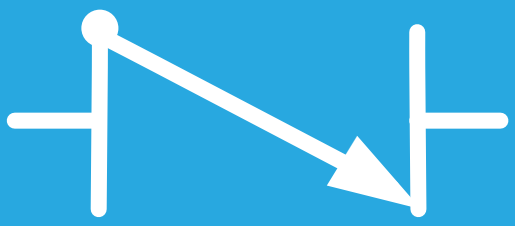
GROUP

400

CHECK VALVES

THAT SATISFIES



DAVINCI VALVES™

MANUFACTURE BROCHURE

CHECK VALVES

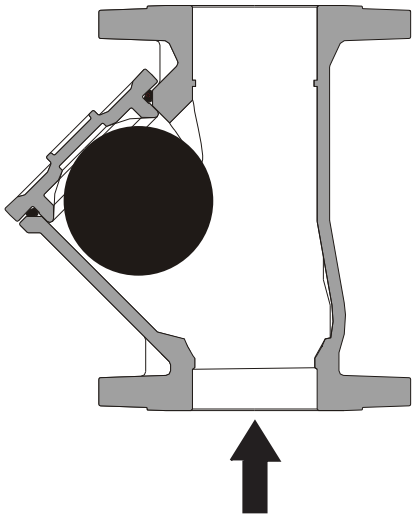
A check valve, non-return valve, reflux valve, retention valve, foot valve, or one-way valve is a valve that normally allows fluid (liquid or gas) to flow through it in only one direction.

Check valves are two-port valves, meaning they have two openings in the body, one for fluid to enter and the other for fluid to leave. There are various types of check valves used in a wide variety of applications.

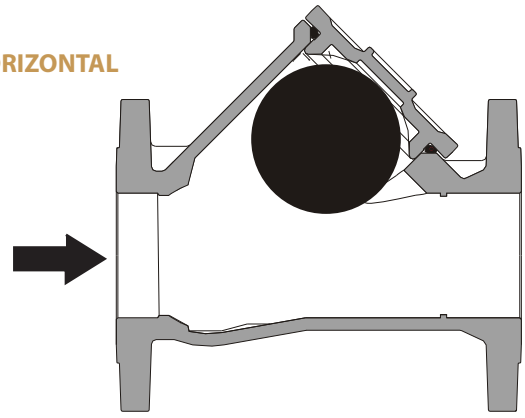
Although they are available in a wide range of sizes and costs, check valves generally are very small, simple, and inexpensive. Check valves work automatically and most are not controlled by a person or any external control; accordingly, most do not have any valve handle or stem. The bodies (external shells) of most check valves are made of plastic or metal.

An important concept in check valves is the cracking pressure which is the minimum differential upstream pressure between inlet and outlet at which the valve will operate. Typically the check valve is designed for and can therefore be specified for a specific cracking pressure.

VERTICAL



HORIZONTAL



PIPELINE MOUNTING STANDARD BALL CHECK VALVE

Check Valves Classification.

DAVINCI VALVES™

Ball check valves

A ball check valve functions by means of a ball that moves up and down inside the valve. The seat is machined to fit the ball, and the chamber is conically shaped to guide the ball into the seat to seal and stop a reverse flow. If the pump capacity is not sufficient it is possible to choose a lighter ball, and if water hammer occurs when the pump stops, it may be solved by selecting a heavier ball.

Ball check valves are often preferred for use in pumping stations that are rarely attended, since they demand only limited maintenance, typically if the ball makes noise caused by insufficient pump capacity or water hammer.

In general, ball check valves are simple and cost effective. Advantages are their compactness and the fact that they have no external parts which helps keeping the price low and the reliability high. A disadvantage may for some applications be that they do not have an open/close indicator.

DAVINCI BALL CHECK VALVES are self-cleaning, as the ball rotates during operation which eliminates the risk of impurities getting stuck on the ball. The standard ball is designed with a NBR rubber lined metal core, and the rubber hardness is optimized to prevent the ball from getting stuck in the seat. Balls of polyurethane are suitable for abrasive media and when different balls weights are needed to prevent noise and water hammer. A full and smooth bore ensures full flow with low pressure loss and eliminates the risk of deposits at the bottom that could prevent tight closure.

DAVINCI MAIN FEATURES for BALL CHECK VALVES:
Tightness at minimum back pressure
Different ball weights available
Self-cleaning construction
Available up to DN 600
Typical challenges are solved with another ball
Full and smooth bore ensures low head loss
Polyurethane balls available for abrasive media
In ductile iron or acid-resistant stainless steel

Keep atention to use in your orders following instructions:
Water hammer effect: use a + 20 % ball weight
Vibrations and resonance from the valve: use a - 20 % ball weight
The ball getting stuck in the seat: use min. shore 60 rubber on the ball or use metal core in the ball

Swing check valves

Swing check valves are the most common check valves. They are inexpensive and as they are automatic they do not require any external power or control to operate – only the flow direction determines the valve operation. Swing check valves with closed bushings do not have an open/close indicator but often the valves are mounted with lever and weight or lever and spring which enable visual check.

