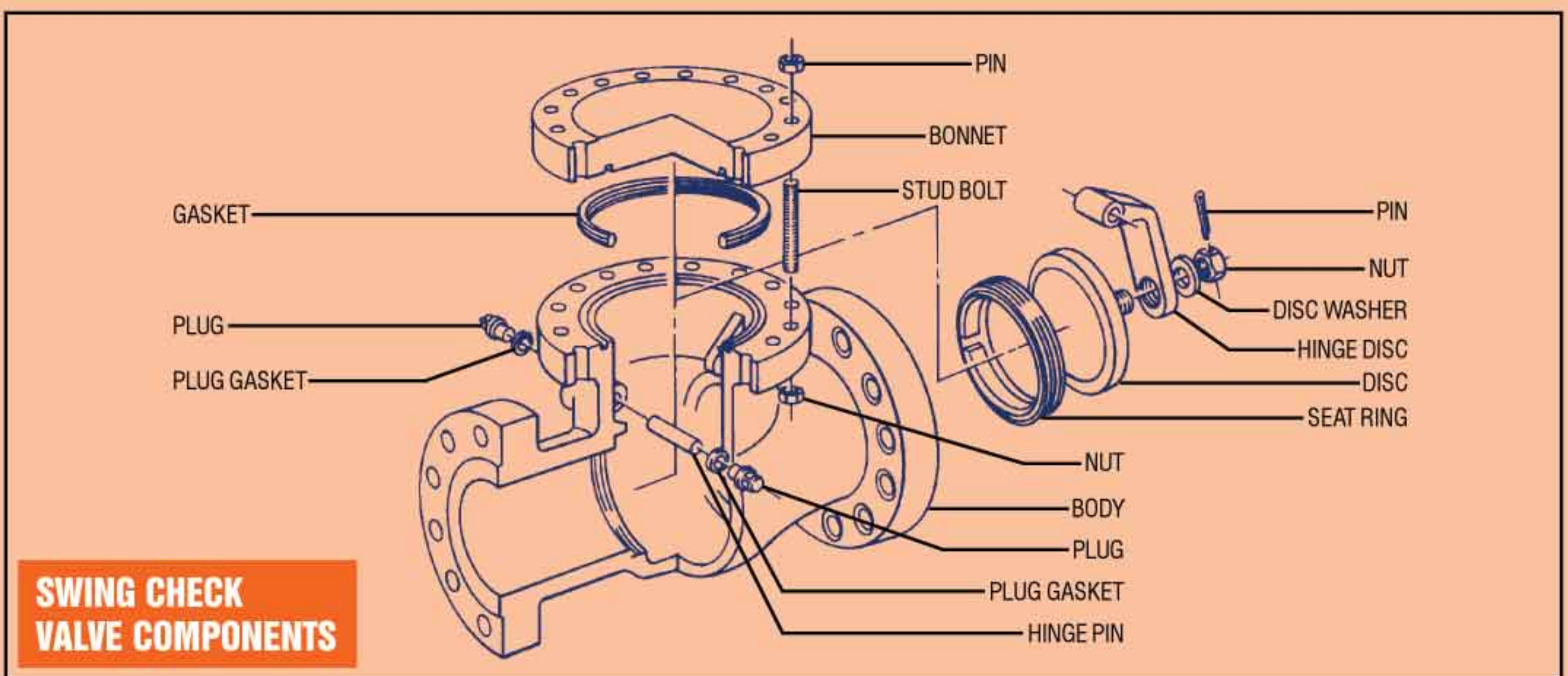
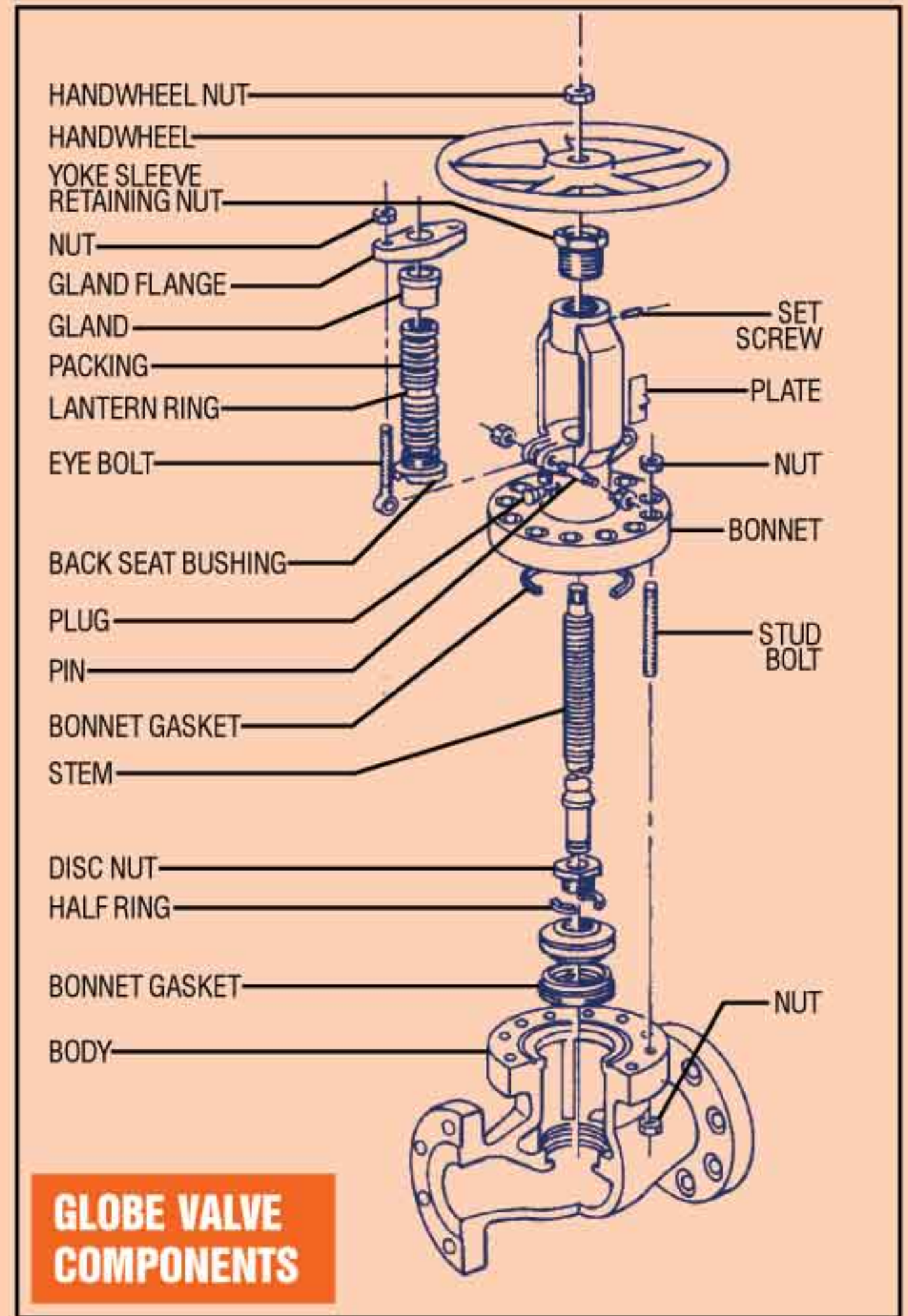
