

UNI BODY BALL VALVES

FS900 SERIES



**AUSTRALIAN
PIPELINE VALVE®**



AUSTRALIAN PIPELINE VALVE®

COMPLETE PRODUCT LINE

“Australian Pipeline Valve produces isolation, control and flow reversal protection products for severe and critical service media in utility, steam, pipelines, oil & gas and process industries. APV valves and pipeline products form the most competitive portfolio in the market.”



SUPER-CHECK®



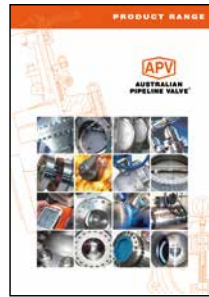
TORQTURN®

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AUSTRALIAN PIPELINE VALVE BRAND RANGE - CATALOGUES



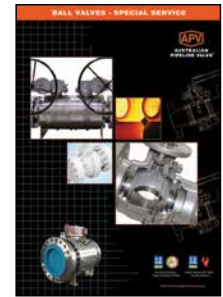
Product Brochure



Ball Valves Floating & Trunnion Mounted



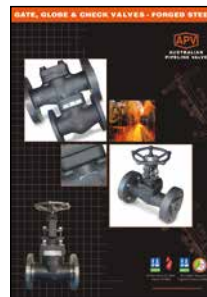
Ball Valves Floating Small Bore



Ball Valves Special Service



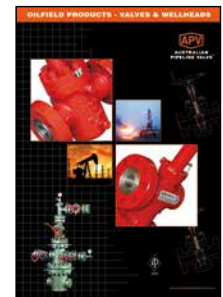
Gate, Globe & Check Valves - Cast Steel



Gate, Globe & Check Valves - Forged Steel



Plug Valves Lubricated, Sleeved & Lined



Oilfield Products Valves & Wellheads

APV FAMILY OF BRANDS RANGE - CATALOGUES



Diamond Gear Gearboxes



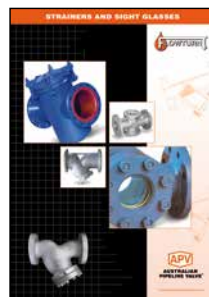
Flowturn Ball Valves Multiway & Deadman



Flowturn Gate, Globe & Check Valves



Flowturn Instrument Valves



Flowturn Strainers & Sight Glasses



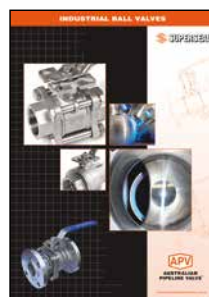
Steamco Steam Valves



Supercheck Wafer Check Valves



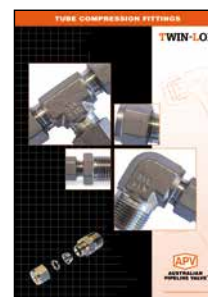
Superseal Butterfly Valves



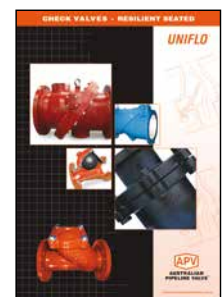
Superseal Industrial Ball Valves



Torqturn Actuators



TwinLok Tube Fittings



Uniflo Check Valves

Contact us for your local stockist/distributor

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INTRODUCTION

The majority of this information is common knowledge to experienced valve users. When properly installed in applications for which they were designed, Australian Pipeline Valve (APV) valves will give long reliable service. This instruction is only a guide for installation and operation on standard service and covers general maintenance and minor repairs. A professional APV approved valve engineering facility should be utilised for reconditioning or major repairs. Check the part number on the label to ensure the valve is configured to firesafe specifications if firesafe is required.



Note

We recommend that this entire document be read prior to proceeding with any installation or repair. Australian Pipeline Valve and its parent company take no responsibility for damage or injury to people, property or equipment. It is the sole responsibility of the user to ensure only specially trained valve repair experts perform repairs under the supervision of a qualified supervisor.

RESPONSIBILITY FOR VALVE APPLICATION

The User is responsible for ordering the correct valves. The user is responsible for ensuring APV Valves are selected and installed in conformance with the current pressure rating and design temperature requirements. Prior to installation, the valves and nameplates should be checked for proper identification to ensure the valve is of the proper type, material and is of a suitable pressure class and temperature rating to satisfy the requirements of the service application.



