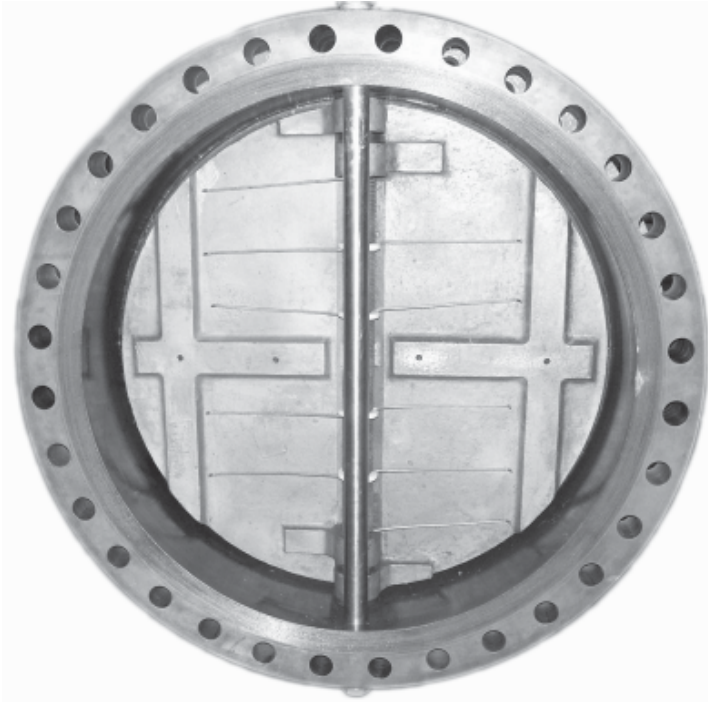


# TITAN FLOW CONTROL INC.

## Double Disc Non-Slam Check Valves



### SIZE RANGE

2" thru 36"

DN50 - DN1000

Pressure Class

125 thru 2500

Optional Full Lug Design

Sizes 14" - 36"

### Features:

- Space Saving
- Light Weight
- Simplicity of Installation
- Interchangeability of Parts
- Wide Range of Seat Options
- Resilient and Hard Face Metal Seating
- Fully Elastomer Lined Available
- Prevents Flow Reversal - Functions Silently
- Manufactured to API 594 and 598 Standards



Unique Body design  
Class 125/150/250/300  
Sizes 2"-6"

***Titan Wafer Check Valves are Stronger, Lighter and More Compact Than Conventional Check Valves. They are also Less Expensive to Purchase, Install and Maintain***

# Performance Features

## 1) Wafer Body

Our wafer body is easily installed between most types of flanges and requires only one set of flange studs. Machined O.D. of valve permits precise self-alignment inside the bolts of standard flanges. Sizes 2 thru 6 inch can accommodate either 125/150 or 250/300 boltings. Central rib adds strength, rigidity and maximum seat area. Eye bolt for ease of lifting, installation and handling

## 2) Disc/Plates

Dome shaped discs are lighter in weight yet provide the same strength as the thicker flat disc. As flow begins the heels of the discs are lifted off the seat face

## 3) Shaft/Stop Pin

Independent dual shaft design allows shaft inter changeability. The stop shaft prevents over travel, in combination with spring forces, to stabilize the disc and minimize flutter and resultant wear at the disc hinge

## 4) Seatings

Separate seats for each disc are molded to the body allowing complete sealing of each disc. Elastomer or lapped metal seats are available.

## 5) Springs

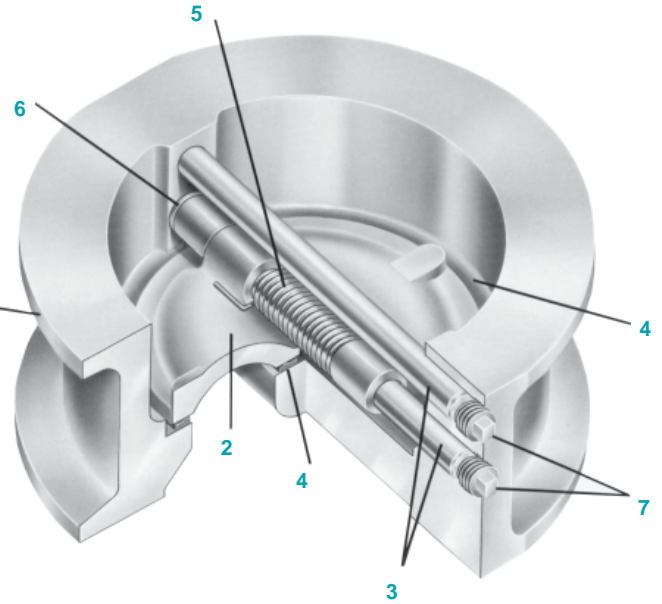
Unique dual torsion spring arrangement forces the "heels" of the disc together to form a complete seal. Quick and sure closing response at the instant of flow loss, prevents flow reversal and water hammer.