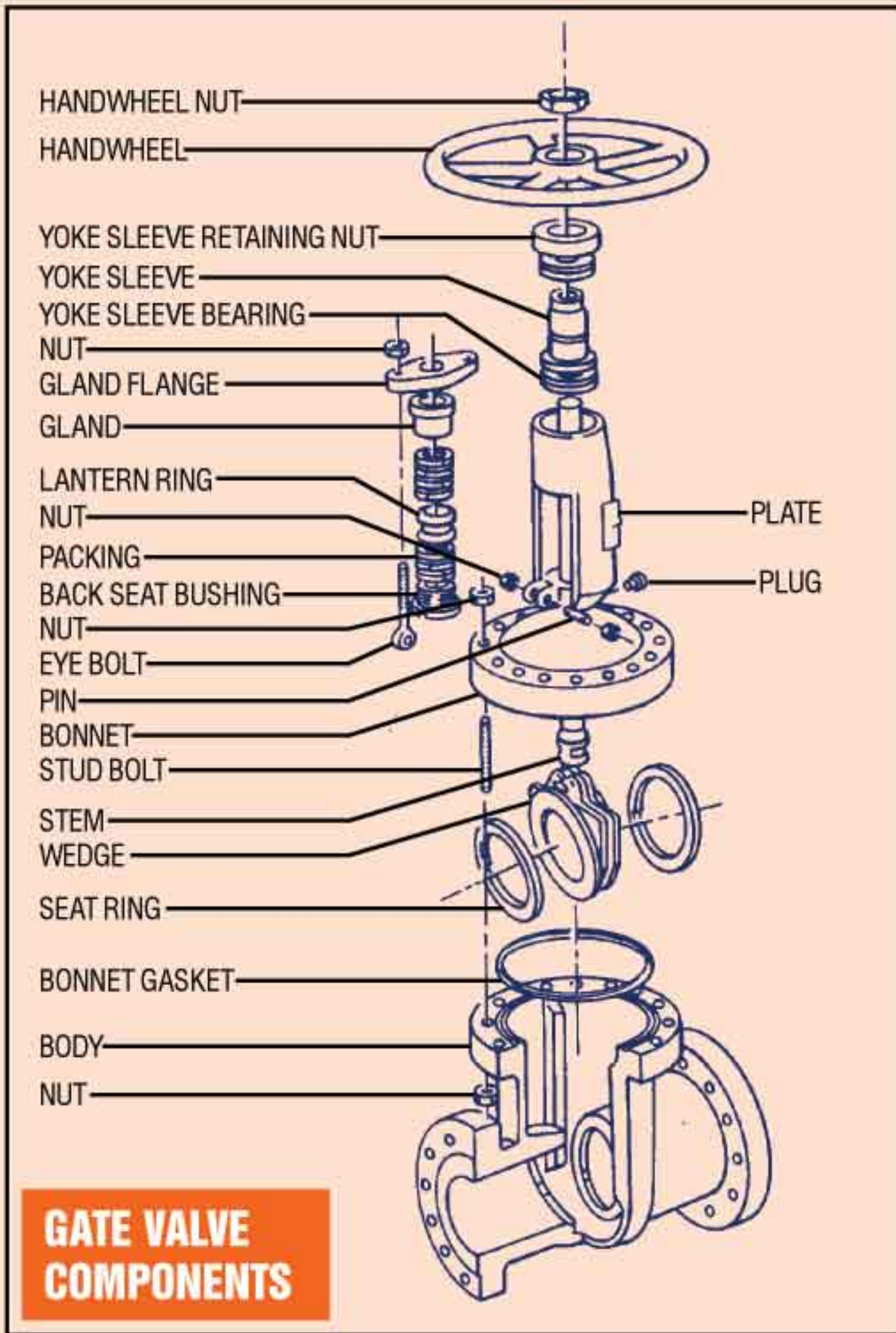
a) Deterioration of disc surfaces:

