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**Installation, Operation & Maintenance Manual
for
Trunnion Mounted Ball Valves**

**Cast Carbon, Alloy or Stainless Steel
2-Piece Bolted Body
Trunnion Mounted Ball Design
Blowout Proof Stem
¼ - Turn Operation
Flanged End Connections**

Index

- 1. Storage of Valves**
- 2. Valve Installation**
- 3. Valve Operation**
- 4. Periodic Valve Inspection.**

DELTA PACIFIC VALVE MFG. CO.	Issue	A	Rev.	0
Title: Installation, Operation & Maintenance Manual for Trunnion Mounted Ball Valves				
Approved By	G. F. Lewis	Page No.	1 of 3	Date
				06-01-95

1. Storage of Valves

- 1.1 Valves should be stored in a dust free well ventilated place with low humidity. Under no circumstances should valves be stored outdoors.
- 1.2 During storage, all valves should be left in full open position.
- 1.3 The lever position indicates the valve position, namely when the lever is parallel to the pipe run, the valve is in the open position and when the lever is perpendicular to the pipe run, the valve is in the closed position.
- 1.4 Do not remove the end protectors before the valves are installed. If they are found to be missing, apply adequate end protection immediately.

2. Valve Installation

- 2.1 Ensure that the correct DPV valves have been delivered, by checking 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 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.

2.4 In the case of uni-directional valves, arrows on the valve bodies indicate the direction of fluid flow. Valves should be mounted according to these flow marks.

2.5 Standard ball valves can be mounted in any convenient position, preferably with easy access to the stem/actuator for future inspection. Avoid mounting the valve with the stem positioned downwards, because in case of possible stem area leakage, the line fluid would run over the actuator.

2.6 Valves should not carry the weight of the pipeline to minimize strain on the valve caused by shock in the pipeline.

2.7 Installing Flanged End Valves:

- (i) Align the bolt holes 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.
- (ii) Tighten the bolts evenly tightening alternately opposite pairs of bolts. The ends of the tightened bolts should protrude equally beyond the nuts.
- (iii) After installing the valves, be sure to re-check all bolts and nuts of coupled flanges and re-tighten them if found loose.

DELTA PACIFIC VALVE MFG. CO.	Issue	A	Rev.	0
Title: Installation, Operation & Maintenance Manual for Trunnion Mounted Ball Valves				
Approved By	G. F. Lewis	Page No.	2 of 3	Date
				06-01-95

2.8 After Installation:

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

3. Valve Operation

- 3.1 Turn the lever clockwise to close the valve. Turn it counter-clockwise to open the valve.
- 3.2 Valves should be opened and closed slowly to avoid hammering effect on the valve and pipeline.
- 3.3 Ball valves should be used only in the full open or full closed position so that the wire drawing effect can be reduced.
- 3.4 It is advisable for use only for on-off services. Avoid use of valve for throttling services.

4. Periodic Valve Inspection

- 4.1 Ball valves do not require regular maintenance. However, after long service life, through valve leakage can develop due to normal wear and tear in service. In case of such, the seats should be replaced.

4.2 Disassembly From Pipeline:

- (i) Be aware of what the line fluid is.
- (ii) Wear any protective clothing and equipment normally required to avoid injury from the line fluid.
- (iii) De-pressurize the line and drain the system fluid. Open the body vent plug/valve.
- (iv) Keep the valve in the full open position and remove valve from the line.

4.3 Disassembling the Valve:

- (i) Flush the valve to remove any residuals inside.
- (ii) Remove the operator. Unbolt and remove the bonnet and stem assembly.
- (iii) Support the valve on a platform in a vertical position with the end-piece facing upwards.
- (iv) Unbolt the end-piece and remove with seat holders. Take care that the seat holders, together with seat springs and o-ring seals do not fall out during removal, as this may cause damage to the ball and other components.
- (v) Remove the body end studs and separate the body from the end pieces.

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Title: Installation, Operation & Maintenance Manual for Trunnion Mounted Ball Valves					
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- (vi) Close the valve to remove the ball. Do not place the ball on metal surfaces.
- (vii) Disassembled components should be placed on clean wood or cardboard.

4.4 Examination of Valve Components:

- (i) The valve body and end interior should be cleaned by means of water, steam, acid or solvent before examination.
- (ii) Examine the body internal area if necessary using a small mirror and flashlight.
- (iii) The ball and seats should be carefully examined to detect any surface damage.
- (iv) Minor scratches or flashes on the ball surface or in the seats can be smoothed with fine grinding cloth.
- (v) Check the condition of the stem, stem washer and seals.
- (vi) Damaged components should be replaced.
- (vii) Worn or corroded areas or parts shall be carefully examined visually by a magnifying glass.
- (viii) The wall thickness should be periodically measured and recorded.

4.5 Valve Re-Assembly:

- (i) Clean all the components of the disassembled valves and prepare new spare parts such as seals and gaskets before re-assembly. Be sure to remove rust and other debris from the seat retaining area of the valve body.
- (ii) Re-assemble the valves in reverse of the procedure taken for disassembly.

4.6 Testing and Inspection:

- (i) Check the valve operating conditions by fully opening and closing several times. The first operation will probably have a relatively high torque, which will reduce after several operations.
- (ii) All valves, after re-assembly, should be subjected to a hydrostatic shell test and seat test to ensure the valve performance is satisfactory.
- (iii) When necessary, consult factory for relative testing pressures and durations.