

# Axial Flow Check Valves for Pumps and Compressors



# Pumps and Compressors Overview

Pumps and compressors are essential devices used in a wide range of industrial plants and buildings. They are the power source that make it possible to transport fluids in a system from one location to another with high levels of efficiency. The pharmaceutical, food and beverage, petrochemical, power generation, and specialty chemical industries rely on this equipment daily to keep fluids and gases flowing between processes in a seamless and uninterrupted manner.

Both pumps and compressors can vary widely in terms of size and output, largely depending on the gas or fluid being pumped and the

power required by the specific application. They can range from small portable units for domestic use, to large-scale industrial equipment capable of supporting whole facility systems. Several pumping or compressor stations can be positioned at predetermined intervals to maintain consistent flow rates and system pressures when transporting of fluids or gasses across vast distances.

Regardless of whether you use pumps or compressors, both are critical power sources and they are a significant investment in your fluid flow systems.



# Axial Flow Check Valves for Pumps and Compressors

## Why Use Axial Flow Check Valves?

Check valves are vital protection to pumps and compressors, ensuring safe and effective operation by allowing flow in one direction while preventing flow in the opposite direction (reverse flow). This protection is crucial since backward flow in pumps and compressors can result in damage to the equipment.

- Quick Closing
- Tight Shut-off
- Prevents Reverse Flow
- Non-Slam
- Can be used in Vertical or Horizontal Orientation
- Long Service Life



For instance, reverse flow can cause pump impellers to spin in the opposite direction, which can cause them to become unthreaded. Other issues associated with reverse flow include impeller galling, casing damage, and accelerated wear of thrust bearings and mechanical seals.

The damage caused by reverse flows into pumps and compressors can cost hundreds of thousands of dollars and lead to inconvenient downtimes and reduced productivity. It is essential that proper check valves are purchased from a reliable manufacturer to ensure that they are durable and reliable enough to operate effectively in the specific application.



*An oilseed processing facility was having check valve slamming issues with their double door check valves installed on the discharge of two cooling water pumps, dumping into a common header. Their valves needed replacement every 6 months.*

*The slamming issue was resolved when the problematic valves were replaced with DFT® Axial Flow model ALC® 14" #150 on pump discharge, with vertical up flow.*

# Differences between Pumps and Compressors

Although these terms are sometimes used interchangeably, there are distinct differences between pumps and compressors.

## Pumps

A pump is a machine that moves a fluid (normally a liquid) from one point to another via some type of mechanical action. A pumping mechanism (either centrifugal or reciprocating) imparts energy to the fluid, thereby forcing it through the pump outlet. Pumps are typically used to transport liquids over predetermined distances at specified pressures.

The overall distance and volumetric requirements of the fluid will determine the output required by the pump, which will in turn dictate the size and power requirements during the pump selection process. In sectors such as the water/wastewater and petrochemical industries, where millions of gallons of liquids are pumped and processed on a daily basis, the durability and reliability of pumping systems are of utmost importance.



## Compressors

A compressor, on the other hand, is only capable of transporting gases. Compressors work by ‘squeezing’ the gas into a smaller volume, causing it to store potential energy to be used when needed. Compressors are frequently used to generate compressed air—often referred to as “the fourth utility.”

Compressors, however, cannot be used with liquids due to the incompressible nature of most liquids. In both pumps and compressors, proper and well-maintained parts and components are crucial to preventing damage, contamination, and overall system failure.



# Common Problems with Pumps and Compressors

## Common Problems with Pumps

One of the most common problems with pumps is their demanding spatial requirements. Because pumps tend to generate a lot of noise during operation, they are usually put in special rooms. However, these rooms are often not suitably sized, resulting in a tight fit with limited space for valves, fittings, and piping. Best practices dictate that there must be a distance of five-to-10 pipe diameters between the pump inlet and the valve.

However, due to the limited space in many pump rooms, this recommended distance is rarely achieved in practice. Valves and other obstructions placed too close to the pump inlet can cause turbulent flow which puts additional stress on valves and pipe fixtures. Additionally, in multiple pump systems that share a common header, the sudden cessation of one pump can result in water hammering in the piping system.



