

## Center-Guided Check Valves

Check Valves are automatic shut-off valves that are commonly used for preventing backflow or drainage in a piping system. Often applied on the discharge side of pumps, check valves prevent the system from draining if the pump stops and protect against backflow, which could harm the pump or other equipment.

**Titan Flow Control offers the following types of check valves to meet your specific needs:**

### CENTER GUIDED - GLOBE STYLE

**Straightening Vanes**

Reduce turbulence in incoming flow, minimizing vibrations that could result in premature valve failure.

**Clearance within Valve's Body**

Allows a butterfly valve to be installed on the outlet side without a spool piece.

**Interchangeable Seats and Springs**

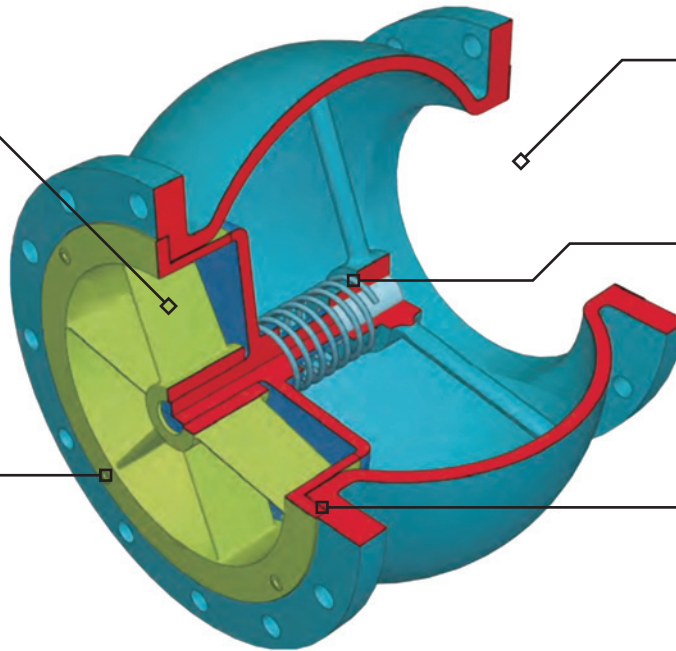
Are available in a wide variety of materials.

**Compression Spring**

Coupled with a small stem guide provides less obstruction to the flow than a typical conical construction

**Additional Gasket**

Independent of the flange gasket is assembled with the seat to improve sealing.



### CENTER GUIDED - WAFER STYLE

**Soft and Metal Seats**

Are available to meet the sealing needs of various applications.

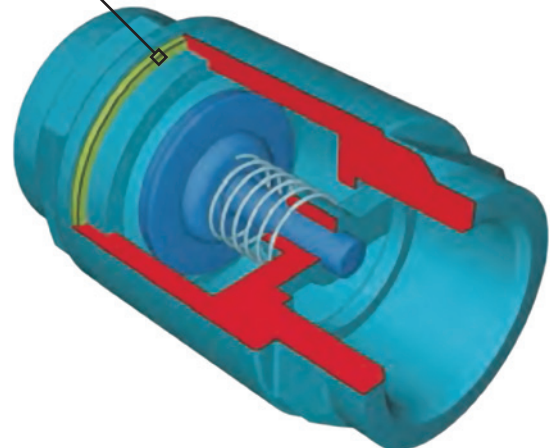
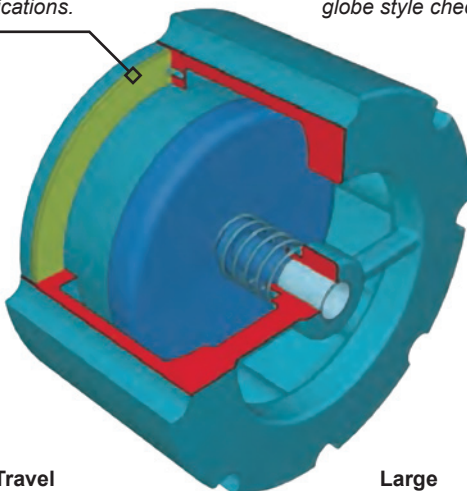
**Compact Design**

Is economical and takes up less space in pipeline than globe style check valves.