Caution

Do not use valves in applications where either the pressure or temperature is higher than the allowable working values. Also valves should not be used in service media if not compatible with the valve material of construction, as this will cause chemical attacks, leakage, valve failure.

RECEIVING INSPECTION AND HANDLING

Valves should be inspected upon receipt to ensure:

- Conformance with all purchase order requirements.
- Correct type, pressure class, size, body and trim materials and end connections.
- Any damage caused during shipping and handling to end connections, hand wheel or stem.



Caution

The User is advised that specifying an incorrect valve for the application may result in injuries or property damage. Selecting the correct valve type, rating, material and connections, in conformance with the required performance requirements is important for proper application and is the sole responsibility of the user.

SAFETY INFORMATION

The following general safety information should be taken in account in addition to the specific warnings and cautions specified in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered in this I.O.M.



Caution

Never attempt to disassemble a valve while there is pressure in the line. Ensure both upstream and downstream pressures are removed. Disassemble with caution in case all pressures are not relieved. Even when replacing stem packing, caution is necessary to avoid possible injury.



Caution

To prevent valve bending, damage, inefficient operation, or early maintenance problems, support piping on each side of the valve. When handling gases/fluids that could cause damage to human health, the environment or property, the necessary precautions to prevent risk must be taken.



Caution

- *A valve is a pressurised mechanism containing energised fluids under pressure and consequently should be handled with appropriate care.*
- *Valve surface temperature may be dangerously too hot or too cold for skin contact.*
- *Upon disassembly, attention should be paid to the possibility of releasing dangerous and or ignitable accumulated fluids.*
- *Ensure adequate ventilation is available for service.*

This manual provides instructions for storing, general servicing, installation and removal of ball valves. APV and its resellers refuse any liability for damage to people, property or plant as well as loss of production and loss of income under any circumstances but especially if caused by: Incorrect installation or utilisation of the valve or if the valve installed is not fit for the intended purpose. It is the sole responsibility of the user to ensure the valve type and materials are correctly specified.

SCOPE OF INSTALLATION ACCORDING TO THE TYPE OF FLUID

(DANGEROUS FOR THE ENVIRONMENT OR HUMAN HEALTH)

Group 1 Classification

- The incorporation of additional safety elements “Double Packing” (utilising a stem extension) is recommended for the range of products included in Group 1.
- The use of valves without additional safety devices in Group 1 will be the responsibility of the user or the purchaser, as well as the advisability of installing leakage detection systems.

Group 2 Classification

- Carbon steel valves will not be used in corrosive fluid lines.

DURING OPERATION TAKE INTO ACCOUNT THE FOLLOWING WARNINGS:

- a- Graphite/Graphoil packing and body gasket is very brittle, any impacting, twisting or bending should be avoided.
- b- The valve's internal parts such as ball, stem, seats, seals, gaskets shall be handled with care avoiding scratches or surface damage.
- c- All tools and equipment for handling internal critical sealing parts shall be soft coated.
- d- Valves can be fitted with gaskets or seals in PTFE, Buna, Viton, etc., hence high temperatures will damage sealing components.
- e- Never part open valve, valve must be full open or full closed to avoid seal damage.

For all operations make reference to position number on part list of the applicable drawing listed.

1.0 SCOPE

This manual describes the methods of installation and maintenance for floating ball valves. The ASME class or cold working pressure shown indicates the maximum rating of the body however, seats & seals down rate the pressure and temperature. See section 5 for pressure/temperature chart.

1.1 ENVIRONMENTAL CONSIDERATIONS

According to ISO 14000 regulations and the environmental policy of APV the recyclability of the components that form part of APV valves is as follows:

Recyclable components:

Metal parts, PTFE (hard), plastic plug (low-density polyethylene).

Non-recyclable components:

PTFE mixed with other compounds (glass-fiber, graphite, etc.), nylon, graphite and graphite mixed with metal.

1.2 STORAGE

1.2.1 Temporary Storage

If valves are to be stored before installation, the following should be observed:

- a) Keep the valves wrapped and protected as shipped from the manufacturer.
- b) Do not remove the protective end covering until the valve is ready for installation. This will reduce the possibility of foreign material damaging the internal valve components.
- c) Valves stored outdoors should be positioned such that water does not accumulate in the valve body.