## Common Problems with Compressors

Compressors - especially reciprocating compressors - can generate pressure pulsation in the system. Pulsation occurs due to the intermittent drops in pressure between the upstroke and downstroke of the reciprocating motion. This results in shaking or vibration within the system

(similar to hammering) which can cause accelerated wear on the valves, piping, and fittings. Wear of compressor components can ultimately lead to gas leakage and subsequent reduction in output pressures through the piping system.

# The Axial Flow Check Valve Solution

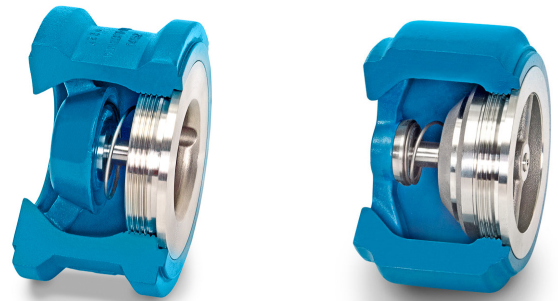
## DFT® Axial Flow Check Valves offer Numerous Advantages over Conventional Swing and Double Door Check Valves Including:

- Rapid closing action to prevent water hammering
- Durable construction
- Increased valve longevity
- Ability to accommodate low-pressure drops and high flow capacities
- Non-slam opening and closing action
- Tight shut-off/zero leakage
- Various end-to-end options
- Can be used in horizontal or vertical orientation
- Custom sizing to your application

## Check Valves for Pumps

In the case of pumps, a valve solution is needed where the pump can perform effectively while occupying as little space as possible. This is even more crucial in vertical (up-and-down) flows where every millimeter of space is valuable. Axial flow check valves are ideal since they occupy less space than manual valves and other types of conventional check valves.

The spring-assisted mechanism also ensures that the valve closes well before the flow reversal, reducing the possibility of water hammering. The durable design of the axial check valve consists of no swinging parts and hinges, reducing wear on components and increasing valve longevity.



*DFT model ALC® and WLC® Wafer Style Axial Flow Check Valve are a direct replacement for failing double doors.*

Axial flow check valves also offer the advantage of being able to be installed in either vertical or horizontal runs of piping.

SCV®	Basic Check®	GLC®	Excalibur®	DLC®	ALC®	WLC®	TLW®
½" to 3"	¼" to 2 ½"	1" to 30"	1" to 24"	½" to 3"	2" to 24"	1" to 10"	2" to 24"
NPT	NPT	Flange	Flange or Butt Weld	Flange	Wafer	Wafer	Wafer Tapped Lug
750 to 3600 CWP	450 to 6000 CWP	150 to 2500 Class	150 to 1500 Class	150 to 2500 Class	150 to 300 Class	150 to 2500 Class	150 to 2500 Class

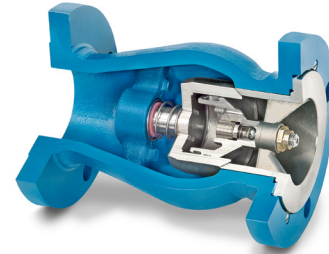
For more information on our full line of check valves visit our online catalog at [dft-valves.com](http://dft-valves.com)

# The Axial Flow Check Valve Solution

## Check Valves for Compressors

### PDC® - Natural Gas Transmission - Reciprocal

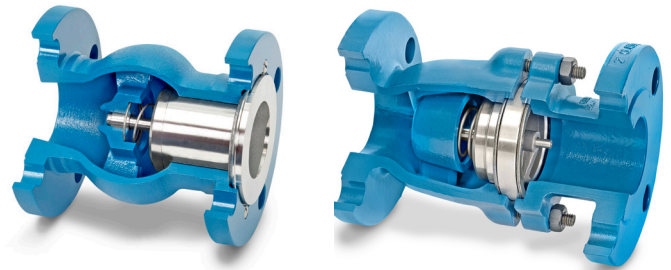
The PDC® model of DFT's check valves are designed specifically for reciprocating pumps and compressors. It contains a pulse dampening chamber which helps maintain the open disc position during intermediate pressure drops (pressure pulses) due to the reciprocating action of the pump. The PDC® model is available in sizes up to 26" line size, class 1500.