Swing Check (Single Dics)

Swing Check Closure is affected by gravity (weight of disc) and reverse flow. The pivot point of the Swing Check is outside the periphery of the disc and the greater the head, the greater the possibility that the fluid will flow back through the valve before the disc can be shut off.
Applying these check valves where reverse flow velocities are high shoud be done with caution.

Double Door Swing Check (Split Disc)

The Double Door Swing Check has the single disc split in two. By splitting the disc in two, the mass of the disc is greatly reduced. The torsion springs forcing the double disc to shut off with minimal flow reversal. The shut off characteristic greatly minimizes the slam potential as compared to the conventional swing check.
In double door checks the hinge pin is stationary and each disc swings freely when opening or closing. Multiple springs are used to larger sizes to compensate for heavier disc and to improve shutt off speed.

DETAIL OF THE BALL AND ITS INTERIOR
DAVINCI BALL CHECK VALVES

A swing check valve
Is mounted with a disc that swings on a hinge or shaft. The disc swings off the seat to allow forward flow and when the flow is stopped, the disc swings back onto the seat to block reverse flow. The weight of the disc and the return flow has an impact on the shut-off characteristics of the valve.

Swing check valves with lever and weight or lever and spring
Often a lever and weight or a lever and spring are mounted to achieve optimum performance. Swing check valves with lever and weight are appropriate for installations with an increased risk of water hammer at standard velocities. Swing check valves with lever and external spring are suitable for high pressure, insufficient back pressure and high flow velocities.

An important thing to be aware of when installing a swing check valve is, that it is not completely maintenance free since the disc needs to be cleaned once in a while. Furthermore, a lever is often mounted to enable visual check. Therefore, swing check valves are often installed where personnel is present.

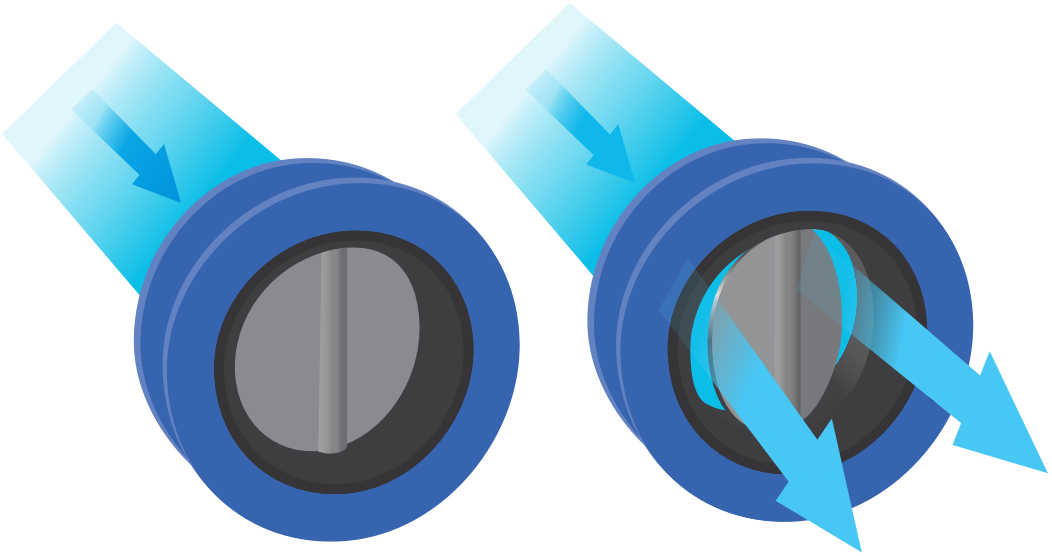
Swing check valves are designed with focus on easy access to maintenance. By unscrewing a few bolts the bonnet assembly including hinge and disc can be removed from the body, and maintenance can be performed.

Unique disc design
The light-weight disc of EPDM rubber with lip sealing and steel insert requires a minimum of force to open and close the valve. The disc is mounted in a nylon bushing, which allows it to move slightly both horisontally and vertically to close completely tight also in case of minor impurities in the seat. The seat is placed in a 20° angle providing tightness even at low backpressure. The hinge is made of acid-resistant stainless steel and is firmly tightened around the shaft with bolts to eliminate play and thus to ensure durability. Where limited space is available, the hinge can be placed in reverse position.

Avoid water hammer
When mounted with lever and weight, the swing check valves in small dimensions offer the possibility of priming by moving the lever manually. The weight is adjustable on the lever to achieve a soft closing against the seat as well as an optimum closing speed to prevent water hammer. A guard covering the lever and weight is available as an extra safety, as it eliminates the risk of injuries. The guard is available with limit switches for remote monitoring.

Main features summary for DAVINCI swing check valves

Bonnet/disc design gives easy access to maintenance
Disc with steel insert is fully vulcanized with EPDM rubber (up to DN 300) ensuring optimum sealing ability
Lip sealing on the disc ensures tightness
Light-weight disc requires a minimum of force to open and close the valve
The disc is able to move slightly both horisontally and vertically to close completely tight
Hinge tightened around the shaft with bolts to eliminate play and thus ensure durability
Full bore ensures low head loss
Ductile iron with epoxy coating in compliance with DIN 3476 part 1 and EN 1490



Tilting disc check valves

The tilting disc check valve is similar in appearance to an eccentric butterfly valve. The valve body is double-flanged and of a short length. The disc is held in place via a shaft which is positioned eccentrically from the body centreline in both the horizontal and vertical axes.