Disassemble disc by removing nut and washer. Repair surface by grinding and relapping using fine grain abrasive paste.

b) Deterioration of seat seal surfaces:

When seal surfaces are damaged and defects are confined to a small area but are not deeper than 0.8 mm (1/32"), the seal surface can be repaired. The recommended method is to use a cast iron strap with an outside diameter matching the valve's raceway. Then using a fine grain abrasive paste between the strap and raceway, it is rotated on the seat to restore original tightness. When defects are deeper than 0.8 mm (1/32") and found on the entire seal surface, a new seat is required. To replace the new seat, use preferably a pneumatic tool with a shape to match the dimensions of the valve seat. It is recommended that an anti seizing compound be used when installing the replacement seat to make threading it in to the body easier.

**\*CAUTION:** Always be sure that the valve is de-pressurized and isolated prior to performing any maintenance work.





## INSTRUCTION FOR INSTALLATION AND MAINTENANCE OF HIGH PRESSURE VALVES TYPE "V" SEAL AND "V" LOK

### Section 1 - Installation, Operation and Maintenance

**1.1** Valve products manufactured by Bonney Forge may be installed and operated in service conditions suitable to their design and construction and only in accordance with all applicable codes, standards and generally accepted construction and operating practices.

**1.2** No special tools are required for installation, disassembly, maintenance and reassembly of these valve products.

**\*1.3** Replacement of minor valve components, including stem packing and bonnet gaskets, may be done in the field provided that proper procedures are followed.

**1.4** Replacement of major components, including stem, wedge and seat rings should not be done in the field but should be done only in a properly equipped work shop.

**1.5** We recommend that the bonnet studs on the valve be checked for tightness prior to pressurization and also after a short period of service. This is particularly important if the valve has been subjected to severe changes in temperature. Tightening of bolts should be done alternately from one side of the bonnet to the other to prevent distortion.

**1.6** We recommend that packing gland nuts and bolts be tightened prior to installation of valves. It is also recommended that a lubricant, such as grease, be inserted in the grease fitting of the yoke nut.

### Section 2 - Stem Packing

**2.1** Stem packing is used on all standard gate and globe valves, both bolted bonnet and "V" Lok and "V" Seal types.

**2.2** We suggest periodic inspection of the stem packing. In the event that the stem packing is leaking, it may only be necessary to tighten the gland flange bolting. To prevent seizure of the stem, care must be taken not to over compress the stem packing.

#### **\*2.3 Procedure for Changing Stem Packing.**

**2.3.1** The valve must be in the fully open position with the stem retracted against the back seat bushing.

**2.3.2** Only when the stem is fully back seated can the gland flange bolting be loosened slightly to release any compression load in the packing/stuffing box chamber.