*DFT® model PDC® Axial Flow Check Valve for use with reciprocating compressors*

### Excalibur® and GLC® - Centrifugal Water, Steam, and Gas

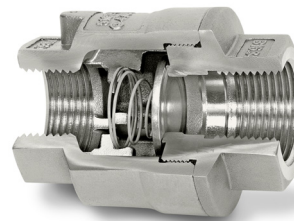
These silent, spring-assisted, in-line check valves provide superior reliability and reduced maintenance over the life of the valve. They are available in a wide variety of sizes and pressure ratings and are ideal for line sizes over 2" in diameter. The Excalibur® is a direct replacement for B16.10 swing check valves.



*DFT® model GLC® and Excalibur® Axial Flow Check Valve for use with water, steam or gas compressors*

### SCV® - Small Compressors

The SCV® check valves are stainless steel, corrosion resistant, and highly durable in-line check valves for a broad range of applications. The tight shut-off mechanism is effective in achieving highly reliable tight shutoff, with options for soft seats that will provide zero leakage. These check valves are suitable for a maximum 3" NPS pipeline size.



*DFT® model SCV® Axial Flow Check Valve for use in water, steam, or gas*

SCV®	PDC® *	GLC®	Excalibur®	DLC®	ALC®	WLC®	TLW®
½" to 3"	2" to 26"	1" to 30"	1" to 24"	½" to 3"	2" to 24"	1" to 10"	2" to 24"
NPT	Flange	Flange	Flange or Butt Weld	Flange	Wafer	Wafer	Wafer Tapped Lug
750 to 3600 CWP	150 to 1500 Class	150 to 2500 Class	150 to 1500 Class	150 to 2500 Class	150 to 300 Class	150 to 2500 Class	150 to 2500 Class

*\*The model PDC® is for use on reciprocating compressors only.*

View DFT's full line of check valves by visiting our online catalog at [dft-valves.com](http://dft-valves.com)

# DFT® Axial Flow Check Valves: The Solution for Ultimate Pump Protection

DFT® provides a wide selection of check valves to meet your specifications. We encourage you to look at our [product catalog](#) and our various [valve animations](#) to gain a better understanding of our check valve solutions.

Our rugged and reliable check valves have tight shut-offs and require minimal maintenance over a very long life, thus reducing the total cost of ownership (TCO) of your valve over the life of the product. If you would like to know more about our check valve products, feel free to contact our technical team for additional information or request a quote detailing the requirements of your application.

DFT® has been making the in-line check valves for over 75 years. It started with a customer's need for a small metal-seated check valve that could be installed in any position while providing tight shut-off. The Basic-Check® valve was developed to satisfy that need. Over the following decades, other customers' needs led to the development of the ALC®, DLC®, DSV®, Excalibur®, FBC™, GLC®, GPV™, PDC®, SCV®, TLW®, WLC®, and Y-Calibur® styles of in-line silent check valves. Each of these DFT® in-line check valves addresses the specific needs of today's customers.

Our objective is to solve check valve problems and prevent check valve failures. DFT® has learned by listening to customers like you that each industry has special needs that can exceed other check valve designs. We specialize in providing in-line check valves that meet customer requirements as opposed to simply meeting line size. In some cases, minor modifications to our valves have solved customer problems by improving performance and extending service life.

Whatever your size, pressure or piping configurations, DFT® has the valve that's right for you.



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Find specification sheets, CAD  
files, Installation Manuals to help  
start your next project

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with DFT® Inc



**TO DISCUSS YOUR NEEDS**  
with one of our valve experts, reach out to your  
DFT® Inc representative today.