



Installation, operation & maintenance manual - original version

AVK Series 53, Ball Check Valves, DN 32-600

The AVK series 53 ball check valves are installed in wastewater lines to make water flow in only one direction.

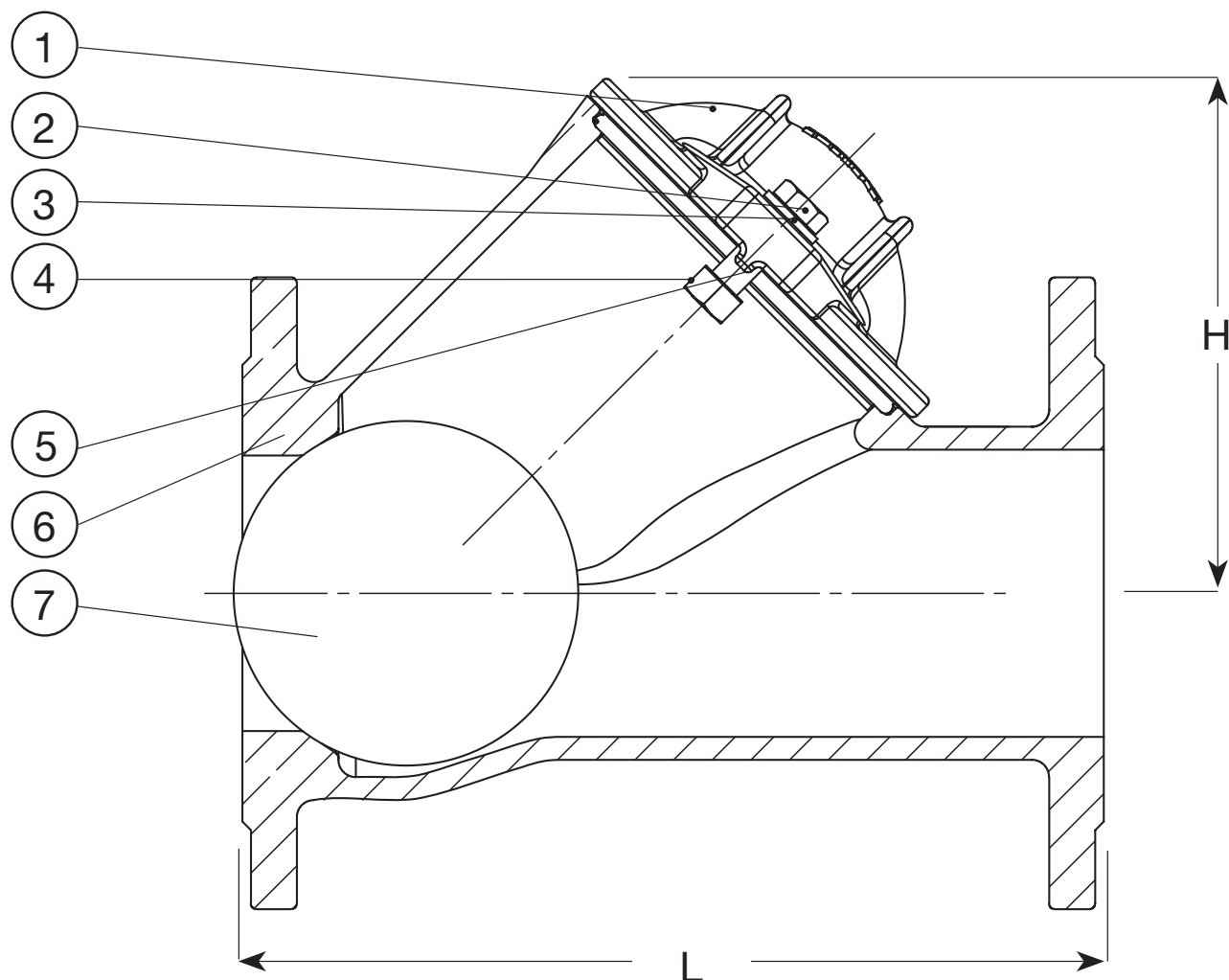
Flow reversal can occur for different reasons, like e.g. pump stop in a plant with large differences in altitude, but with a check valve in the line this can be effectively controlled.