**2.3.3** The gland flange bolting may be further loosened to allow gland bushing to move up the stem permitting the removal and replacement of the stem packing.

**\*CAUTION:** Always be sure that the valve is de-pressurized and isolated prior to performing any maintenance work.



## SECTION 3 - GATE AND GLOBE PRESSURE SEAL ("V" SEAL)

### 3.1 Disassembling

**3.1.1** Partially open the valve to unseat the wedge from the seat-rings. Remove the hand wheel nut, hand wheel, yoke retaining nut, the yoke nut and companion thrust bearings. The yoke can now be removed totally.

**3.1.2** Remove the retainer bolts by alternately loosening them diagonally across the bonnet's diagonal.

**3.1.3** Pull out the bolts from the bonnet retainer and extract the sector retaining ring.

**3.1.4** Remove the entire assembly consisting of the bonnet, stem, and wedge. The bonnet will include the spacer ring and the body bonnet gasket.

### 3.2 Re-assembling

**3.2.1** Before proceeding further, check the surfaces of the bonnet body gasket (generally made in stainless steel), housing and bonnet do not have evidence of corrosion or scratches.

**3.2.2** Reverse the above procedure to re-assemble the unit.

**3.2.3** After positioning the bonnet with its respective gasket and spacer ring, put in place the sector retaining ring and the bonnet retainer. Next, screw-in the retainer bolts taking care to tighten them alternatively by opposite diameters.

**3.2.4** Assemble the yoke and the remaining components of the valve.

**Caution:** It is possible that at low pressure the valve leaks between the body and bonnet. This is because the bolt's function is more for positioning the bonnet correctly and not tightening. To determine if more tightening is required, the valve needs to be fully pressurized.

### 3.3 Globe Valve

**3.3.1** Follow the same procedure for gate valves. Note that some globe valves for dimensional reasons, require disassembly of the opposite gland flange screwed on the bonnet.

### 3.4 Check Valve

**3.4.1** For either swing type, tilting or piston check valves, the procedure to follow is the same as the gates. The only exception in the procedure is the bonnet retainer is substituted by a disc.



## SECTION 4 - V-LOK GATE VALVES, GLOBE VALVES AND CHECK VALVES

### 4.1 Disassembling

**4.1.1** Fully relieve line pressure from the valve. If the valve is a gate or globe type, unseat the wedge/disc and disassemble the yoke (see sect 3).

**4.1.2** Grind down the seal weld by using a small light grinding disc. Care must be taken not to cause permanent damage because there is thin clearance between the body and the bonnet around the complete seal weld (see fig. A).

**Caution:** The amount of care taken in removing this seal will determine the number of times the valve can be disassembled.

**4.1.3** Hammer the bonnet to push it down about 1 mm.

**4.1.4** Turn the bonnet anti clock wise, approx. 45 degrees (see fig. B).

**4.1.5** The bonnet is now free to be lifted from the body.

**4.1.6** For "V"-Lok and "V" Seal type tilting disc valves there is an additional seal weld around the plug of the hinge pin. To disassemble the pin, grind out the seal weld by using a small and light grinding disc until a clearance appears all around. Then unscrew the plug and remove the pin (see fig. C). For reweld see par. 5.6.