The double eccentricity of the shaft results in the lower section of the disc occupying a greater area in the flow path. Consequently, the disc begins to open at very low flow rates. The tilting disc check valve is therefore commonly used in pumping systems with low flow rates and also for pulsating flows.

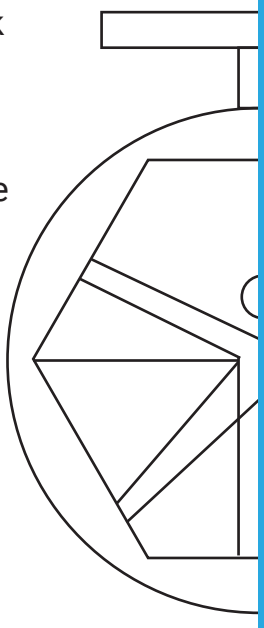
During flow reversal, the disc closes due to gravity and the upper part of the disc above the shaft centreline pushes against the flow thus acting as a hydraulic brake which cushions the disc as it returns to the closed position. Tilting disc valves can be supplied with optional levers and weights to adjust the closing characteristics of the valve. As such, the tilting disc check valves are well suited to reduce the risk of water hammers.

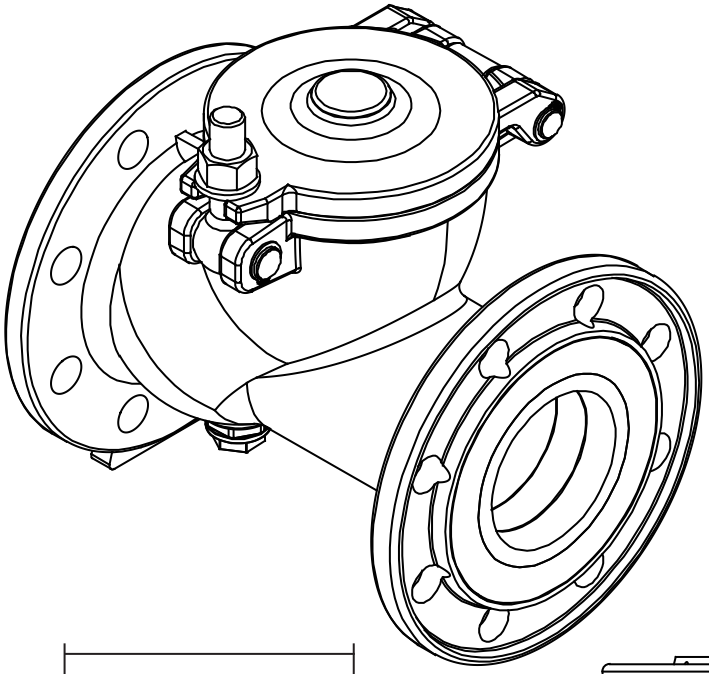
Because of the internal shafts which are within the flow stream, the tilting disc check valve is used for water and treated effluent applications.

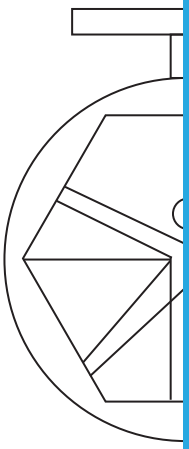
Tilting disc, slanted seat check valves

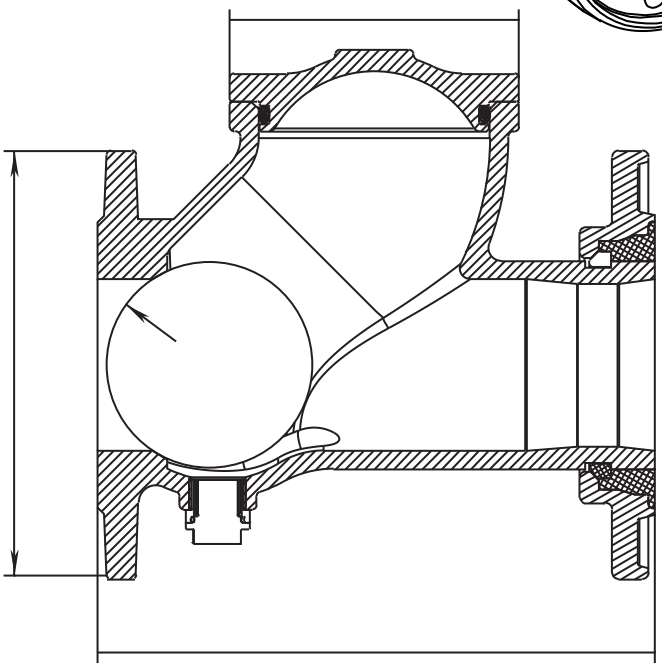
The slanted seat check valve offers enhanced resistance to water hammer. The valve has the double eccentric shaft position as well as an increased seating angle. This yields a shorter valve stroke, thus reducing the time taken for the door to close. The slanted seat check valve can be installed with an optional hydraulic damper which is located at the internal base of the valve body.