### CENTER GUIDED - THREADED

**Resilient Seats**

With precision machined sealing surfaces maintain a bubble tight seal.



**Short Disc Travel**

Reduces the risk of slamming and the potential for water hammer.

**Large**

Cross-Sectional Area exceeds that of the pipeline to minimize head loss.

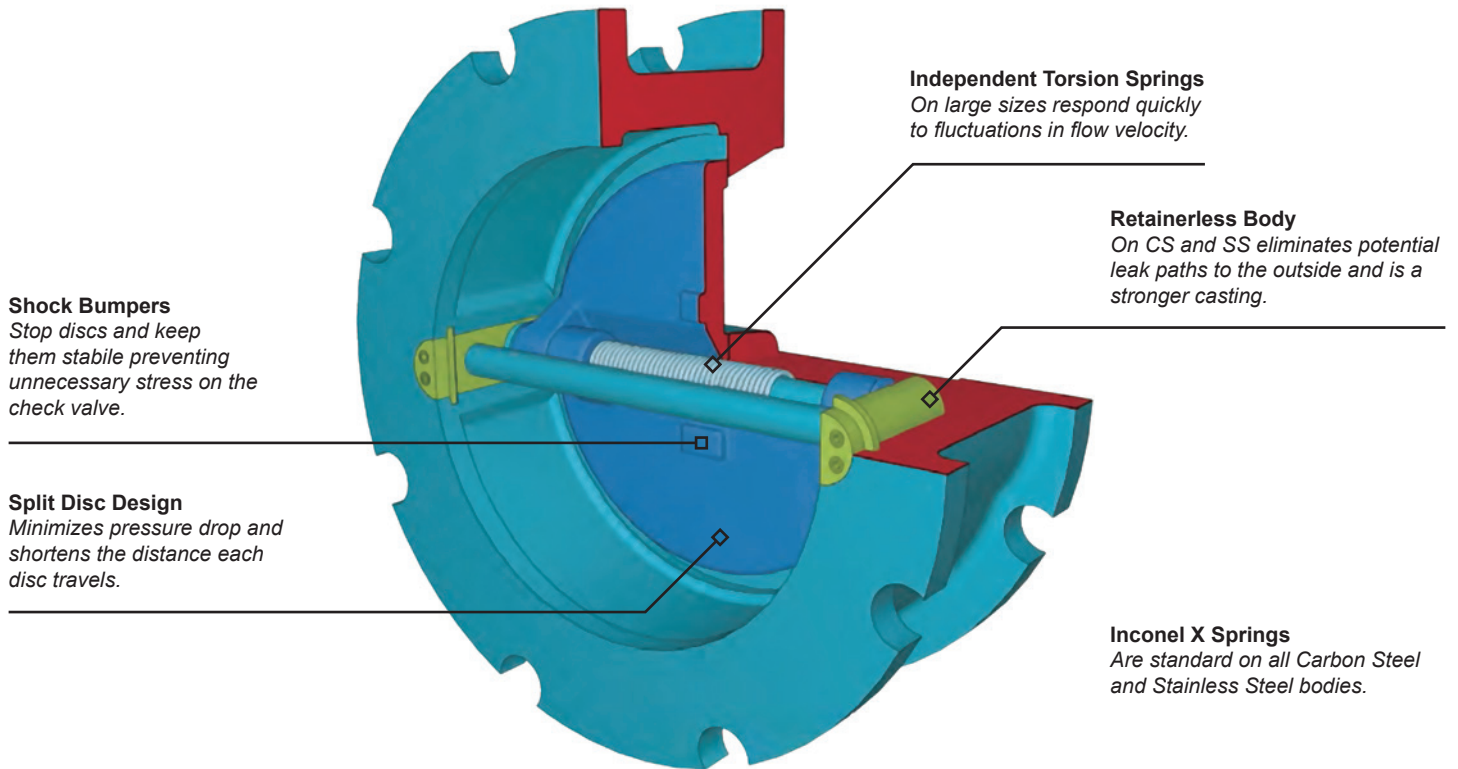
**Short, Straight Flow Path**

Across valve generates little turbulence.