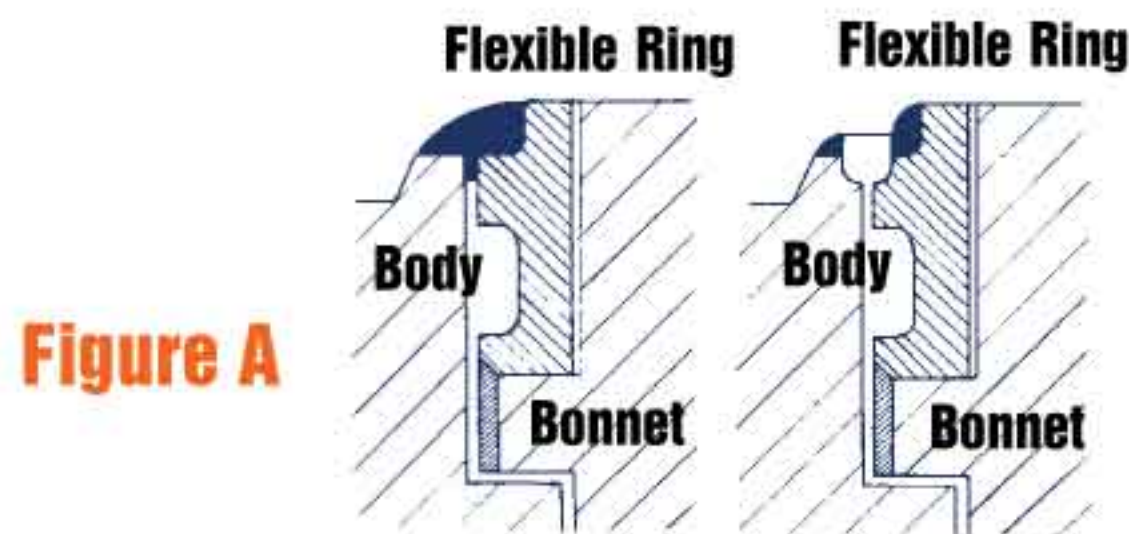


Figure A

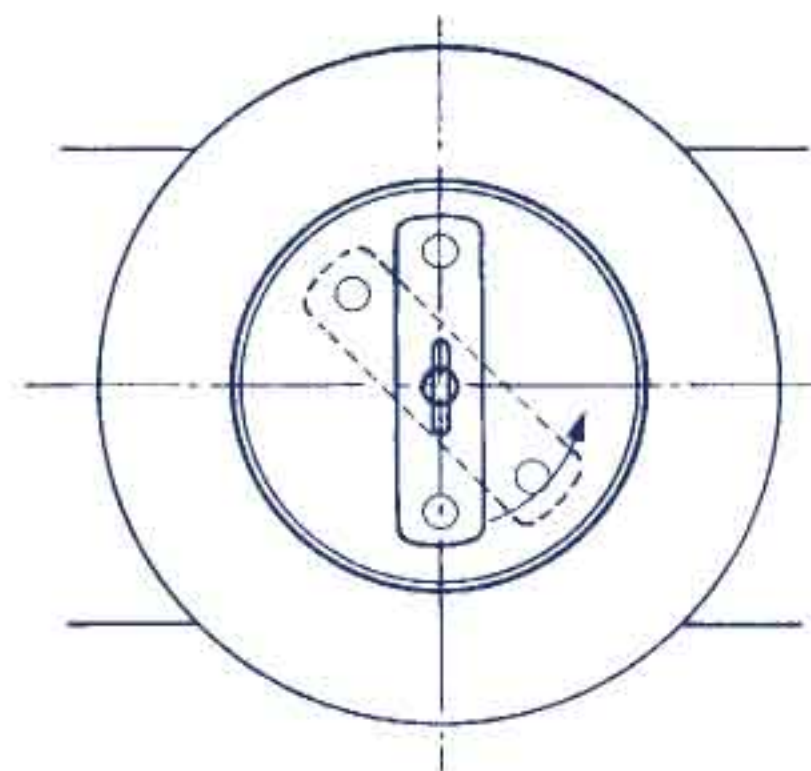


Figure B



Figure C

### Section 5 - Assembling

**5.1** Reinstall the bonnet back into the body so the bonnet lug in the packing area is at 45 degrees.

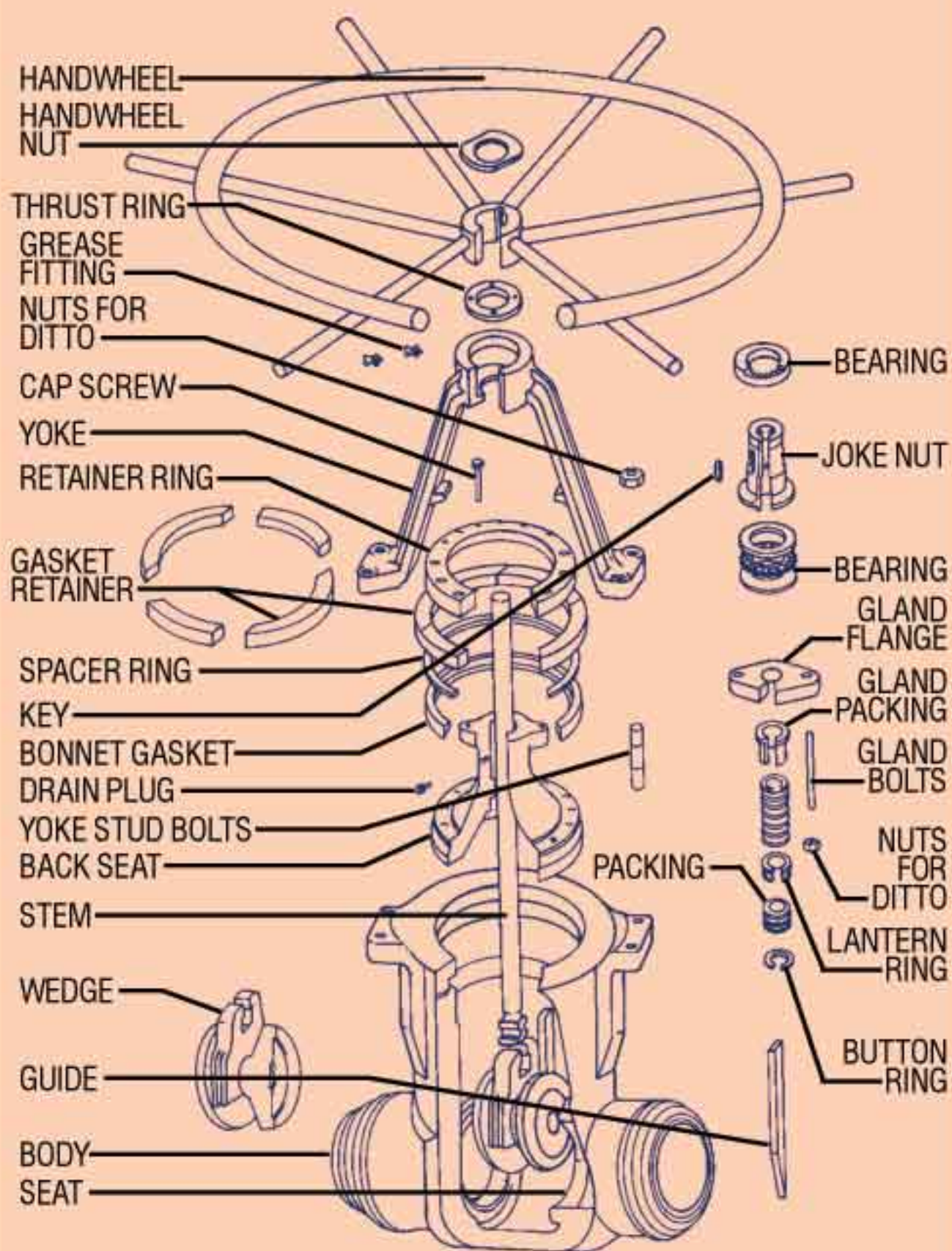
**5.2** Turn bonnet 45 degrees with the bonnet lug in line with valve run.

**5.3** If the valve is a gate or globe, assemble the complete yoke, fit the yoke