## 6) Thrust Bearings

Thrust bearings are located between the I.D. of the body and the face of the disc lug to prevent body/disc lug contact when the valve is located in a horizontal position.

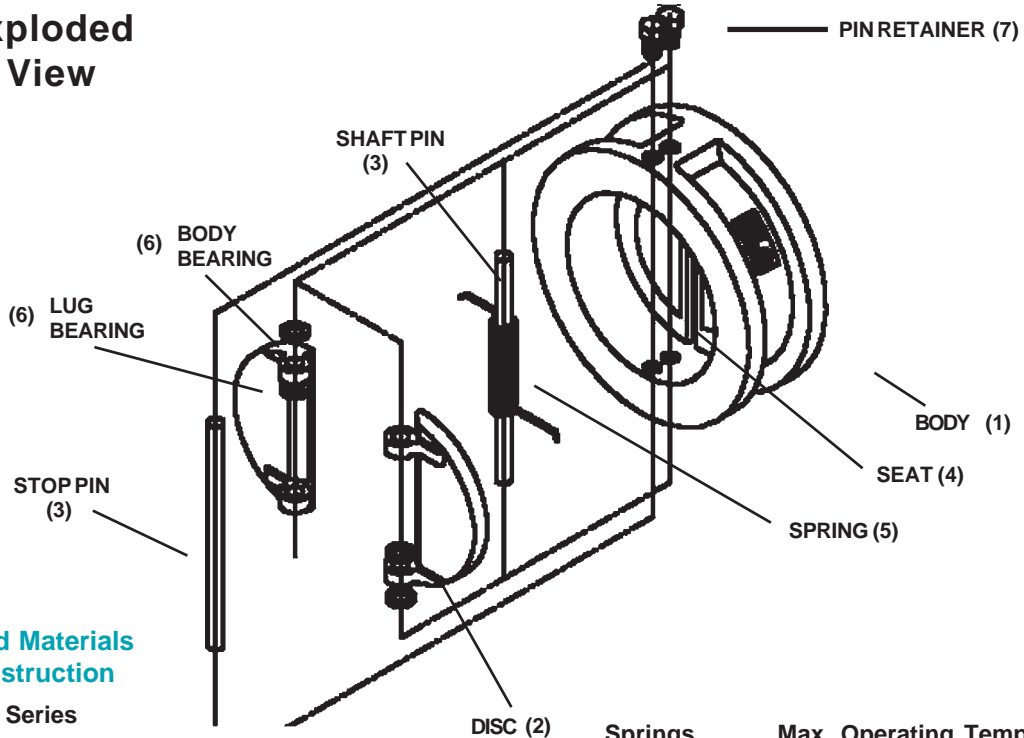
## 7) Pin Retainers

Four pipe plugs are used to secure shafts allowing for easy field removal.



# Valve Components

## Exploded View



## Standard Materials of Construction

### ANSI 125 & 250 Series

ASTM A126 Class B  
BS 1452 Grade 220 Cast Iron (Body Casting Only)  
BS 1400 Grade AB2 Aluminum Bronze (Plate Casting Only)

### ANSI 150 through 2500 Series Body & Plate Castings

ASTM A536 DI.  
ASTM A216 Grade WCB Carbon Steel (0.22% Carbon Max.)  
ASTM A217 Grade CA - 15 Stainless Steel (410)  
ASTM A351 Grade CF - 8M Stainless Steel (316)  
BS 1400 Grade AB2 Aluminum Bronze (ANSI 150 & 300 Series)  
Other materials available on request.