1.2.2 Long Term Storage

If valves are to be stored more than one year, they should be prepared in the following manner:

- a) Remove the packing and apply a preservative to the packing chamber.
- b) Do not remove the protective end covering.
- c) Do not store the valves outdoors.

1.3 PREPARATION

- a) Remove the valve end protection.
- b) Prior to shipment, a preservative/corrosion inhibitor may have been applied to the inner body of the valve. This preservative/corrosion inhibitor can be removed with a solvent provided the solvent used does not affect the seats/seals used in the valve.
- c) The inside of the valve should be inspected and blown out with compressed air. Adjacent piping must be clean and free from debris to prevent damage to the valve.
- d) To prevent valve distortion, inefficient operation or early maintenance problems, support piping on each side of the valve.
- e) Make sure the valve is positioned such that there is sufficient space so that the hand lever is easily and safely reached and there is enough clearance for the stem when the valve is open.
- f) Install the valve according to the flow indicator on the valve body where applicable.

2.0 INSTALLATION

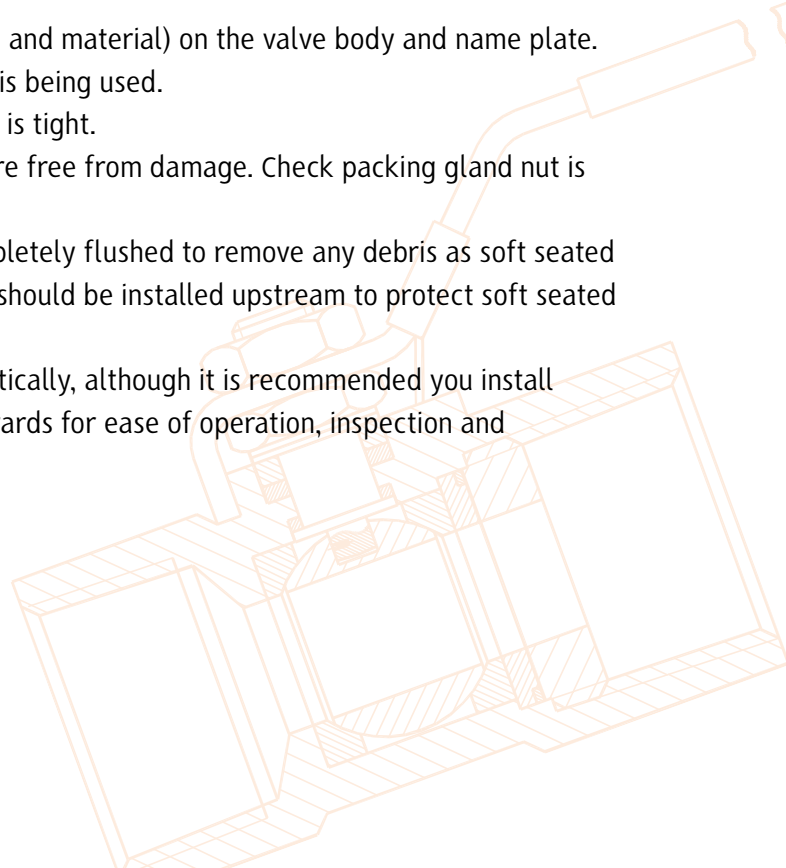


Caution

Piping should be properly aligned and supported to reduce mechanical loading on end connections. Never use the lever (wrench) to hold the valve during transport, handling or assembly.

The following procedure is required to be followed for correct installation.

- a) Before installation confirm the marking (rating, size and material) on the valve body and name plate. Ensure the valve is suitable for the service which it is being used.
- b) Before installation check internal ball/seat retainer is tight.
- c) Remove valve end protectors and ensure threads are free from damage. Check packing gland nut is tight.
- d) Prior to installation of valve, ensure the line is completely flushed to remove any debris as soft seated ball valves are easily damaged. Filters or strainers should be installed upstream to protect soft seated valves.
- e) Valves will operate at any angle horizontally or vertically, although it is recommended you install valves in a vertical position with stem pointing upwards for ease of operation, inspection and accessibility.



2.1 PREPARATION FOR INSTALLATION

- Remove protective end caps or plugs and inspect valve ends for damage to threads.
- Thoroughly clean adjacent piping system to remove any foreign material that could cause damage to seating surfaces during valve operation.
- Verify that the space available for installation is adequate to allow the valve to be installed and to be operated.