## Advantages of Ductile Iron Check Valves

Titan Check Valves are made with the alloy Ductile Iron for prices that are comparable to Cast Iron! Ductile Iron is composed of graphite in spheroidal shapes compared to Cast Iron, which has lenticular flakes that make it brittle. Not only does Ductile Iron have a yield strength comparable to Carbon Steel, but it also has the anti-corrosive properties of cast iron, making it the preferred material for iron check valves.

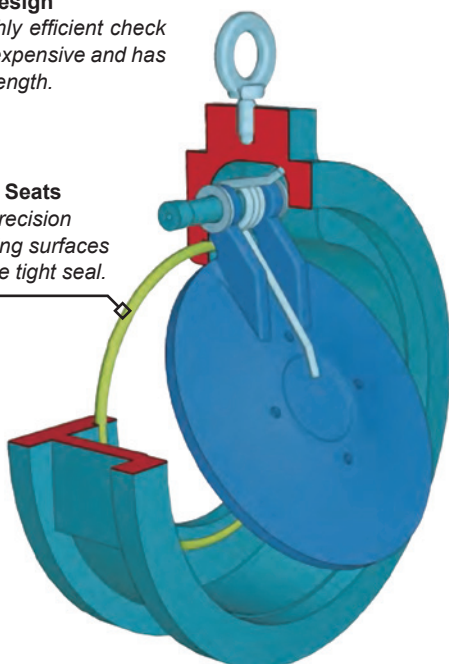
### DUAL DISC CHECK VALVES



### SINGLE DISC - WAFER STYLE

**Economical Design**  
Provides a highly efficient check valve that is inexpensive and has a short laying length.

**Resilient, Soft Seats**  
Coupled with precision machined sealing surfaces ensure a bubble tight seal.

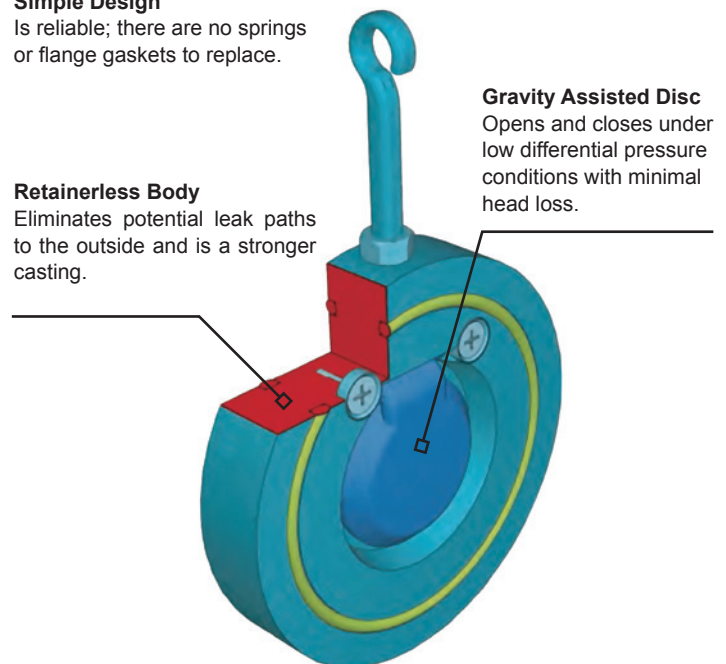


### SINGLE DISC - SHORT PATTERN

**Simple Design**  
Is reliable; there are no springs or flange gaskets to replace.

**Retainerless Body**  
Eliminates potential leak paths to the outside and is a stronger casting.

**Gravity Assisted Disc**  
Opens and closes under low differential pressure conditions with minimal head loss.



## Check Valves

As part of Titan Flow Control's dedication to cutting edge design, Titan's Engineering Department developed the patent pending CV 50 series of center guided, globe style, check valves. Only Titan's CV 50 series have integral straightening vanes to calm turbulent flows, smaller stem guides for less flow obstruction, and extra clearance to allow direct butterfly valve installation on the outlet side.