Carbon Steel not recommended for use above 800°F. Soft Seated Valve not recommended for use above 400°F (Viton) or 250°F (Buna-N)

### Springs

316 SS  
Inconel 600  
Inconel X 750

### Max. Operating Temperature

120 °C (248 °F)  
315 °C (400 °F)  
537 °C (1000 °F)

### Spring Selection

For temperature up to 315 °C (400 °F), Inconel springs will be furnished as standard on all valves that are ordered with metal and viton seals. For service conditions above 315 °C (400 °F), Inconel X springs should be specified.

## The Strength of Ductile Iron When Compared to Cast Iron Is Overwhelming

Dropping a cast iron valve could result in a crack or break. The crack can go unnoticed by the naked eye, but the valve is likely to fail with use. Cracking or breaking are much less likely to occur with a ductile iron valve because of the metals excellent resistance to shock and superior physical properties. The strength of ductile iron also compares very favorable to cast steel (see accompanying table).

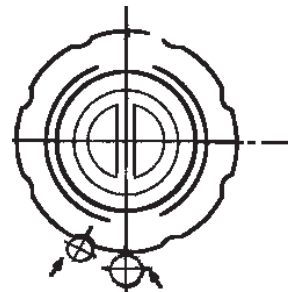
Physical Properties	Ductile Iron ASTM A-336	Cast Iron ASTM A126 Class B	Cast Steel ASTM A126 WCB
Tensile PSI	60,000	31,000	70,000
Yield PSI	40,000	0	36,000
Elongation %	18	0	22

**Titan offers ductile iron valves that compete with other manufacturer's cast iron valves.**

Value added feature at no extra cost, cast iron body is repl by DI Body. DI Valve are higher pressure ruled than cast iron, 125 CI = 200 WOG (150 DI 250 WOG). 250 CI = 400 WOG (300 DI = 650 WOG).

## COST SAVING / FLEXIBLE BODY

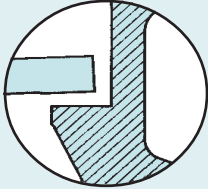
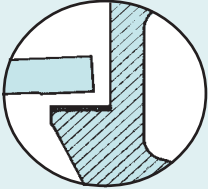
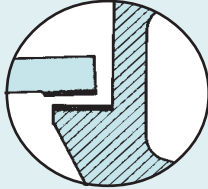
Whether you require a 125, 150, 250, or 300 class valve, our unique scallop design body will comply with all standards for both pressure and flanged bolting classes. Available sizes: 2", 3", 4" and 6". (No need to stock four different valves only two 125/150, 250/300) Let TITAN FCI expand your product offering while reducing your inventory.



ANSI 125Lb./150 Class Bolt Circle

ANSI 250Lb./300 Class Bolt Circle

### Metal To Metal Seals † (Body and Disc)

Description	Description	Description
Body and plate same material, e.g., carbon steel, stainless steel, bronze.	Most ANSI 150 and 300 Series. Overlay is welded†† on body seats only. Plate is same material as overlay (e.g., if body seat is 316SS, plates are 316SS).	Most ANSI 600 Series and higher rating. Overlay is welded††† on body and plate / seat surfaces.
		

† Sealing surface meets flatness and finish to insure compliance with leak rate identified in API 594.

†† Full penetration weld metal  $1/14$  to  $3/12$ " (1.6-2.4mm) thick on seating surface, (e.g., 316L, 410 and others).

## Design and Technical Data

This is a self acting pivoting check valve of the double disc wafer type. The valve is maintenance free. The design is compact and space saving.

The check valve has a superior closing response prior to flow reversal. The corrosion resistant springs are designed to quickly close the valve at zero flow to prevent undesirable pressure surges. In the closed position the valve is designed for tight shut off. It opens automatically when the flow starts again.

The elastomer seat is vulcanized and bonded to the body casting. It is out of the flow path thus ensuring extended seal life. Spherical profiling of the seat ensures positive shut-off even at low pressures and the area adjacent to the seat is also protected by the same elastomer material. Metal seating also available.

Attention paid to the streamlining of the flow path is paramount if good flow characteristics are to be achieved. The saving of energy costs by selecting a Titan check valve may be several times the initial cost of the valve.

