

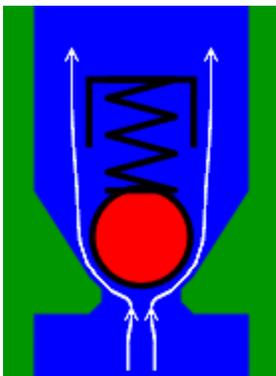
CHECK VALVE

A check valve is a type of valve which normally allows fluid (liquid or gas) to flow through it in one direction but not the opposite 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. Check valves are often part of common household items. Although they are available in a wide range of sizes and costs, many check valves are very small, simple, and/or cheap. 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, and some alloy check valves are made of exotic materials, such as nickel-copper alloys or titanium.

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

Because of the force of gravity on the disc, various types of check valves need to be placed horizontally in an upright position to work properly, especially swing and lift check valves which are not spring loaded. Ball valves, particularly very small ones, are often less susceptible to this problem. Spring loading may work against the force of gravity, forcing the disc against the seat to help keep the valve shut in other orientations. The drawback is that there can be more resistance to forward flow.

Different types



An open ball check valve. White lines with arrowheads show direction of fluid flow through the valve around the unseated ball.

A Ball check valve is a check valve in which the disc, the movable part to block the flow, is a spherical ball. In many ball check valves, the ball is spring-loaded to stay shut, but also many do not have a

spring inside. The interior surface of the seats of ball check valves are more or less conically-tapered to guide the ball into the seat and/or form a positive seal when stopping reverse flow.

Ball check valves are often very small, simple, and cheap (although some are expensive). They are commonly used in liquid or gel mini-pump dispenser spigots, spray devices, some rubber bulbs for pumping air, etc., manual air pumps and some other pumps, and refillable dispensing syringes. Although the balls are most often made of metal, they can be made of other materials, or in some specialized cases out of artificial ruby. High pressure HPLC pumps and similar applications commonly use small inlet and outlet ball check valves with balls made of artificial ruby and seats made of artificial sapphire, both for hardness and chemical resistance. After prolonged use, such check valves can eventually wear out or the seat can develop a crack, requiring replacement. Therefore, such valves are made to be replaceable, sometimes placed in a small plastic body tightly-fitted inside a metal fitting which can withstand high pressure and which is screwed into the pump head.

There are similar check valves where the disc is not a ball, but some other shape. Ball check valves should not be confused with ball valves, which are different types of valves in which a ball acts as a controllable rotor to stop or direct flow.

There are check valves where the pressure on the upstream side must be greater than the pressure on the downstream side by a certain amount, the pressure differential, for the check valve to open allowing flow.

A swing check valve is a check valve in which the disc, the movable part to block the flow, swings on a hinge or trunnion, either onto the seat to block reverse flow or off the seat to allow forward flow. The seat opening cross-section may be perpendicular to the centerline between the two ports or at an angle. Although swing check valves can come in various sizes, large check valves are often swing check valves.

Swing check valves may be of flap type or butterfly type.

In a flap type check valve, the disc swings on a hinge along its top.

In a butterfly type check valve, the disc swings on a lateral trunnion closer to its center, but still slightly above center.

At the suction end of centrifugal pumps used as an independent unit (as compared to more than one pump connected to run in parallel) below fluid level a non return valve of plunger type is provided called the foot valve. This also allows one way flow only and can be classified as non return valve.



this siamese clapper inlet allows one or two inputs into a deluge gun.

A clapper valve is a type of check valve used in or with firefighting[[1]] , and has a hinged gate (often with a spring urging it shut) that will only remain open in the outflowing direction.

A lift-check valve is a check valve in which the disc, sometimes called a lift, can be lifted up off its seat by higher pressure of inlet or upstream fluid to allow flow to the outlet or downstream side. A guide keeps motion of the disc on a vertical line, so the valve can later reseat properly. When the pressure is no longer higher, gravity or higher downstream pressure will cause the disc to lower onto its seat, shutting the valve to stop reverse flow.

A stop-check valve is a check valve with override control to stop flow regardless of flow direction or pressure. When the valve is open, it acts as a check valve, but the valve can be deliberately shut to stop flow.

A double check valve [[2]] is often used as a backflow prevention device to keep potentially contaminated water [[3]] from siphoning back into municipal water supply lines.

There are also double ball check valves in which there are two ball/seat combinations sequentially in the same body to ensure positive leak-tight shutoff when blocking reverse flow.

In electronics however, a diode functions as a check valve but not for water or fluids but for current flow.

Uses

Check valves are used in plumbing and many fluid systems such as those in chemical, and power plants, and in many other industrial processes.

A common type of check valve found in plumbing in general practice and fluid systems in plants is the flap type. This can be seen generally in pump sets used in buildings or in agricultural forms. As foot valves the plunger type check valve is also very common at suction of water pumps in buildings. It is also common in construction and sewage works.

In industries using big diameter water pipe lines, such as utility Thermal power stations, butterfly type is used. In steam lines however due to small size pipes involved, flap type valves are generally

common. (These steam line valves are generally controlled automatically with external operating mechanism. The big water pipe line valves are generally controlled locally by mechanical means external to the valve).

Check valves are often used with some types of pumps. Piston-driven and diaphragm pumps such as metering pumps and pumps for chromatography commonly use inlet and outlet ball check valves. These valves often look like small cylinders attached to the pump head on the inlet and outlet lines. Many similar pump-like mechanisms for moving volumes of fluids around use check valves such as ball check valves.

Check valves are also often used when multiple gases are mixed into one gas stream. A check valve is installed on each of the individual gas streams to prevent mixing of the gases in the original source. For example, if a fuel and an oxidizer are to be mixed, then check valves will normally be used on both the fuel and oxidizer sources to ensure that the original gas cylinders remain pure and therefore nonflammable.

Some types of irrigation sprinkler [[4]]s and drip irrigation[[5]] emitters have small check valves built into them to keep the lines from draining when the system is shut off.

Source : http://engineering.wikia.com/wiki/Check_valve