bolts and fasten nuts. Turn hand wheel so the disc/wedge is in its fully open position with the stem head tight against the back seat. For check valves, lift the bonnet using the relevant lug to provide full contact in that area. This operation is essential to avoid stressing the seal weld.

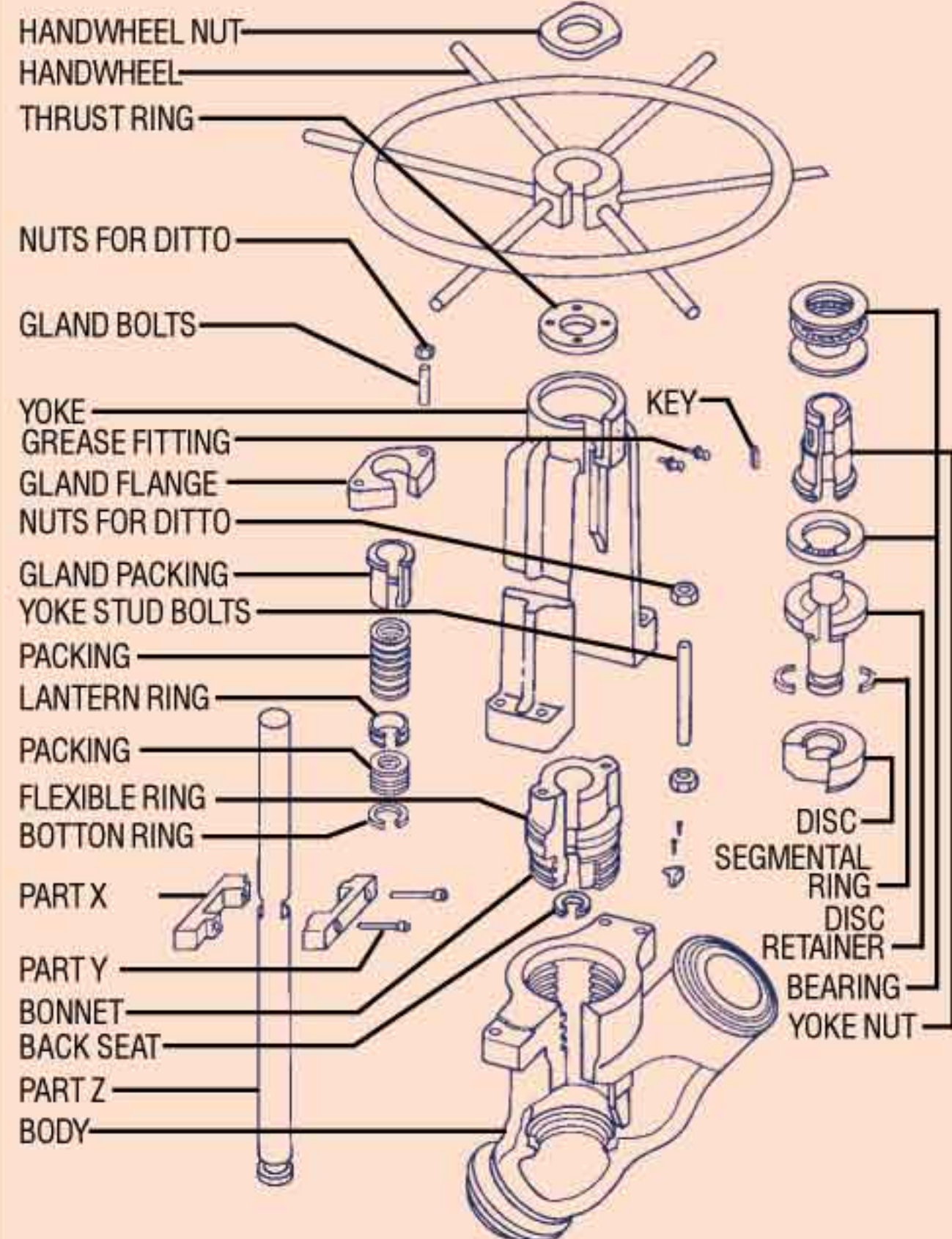
**5.4** Before rewelding the seal weld, apply 4 (four) tack welds to maintain the bonnet in the upper position.