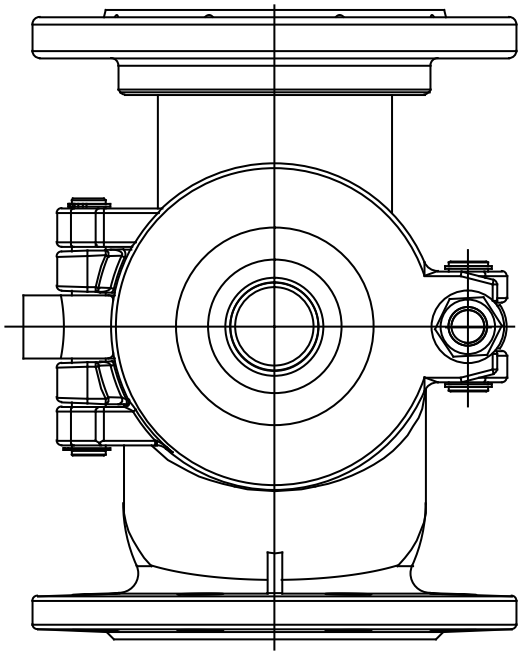
Hydraulic dampers are recommended, especially when the valves are installed on a pumping station where high frequency opening and closing of the valve is required. Under these conditions, the damper will greatly protect the valve from accelerated wear and tear of the internal moving parts. The slanted seat design also allows these valves to seal at lower back pressures.

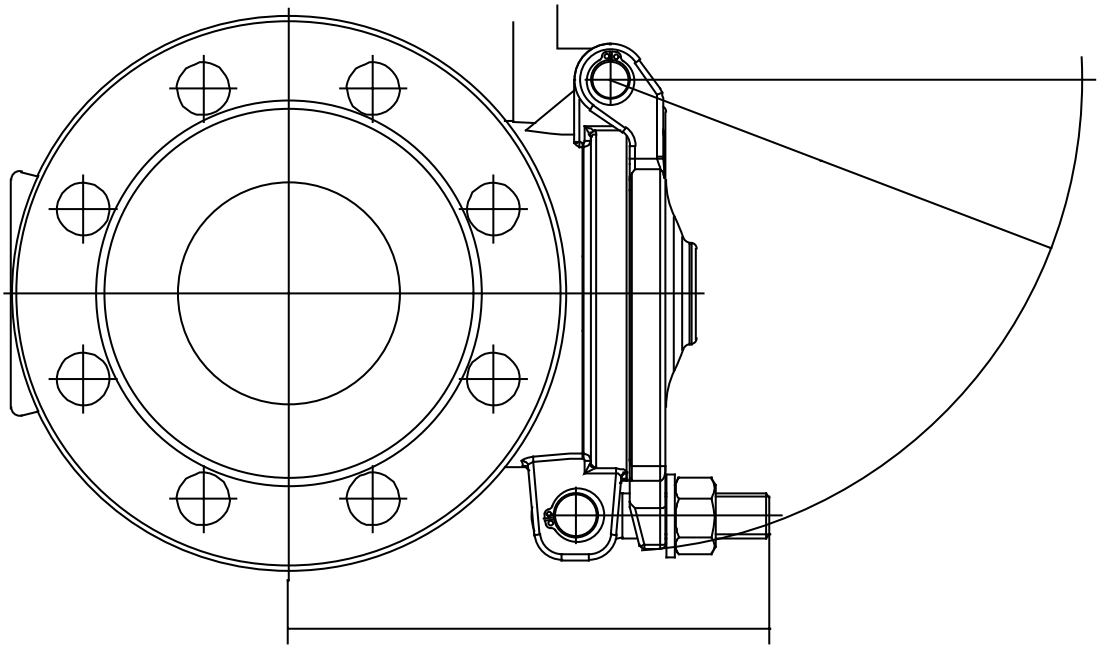












COMPONENTS

Major components of REGULAR CHECK VALVES

Body
The body geometry is designed as the result of stress calculations to achieve the most regular distribution of the internal forces dues to pressure action.
The body material is high quality cast steel. The seat surface is covered by a wear resistance stainless steel deposited by welding overlay with a hardness difference of +50 HB in comparison with the disk seats. On request the seat surface can be covered also with stellite or other special material overlays.

Cover
The cover is bolted type or pressure seal type for the higher pressures. The cover is produced with forged material similar to the body material.
Besides, the cover is designed and manufactured in order to ensure a perfect seal, as well as to allow an easy disassembly and reassembly work.

Disk
The disk is produced with forged material similar to the body material. A welding overlay of stainless steel material, with high hardness, is deposited on the contact surface. On request the disk can be provided with an overlay of stellite or other materials.
The disk - hinge joint is built to achieve a perfect tightness mean a self-positioning system. Also the normal wear is easily recovered by this system that guarantee a prolonged life of the valve with low maintenance costs.

Pin
The pin is produced only whit special turning machinery for a high resistance and durability. The pin is produced with a high finish degree and a strict diametrical clearance to reduce the wear at the minimum possible.

