

**IRON SWING & TILT CHECK VALVES**



**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®**



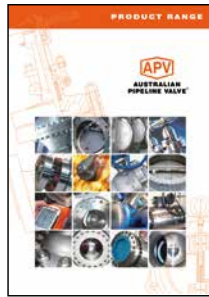
**TORQTURN®**

**TWIN-LOK®**

**UNIFLO®**



**AUSTRALIAN PIPELINE VALVE BRAND RANGE - CATALOGUES**



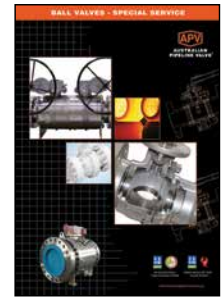
Product Brochure



Ball Valves Floating & Trunnion Mounted



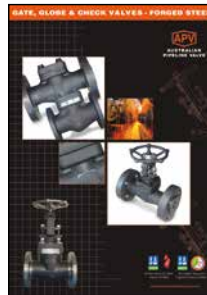
Ball Valves Floating Small Bore



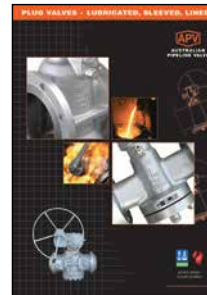
Ball Valves Special Service



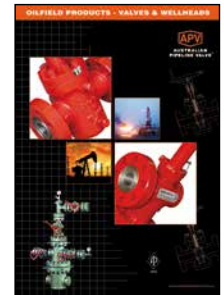
Gate, Globe & Check Valves - Cast Steel



Gate, Globe & Check Valves - Forged Steel



Plug Valves Lubricated, Sleeved & Lined

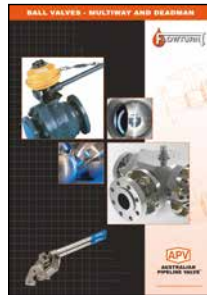


Oilfield Products Valves & Wellheads

**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



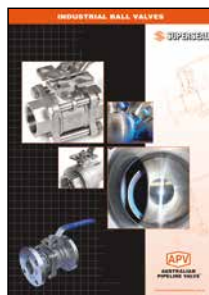
Steamco Steam Valves



Supercheck Wafer Check Valves



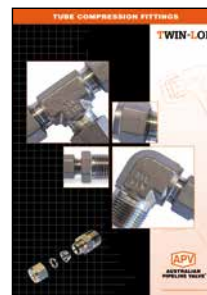
Superseal Butterfly Valves



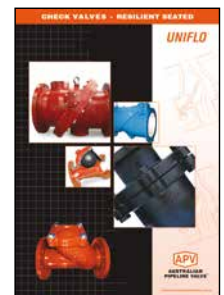
Superseal Industrial Ball Valves



Torqturn Actuators



TwinLok Tube Fittings



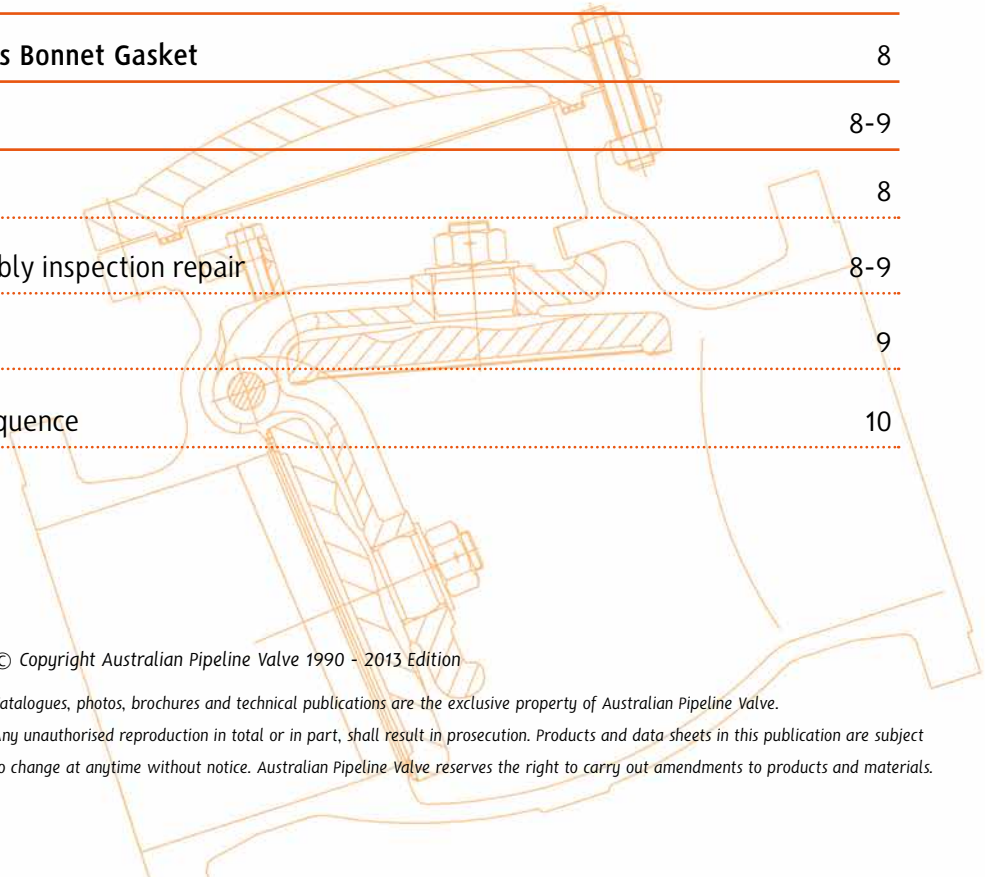
Uniflo Check Valves

Contact us for your local stockist/distributor

# INDEX



Introduction	2
Safety Information	3-4
1.0 Installation	5
1.1 Installation positions	5
1.2 Preparation for installation	5
1.3 Post-installation procedures	5
2.0 Handling	5-6
3.0 Operation	6
4.0 Leakage Across Seat	6
5.0 Disassembling Valves	7
6.0 Reassembly	7
7.0 Preventative Maintenance	7
8.0 Other Services	7-8
9.0 Preventing Leakage Across Bonnet Gasket	8
10.0 Major Maintenance	8-9
10.1 Gasket replacement	8
10.2 Valve internals disassembly inspection repair	8-9
10.3 Disc & seat	9
Appendix A - Bolting torque sequence	10



© Copyright Australian Pipeline Valve 1990 - 2013 Edition

Catalogues, photos, brochures and technical publications are the exclusive property of Australian Pipeline Valve. Any unauthorised reproduction in total or in part, shall result in prosecution. Products and data sheets in this publication are subject to change at anytime without notice. Australian Pipeline Valve reserves the right to carry out amendments to products and materials.

## INTRODUCTION

The majority of this information is common knowledge to experienced valve users. When properly installed in applications for which they were designed, Flowturn 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.



Note

*We do recommend however 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-Flowturn 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

*To avoid injury, never attempt disassembly while there are pressures either upstream or downstream. 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.*