**5.5** When seal weld is complete check with PT examination following by a pneumatic test of shell at 6 BAR (80 PSIG).

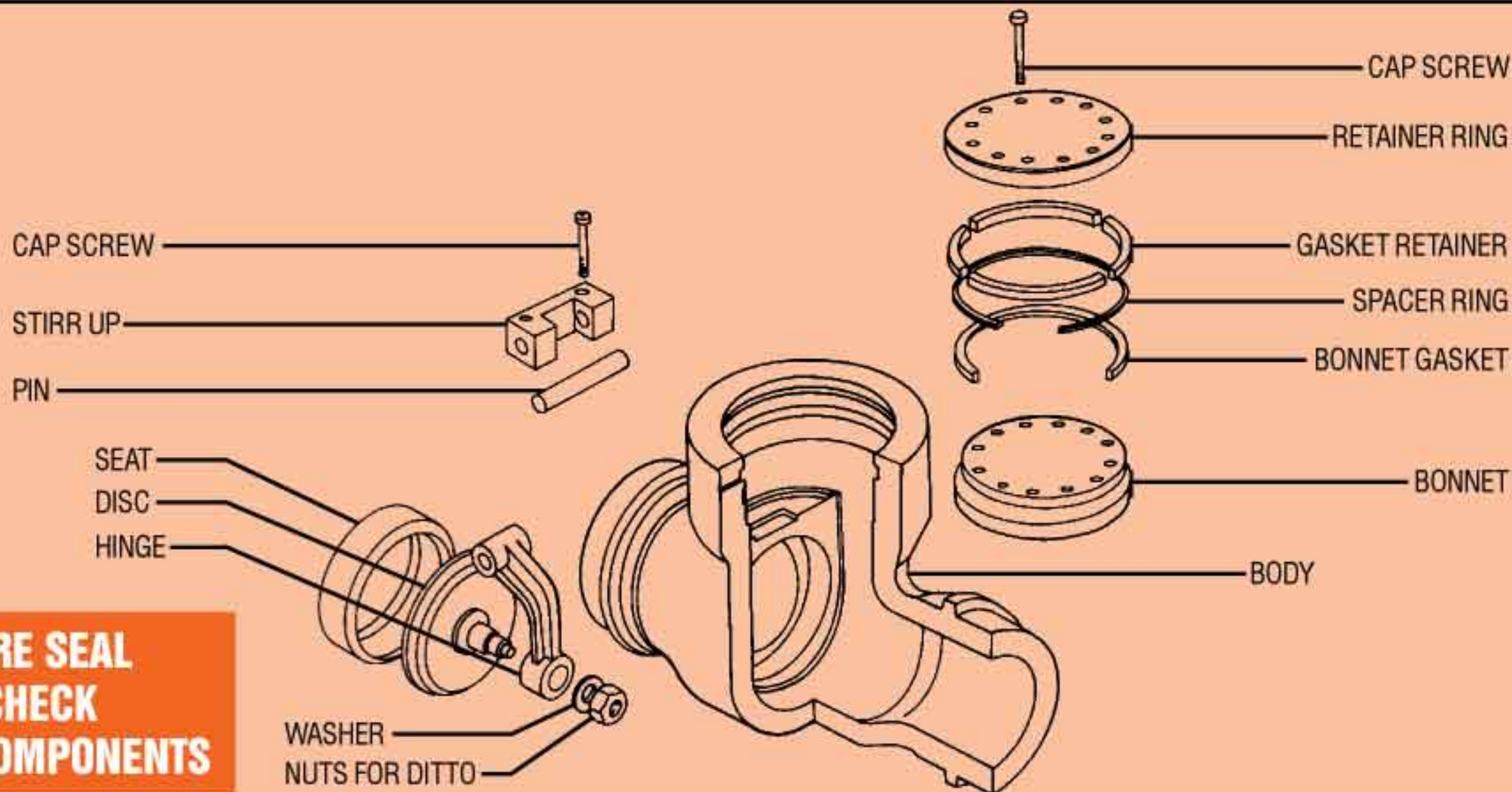
**5.6** Welding instruction (WPS) applicable to each type of Body Bonnet materials are available on request.