The use of these design features together with careful material selection makes our design a product with a high reliability and a low operating cost.

### Computerized Finite Element Design

Dual plate check valves are designed and verified on Computerized Package based on well known principle of Finite Element Analysis. This computer modeling system verifies the design for stress analysis and deflection produced by pressure.

### Independent Dual Spring

The use of separate, corrosion-resistant springs activate the check valve disc and distribute the load force across the entire disc, ensuring quick and sure response to flow reversal. This design reduces and overcomes the frictional coefficients due to one plate resting upon another. The spring life cycle is studied and the dynamic behavior of the valve is recorded.

### Seat Options

The right seat selection is critical for correct functioning of the valve in its designated service. Our design offers a wide range of seat options.

Metal to metal seats can be either the body/disc parent material or a hardfacing of other material, overlaid by deposition. For soft seated valves, standard elastomers are vulcanized for maximum security. On high pressure class valve seats are set into a groove for further safety.

## *Titan-FCI Check Valves are designed to meet API Specifications*

**Testing Standard:** API 598

**Design Standard:** API 594

**Ends /Installation:** Wafer ends are suitable to install between ANSI 150, 300 or 600 flanges

**Ends:**

Raised face or ring joint type flanges i.e. RF or RTJ ends.

Wafer ends are Serrated finished to Ra 125 as standard

**Rating:** ANSI Class 150, 300, 600, 1500, 2500

**Valves with soft seats are bubble tight and closure to API 6D**

**Valves with metal/hard faced seats have low leakage in accordance with API 598**

**Material Conformity Traceability and full certification are available for each valve**

The Titan Double Disc Check Valve is available in different materials as shown in the following tables. The selection is mainly based on the corrosive properties of the fluids. External and internal coating materials apply for grey and ductile iron bodies. Inconel springs have a longer life than the standard stainless steel and perform well in chloride containing fluids and sea water

**SPECIAL VALVE BODY & DISC MATERIAL OPTIONS**

Purpose	Material Description	Specification ASTM Grade
General	DI	A 536 - 65-45-18
Hard Waring	Carbon Steel	WCB A216
Corrosion	Stainless Steel	CF8M A351
Low Temp	Low Temp Carbon Steel	A352 LCB, A352 LCC
High Temp	High Temp Chromemoly Steel	A217 WCB, A217 C5
Corrosion	Chrome Duplex	A890
Resistance	Hastalloy	A494

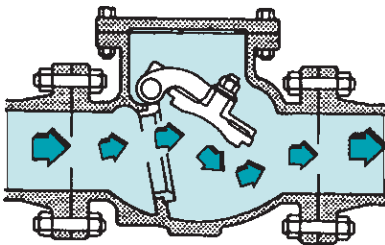
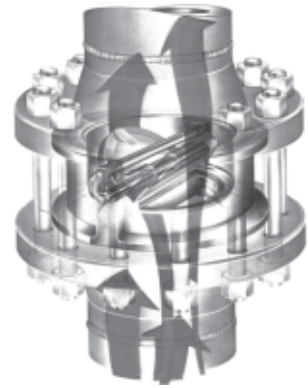
**Valve Testing**

Valve testing standard: API 598				
Valve Rating	Shell		Seat	
	bar	psi	bar	psi
125	15	217.5	11	159.5
150	30	435	22	319
300	76	1102	5	797.5
600	153	2218.5	112	1624

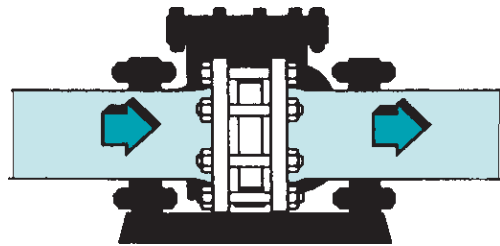
## Design Advantages/Comparison

Dual plate check valves are multi-purpose Non-return valves. Wafer style check valve offer design advantages over conventional swing and lift type, such as:

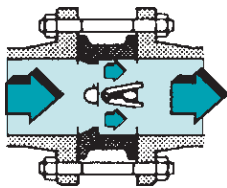
- ① Substantially Lighter (in weight)
- ① Swing check valve required twice as many studs and nuts as wafer check valve, further adding to weight difference
- ① Compact Wafer Design (space saving)
- ① Lower head loss than swing check valves above 6"
- ① High Cv value and less pressure drop
- ① Simplicity of Installation
- ① Mount in any direction (horizontal/vertical)
- ① Wide range of seat option
- ① Non-slamming action prevents premature valve failure



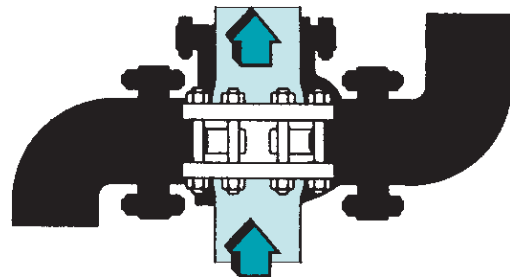
*Conventional swing Check valve*



*Horizontal Flow - rib vertical*



*Our dual plate wafer check valve  
Lighter Design*



*Vertical Flow*

### Non-Slam "Silent Type Design"

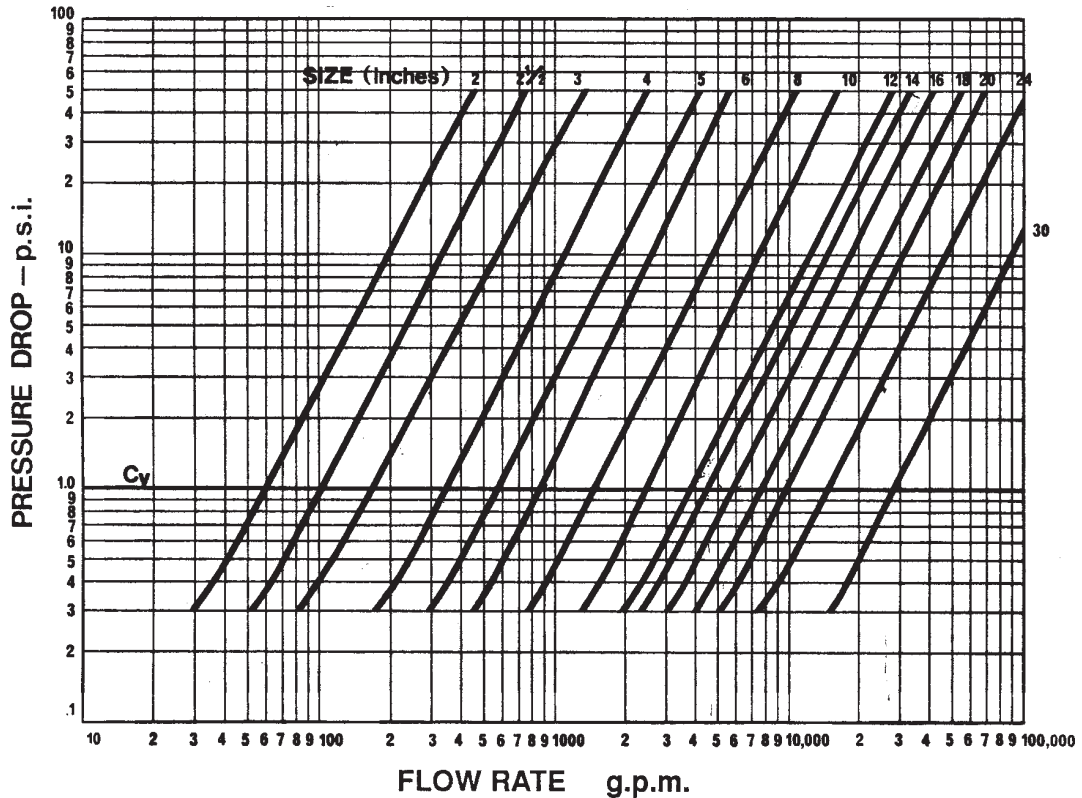
Designed to eliminate water hammer problems connected with the use of conventional swing type check valves. In theory the swing check valve closes when the pump shuts down. The reversal of flow in the piping will slam the discs against its seat and cause an objectionable loud noise, added vibration and piping stresses will shortened valve life in many cases. Water hammer can be so severe that it can rupture pump casings, expand and rupture piping and even vibrate buildings on their foundations. Our non-slam spring actuated design will eliminate water hammer.