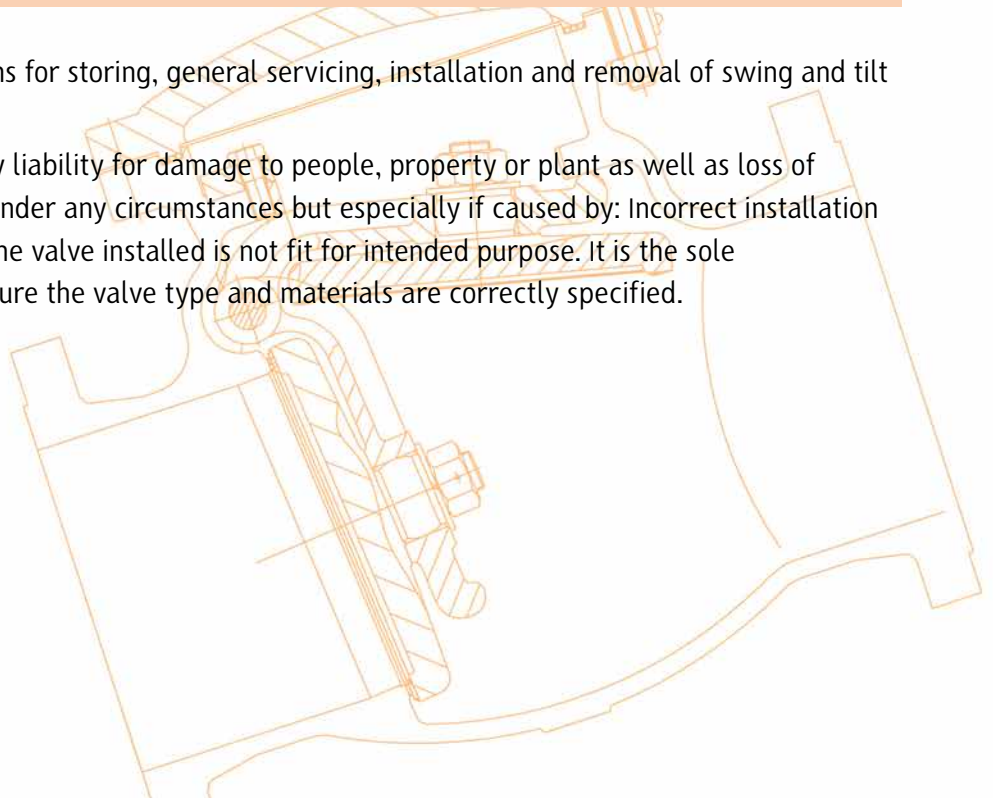


Caution

- *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 swing and tilt check valves.

APV and it's 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 intended purpose. It is the sole responsibility of the user to ensure the valve type and materials are correctly specified.



DURING OPERATION TAKE INTO ACCOUNT THE FOLLOWING WARNINGS:

- a- Graphite body gaskets are very brittle, any impacting, twisting or bending should be avoided.
- b- The valve's internal parts such as disc, hinge pin, seats, seals, gaskets shall be handled with care avoiding scratches or surface damage.
- c- All tools and equipment for handling the internal parts shall be soft coated.
- d- Valves can be fitted with gaskets or seals in PTFE, Buna, EPDM, NBR, Viton, etc., hence chemicals or high temperatures will damage sealing components.

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



Caution

*Bonnet seal could result in personal injury. Bonnet is tightened prior to shipping but may require replacement seal or tightening to meet specific service conditions.*



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 line providing air pressure, control signals or electrical power to actuators.*



Caution

*For check valves with external packed hinge pin, 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.*



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.*

## 1.0 INSTALLATION



*Piping should be properly aligned and supported to reduce mechanical loading on the end connections.*

### 1.1 INSTALLATION POSITIONS

Check valves are uni-directional, the direction of flow will be indicated on the valve body. Check valves should be used for horizontal lines with the bonnet facing up, and vertical lines where the direction of flow as indicated on the valve body is upwards.

### 1.2 PREPARATION FOR INSTALLATION

- Remove protective end caps or plugs and inspect valve ends for damage to flange faces.
- 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.

### 1.3 POST-INSTALLATION PROCEDURES

After installation, the line should be cleaned by flushing to remove any foreign material. When caustics are to be used to flush the line, additional flushing with clean water is required. The valve should be tested after installation to ensure proper operating function.

With the line pressurised, check the valve end connections, body to bonnet/cover joints and plugs for leaks.

## 2.0 HANDLING

Check valves are designed to prevent reverse flow. Leakage rate for check valves with metal-to-metal seats are dependent on the amount of back pressure and the viscosity of the flowing medium. Check valves should not be used in gas or low back pressure liquid applications if zero leakage is desired.

1. Take care in handling valves especially the sealing faces.
2. Make sure that piping and equipment is clean of dust, rust and pipeline scale. Clean all adjoining pipe and fittings. Remove end protector covers from the valves immediately prior to installation. Blow compressed air inside the valves to remove residual dust, dirt, etc., from inside the valves as this could hamper the valves functioning and could also damage the seats.
3. Make bonnet joints tight but do not overstress them. Always tighten in a diagonal pattern, gradually

- increasing torque settings. Refer to Appendix A, Diagram 1.
4. Install valves in the connecting piping so that the arrow mark on the valve body coincides with the flow direction in the pipe.
  5. After installation it is advisable to once again flush the piping. Check carefully for visible leaks if any and tighten bonnet nuts accordingly.
  6. If the leakage still persists change the bonnet gasket.



**Caution**

*Proper safety equipment and apparel should be worn when preparing to service a valve.*

## **3.0 OPERATION**

The check valve operation is automatic and requires no assistance. When the flow exerts sufficient pressure against the disc to overcome the disc's weight, the disc allows the flow to continue through the piping system. As pressure decreases, the disc lowers until it's own weight forces it to seat. This prevents the possibility of a reversal in the flow. Metal seated check valves are not zero leak devices and may "seep" in service. This type of valve should always be backed up with an isolation valve (either gate, butterfly or ball valve).