Gasket
The standard gasket is in pure graphite stainless steel reinforced. This type of gasket is suitable for many different applications. For special applications (cryogenic gases, high corrosion acids, etc.) we can supply special gaskets designed for the specific application or according to customer specifications. All swing check valves are provided by standard with chambered gasket.

Lever and counterweight
On request the swing check valve can be provided with lever with counterweight to balance the weight of the disk and make the closing more soft.
This optional device is suggested for diameters over 200 mm where the weight of the disk is relevant. Also in vertical installation the counterweight can reduce the adverse influence of gravity on the functioning of the swing check valve.
On request the counterweight can be adjustable to be easily adapted to the specific operating conditions.

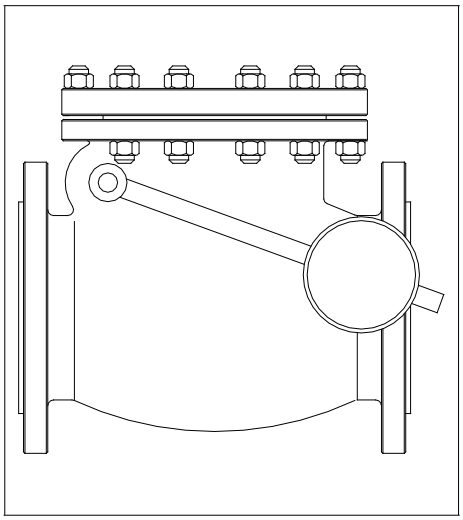
Hydraulic brake
Where the flow reversal is very quick the swing check valve shall be provided with a hydraulic brake connected to the lever. The brake, lengthening the time of closing to the selected value, avoids the risk that the swing check valve, due to the quick closing of the disk, can cause a water hammer in the pipeline.
Different types of brake are available depending on customer requirements.
All the brakes are provided by a pin valve to set-up the closing time to the required value.

Anti-shock device
When cause a quick closing of a valve or a quick stop of a pump or in any other situation where the pipeline can be subject to water hammers, the swing check valve must be provided with an anti-shock device.
The water hammers indeed can give rise strong impacts of the disk against the body seats. This fact generally cause several damaged to the swing check valves and vibrations propagating in the pipeline.
The anti-shock device avoids the impacts mean a spring that absorbs all the kinetic energy decelerating quickly the disk. The anti-shock devices are adjustable to be easily adapted to the specific operating conditions.

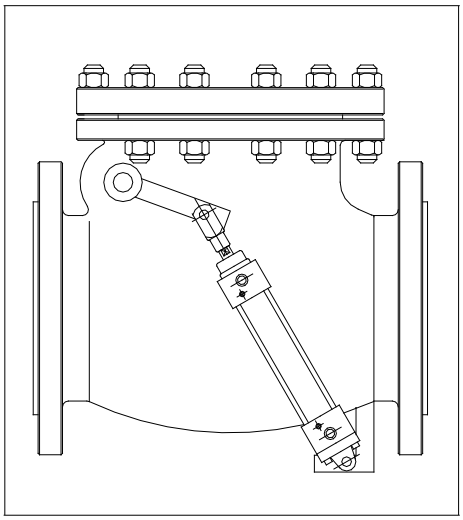
Important Advice
§ The swing check valves can't be used for media whom tend to produce high sedimentation or encrustation, as well as fluids containing foreign solids that, due to their hardness, present the risk of damage to the seat faces.
§ For larger sizes (over DN 200) and frequent opening and closing the lever and counterweight are required to reduce the wear of the components.
§ In case of quick flow reversal the swing check valve shall be always provided with lever and brake to avoid causing water hammers.
§ When they are possible water hammers caused by other devices, the swing check valve shall be provided with anti-shock device to avoid damages to the valve and to the pipeline.
§ When the swing check valve is provided with lever, appropriate devices shall be predisposed on the installation to avoid the risk of accident for the people due to rapid movement of the lever.

In DAVINCI VALVES we work to offer you a wide range of quality knife gate valves which will fit perfectly for all your project requirements and needs. Do not hesitate to contact us, to ask for all technical details.

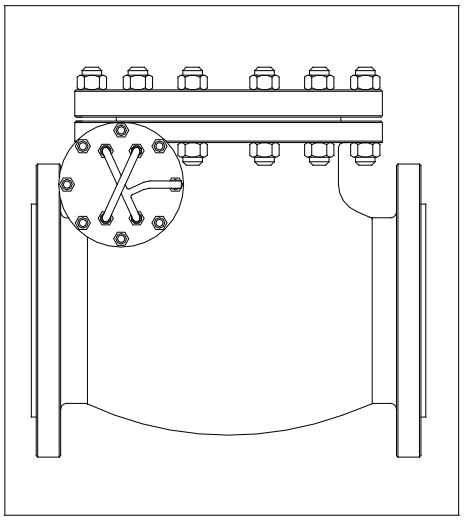
DAVINCI OPERATORS and Variety of Funcionalities