### Stronger

Our computer design minimizes the distance between faces, only one set of flange studs are required. The installed valve is actually stronger than the equivalent length of pipe it replaces. Ribs around the side wall also supports the faces.

# TECHNICAL DATA

- Flow Curve (Pr. Drop vs Flow).



- The above curves show pressure drop of flow of water at ambient temperature for standard valve.
- For efficient function and improved service life of check valve it is a good piping practice of placing of check valves a distance equal to 5 to 10 pipe diameters from any turbulence producing device such as elbows, pumps etc.
- This type of all double disc check valve in the industry has limitation and not recommended for low flow, reciprocating flow, pulsating flow or parallel pumping station.
- This check valve is most effective for flow rates ranges 5 ft/sec. to 10 ft/sec. leauid media horizontal or vertical upward flow installation.

### Maximum Non-Shock Pressure Rating

Per ANSI B16-34, ANSI B16-1, ANSI B16.5, ANSI B16-42

Temp	Class 125 Grey Iron		Class 150			Class 300		Class 600	
	CV-40		CV-41-DI	CV-42-CS	CV-42-SS	CV-44-CS	CV-42-SS	CV-46-CS	CV-46-SS
	2" - 12"	14" - 24"	2" - 24"	2" - 24"	2" - 24"	2" - 24"	2" - 24"	2" - 24"	2" - 24"
-20 to 100	200	200	250	285	275	740	720	1480	1440
200	180	135	235	260	240	675	620	1350	1240
300	160	120	215	215	230	655	560	1315	1120
400	138	82	200	200	195	635	515	1270	1030
500	-	-	120	170	170	600	480	1200	955
600	-	-	140	140	140	550	450	1095	905

### Temperature limitation of Seat Material

Seat	Temp. in °C	Temp. in °F	Seat code
BUNA-N	-30 to 120	-10 to 250	1
EPDM	-4 to 150	-20 to 300	2
VITON	-30 to 204	-60 to 400	3
METAL	-267 to 537	-450 to 1000	6

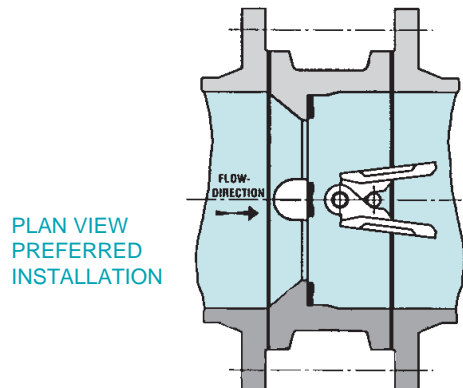
- Design ANSI B16-1, B16-34 & B16-5
  - Material Per ASTM / ASMC VII Dev-2
  - Conform to API594 & 6D
  - Testing API 598
- SEAT TEST = 1.1 x WOG Psi  
SHELL TEST = 1.5 x WOG Psi

**Note:** All dimensional and weight information can be found in our individual submittal sheets of double disc check valve in our master catalog. If not available in this master catalog please, consult the factory.

# Installation

Our check valves are designed for steady flow conditions and can be installed in horizontal and vertical pipelines, instructions shown (as follows) must be adhered to.

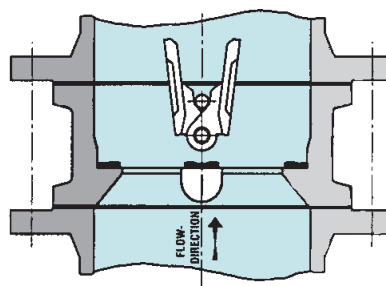
## Installation in a horizontal pipeline:



The disc shaft must be in the vertical position

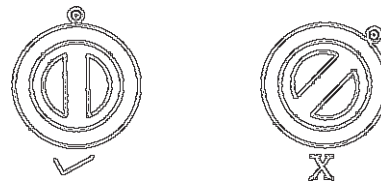
In horizontal installation, the valve rib has to be in vertical position as shown. For indication, the valve rib is at the location of eyebolt which can also be used for installation and lifting.