**PRESSURE SEAL GATE VALVE COMPONENTS**



**PRESSURE SEAL GLOBE VALVE COMPONENTS**



**PRESSURE SEAL SWING CHECK VALVE COMPONENTS**



# MATERIAL & TRIM SPECIFICATIONS

BONNEY FORGE

MATERIALS			
	Material Type	ASTM	Symbol
Carbon Steel	0.25 C Max	A 216	WC B WC C
Alloy Steel	0.5 Mo 0.5 Cr - 0.5 Mo 0.75 Cr - 1 Mo - 0.75 Ni 1.25 Cr - 0.5 Mo 2.25 Cr - 1 Mo 5 Cr - 0.5 Mo 9 Cr - 1 Mo	A 217 - WC 1 A 217 - WC 4 A 217 - WC 5 A 217 - WC 6 A 217 - WC 9 A 217 - C 5 A 217 - C 12	WC 1 WC 4 WC 5 WC 6 WC 9 C 5 C 12
Stainless Steel	13 Cr 19 Cr - 9 Ni 19 Cr - 9 Ni - Low Carbon 19 Cr - 9 Ni - 2 Mo 19 Cr - 9 Ni - 2 Mo - Low Carbon 19 Cr - 9 Ni - Cb 20 Cr - 30 Ni - 2 Mo	A 217 - CA 15 A 351 - CF 8 A 351 - CF 3 A 351 - CF 8M A 351 - CF 3M A 351 - CF 8C A 351 - CN 7M	CA 15 CF 8 CF 3 CF 8M CF 3M CF 8C CN 7M
Nickel Alloy	Ni - Cu Ni - Mo Ni - Mo - Cr Ni - Cr - Fe Nickel	A 494 M35 - 1 A 494 N12M A 494 CW12M A 494 CY40 A 494 CZ100	M35 - 1 N12M CW12M CY40 CZ100
Low Temperature Steel	0.25 C Max 0.5 Mo 2 Ni 3.5 Ni	A 352 - LC B A 352 - LC 1 A 352 - LC 2 A 352 - LC 3	LC B LC 1 LC 2 LC 3
Duplex Stainless Steel	Cr - Ni - Mo	UNS 531803	
Bolting	0.80 Cr - 0.15 Mo 0.80 Cr - 0.50 Mo - .025 V 19 Cr - 9 Ni Carbon Steel 0.20 Mo 19 Cr - 9 Ni 0.8 Cr - 0.15 Mo 19 Cr - 9 Ni Carbon steel	A 193 - B 7 A 193 - B 16 A 193 - B 8 A 194 - 2 H A 194 - 4 A 194 - 8 A 320 - L 7 A 320 - B 8 A 307 - B	B 7 B 16 B 8 2 H 4 8 L 7 B 8 B
Trim Materials	Co - Cr - A Ni - Cu - alloy Bronze P.T.F.E.	A 399 B 164 - B B 62	Stellite n°6 Monel Bronze TF

## TRIM

API 600 TRIM No.		1	2	5	6	8	9	10	12	13	15	16
Seating Surface	Wedge - Check Disc	F6	F304	Stellite	F6	F6	Monel	F316	F316	ALLOY 20	Stellite	Stellite
	Seat Ring				Monel	Stellite			Stellite			
	Globe Disc				F6	F6			F316			
	Seat Ring				Monel	Stellite			Stellite			
Back Seat				F6	F6	F6			F316		F304	F316
Stem - Hinge Pin												