Caution

Ensure sufficient clearance for the stem in the full open position. Inadequate clearance for valves may add mechanical loading to the valve ends. Sufficient clearance should be allowed for threaded end valves to be 'swung' during installation.

2.2 END CONNECTIONS

2.2.1 Threaded Ends

Check condition of threads on mating pipe. Apply joint compound to the male end of joint only. This will prevent compound from entering the valve flow path. Use compatible grade of PTFE thread tape.



Caution

FS900 Series is not suitable for socket weld use.

3.0 OPERATION

3.1 MANUAL OPERATION

Valve adjustment is by clockwise turning of stem. Lever operated valves have a position indicator to indicate open or closed (see figure 1). Ball Valves must not be used for throttling. Do not leave part open, or seats will be damaged. Valve must be full open or full closed or damage to seats or body will occur.

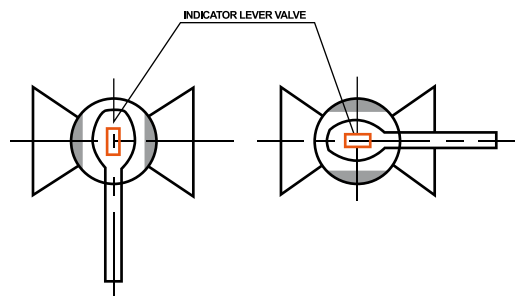


FIG 1.

3.2 LOCK DEVICE

Where provided (optional) the valve has a locking lug that allows valve to be locked in full open or full closed position.

4.0 MAINTENANCE

Valves should be periodically checked at least once every 3 months, but depending on service, criticality and frequency of use, more regular checking may be required.



Caution

Packing leakage could result in personal injury. Valve packing is tightened prior to shipping but may require adjustment to meet specific service conditions. If a valve does not fully close, damage to the seat and body will result due to the venturi effect resulting in high pressure erosion. Flush or remove the valve at next opportunity. Do not over tighten or the valve could be damaged. If debris is blocking the seat do not attempt to force the valve or the stem will be damaged.

A good program of inspection and maintenance cannot be over stressed. It is recommended that the valve be periodically and at least partially stroked/function tested to ensure the valve functions and prevent seizure/sticking of any mating surfaces. Duration depends on service, criticality etc. However it also must be factored in that if there are impurities or particulates in the line each operation could reduce seat life proportionately. Periodic inspection of critical leak-path areas such as body/bonnet joint, end connections, seating surfaces, and around the stem packing should be a requirement.

The most common area for leakage is around the stem packing, this is usually due to wear and can normally be stopped by adjusting the packing. This procedure is performed by turning gland nut 1/2 turn at a time until leakage stops. Once leakage stops, continue tightening gland nut an additional 1/2 turn. If leakage cannot be halted by adjusting packing, repacking of the valve is indicated. (Refer to field repair).



Caution

Do not attempt to replacing packing or replace stem while the valve is in service! (The stem is blowout proof and can only be removed by disassembling the valve). Only graphite packing is to be used for firesafe service, PTFE is not firesafe. A FS900 valve is firesafe only when fitted with graphite packing and graphite gasket. Check the full part number on the label to ensure the valve is specified as firesafe. If the port number indicates PTFE packing or body gasket the valve is not firesafe.

4.1 GLAND PACKING REPLACEMENT

In case of slight leakage from the gland, gland packing bolts can be lightly tightened up without effecting torque. (Refer to Section 5.0 for Bill of materials).

4.1.1 Stem Leakage – Stem Packing Replacement

The most common point for leakage is around the stem and packing this leakage can normally be stopped by adjustment of the packing gland. If this does not stop the valve leakage, the valve will have to be repacked.

The system and valve MUST be depressurised and removed from the line before attempting any repair work. After removing all pressure from the valve and draining the system the following procedure should be used to repack the valve.