## Installation in a vertical pipeline:



As standard the valve must be installed with flow up

Note: Additional pressure drop can be expected due to the weight of the discs.



## Simple Installation

Simplicity and speed of installation are of paramount importance for the process or pipeline engineer. Our check valve is simply installed between the flanges. A raised face (serrated or smooth finish) RTJ, profile hub can be provided. Only one set of studs are required as our check valve fits inside the bolt circle PCD. If the valve needs to be taken out of the line, only half the bolts need to be removed, reducing the amount of work required.

## Interchangeable

Many Titan Models are completely interchangeable, having the same face to face dimension as other Brands, such as Mueller's Sure Check, Techno, Missions, and Duo-Check.

## Pipe Connection

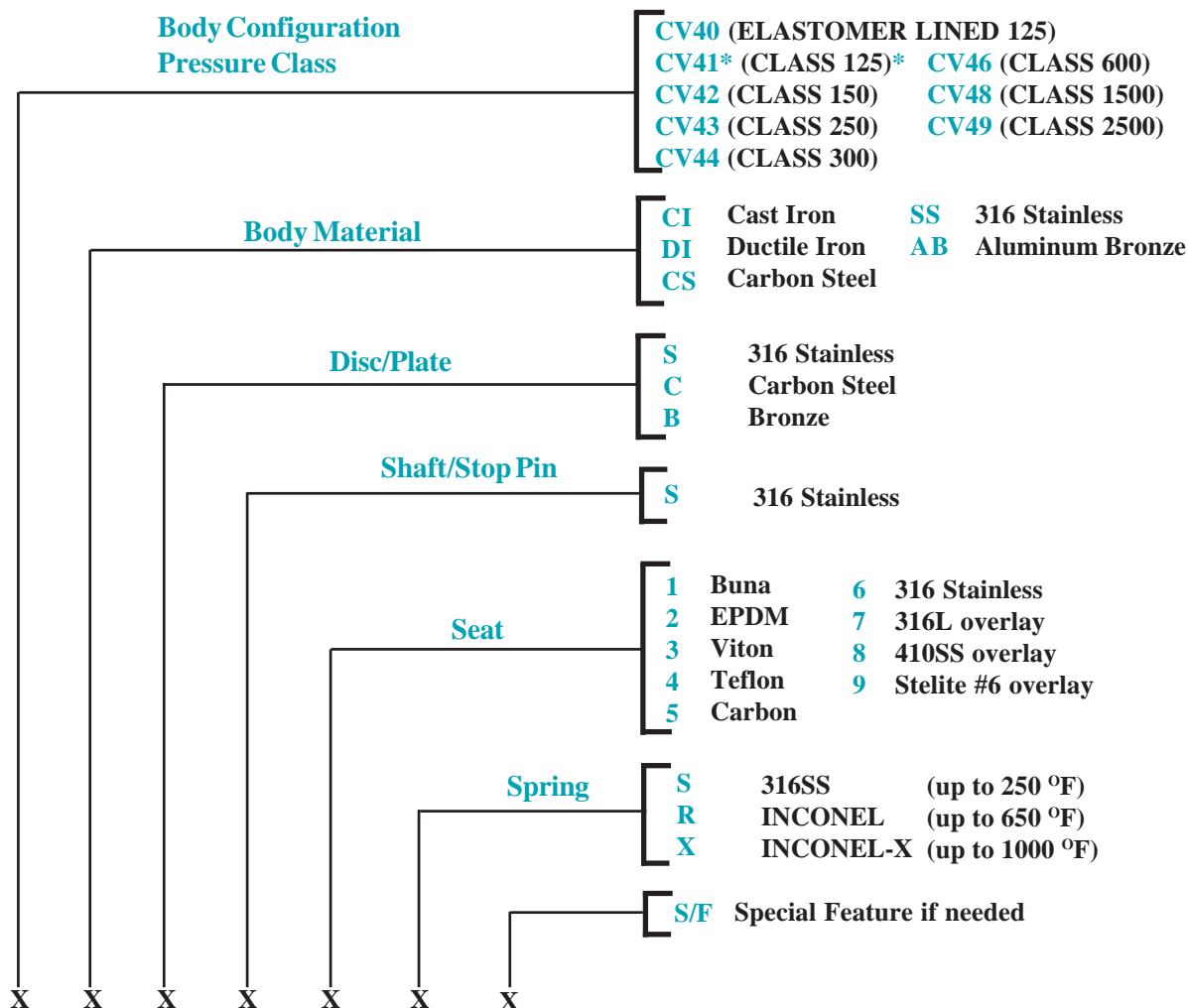
The Titan check valve has been designed for installation in flanged piping systems. The flangeless wafer type body shall be clamped between two flanges with flat, or raised face or ring type designs (weld neck or slip on flanges). Suitable gaskets shall be used for sealing between valve and flanges.

