CHECK VALVE SELECTION

Check valve cracking pressure vs. pressure drop

A water branch can develop 2 psi across its check valve when the pump starts. The spring is marked 1/3 psi. It sounds like plenty of margin until you read what the nominal number represents.

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BMT SUPERLOK

SHCV series

Spring-loaded check valves

SHCV product family, manufacturer's photograph, p. 4.

AVAILABLE AT START

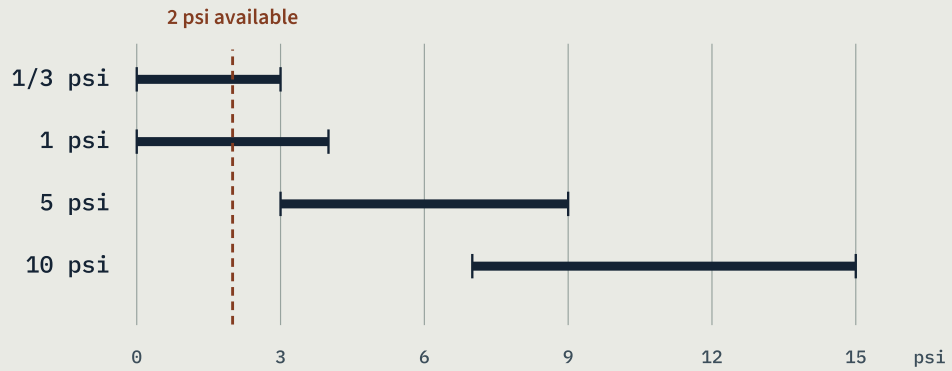
2 psi

Cracking pressure describes the first detectable forward flow. Pressure drop at the specified flow and the differential needed to reseal are separate requirements. For the BMT SHCV 1/3 psi spring, the published cracking range extends to 3 psi.

READING THE SPRING DATA

A nominal spring value has a range

A check valve responds to differential pressure. Before the poppet lifts, compare inlet pressure with outlet pressure at the valve. As flow increases, the opening and hydraulic losses change. A system's operating pressure tells you little about whether enough differential exists at the valve.



Selected SHCV spring ranges from BMT's table at approximately 20 °C. The vertical line is the example start-up differential. BMT source.

BMT lists a maximum Cv of 1.8 for SHCV2 with 12 mm tube ends. This describes capacity at the stated maximum opening. Near first lift the effective opening is smaller. A calculation made with maximum Cv can understate the loss at low lift.

Three different questions to put to the data

Condition	Data to read	Decision
First forward flow	Cracking range of the spring	Will the least favourable unit open?
At target flow	Flow versus Δp for that valve and spring	Can the line deliver its duty?
Flow falls or reverses	Reseal value and pressure direction	Can the element return to its seat?

BMT SHCV specifications, pp. 4–5

WORKED SELECTION

A 2 psi start-up margin on a water branch

At start-up, gauges at the valve ports read 20 and 18 psig. Their difference is 2 psi. For an SHCV2 with a nominal 1/3 psi spring (code 0.3P), BMT gives a cracking range of 0–3 psi. With forward differential defined as inlet minus outlet, the available value is +2 psi. The upper cracking value is +3 psi. That leaves a 1 psi shortfall against the upper limit before any flow-capacity calculation.

Then check the required flow

Suppose the branch must pass 4 L/min. Establish the pressure available at that flow after the losses in the rest of the branch. Obtain a flow-versus-differential curve or test point for the selected SHCV size, spring and fluid. The spring marking alone gives no flow rate.

When the pump stops

For the same spring, BMT lists 6 psi back pressure in the minimum reseal column at the reference condition. With the same sign convention, 6 psi of downstream backpressure is −6 psi differential. Check the available reverse differential and the required seat leakage criterion. The table entry is a published test condition, not an exact switching point for every valve. Record which side is higher for both opening and reseal.

Is cracking pressure the valve's pressure rating?

No. The body rating concerns pressure containment under specified conditions. Cracking and resealing describe how the moving element responds to pressure difference. Verify all three against the actual duty.

SHCV 0.3P in the worked example

Available to open	Upper crack value	Listed reseal
2 psi forward	3 psi forward	6 psi reverse

Technical references

BMT SUPERLOK · SHCV spring ranges and reseal, p. 4
BMT SUPERLOK · SHCV2 end connections, maximum Cv and ordering, p. 5

View SHCV2-S12M-0.3P in the parts catalogue