



# SPRING CHECK VALVES

## Literature



### Introduction:



Figure 1 Spring Check Valves

Check valve requires a pressure differential to function properly and flow moves from high pressure to low pressure. Therefore, the high pressure on the inlet side when higher than the cracking pressure will allow flow to move through the check valve by overcoming the spring strength. They are simple to understand and install due to their reliability and durability.

It comes with two types of sealing and there are metal seats and soft seats.

- Soft seats are generally made of thermoplastic material such as Viton or PTFE. They are great for applications where chemical compatibility is important for tight sealing. It helps to achieve a high level of sealing performance. However, soft seats are not recommended for process fluids that are dirty or abrasive as the seal can break down in these conditions and cause valve leakage.
- Metal seats valves are able to withstand high temperatures, working pressure and severe service conditions. A metal seat endures severe flashing, abrasive process fluid, hydraulic shock and high temperature up to 537°C (1,000°F). They are applicable in high erosion or corrosion applications. However, it is easy to leak as it provides relatively poor sealing performance in between metal to metal.

### Cracking pressure:

Cracking pressure is the minimum upstream inlet pressure where a normally closed check valve requires it to open and fluid starts to flow through. When the inlet pressure meets the cracking pressure, the spring inside the valve will open to allow flow of the body in one direction and block the reverse flow direction. The standard cracking pressure is either 0.5, 1.0 or 2.0 bars and the manufacturer can customize it during production. The different cracking pressure can be customized upon request. Technical specifications for spring check valves are:

- Material for chemical compatibility
- Minimum cracking pressure
- How quickly the check valve closes
- End connection options
- Pressure drop across the valve when it is completely open

The spring forces the disc to close the orifice when the inlet pressure drops below the cracking pressure. The only drawback is if the valve needs to be inspected or undergo maintenance and repairs, the valve needs to be completely removed from the pipeline for the procedures to be conducted.

## Installation:

Spring check valves can be installed in horizontal or vertical position in the pipeline with condition that the flow is running upwards. Upon installing the check valve, a label of flow direction that allows the valve to perform can be found stamped on the valve body. The flow arrow is labelled on the body to make sure the valve is installed correctly in position.



Figure 2 CF8M Spring Check Valve

Mounting for vertical installation is critical. Check valves are frequently used as a great solution to prevent back flow that causes damage to equipment. The main selection criteria to consider are as per below:

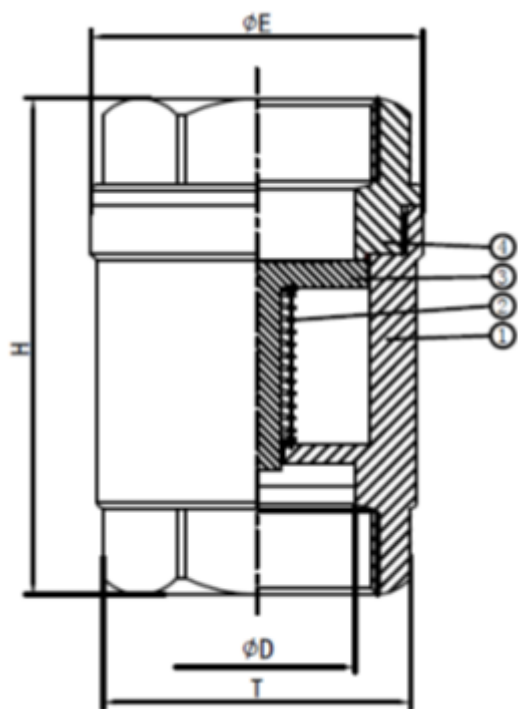
- 1) Design type: Determine the media and application.
- 2) Connection: Ensure the valve connection has a good sealing upon installation.
- 3) Size: Size determines the pressure and flow rate that the valve can handle. Therefore, select the correct size to increase system efficiency.
- 4) Material: Ensure the material does not contaminate the media and it can withstand the media characteristics.

## Differences between a spring check valve and a swing check valve:

Both valves function in the same way to ensure one flow direction with no reserve flow. Swing check valve operates with a disc and the spring check valve operates with a spring. The swing check valve has a disc inside that covers the opening of the valve. The disc is attached to a hinge, so that it can swing open or close when fluid hits the disc.

The spring stays close when there is no flow in the correct direction. It is easy to get the swing and spring check valve confused and it comes with different purposes. Both valve bodies have an arrow sign to show the flow direction as it is the most important thing when using a check valve. Swing check valves are forced close by backflow and while spring check valves are closed by default. The default standard for spring check valves is that it requires cracking pressure to push the spring and allow fluid through the valve.

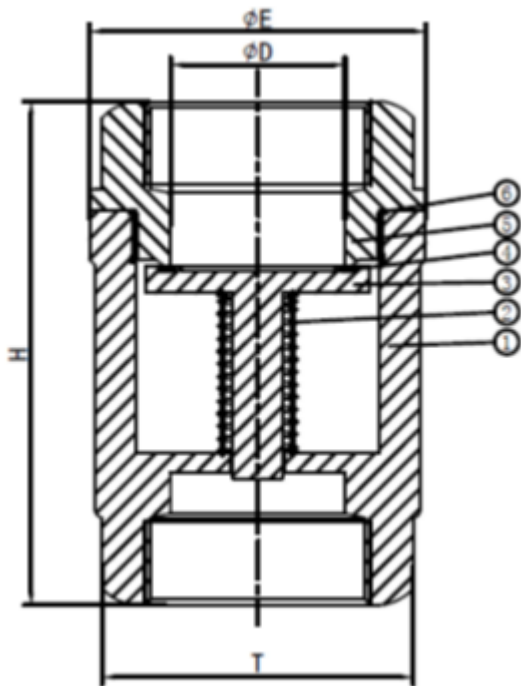
**Spring Check Valve Metal Seat Drawing:**



**Material:**

No	Part Name	Material
1	Body	SS316, CF8M
2	Spring	SS316
3	Disc	SS316, CF8M
4	Cap	SS316, CF8M

**Spring Check Valve with Viton Seat Drawing:**



**Material:**

No.	Part Name	Material
1	Body	SS316, CF8M
2	Spring	SS316
3	Disc	SS316, CF8M
4	Seat Ring -(O-Ring)	VITON
5	Cap	SS316, CF8M
6	Seal Gasket	PTFE

## **Chuan Kok Hardware & Machinery Pte Ltd**

Address : 1783 Geylang Bahru, #01-02, Singapore 339708  
Telephone Number : +65 6294 2566  
Email Address : [info@chuankok.com](mailto:info@chuankok.com)  
Website : [www.chuankok.com](http://www.chuankok.com)  
Business Registration Number : 198201577Z  
Country of Registration : Singapore

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