Check valves are designed to prevent reverse flow. Leakage rate for check valves with metal-to-metal seats are dependant on the amount of back pressure and the viscosity of the flowing medium. Check valves should not be used in gas or low back pressure liquid applications if zero leakage is desired.

## **4.0 LEAKAGE ACROSS SEAT**

It is always difficult to ascertain whether there is an internal seat leakage unless there is pressure or leak detection facility in place to monitor any rise or fall in pressure or leakage. Metal seated check valves allow a much higher rate of seat leakage than gate valves, consult appropriate test standard for leakage allowance. Soft seated check valves are available if seat leakage is not acceptable.

To investigate suspected leakage, the valve should be removed from the line then dismantled. Prior to removal from line ensure all pressure and fluid is purged from line and valve cavity. Remove disc and inspect the seating surfaces, also inspect the body seat for any sign or damage.

Relap the seats or disc as required if minor damage or else send the valve to an experienced APV approved valve repair facility. Assemble the valve, should any leaks still persist then the concerned part may need complete replacement.

When ordering spare parts for replacements, kindly inform us the size, type, rating, part description, model number and serial number.



## 5.0 DISASSEMBLING VALVES

1. Check that the line is in a complete shut down phase.
2. Pre-order all necessary jointing gaskets and hinge pin seals.
3. Check to ensure the flapper is functioning correctly.
4. If the bolts and nuts are too tight, apply deep penetrating oil and then unscrew.

## 6.0 REASSEMBLY

1. Re-assemble in reverse order of disassembly.
2. Refer Appendix A for bonnet bolt re-tightening procedure.

## 7.0 PREVENTATIVE MAINTENANCE

1. Check valves are virtually no maintenance but ensure during normal functioning the disc is not hammering or slamming.
2. If an external device like a counterweight is fitted, check the gland tightening nuts for any slackness, if required tighten these nuts and ensure that the valve operation is not hampered by over tightening of the gland.



Caution

*If an external device like a counterweight is fitted, do not attempt to repack the stem packing in line while the valve is under pressure. The line must be totally purged. Prior to removing bonnet, exercise extreme caution no fluid remains in the valve cavity. Wear appropriate safety apparel and follow industry and plant safety procedures.*

## 8.0 OTHER SERVICES

If an external device like a counterweight is fitted, when servicing the packing gland use Graphite (Graphoil)/PTFE impregnated Graphoil/Pure PTFE packings as per permissible limits of line pressure, temperature as well as media of flow through the valves. Some styles only have an O-ring stem seal system so ensure the grade of O-rings suits the service media and temperature.

## 9.0 LEAKAGE ACROSS GASKET

Should any bonnet gasket leaks occur, tighten the bolts/nuts & studs (refer Diagram 1, Appendix A). If leakage still persists, the bonnet gasket should be changed, refer to 10.1 below.

## 10.0 MAJOR MAINTENANCE

Only an expert valve re-conditioner should attempt the following major maintenance/repairs.

Check valves require very little maintenance. Due to the relatively low replacement cost of cast iron valves especially under 300 NB (12"), it is usually less expensive to replace the complete valve than to have maintenance personnel effect repairs. Generally, the only viable repairs are replacement of bonnet gasket. However, see below for further extraordinary repairs.

Always replace the bonnet gasket whenever a valve is disassembled. Gasket seating surfaces should be scraped clean (avoid radial marks). Bonnet bolts should be tightened in a diagonal pattern at several different increasing torque settings in accordance with the recommended torque value (see Diagram 1, Appendix A).

### 10.1 GASKET REPLACEMENT

1. Disassemble all cover bolts and nuts.
2. For check valve in sizes 400 NB (16") and larger, lifting lugs are generally provided. Lift up the cover utilising cover lifting lugs. For smaller valves the bonnet should be easy to remove without the aid of a mechanical lifting device. In both cases gently break the seal with a lever, gradually lifting the bonnet flange at intervals 360° around the bonnet.
3. Clean gasket surface areas, replace gasket and refit bonnet as detailed in 10.0 above.