### DOUBLE DISC / WAFER STYLE

CV 41 - DI	Wafer	Class 150	Ductile Iron	Sizes 2" - 48"
CV 42 - CS/SS	Wafer	Class 150	Carbon or Stainless	Sizes 2" - 48"
CV 42L - CS/SS	Lug	Class 150	Carbon or Stainless	Sizes 2" - 48"
CV 44 - CS/SS	Wafer	Class 300	Carbon or Stainless	Sizes 2" - 48"
CV 46 - CC/SS	Wafer	Class 600	Carbon or Stainless	Sizes 2" - 48"
CV 47 - CC/SS	Wafer	Class 900	Carbon or Stainless	Sizes 2" - 48"



Double Disc  
Wafer Style



Single Disc  
Wafer Style

### SINGLE DISC / WAFER STYLE

CV 31 - DI	Wafer	Class 150	Ductile Iron	Sizes 2" - 12"
CV 32 - CS/SS	Wafer	Class 150	Carbon or Stainless	Sizes 2" - 12"



Single Disc  
Short Pattern Wafer

### SINGLE DISC / SHORT PATTERN WAFER

CV 12 - CS/SS	Short Wafer	Class 150	Carbon or Stainless	Sizes 2" - 24"
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Center Guided  
Globe Style

### CENTER GUIDED / GLOBE STYLE

CV 50 - DI	Globe	Class 150	Ductile Iron	Sizes 2" - 36"
CV 51 - CS/SS	Globe	Class 150	Carbon or Stainless	Sizes 2" - 36"
CV 52 - DI	Globe	Class 300	Ductile Iron	Sizes 2" - 36"
CV 52 - CS/SS	Globe	Class 300	Stainless Steel	Sizes 2" - 36"



Center Guided  
Wafer Style

### CENTER GUIDED / WAFER STYLE

CV 90 - DI	Wafer	Class 150 / 300	Ductile Iron	Sizes 2" - 12"
CV 91 - SS	Wafer	Class 150 / 300	Stainless Steel	Sizes 2" - 12"



Center Guided  
Mini-Wafer

### CENTER GUIDED / MINI-WAFER

CV 70 - SS	Mini-Wafer	Class 150 / 300	Stainless Steel	Sizes 1/2" - 3"
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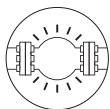
### CENTER GUIDED / THREADED

CV 20 - BR	Threaded	WOG 400	Bronze	Sizes 1/4" - 2"
CV 80 - SS	Threaded	Class 300	Stainless Steel	Sizes 3/8" - 3"



Center Guided  
Threaded

## Key Features for Comparison



#### Minimal Slam

Designed to minimize slamming potential.



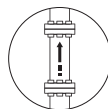
#### Minimal ΔP

Designed to minimize head loss across valve.



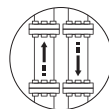
#### Buried Service

May be used for buried service; valve box recommended.



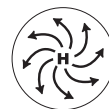
#### Vertical - Up

May be used vertically, only in an upward position



#### Up & Down

May be used in downward position with nonstandard spring; C/F.



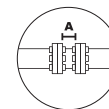
#### High Pressure

Pressures higher than 300 PSI are available.



#### High Velocities

May be used for velocities higher than 15 FPS.



#### Short Length

Short faceto-face takes up minimal space in pipeline



#### Low Cost

Relatively low initial cost.

## Design Specifications

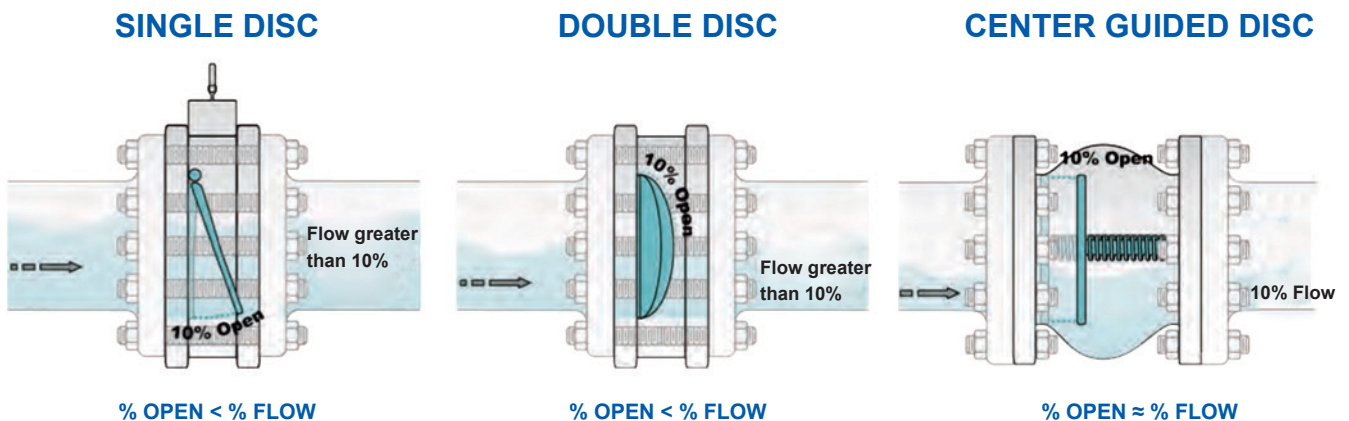
The following specifications are referenced in the design of Titan Flow Control, Inc's Check Valves. Please contact a Titan Engineer with any questions about design requirements or specifications.