1. Remove nuts or screw from the lever. Remove the lever and lock plate. Remove locking tab. Remove the gland nut.
2. Remove old packing, taking care not to scratch or damage the stem of stuffing box. Note, the stem design is anti-blow out so the stem cannot be removed up through the top of the valve.
3. Clean and inspect stem, stuffing box, and gland. If any scratches, nicks, or corrosion is found, the parts should be replaced.
4. Slide each packing ring over the stem and into packing chamber. Carefully tap each ring into place and continue installing rings until the recommended number of rings have been installed. A thin smear of molybdenum sulfide anti-seize grease may be used on the stem and packing chamber wall for packing lubrication.
5. Replace gland, and gland nuts. Tighten gland nut alternately in 1/2 turn increments until a reasonable torque (Refer to Section 5.0 for Bill of materials) is applied to lightly compress packing. Lubricate stem and cycle valve through a couple of complete cycles.
6. If slight stem leakage occurs after system is pressurised, continue tightening gland nut in alternating 1/2 turn increments until leakage stops. Once leakage stops, continue tightening gland plate nuts and additional 1/2 turn. There is also a thrust washer however, this part can only be replaced during complete disassembly of the valve. Should replacement of packing fail to prevent the leakage, complete reconditioning of the valve may be required.



Caution

Personal injury may result from sudden release of any process pressure. APV recommends the use of protective clothing, gloves and eye wear when performing any installation or maintenance. Isolate the valve from the system and relieve pressure prior to performing maintenance. Disconnect any operating lines providing air pressure, control signals or electrical power to actuators.

4.2 BODY SEAL

Sealing between three body segments is provided by a friction fit retainer and a gasket (Teflon or graphite). Ensure thread is undamaged and body pocket around gasket is clean and free from scratches or damage.



Caution

If a gasket seal is disturbed while removing or adjusting gasketed parts, APV recommends installing a new gasket while reassembling. A proper seal is required to ensure optimum operation.

4.3 INSPECTION AND REPLACEMENT OF TRIM COMPONENTS

Disassembly: -

1. Place the valve in the half open position, remove all pressure and drain the system. Make sure that leakage of any residual material is caught in an appropriate container and disposed of properly.
2. Remove the nut fastening the lever. Remove the lever. Remove the retainer/lock nut/washer and the stop plate.
3. Follow disassembly procedure 4.4 below.
4. Remove the ball from the body. Inspect the surface of the ball for any scrapes or damage.
 - a. The cause of the problem such as dirt, fluid, etc must be rectified to avoid further damage.
 - b. If imperfections are found on the contacting area of the ball and ball seat the ball must be taken for fine milling. If heavily damaged, then it will need to be welded and re-machined or the ball replaced completely. If the scraped area damage is elsewhere, it too must be fine milled to avoid the ball heavily damaging the soft seat during the open and close operation.
 - c. Remove the seat from the body. Inspect the seat for any scrapes, concaves, dust (including welding dregs, iron bits, sands, etc) and abrasion damage. Typically the damage will occur at the same time the ball is damaged and is the leading cause of leakage. If leakage occurs before repairing, replace the seat (PTFE or RPTFE).
 - d. If marks from press or fine scrapes are found during abnormal operation pressure, consider the right choice of valve.
5. Remove the stem and thrust washer from the body. Remove the thrust washer from the stem. Check the stem for any damage.
6. Clean and inspect body and retainer gasket surfaces. Check for erosion, corrosion, or damage,

especially near point where leakage occurred. If damage is found, those surfaces must be repaired before continuing.

7. Replace or repair all damaged parts.

Reassembly: -

1. Installation of new seats, packing and thrust washer is recommended, then follow reassembly procedure 4.5 below.
2. Install stop plate.
 - 3a. Install retainer/thrust washer.
 - 3b. Install lever.
 - 3c. Install belleville washer and tighten the gland nut.
3. To complete the reassembly, operate the valve 10 times through open and close cycles to ensure all the parts are assembled correctly and the torques are the same value during the open/close operations. If torques are not the same during operation this could indicate that some parts have not been correctly positioned during installation causing interference. Allowing the valve to operate in this state on a pipeline under higher pressure would only cause more damage. The unit must be dismantled and re-assembled, then cycled & tested with perfect result.

4.4 DISASSEMBLY PROCEDURE

Before removing valve from line ensure valve is in the closed position and line is fully closed off and drained. Client should observe all industry & regulatory procedures in this process. To disassemble first remove the operator (4.3.2) then the following steps should be followed with reassembly in reverse order.

1. Drain & clean valve including contents in cavity.
2. Remove (unscrew) retainer nut.
3. Remove body gasket.
4. Carefully remove ball. Avoid scratching ball surface.
5. Remove seats.
6. Remove stem nut, lever, gland nut, stopper, spring washer, and gland retainer.
7. Remove stem by pulling from inside body cavity.
8. Remove thrust washer.
9. Remove gland packing.