### 10.2 VALVE INTERNALS DISASSEMBLY INSPECTION AND REPAIR

1. Check that the (where applicable) hinge, nut and pin are in good condition and firmly connected. Replace damaged parts as necessary.
2. 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 or scraping marks. If marks are deeper than 1.5mm (1/16"), re-machine hinge pin and reassemble hinge pin and re-assemble. If defect depth is greater than 1.5mm (1/16"), a new hinge pin is necessary. When reassembling hinge pin, it is recommended that the disc be removed by loosening the nut.
3. When leakage is due to deterioration of seal surfaces caused by corrosion, erosion or foreign substances, it must be determined whether the disc or seal seat are the cause. Where special soft seat inserts are supplied, see 10.3 below.
  - a) Deterioration of disc surfaces:

Swing check valves: - Disassemble disc by removing nut and washer. Repair surface by grinding and relapping using a fine grade 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 0.4mm the seal surface can be relapped. For smaller sizes the recommended method is to use a cast iron strap with an outside diameter matching the valve's raceway. If the seat surfaces cannot be relapped an APV approved repairer will decide if the surface has to be reground/re-machined or replaced. When defects are deeper than 0.4mm and found on the entire surface, re-metallising or a new seat is required. For threaded-in seats it is recommended that an anti seizure compound be used when installing the replacement seat to make threading it in the body easier.

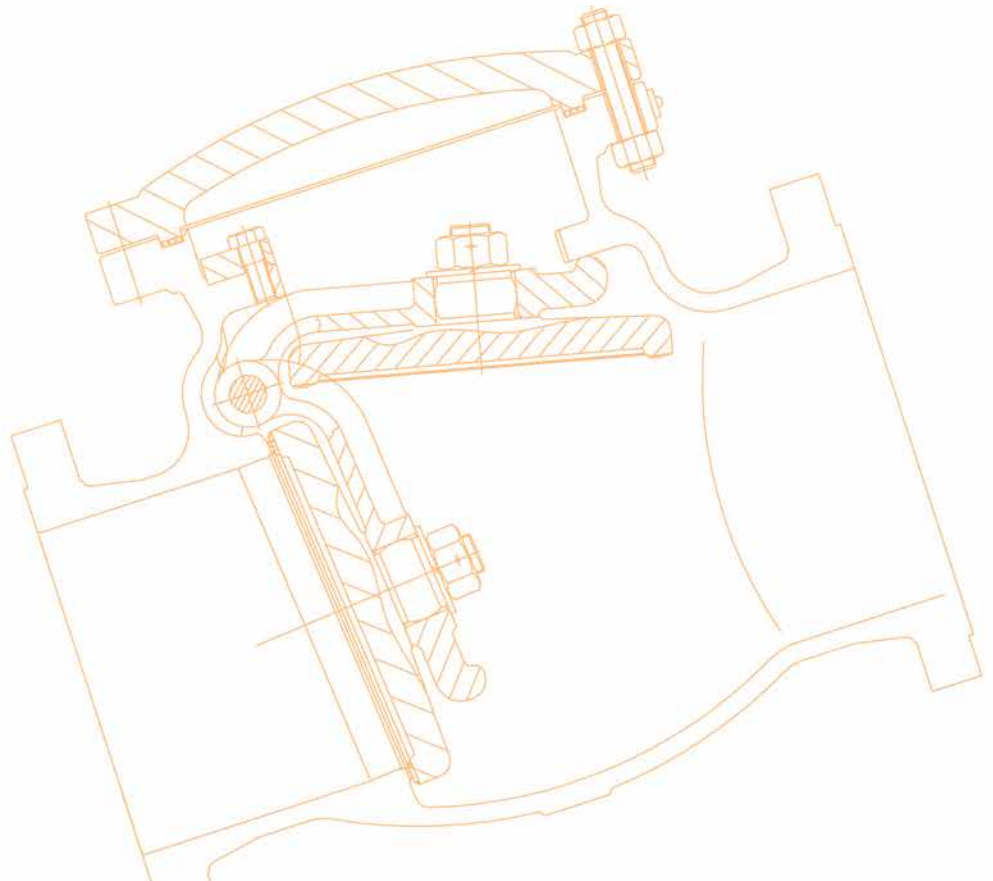


Caution

*Always be sure that the valve is de-pressurised and isolated prior to performing any maintenance work. Remove any dangerous fluids from valve before commencing maintenance.*