<b>API 594</b>	General Valve Design	ASME B16.34	Flanged, Threaded, and Welding Ends
<b>API 598</b>	Valve Pressure Testing and Inspection	ASME B16.42	Ductile Iron Pipe Flanges
<b>API 6A</b>	Production Valves	ASME B16.47	Large Diameter Steel Flanges
<b>API 6D</b>	Pipeline Valves	ASME B31.1	Power Piping
<b>ASME B16.1</b>	Cast Iron Pipe Flanges & Flanged Fittings	ASTM	Material Specifications
<b>ASME B16.5</b>	Pipe Flanges and Flanged Fittings	MSS SP-6	Finishes for Connecting End Flanges
<b>ASME B16.10</b>	Face-to-Face & End-to-End Dimensions	MSS SP-25	Standard Marking System for Valves
<b>ASME B16.24</b>	Cast Copper Alloy Pipe Flanges	MSS SP-55	Quality Standard for Valve Castings

## Factors For Consideration

### Water Hammer

The term water hammer refers to a pressure surge in a pipeline that is created when a closing check valve stops reverse flow suddenly. This surge causes a slamming sound and it potentially can damage pipelines and buildings that house the pipelines, especially when the fluid has a high velocity or mass or when the pipeline's elevation fluctuates greatly. Because quick closure is the key to the prevention of water hammer, it is important to consider the speed at which the check valve will close and the distance it has to travel to close. Features like Titan's independent torsion springs on large double disk check valves allow the valves to respond quickly to fluctuations in pipeline flow. As illustrated below, because a center guided check valve that is almost closed will only have a small amount of reverse flow, water hammer is less likely in any specific application. Conversely, a single disc or double disc check valve's flow rate may be greater than its percentage open, meaning that more reverse flow is present. Consult Titan with any concerns or questions about water hammer before selecting a check valve.



### Head Loss

Head loss can be an important factor in check valve selection because energy loss in a pipeline can increase expenses significantly over time in certain applications. The main design features that affect head loss are the internal shape of the body and obstructions to the flow. Titan's Check Valves are designed with the following features to minimize head loss:

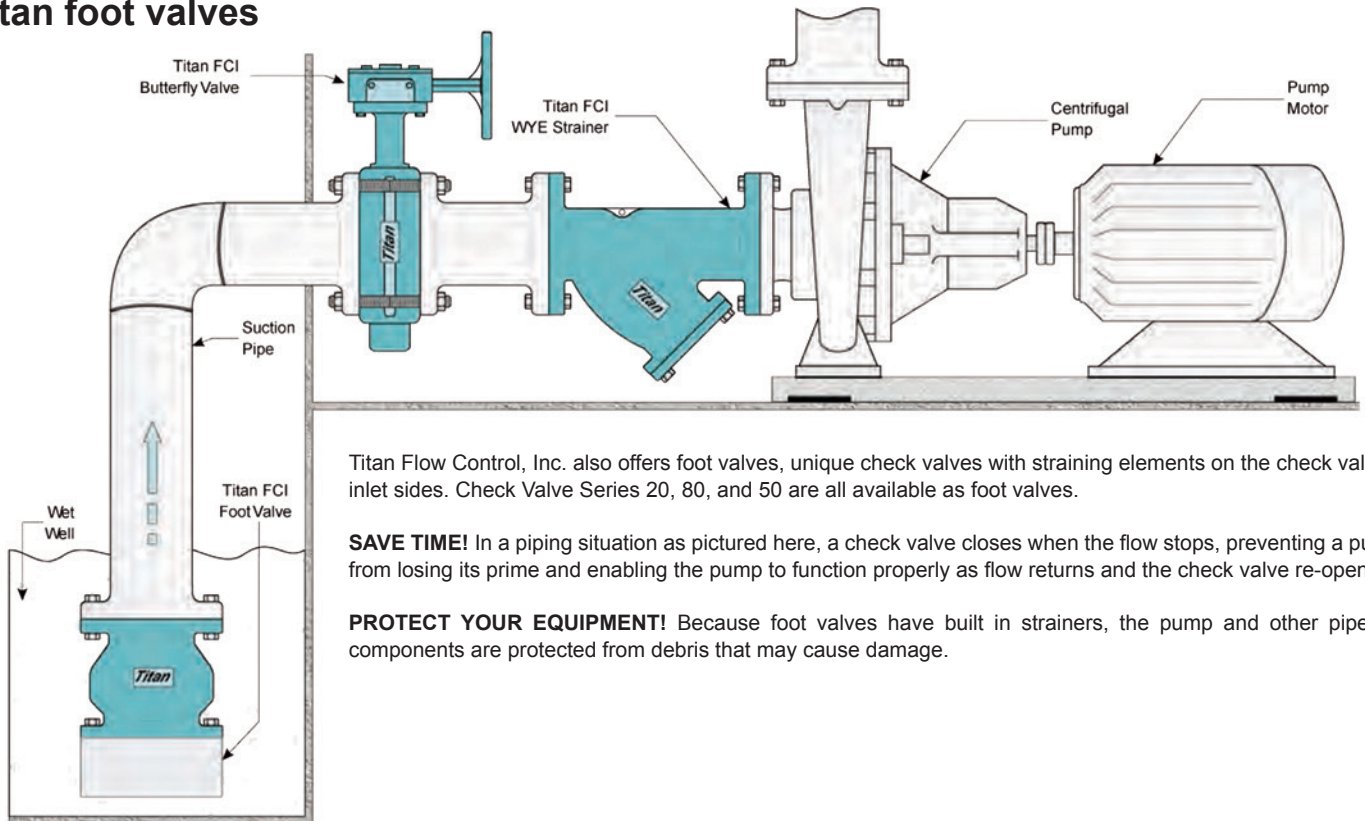
- Large cross-sectional area of center-guided check valves exceed that of the adjacent pipeline.
- Specially contoured bodies on globe check valves are designed to allow a smooth flow across the valve.
- Short, straight flow paths on double and single disk check valves prevent unnecessary head loss.
- Compression springs with a small boss obstruct flow less than typical conical constructions by other manufacturer's.
- Low cracking pressure on single and double disc check valves minimally slows the pipeline flow.



## Resilient / Soft Seat Options

BUNA-N	PTFE (Teflon)	VITON	EPDM	NEOPRENE
Max Temp: 250 °F	Max Temp: 425 °F	Max Temp: 400 °F	Max Temp: 300 °F	Max Temp: 250 °F
Buna-N is the most widely used elastomer. It works well for most petroleum oils and fluids, silicone greases and oils, and cold water. It also has an excellent compression set, tear, and abrasion resistance, but has poor weather resistance and moderate heat resistance. Buna-N is not recommended for ozone-resistant applications.	PTFE works well in most chemical environments. It has excellent tear, abrasive, chemical, acid, and alkali resistance. PTFE is not recommended for high pressure steam or large temperature variations.	Viton offers a broad range of chemical resistance and excellent heat resistance. Viton has good mechanical properties and compression set resistance, fair low temperature resistance, and limited hot-water resistance and shrinkage. Viton seats are often used in applications where nothing else will work.	EPDM is likely the most water resistant rubber available. EPDM has good resistance to mild acids, alkalis, ketones, alcohols, and other polar solvents; however, it is not recommended for use with petroleum oils, di-ester lubricants, mineral oils, nonpolar solvents, or aromatic fuels.	Neoprene is a durable & versatile synthetic rubber that was developed as an oil-resistant replacement for natural rubber. It is also resistant to the effects of moderate chemicals and acids, ozone, fats, greases, and solvents. It displays good chemical stability and is moderately resistant to heat. Neoprene is not recommended for use with strong oxidizing acids, esters, ketones, or chlorinated, aromatic and nitro hydrocarbons oils, non-polar solvents, or aromatic fuels.