4.5 REASSEMBLY PROCEDURE



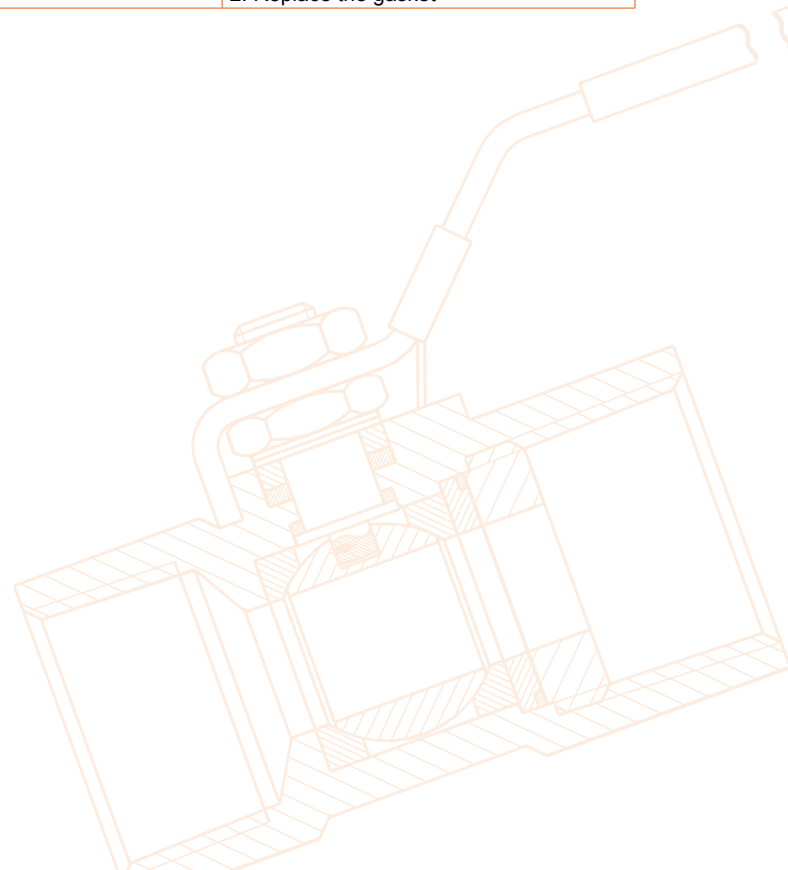
Caution

Check the packing box for pressurised process fluids even after the valve has been removed from the pipeline, particularly when removing packing hardware or packing rings, or removing packing box pipe plug.

1. For reassembly of the disassembled valves, follow the above disassembling procedure in the reverse order.
2. After cleaning the disassembled parts, reset each part in the original position properly. The threaded parts should be cleaned thoroughly and applied with lubricating paste.
3. The stuffing box and base of gasket should be thoroughly cleaned with care.
4. The gland packing and gasket should be replaced preferably each time the valve is disassembled.
5. Ensure the valve is in the closed position whilst reassembling the body and cap, the stopper must be located in the right place, otherwise, the open and close operation will be opposite. Each bolt and nut shall be pre greased and then tightened in accordance with applicable Torque as per Table 1 (see the Appendix).
6. After installation of new parts:
Reassemble using reverse order of steps outlined above. Operate valve several times to be assured of smooth operation before reinstalling.

TROUBLESHOOTING

MALFUNCTION	POSSIBLE CAUSE	REDIAL ACTION
Valve does not rotate or operate	<ol style="list-style-type: none"> 1. Packing is tensioned too tightly 2. The stem is torn or there is dirt 3. The times or on-off operation are too many or dirt exists on the surface of the ball 	<ol style="list-style-type: none"> 1. Loosen and adjust again 2. Pull apart the valve and clean the dirt
Ball/Seat Leaking	<ol style="list-style-type: none"> 1. Valve not fully closed 2. Seat or ball damaged 3. Debris trapped in valve 	<ol style="list-style-type: none"> 1. Close the valve tightly 2. Replace seat or ball 3. Clean the debris
Stem Packing Leaking	<ol style="list-style-type: none"> 1. Gland bolts loose 2. Packing damaged or missing 3. Seal misaligned 	<ol style="list-style-type: none"> 1. Tighten gland nut 2. Replace packing (shut down first) 3. Replace and align it correctly
Body Gasket Leaking	<ol style="list-style-type: none"> 1. Body bolts loose 2. Body gasket damaged 	<ol style="list-style-type: none"> 1. Tighten retainer 2. Replace the gasket

