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**INSTALLATION, OPERATION & MAINTENANCE MANUAL
FOR
WEDGE GATE, GLOBE AND SWING CHECK VALVES**

**Cast carbon, alloy or stainless steel
Bolted bonnet or cover
Outside screw and yoke
Rising Stem
Rising Handwheel (for globe valves)
Non-rising Handwheel (for gate valves)
RF-flanged, RTJ-flanged and butt welding ends**

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1. Storage of Valves

- 1.1** Valves should be stored in a dust free well-ventilated place with low humidity. Under no circumstances should the valves be stored outdoors.
- 1.2** During storage, all valves should be left fully closed.
- 1.3** Do not remove the end protectors before the valves are installed. If they are found to be missing apply adequate end protection immediately.
- 1.4** Check that an adequate rust preventative has been applied to valve interior and end flange face.

2. Valve Installation

- 2.1** Ensure that the correct DPV valves have been delivered by checking nameplate, identification tags or any other identification marking on the valves.
- 2.2** Remove the valve end protectors before the valves are ready for installation.
- 2.3** After the removal of the end protectors and other valve protective materials, clean the inlets and outlets of both pipes and valves completely so that the gasket faces of end flanges are free from dust, scratches or other irregularities that will affect the sealing performance of the valves. In the case of weld end valves the weld ends should be free from dust, rust or other irregularities that will affect subsequent welding.
- 2.4** In the case of the globe or check valves, arrows on the valve bodies indicate the direction of fluid flow. Valves should be mounted according to these flow marks.
- 2.5** **Installing Flanged End Valves:**
- (1) Align the boltholes of the valve flanges with those of the pipe flanges, then insert the gaskets and tighten the bolts. Inaccurate alignment causes unbalanced tightening of the bolts and consequently excessive stress on the bolts.
 - (2) The bolts should be evenly tightened, ensuring that the ends of the bolts protrude equally beyond the nuts.



- (3) After installing the valves, be sure to re-check all bolts and nuts of the coupled flanges and retighten them if found loose.

2.6 Installing Weld End Valves:

- (1) All welding for mounting valves to the pipelines should be made by duly qualified welders or welding operators in accordance with the qualified welding Procedures.
- (2) Valves should be welded with the disc slightly opened, using weld material (rod or wire) with an appropriate diameter to meet the dimension and shape of the area to be welded, and to prevent overheating of the valves.
- (3) Valves should be protected from becoming overheated.

2.7 After Installation:

- (1) The valve and pipe interiors should be flushed to remove foreign objects, as they may later cause fluid leakage through the valve seats.
- (2) Ensure that the pipeline stresses are not concentrated on the valves.

3. Valve Operation

- 3.1** Turn the handwheel clockwise to close gate or globe valves. Turn it anti-clockwise to close open them.

- 3.2** In new valves or when the gland packing of old valves is replaced, the handwheel torque may be found to be relatively high, due to the new packing rings. This however will reduce after the valves have been operated several times.

- 3.3** The handwheel operating torque also depends on the type and size of each valve, and its opening position. Note that the operating torque is extremely high when a fully closed valve is opened, or when the disc comes close to the extremity of its travel at the fully closed position.

- 3.4** Turn the handwheel of gate valves in the reverse direction by about 90° at the moment when the disc reaches the extremity of its fully closed position. This is particularly important in high temperature service to remove the thermal stress and make valve reopening easier and smoother.



3.5 Gate valves are to be used only in the fully opened or closed position, since they are designed only as shut-off valves. Partial opening will vibrate the valve disc and may cause damage to the valve. If foreign bodies are found around disc seating areas, open the valve to allow fluid flow and try to remove all the foreign objects through the valve bore.

3.6 Special tools such as levers or wrenches provided with pipe extensions should not be used to turn handwheels as it may damage the yokes and discs of valves. Manual gears or valve actuators are recommended for easier operation of larger size valves.

3.7 Detection of leakage during valve operation:

(1) Leakage may occur through the gland area of a new valve. If so, the gland packing should be tightened in accordance with Section 3.7(2) of this manual. If a large amount of leakage is detected, or the fluid itself is considered toxic, the valve should be fully opened so that the backseat is in contact with the gland area to interrupt the leakage temporarily.

(2) Tightening gland bolts is the usual method to stop stem leakage. Care should be taken to tighten them alternately and evenly to avoid one-sided tightening. The torque should be minimised just to stop leakage, since overtightening may cause reduced packing elasticity for lower sealing performance. New packing should be provided if the problem still cannot be solved.

(3) If leakage is detected through the flange gaskets, all related bolts and nuts should be retightened in accordance with section 3.7(2) of this manual. Replace the gaskets if the leakage still cannot be stopped.

4. Periodic Valve Inspection

4.1 Inspection should be made periodically to detect wear of the body seats, disc seats or stems, corrosion of the valve body or bonnet interior and wear of the threads. Usually, packing and gaskets are replaced after periodic inspections as part of the basic maintenance operation.