## Titan foot valves



Titan Flow Control, Inc. also offers foot valves, unique check valves with straining elements on the check valves' inlet sides. Check Valve Series 20, 80, and 50 are all available as foot valves.

**SAVE TIME!** In a piping situation as pictured here, a check valve closes when the flow stops, preventing a pump from losing its prime and enabling the pump to function properly as flow returns and the check valve re-opens.

**PROTECT YOUR EQUIPMENT!** Because foot valves have built in strainers, the pump and other pipeline components are protected from debris that may cause damage.

## Specifications

Below are the typical ordering constructions for Titan Flow Control, Inc.'s Dual Disc Check Valves, Center Guided Check Valves, and Single Disc Check Valves. Please call Titan Flow Control or your nearest sales representative with any questions about Titan Check Valves related to ordering, availability, etc.

### DUAL DISC CHECK VALVES

Series	Body	Disc	Shaft	Seat	Spring
<b>CV 42</b>	<b>CS</b>	<b>S</b>	<b>S</b>	<b>1</b>	<b>X</b>
Dual Disc Wafer Type Check Valve (Class 150), Carbon Steel Body, Stainless Steel Disc, Stainless Steel Shaft, Buna Seat, and Inconel-X Spring.					

<b>SERIES</b>	<b>CV 41</b>	ANSI 150	<b>CV 42</b>	ANSI 150	<b>CV 42L</b>	ANSI 150
	<b>CV 44</b>	ANSI 300	<b>CV 46</b>	ANSI 600)	<b>CV 47</b>	ANSI 900
<b>BODY</b>	<b>DI</b>	Ductile Iron	<b>CS</b>	Carbon Steel	<b>SS</b>	Stainless Steel
<b>DISC</b>	<b>S</b>	Stainless Steel	<b>B</b>	(Aluminum Bronze		
<b>SHAFT</b>	<b>S</b>	Stainless Steel				
<b>SEAT</b>	<b>1</b>	Buna-N	<b>3</b>	Viton	<b>5</b>	Neoprene
	<b>2</b>	EPDM	<b>4</b>	PTFE/Teflon	<b>6</b>	Metal to Metal, Stainless Steel
<b>SPRING</b>	<b>S</b>	Stainless Steel	<b>R</b>	Inconel	<b>X</b>	Inconel-X

### CENTER GUIDED AND SINGLE DISC VALVES

Series	Body	Disc	Seat
<b>CV 91</b>	<b>SS</b>	<b>S</b>	<b>3</b>
Wafer Type, Center Guided, Check Valve (Class 150/300) Stainless Steel Body, Stainless Steel Disc, Viton Seat			

<b>SERIES</b>	<b>CV 12</b>	ANSI 150	<b>CV 20</b>	WOG 400	<b>CV 80</b>	ANSI 300	<b>CV 31</b>	ANSI 150
	<b>CV 32</b>	ANSI 150	<b>CV 70</b>	150 / 300	<b>CV 90</b>	150 / 300	<b>CV 91</b>	150 / 300
	<b>CV 50</b>	ANSI 150	<b>CV 51</b>	ANSI 150	<b>CV 52</b>	ANSI 300		
<b>BODY</b>	<b>DI</b>	Ductile Iron	<b>CS</b>	Carbon Steel	<b>SS</b>	Stainless Steel	<b>B</b>	Bronze
<b>DISC</b>	<b>S</b>	Stainless Steel	<b>B</b>	Aluminum Bronze				
<b>SEAT</b>	<b>1</b>	Buna-N	<b>2</b>	EPDM	<b>3</b>	Viton	<b>4</b>	PTFE/Teflon
	<b>S</b>	Metal to Metal, Stainless Steel						