Valves in the size range DN 32-600 come:

- Ductile iron flanged body, DN50-600
- Ductile iron threaded body, DN32-50
- Stainless steel flanged body, DN80-100 and 150
- Stainless Steel threaded body, DN32-80



1. AVK series 53/35, ball check valves, drawing



2. AVK series 53/35, parts list

No.	Item	Material
1	Cover	Ductile iron
2	Bolt	Stainless steel
3	Washer	Stainless steel
4	Nut	Stainless Steel
5	O-ring	NBR rubber
6	Body	Ductile iron
7	Ball	NBR rubber line on a metal core (DN50-500) PUR rubber line on a metal core (DN600)

3. Table of contents

1. AVK series 53/35, ball check valve, drawing.....2

2. AVK series 53/35, parts list3

3. Table of contents4

4. Principle of operation5

5. Health and safety at work5

6. Receiving and storage6

7. Installation and commissioning.....7

 7.1 Flow direction.....8

8. Operation and maintenance.....9

 8.1 Operation9

 8.2 Maintenance9

 8.3 Disassembly for inspection and cleaning.....9

9. Decommissioning.....9

10. Recommended spare parts9

4. Principle of operation

The main operating principle is simple and reliable: a ball in the water stream moves open when the flow is forward and shuts off against the valve seat if the flow tends to reverse.

If the reverse water flow shall deliver the force to close the ball there is risk of water hammer and to mitigate this a different ball can be installed. This helps force the valve closed before the flow reverses and thus results in quiet operation.

Ball check valve can operate in vertical and horizontal installation, and arrow in the body shows the correct position installation.

The sturdy construction and design of the valve with a gradient makes the ball fall into place easily.

5. Health and safety at work

Make sure all relevant Health and Safety issues and regulations are adhered to prior to and during installation or maintenance work carried out on this product. It is the end user's responsibility to ensure that safe working practices are followed at all times.

Whenever AVK's products are installed, operated or maintained the inherent dangers of pressurised liquids and gasses must be addressed. Before work on a valve or other piping component is undertaken, that may involve the release of internal pressure, the valve or line must be fully isolated, depressurised and drained prior to commencing the work. **FAILURE TO COMPLY WITH THIS MAY RESULT IN SEVERE INJURY OR DEATH.**

All workers handling the product must be aware of the weight of the components or assemblies to be handled and manipulated during installation and maintenance.

It is essential that staff undertaking these operations are adequately trained and it is the responsibility of the end user that only trained and competent staff undertake these duties. This manual has been designed to assist, but it cannot replace quality training in the workplace. However, the AVK technical staff is always available and ready to answer questions relating to specific problems that may not be covered by this manual.

AVK's products are designed to be fit for purpose and to a high reliability standard. This provides a safe, low risk product when used correctly for the purpose for which it was designed. However, this assumes that the equipment is used and maintained in accordance with this manual, and the user is advised to study it and to make it available to all staff that may need to refer to it.

AVK cannot be held responsible for incidents arising from incorrect installation, operation or maintenance. The responsibility for this rests wholly with the end user.

6. Receiving and storage

Unloading must be carried out carefully. The load must be put gently to the ground without dropping.

Do lift only by means of shackles in the flange bolt holes or slings around the body casting. If a forklift is used it shall have sufficient capacity to lift the required weight and have a valid inspection certificate.

All workers involved in the unloading shall be able to perform their functions. They shall wear safety boots, safety vest, safety goggles and hard hat.

All slings used for the lifting shall be of sufficient strength. A record shall document that they have been stored under cool, dry conditions away from sunlight and chemical atmosphere, and that they still perform according to their marked strength.

Immediately after unloading the item should be inspected for compliance with specifications and damage in shipment.

Compliance with specification check will typically comprise size, pressure class, drilling and face-to-face dimension.

Damage in shipment check shall comprise coating and all other parts that could have been exposed to mishandling during shipment.

Check that the ball moves freely from one end position to the other and make sure to check it in the position in which the valve is to be installed.

Storage shall be under dry, cool conditions, away from direct sunlight and corrosive or otherwise chemically active atmosphere.

7. Installation and commissioning

WARNING: Prior to installation make sure that all pressurised lines involved in the installation are isolated, depressurised and drained before starting any work. Failure to do so may result in sudden pressure release and subsequent severe injury or death.

The valve must be installed in a way that gives access to maintenance or inspection. Ample room around cover should be left to allow for hoisting equipment for taking out the ball. The valve and adjacent piping must be supported and aligned to prevent cantilevered stress on the valve.

Keep a distance of at least 5-6 pipe diameters to the nearest upstream elbow, tee, control valve or other kind of equipment that can cause turbulence in the water stream.