4.2 Valve Disassembly:

(1) **DPV** gate, globe and swing check valves can be disassembled by referring to the drawings and component lists in Sections 6, 7 and 8 of this manual. If bolting is found too tight to be loosened, apply a lubricant.

(2) Before disassembly, be sure to follow the preliminary procedures below:

a) Before dismantling the valves from the pipeline, mark them with their original locations to avoid confusion on subsequent valve reinstallation.

b) Before disassembly, remove and collect foreign bodies from the valves and note their location. Subsequent examination of these records and materials may be found useful for future valve maintenance.

c) Identify the edges of the mating flanges and wedges of gate valves so that they may be reassembled in the same positions as originally assembled.



4.3 Examination of valve components

- (1) The valve interior should be cleaned by means of water, steam, acid or solvent before examination.
- (2) Examine the internal area if necessary using a small mirror and flashlight. Seating areas should be carefully examined to detect any surface damage. This should be corrected by lapping.
- (3) Worn or corroded areas or parts should be carefully examined visually with a magnifying glass.
- (4) The wall thickness should be periodically measured and recorded.

4.4 Valve re-assembly:

- (1) Clean all the component parts of the disassembled valves and prepare new spare parts such as gland packing and gaskets before re-assembly. Be sure to remove gland packing and gaskets before re-assembly. Be sure to remove rust and other debris from the seat retaining area of the valve body.
- (2) Reassemble the valves in reverse of the procedures taken for disassembly.

5. Maintenance of valve component parts

5.1 Replacement of gland packing:

- (1) The gland packing should be replaced preferably every 2 to 3 years to reduce valve operating torque and prevent stem wear. It is recommended that the gland packing be replaced at every periodic inspection of valves as suggested in section 4 of this manual.
- (2) Ensure that the gland packing is suitable for the maximum working pressure and temperature of the process, and the product being handled. Refer to **DPV** valve drawings and technical data of your plant process for the correct selection of packing materials.
- (3) Select a suitable tool to remove packing so as not to damage the valve stem and valve stuffing box.
- (4) Clean the valve stem and valve stuffing box carefully.
- (5) The width of the packing should be the same as the gap between the inside diameter of the packing chamber and the valve stem diameter.
- (6) Cut the packing at a 30° angle with a sharp knife. Each piece of packing must be sized properly so that both ends may meet one another with no gap between the ends.



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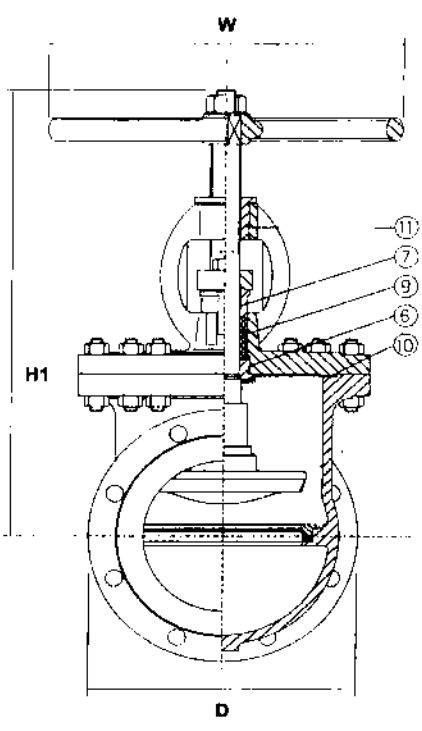
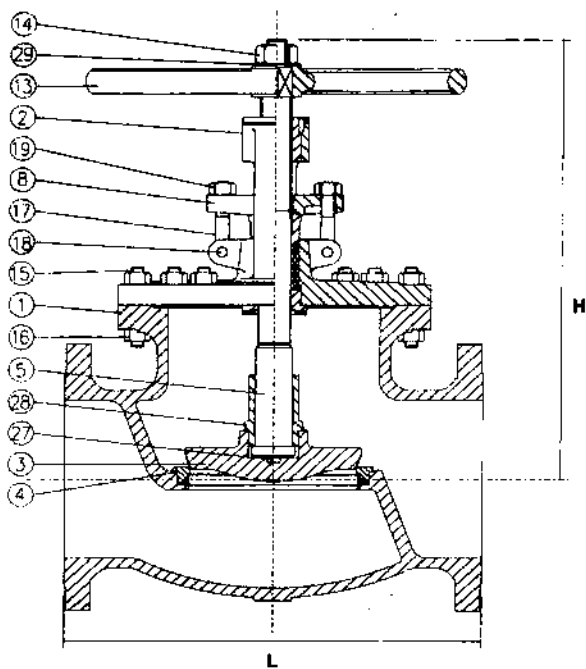
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- (7) Load packing rings to half the depth of the packing chamber, and press down once. Load the remaining packing rings and tighten securely. Loading all the packing rings at the same time is not recommended. All gland packing should be located so that the seams are 120° apart from each other. This will place the seam of the fourth packing ring in the same vertical position as the first one.
- (8) The gland packing should be tightened to a position 3 to 4mm below the top end of the packing chamber. If leakage occurs, tighten the packing further down until the leakage stops.