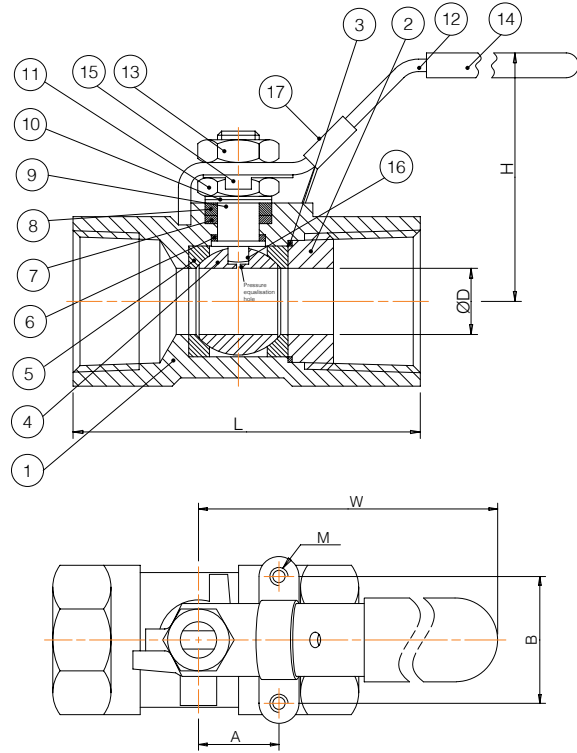


5.0 CONSTRUCTION

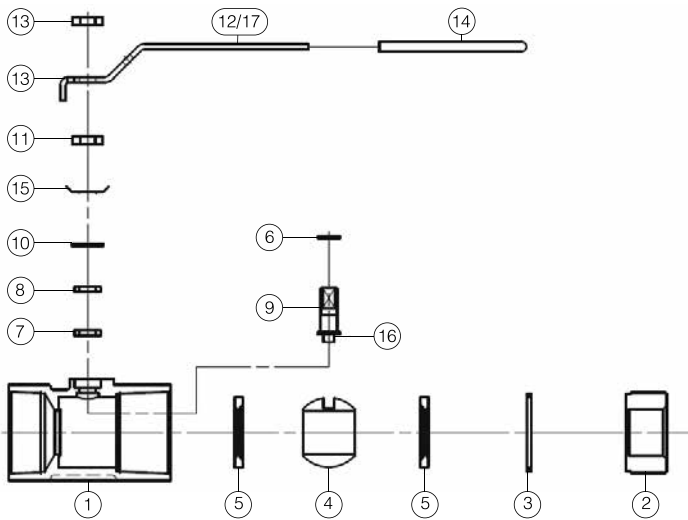
BILL OF MATERIALS

MATERIALS LIST

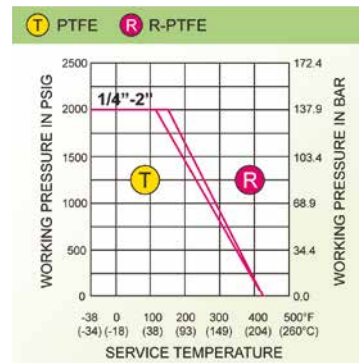
NO.	PART NAME	MATERIAL	NOTES
1	Body	ASTM A216 WCB/CF8M	
2	Retainer	ASTM A216 WCB/316	
3	Body gasket	Graphite/PTFE	
4	Ball	ASTM A351 CF8M/316	Solid
5	Seat	RPTFE	Glass reinforced
6	Thrust washer	Graphite/PTFE	
7	Stem packing	Graphite/PTFE	
8	Gland	AISI 304/316	
9	Stem	ASTM A276 316	
10	Belleville washers	AISI 304/316	
11	Gland nut	AISI 304/316	
12	Handle	Zinc plated steel/316	
13	Handle nut	AISI 304/316	
14	Sleeve	Vinyl plastisol	
15	Locking tab	AISI 304/316	
16	Anti-static device	AISI 316	
17	Lock device	AISI 304/316	



EXPLODED VIEW OF PARTS



PRESSURE/TEMPERATURE RATING



The above is indicative only. Design varies according to size, class, trim, etc. Refer as-built drawing.