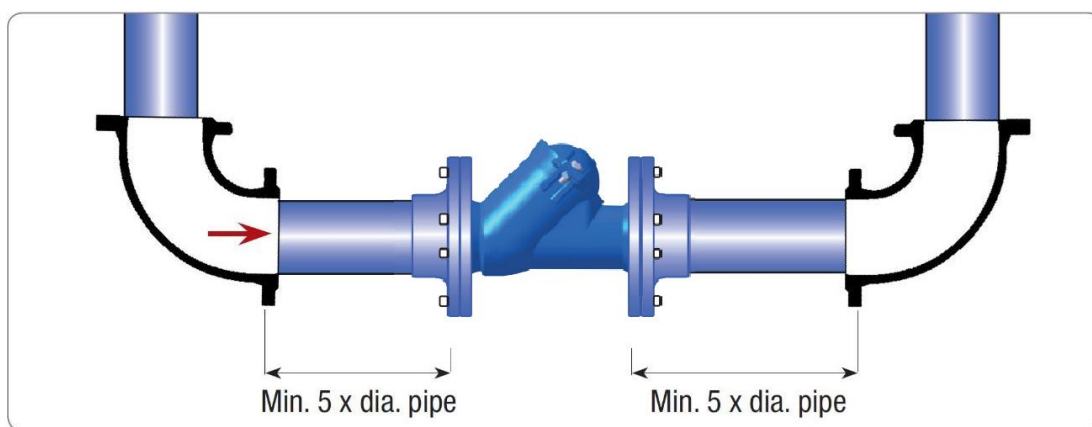


Fig. 1, Recommended distance for installation

The valve must be provided with adequate support and the adjoining pipework must not transfer stress to the valve body.

Flange bolts should be tightened gradually in a criss-cross sequence as shown on fig. 2.

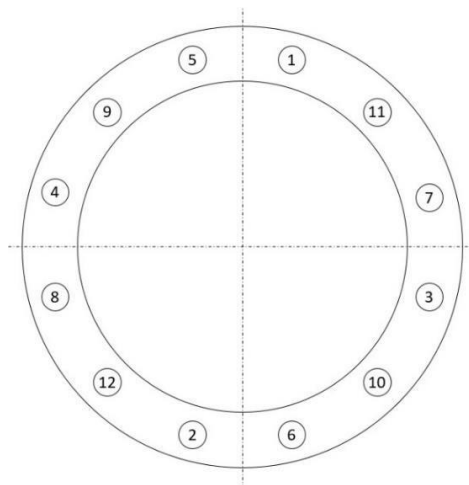


Fig. 2, Example of a tightening sequence, 12-bolts flange

7.1 Flow direction

There are two configurations:

1. When installed with horizontal flow.
2. When installed with vertical rising flow the ball itself will act as a weight that helps close.

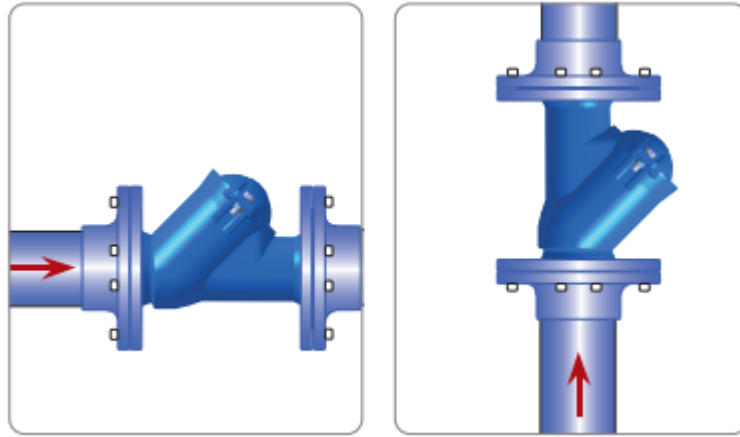


Fig. 3, Possible configurations

8. Operation and maintenance

8.1 Operation

The valve operates automatically.

8.2 Maintenance

WARNING: *Prior to any maintenance work that requires disassembly make sure that the pressurised line involved is isolated, depressurized and drained before starting any disassembly. Failure to do so may result in sudden pressure release and subsequent severe injury or death.*

Very little maintenance is required, but the following parts should be inspected periodically:

- Inner body should be kept clear of debris
- If the valve does not operate frequently, it should be exercised regularly depending on the water quality and amount of minerals and debris that could deposit.
- Check ball and O-ring for excessive wear – particularly relevant in installations with fluctuating or low flow
- Clean the surface and check for damage
- Check lid sealing for leakage

8.3 Disassembly for inspection and cleaning

The valve body does not need to be removed from the pipeline to remove the bonnet and the ball

- 1) Depressurise the pipeline completely; not only for safety reasons but also because when loosening the bonnet bolts even a slight overpressure can shoot out the bonnet gasket and damage it.
- 2) Remove ball.
- 3) Inspect the lid and body inside and the ball for tears or cracks in the rubber.

9. Decommissioning

When decommissioning the valve it should be disposed of according to local regulations and in a way that allows as much recycling of materials as possible.

AVK series 53 ball check valves do not contain hazardous materials that require special treatment.

10. Recommended spare parts

Only genuine AVK spare parts should be used.

AVK cannot accept responsibility for damage caused by failing non-AVK parts.

Following spare parts are recommended to purchase with a series 53 valve:

1. Cover gasket
2. Ball
3. Bolting