## ANSI Stud Bolting

**Example:** 4 Number of Studs     5/8 Stud Diameter     5 1/2 Stud Length Raised Faces Class 125 Flat Face     6 Stud Length RTJ (not for class 125)

Size	Class 125			Class 150			Class 300			Class 600			Class 1500				Class 2500						
2	4	5/8	5 1/4	4	5/8	5 1/2	6	8	5/8	5 3/4	6 3/4	8	5/8	6 1/2	7	8	7/8	8 1/2	8 3/4	8	1	9 3/4	10
3	4	5/8	5 3/4	4	5/8	6 1/2	7	8	3/4	7	8	8	3/4	7 3/4	8 1/4	8	1 1/8	10 1/2	10 1/2	8	1 1/4	12	12 1/4
4	8	5/8	6 1/4	8	5/8	6 1/2	7	8	3/4	7 1/4	8 1/4	8	7/8	9 1/4	9 1/2	8	1 1/4	11 3/4	12	8	1 1/2	14	14 1/2
6	8	3/4	7	8	3/4	7 3/4	8 1/4	12	3/4	8 3/4	9 3/4	12	1	12	12 1/2	12	1 3/8	16 1/2	16 3/4	8	2	20	20 1/2
8	8	3/4	8	8	3/4	9 1/4	9 3/4	12	7/8	10 1/2	11 1/4	12	1 1/8	14 1/4	14 1/2	12	1 5/8	19 1/2	20	12	2	23 1/4	24
10	12	7/8	9	12	7/8	10 1/2	11	16	1	12	12 3/4	16	1 1/4	16 3/4	17 1/4	12	1 7/8	23 1/4	23 1/2	12	2 1/2	29 1/2	30 1/4
12	12	7/8	10 1/2	12	7/8	11 3/4	12 1/4	16	1 1/8	13 3/4	14 3/4	20	1 1/4	17 3/4	18	16	2	27	37 1/2	12	2 3/4	33 1/2	34 1/2
14	12	1	12	12	1	12 1/4	13 1/4	20	1 1/8	16 1/4	16 1/4	20	1 3/8	20	20								
16	16	1	13 1/4	16	1	13 1/4	14 1/2	20	1 1/4	16 3/4	16 3/4	20	1 1/2	22 1/2	22 1/2								
18	16	1 1/8	14	16	1 1/8	14	15 1/4	24	1 1/4	19	19	20	1 5/8	24 1/2	24 1/2								
20	20	1 1/8	14 1/4	20	1 1/8	14 1/2	15 1/2	24	1 1/4	20 1/4	21 1/4	24	1 5/8	26	27								
24	20	1 1/4	16 1/2	20	1 1/4	16 3/4	16 3/4	24	1 1/2	22 1/2	22 1/2	24	1 7/8	30 1/2	30 1/2								

# Check Valve Assembly Base Part Numbers



## ORDERING SAMPLE:

TYPE CLASS	MATERIAL BODY	DISC	SHAFT	SEAT	SPRING
CV42	CS	S	S	3	R
150#	Carbon	Stainless	Stainless	Viton	Inconel

\*\* Multi Pressure Rated, Sizes 2" thru 6", 125/250/150/300, larger sizes meet 125 and 150 Lb. only.

## Titan's Fully Elastomer Lined Check Valve Series

The valves in this series have completely isolated the valve body from the line media. This unique feature extends the service life and makes it an ideal alternative to expensive alloys. Valve linings are available in several different elastomer compounds to meet most corrosive application specifications.



Model- CV40  
Class 125

This brochure is general in nature and manufacturer reserves the right to alter materials or to make design improvements