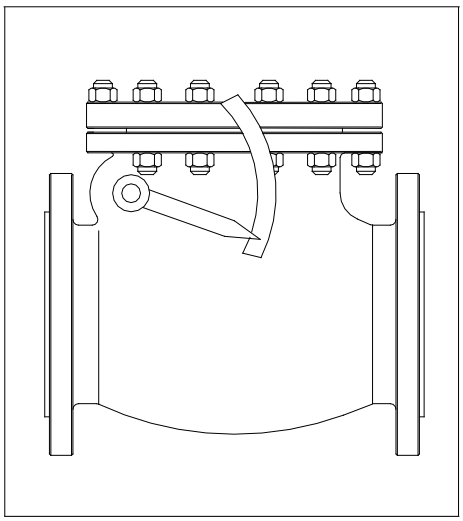
Lever and counterweight



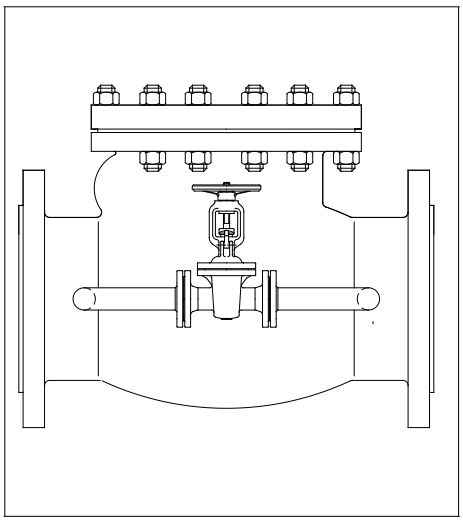
Hydraulic linear brake



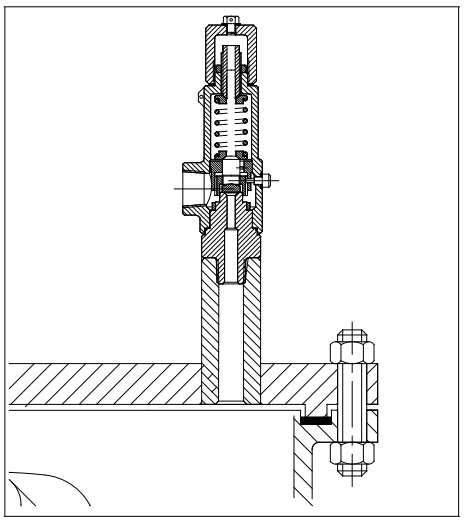
Hydraulic rotative brake



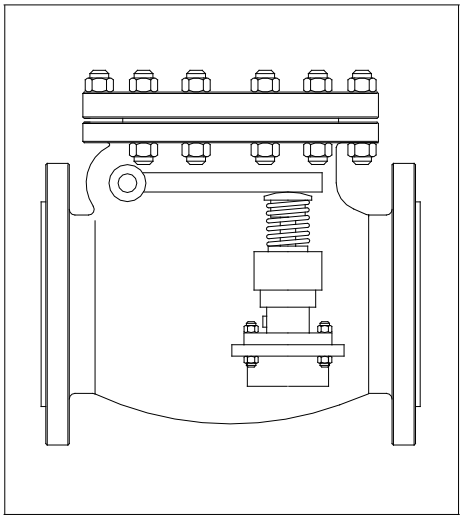
Position indicator



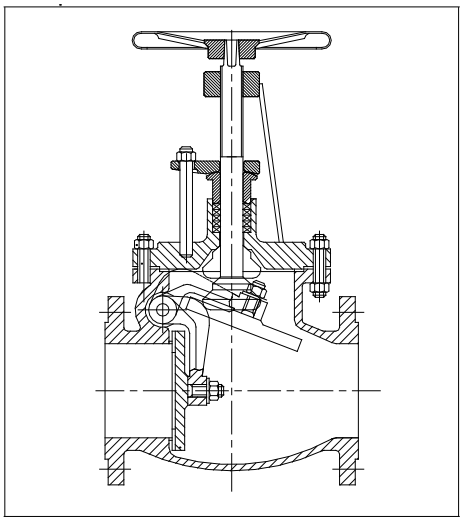
By pass



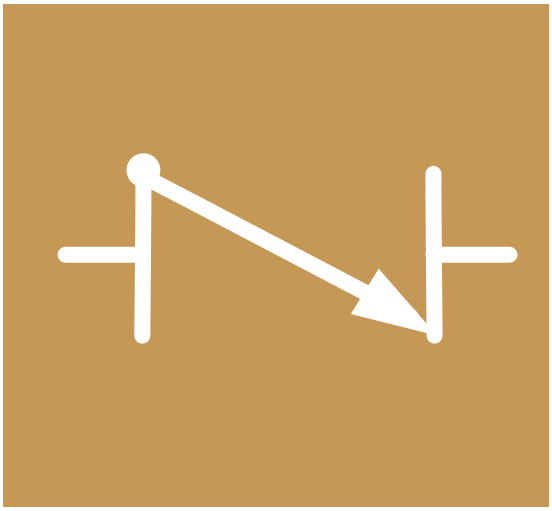
Pressure relief valve



Anti-shock device



Stop device



And others can all be supplied to the basic DAVINCI CHECK VALVES upon request.