No.	Part Name
1	Body
2	Bonnet
3	Plug Disc
4	Seat Ring ①
5	Stem
6	Backseat Bushing
7	Gland
8	Gland Flange
9	Packing
10	Gasket
11	Yoke Sleeve
13	Handwheel
14	Handwheel Nut
15	Stud Bolt
16	Hex Nut
17	Eyebolt
18	Pin
19	Hex Nut
20	Set Screw ③
21	Grease Fitting ③
22	Nameplate ③
25	Lantern Ring ②③
26	Plug ②③
27	Disc Washer
28	Disc Nut
29	Washer

Notes
 ① Renewable Design (Threaded-In or Welded-In)
 ② Optional; Available upon Request
 ③ Not Shown

Test Pressures			
Shell	Hydrostatic	450 psig	(31.0 bar)
	Pneumatic	80 psig	(5.5 bar)
Seat	Hydrostatic	325 psig	(22.5 bar)
Backseat	Hydrostatic	325 psig	(22.5 bar)

Standards	
Design	API 600 / BS 1873
Shell Thickness	API 600 / BS 1873
Face-to-Face Dimension	ANSI B16.10 Class 150
Flange Dimensions	ANSI B16.5 Class 150
Testing	API 598 / BS 6755 Part I

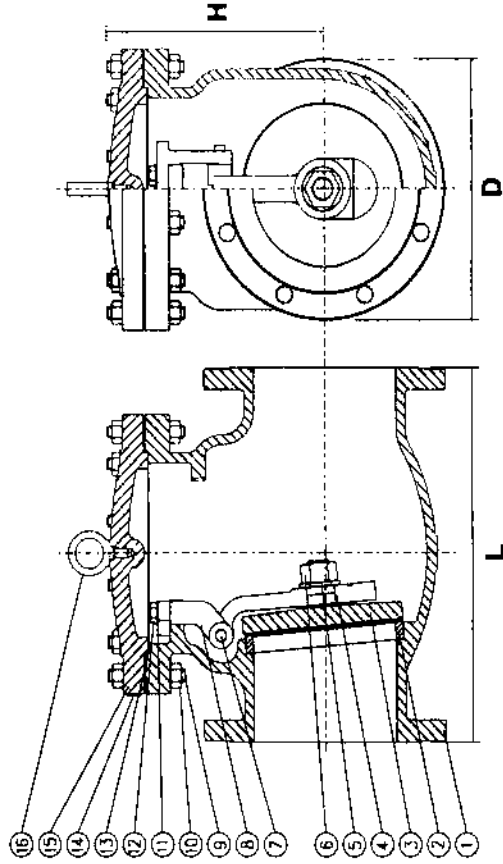
7. G.A. & Component list of Globe Valve

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Globe Valve, ANSI Class 150 R.F. Flanged, Plug Disc, Boiled Bonnet, OS&Y, Rising Stem, Handwheel Operated				Drawing No.	1522FA01	
				DPV Fig. No.	1522F	
Drawn By	Date	Checked By	Date	Approved By	Date	Scale
HWW	07/01/1992	LFL	07/01/1992	PNF	07/03/1992	N.T.S.

8. G.A. & Component list of Check valve



No.	Part Name
1	Body
2	Seat Ring ①
3	Disc
4	Arm
5	Washer
6	Nut
7	Pin
8	Hanger
9	Stud Bolt
10	Hex Nut
11	Washer
12	Capscrew
13	Gasket
14	Nameplate
15	Cover
16	Lifting Lug ②
	Notes
①	Renewable Design
②	Size 6" and Larger
	Test Pressures
	Shell Hydro. 450 psig (31.0 bar)
	Seat Hydro. 325 psig (22.5 bar)
	Pneu. 80 psig (5.5 bar)
	Standards
	Design API 600 / API 6D / BS 1868
	Shell Thickness API 600 / API 6D / BS 1868
	Face-to-Face Dimension ANSI B16.10 Class 150
	Flange Dimensions ANSI B16.5 Class 150
	Testing API 598 / BS 6755 Part I

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Check Valve, ANSI Class 150 Raised Face Flanged
 Swing Disc, Regular Opening Type, Bolted Cover

Drawing No. 1532FA01
 DPV Fig. No. 1532F

Drawn By GS Date 06/06/00
 Checked By TPS Date 06/06/00
 Approved By PFL Date 06/06/00
 Scale N.T.S.