BREAK TORQUE VALUES (NM) - PTFE/REINFORCED PTFE SEATS

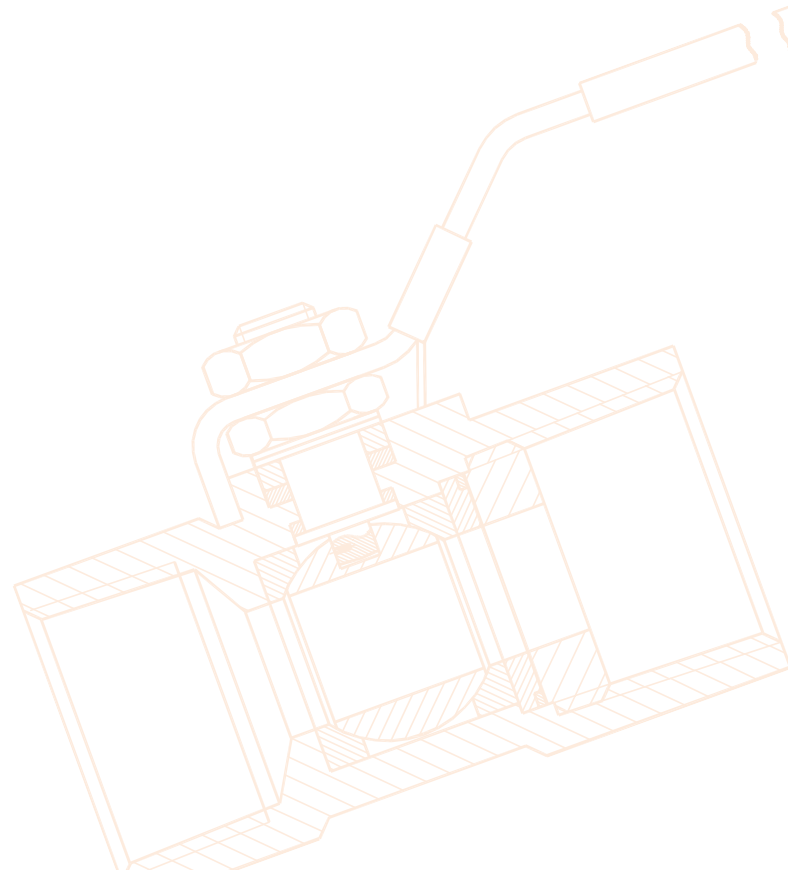
Valve Size mm	Line Pressure - Mpa									Maximum Stem Torque (NM)
	1	2	3	4	5	7	9	10.3	13.8	
8, 10, 15	4	4	5	5	6	6	6	7	7	13
20	10	10	11	12	13	13	14	14	15	28
25	12	13	14	15	16	17	19	19	20	31
32	14	15	16	17	18	20	24	24	25	40
40	20	20	21	22	23	24	26	26	27	50
50	23	24	24	25	25	26	28	28	29	52

Cv/KV FULL PORT 2000 PSI

Size in.	Cv Factor GPM	KV Factor M ² /H
1/4" (8NB)	7	6.0
3/8" (10NB)	7	6.0
1/2" (15NB)	8	6.8
3/4" (20NB)	13	11
1" (25NB)	32	27.5
1 1/4" (32NB)	48	41.0
1 1/2" (40NB)	82	70.0
2" (50NB)	120	103.0
2 1/2" (65NB)	445	381
3" (80NB)	680	583

ETC = BTO X .75. BTC = BTO X 1.0. Theoretical time shown only.
 No safety factor is included. Theoretical torque only, actual torque will vary. When conditions below apply, then calculate torque using the following application factors:

- PEEK SEATS** up to +80% to all torques shown
- FREQUENCY OF OPERATION**
- Less than once per month +25%
 - Less than once per month +40%
 - Less than once per year +60%
- SERVICE CONDITIONS**
- Light slurry semi solids +40%
 - Heavy slurry and some solids +75%
 - Temp. -40°C to -20°C +75%
 - Temp. -20°C to 0°C +25%
 - Temp. Over 150°C +40%





AUSTRALIAN PIPELINE VALVE®

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AUSTRALIAN PIPELINE VALVE® HEAD OFFICE
70-78 Stanbel Road Salisbury Plain South Australia 5109 Telephone +61 (0)8 8285 0033 Fax +61 (0)8 8285 0044
email: admin@australianpipelinevalve.com.au

www.australianpipelinevalve.com.au

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