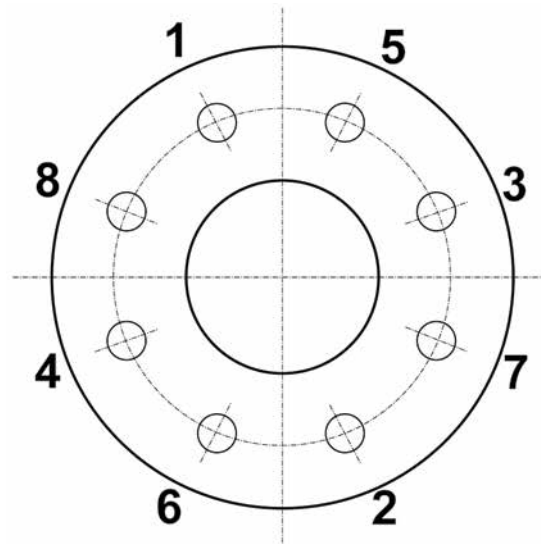
### 10.3 DISC & SEAT

Check disc and body seat sealing area. Relap or replace disc and seat as required. Some valves may have a soft seat insert bonded into the seating of the disc, this should only be replaced if damaged.



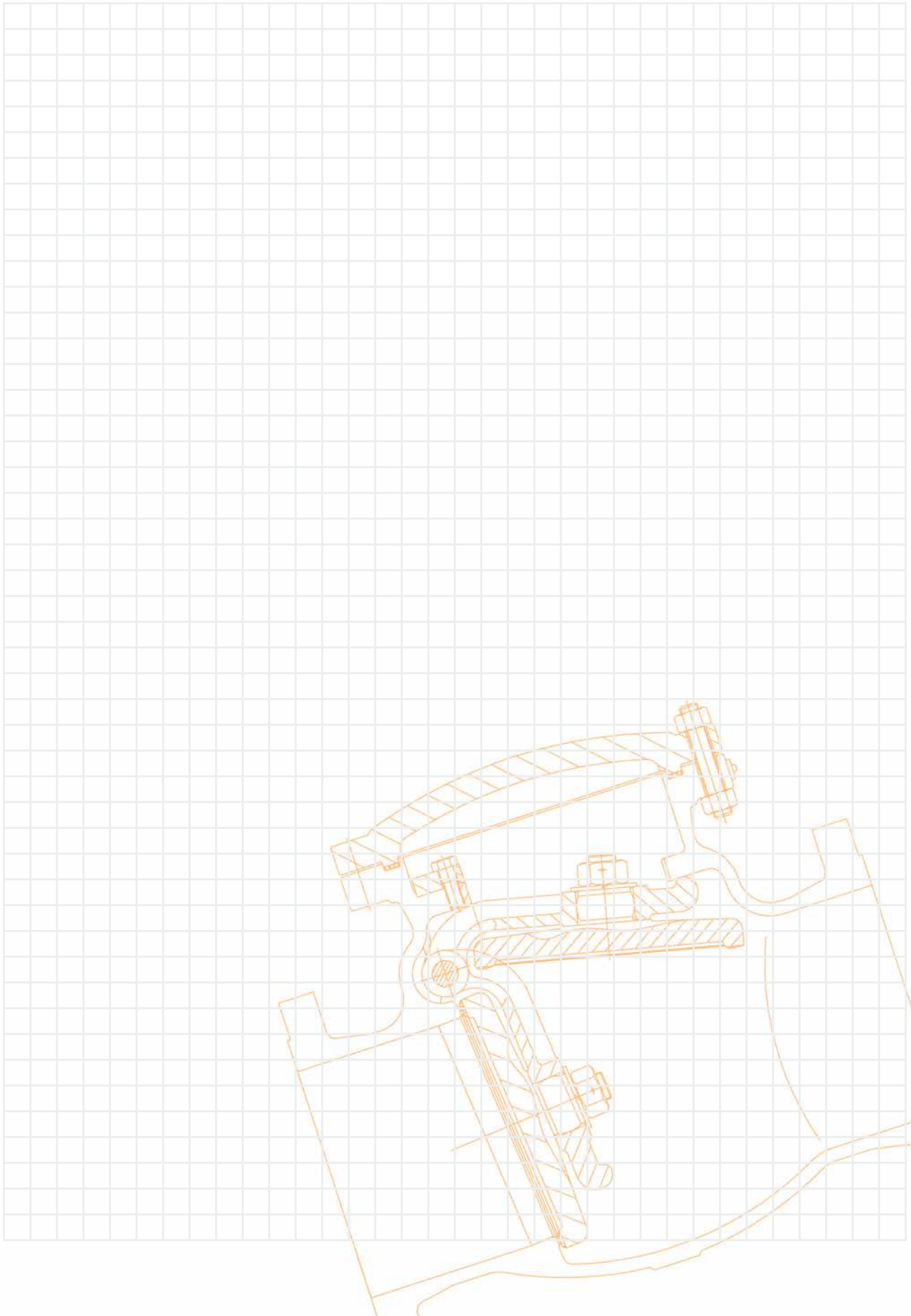
## APPENDIX A

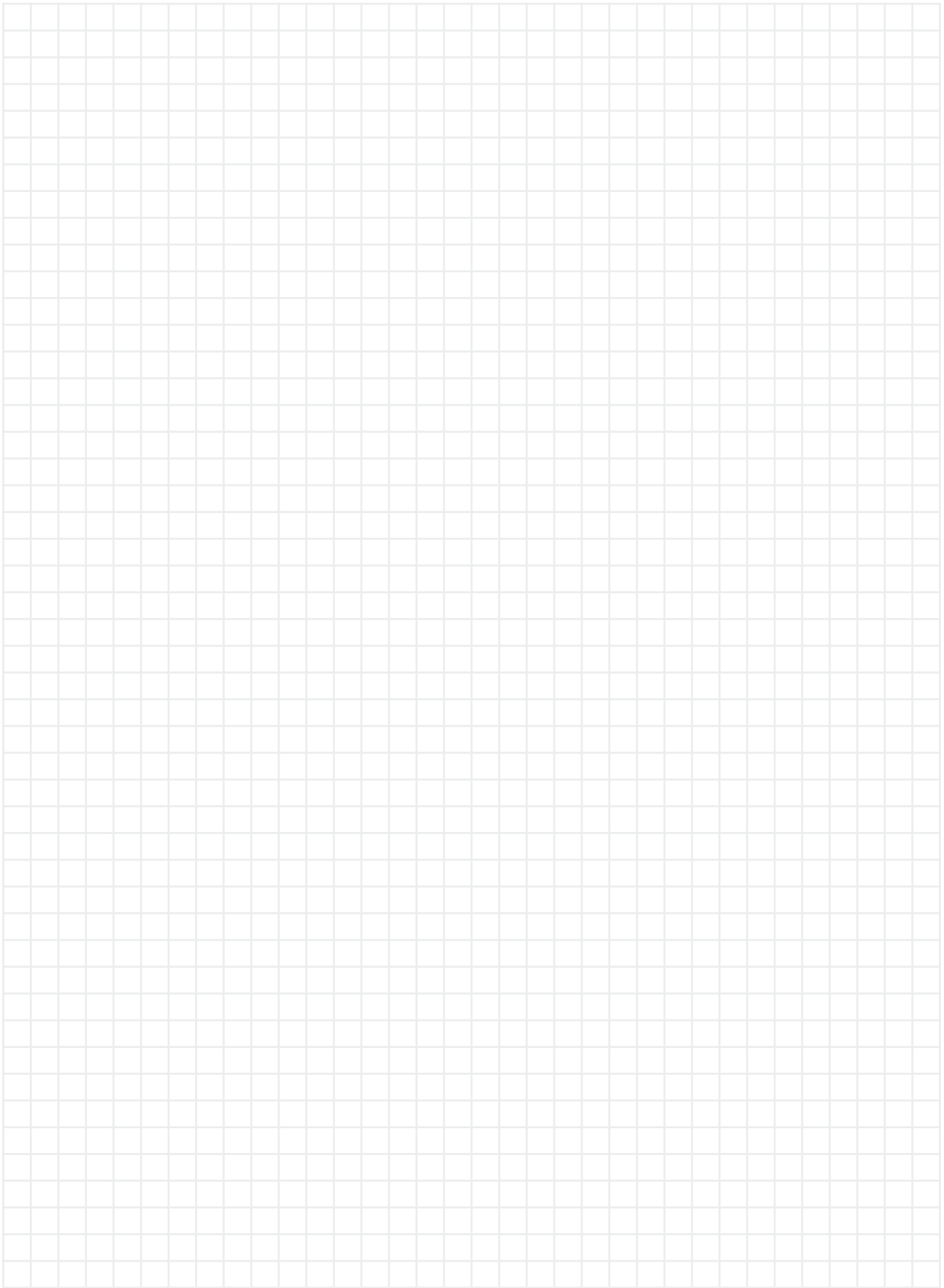
DIAGRAM 1

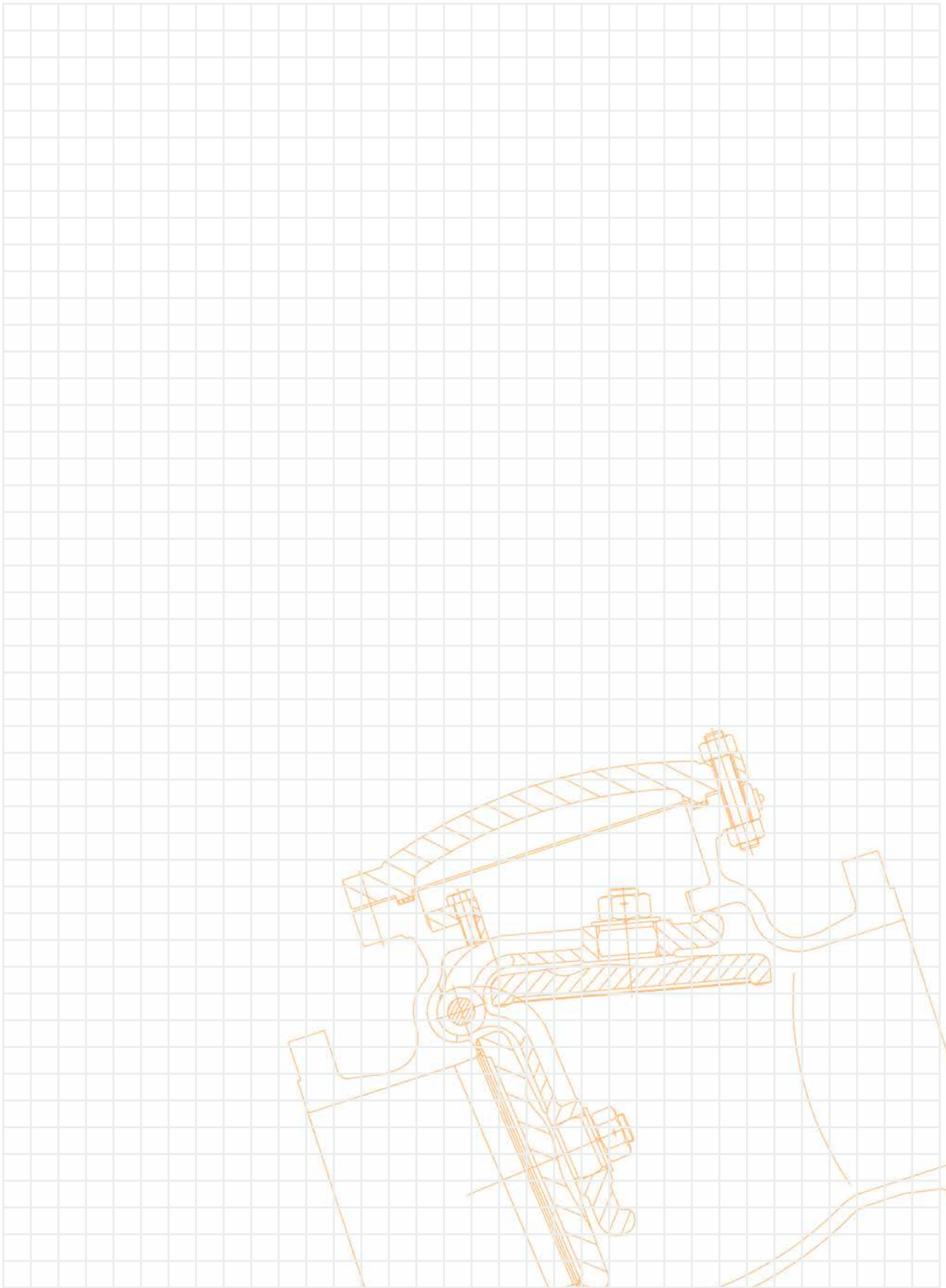


Bolting torque sequence: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Example only, number of bolts will vary, apply the same criss cross process, gradually tightening more after each revolution.



A large, empty grid of small squares, intended for handwritten notes or diagrams. The grid consists of 30 columns and 40 rows of squares.





# APV AUSTRALIAN PIPELINE VALVE®

ADELAIDE • BRISBANE • PERTH



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](http://www.australianpipelinevalve.com.au)

LOCAL DISTRIBUTOR/AGENT

*If you have any requirements in the field of valves, please contact us for a prompt response. Continuous development of Australian Pipeline Valve products may necessitate changes in the design or manufacture process. Australian Pipeline Valve reserves the right to effect any such changes without prior notice.*