DAVINCI VALVES™

QUALITY THAT SATISFIES

APPLICATIONS

Where are check valves used?

In proyects where its necessary:
- Protect drinking water from contamination by backflow resulting from gravity, back siphonage or backpressure.
- Protect sensitive equipment against possible damage or contamination resulting from a reversal of flow direction (e.g. water meter, pump or filter).
- Hold water in a system or pipe after the flow has been turned off to prevent drainage or facilitate restart (e.g. pumping systems).
- Prevent crossover flow in systems with unequal line pressures (e.g. cold and hot water inlets in thermostatic mixers).
- Reduce the risk of backflow or leakage in case of valve failure (e.g. solenoid valve at the inlet of an appliance).
- Allow complex systems to function properly by ensuring unidirectional flow (e.g. multi-zone heating system or booster pumps).

The most common applications of Check valves

1. Water
2. Wastewater
3. Chemical Industry
4. Steel Industry
5. Power Solutions
6. Industrial processes
7. Fire systems

Advantages/disadvantages of check valves

The primary advantage of a check valve is they prevent reverse flow while typically requiring no external actuation. They also provide a fast-acting solution to preventing backflow. Some disadvantages include the inability to determine the condition of the valve and its status, limitation(s) on its installation configurations, and the possibility of sticking in the open position (not often a problem associated with ball and piston types).

How do you choose the right check valve?

There are several factors to consider when deciding on a check valve for your needs:

Material Selection:
Material used for valve construction must stand up to piping system and media demands associated with the specific type of gas or liquid flowing through the piping system.

Performance Requirements:
Performance considerations include the capability of the valve to handle various temperature and pressure instances.
Type and Size: Selection of the right check valve includes control considerations, typically related to increased safety in hazardous applications as well as sizing the valve to properly accommodate the piping system's flow conditions.

Maintenance:
In addition to considering the frequency of maintenance or replacement, operators must also think about the valve's resistance to clogging, jamming, or otherwise malfunctioning.

Special Requirements:
Check valve selection also includes several special requirements unique to their function, including response time, cracking pressure, normally closed vs. normally open, vertical vs. horizontal mounting, flow direction (upward or downward) and fluid density.

How do you prevent check valves from failing?
One of the disadvantages of check valves is the difficulty of determining the condition of the enclosed valve. Consequently, there are certain measures necessary for recognizing their failure and preventing it. Several indicators that signal failure or potential failure include valve vibration (chattering), measured reverse flow, excessive component wear, audible indications of leakage (water hammer), and leaking.

You can prevent failure by:
Proper sizing
Routine inspections for cleanliness
Proper installation
Replacing valves as needed

DAVINCI VALVES™

QUALITY THAT SATISFIES

MANUFACTURE

In DAVINCI VALVES we manufacture the best quality check valves and our manufacture programm includes our technical service through all the different steps necessary to get your product just the way you need.

1

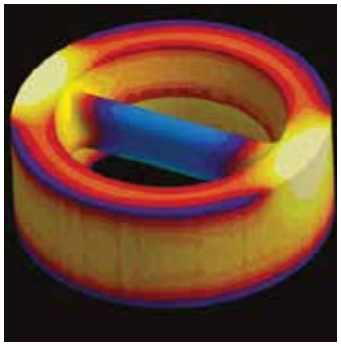
RAW MATERIAL

2a

FOUNDRY 1.

2b

FOUNDRY 2.



3a

MOULDING

3b

MECANIZE

3c

MECANIZE

4

PAINTING

5

ASSEMBLY 1.

7a

ASSEMBLY 2.

7b

TESTING 1.

7c

TESTING 2.

8

PACKING

"Quality that satisfies"

CHECK VALVES

Ref. 400C

STANDARDS:

BALL CHECK VALVE FLANGED END
Material construction in Ductile Iron GJS500.
Working pressure 1.0Mpa 1.6Mpa
Face to face DIN 3202 F-6.
Epoxy paint FBE Min 250 Mic

Ref. 400C-1

STANDARDS:

BALL CHECK VALVE THREADED END
Material construction in Ductile Iron GJS500
Ball with metalic core vulcanize with NBR
Working pressure 1.0Mpa
Threaded ends DIN 259 (GAS/NPT)
Epoxy paint FBE Min 250 Mic

Ref. 420

STANDARDS:

DUAL PLATE WAFER CHECK VALVE
Construction in cast iron GJL250.
Plates in Ductil Iron and S.steel AISI316 (CF8M)
Wafer type to mount between flanged ends NP10/16
Working pressure 1.0Mpa 1.6Mpa
Face to face EN 558-1 Serie 16
Epoxy paint FBE Min 250 Mic

Ref. 420-1

STANDARDS:

SINGLE PLATE WAFER CHECK VALVE
Construction in SS316L
Plates in SS316L
Wafer type to mount between flanged ends NP10/16
Working pressure 1.0Mpa 1.6Mpa
Epoxy paint FBE Min 250 Mic

CHECK VALVES

Ref. 410

STANDARDS:

SWING CHECK VALVE SOFT SEAT FLANGED END
Material construction in Ductile Iron GJS450
Seat Metal to Metal Brass
Working pressure 1.0Mpa 1.6Mpa
Face to face DIN 3202 F6
Epoxy paint FBE Min 250 Mic

Ref. 410

STANDARDS:

SWING CHECK VALVE METAL SEAT FLANGED END
Construction ductile iron GJS450 NP10/16 / carbon steel WCB >=NP25
Seat Metal to Metal Brass
Working pressure 1.0Mpa 1.6Mpa 2.5Mpa 4.0Mpa
Face to face DIN 3202 F6
Optional lever&weight and hydraulic Dumper
Epoxy paint FBE Min 250 Mic

Ref. 410A

STANDARDS:

BALL CHECK VALVE FLANGED END
Material construction in Ductile Iron GJS500.
Working pressure 1.0Mpa 1.6Mpa
Face to face DIN 3202 F-6.
Epoxy paint FBE Min 250 Mic

Ref. 831A

STANDARDS:

TILTING BUTTERFLY CHECK VALVE
Material construction in ductile iron GJS450
Working pressure 1.0Mpa 1.6Mpa 2.5Mpa 4.0Mpa
Face to face DIN 3202 F-4/BS5155
Optional lever&weight and hydraulic Dumper
Epoxy paint FBE Min 250 Mic

CHECK VALVES

Ref. 410

STANDARDS:

NOZZLE CHECK VALVE
Material construction in Ductile Iron GJS500
Obturator EPDM
Working pressure 1.0Mpa 1.6Mpa 2.5Mpa
Epoxy paint FBE Min 250 Mic
Face to face According to DIN 3202 F4

Ref. 460C

STANDARDS:

FOOT CHECK VALVE
Material construction in Ductile Iron GJS500
Obturator EPDM
Working pressure 1.0Mpa 1.6Mpa 2.5Mpa
Epoxy paint FBE Min 250 Mic
Face to face According to DIN 3202 F4

Ref. 411

STANDARDS:

SWING CHECK VALVE FLANGED END 300PSI
UL-FM FOR FIRE SYSTEMS
Construction ductile iron GJS450
Design according to AWWA C508.
Max working pressure 300 PSI
Flanged ends ASME/ANSI B 16.1 Class 125
or ASME/ANSI B 16.42Class 150

Ref. 412

STANDARDS:

SWING CHECK VALVE GROOVED END 350PSI
UL FOR FIRE SYSTEMS
Construction ductile iron GJS450
Design according to AWWA C508.
Max working pressure 300 PSI
Flanged ends ASME/ANSI B 16.1 Class 125
or ASME/ANSI B 16.42Class 150

CHECK VALVES

Ref. 470

STANDARDS:

FLAP VALVE
Material construction in Ductile Iron GJS500
Obturator Ductile Iron GJS500
Working pressure 1.0Mpa 1.6Mpa
Epoxy paint FBE Min 250 Mic

Ref. 430

STANDARDS:

3-PC ESRING DISC CHECK VALVE
Material construction in SS316
Obturator SS316
Working pressure 1000WOG
Thread end GAS/NPT

Ref. 431

STANDARDS:

2-PC ESRING DISC CHECK VALVE
Material construction in SS316
Obturator SS316
Working pressure 1000WOG
Thread end GAS/NPT

Ref. 413

STANDARDS:

SWING CHECK VALVE THREAD END
Material construction in SS316
Obturator SS316
Working pressure PN16
Thread end GAS/NPT

Ref. 432

STANDARDS:

Y - CHECK VALVE THREAD END
Material construction in SS316
Obturator SS316
Working pressure PN16
Thread end GAS/NPT

TESTING

DAVINCI VALVES™
QUALITY ASSUREMENT

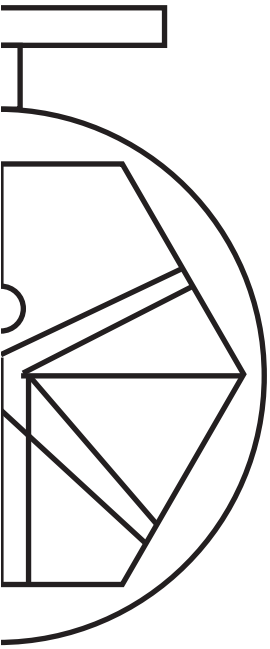
DAVINCI VALVES™
PRODUCT QT ASSUREMENT

DAVINCI VALVES™
COMPANY QT ASSUREMENT

If you need specific certification for the different types of tests that verify the measurements, the quantities, the weights, in addition to the tests that check both, the components and the final product, this is the absolute guarantee service of DAVINCI VALVES LTD, through which it is ensured that the order sent to you is the one actually contracted.

The consumption of time, resources and efforts in the import process is overwhelming due to the complexity it requires and it is highly recommended to be advised by experts in this field. Avoiding possible delays and unnecessary complications you will have enough room to dedicate your time to matters of greater importance in your company. In DAVINCI VALVES LTD we offer you a personalized service adapted to your requiremets.

While the import process lasts, you will know the status of your goods with all detailed information.



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