The TD Series Tilting Disc Check Valve

Sizes from 3” to 72” • #125 and #250 ratings available • 55˚ seating angle • 40% size increase through seat

Crispin

Since 1905

Crispin Multiplex Manufacturing Co. • 600 Fowler Avenue • Berwick, PA 18603 • 1-800-247-VALV
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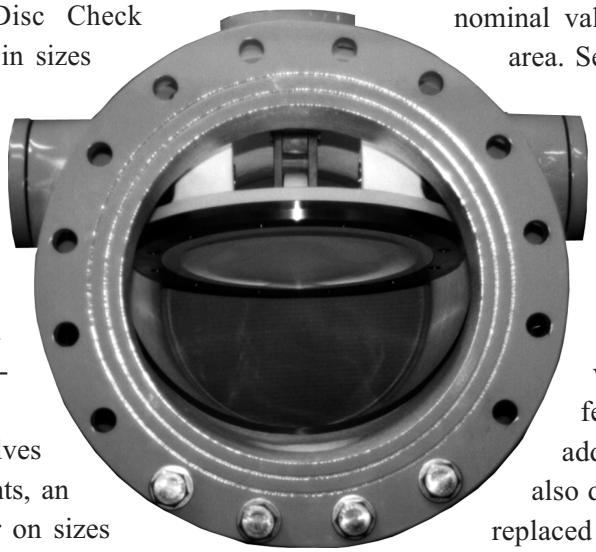
TD SERIES

Tilting Disc Check Valve

TD Series Tilting Disc Check Valves are available in sizes from 3" to 72".

They are available with top- or bottom-mounted buffering systems, as well as a variety of industry preferred material options, including a ductile iron body and aluminum bronze seating.

Tilting Disc Series valves also offer fixed pivot points, an external position indicator on sizes 10" and larger, and a 40% increase in nominal valve size through the seat area. Seating is achieved at a 55 degree angle, with full opening requiring the seat to travel no more than 40 degrees from the seating position.



The Crispin Tilting Disc is contoured to prevent fluttering above a 4 feet per second velocity. In addition, the body seat is also designed so that it may be replaced in the field without requiring any special tools. ●

By pivoting the disc in the flow, the opening stroke range of the Tilting Disc Valve is much less than that of other check valves, reducing the opening and closing times critical to controlling flow reversal and reducing water hammer. In addition, the unique 55 degree slanted seat position of the TD Series ensures extremely high efficiency and operability.

The hallmark of the our TD Series is its superior design and function, which provides the most efficient approach to flow reversal, and offers a head loss lower than that of most any other check valve made.

Its 55 degree slanted seat position, unique to the TD Series, provides extremely high efficiency and operability.

Seating

The Tilting Disc Valve accomplishes full flow opening by having the disc pivot or "tilt" in the flow of the media. Swing check valves move the disc out of the flow by displacing the seat disc to the upper portion of the valve. By pivoting the disc in the flow, the opening stroke range of the TD Series is far less than that of other valves, reducing the opening and closing times critical to controlling flow reversal and reducing water hammer.

The seating surfaces of the seat ring and disc are machined to an angle of approximately 20 degrees, providing more clearance right up to closing, while reducing seat wear and improving sealing properties.

Opening Stroke

The key to the Tilting Disc Valve's efficiency is its "in the flow pivot." When the velocity is sufficient to open the valve, the pivot pin clearance allows the valve to un-seat without sticking. Once open, the teardrop like design of the disc keeps it stable and un-fluttering in the flow. Meanwhile, full opening is achieved through only 40% stroke from the seated position.

● Disc Pivoting

The seat disc opens and closes the valve by pivoting on two fixed pivot shafts attached to the disc from either side of the body. Replaceable pivot bushings of a different material hardness in the disc are the actual pivot points, and are located almost 1/3 of the way down the disc, leaving 2/3 of the disc weight below. The resulting counter balance effect closes the valve quickly, yet limits slamming.

● Pivot Pin Clearance

Since the "tilting" of the disc on a 1/3, 2/3 split puts part of the disc through the seating area, there must be a small clearance around the pivot bushing and pivot shaft. The top of the disc seats from the opposite direction as the bottom. This built in clearance allows the disc to "float" into place at final seating. ●

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Tilting Disc Check Valve

● Longer Laying Length

Having the disc "tilt" in the media gives the valve a longer laying length or face-to-face dimension than other check valves. This extended length provides a very smooth body and disc contour, thus reducing the turbulence common to other designs.

● Increased Flow Area

With a flow area that is at least 40% greater than the nominal valve size, the Tilting Disc Check Valve has a much lower head loss than a conventional swing check valve. It has three times higher flow in many cases.

● Field Replaceable Seat

The Crispin Multiplex TD Series Tilting Disc Check Valve is manufactured with ease of field maintenance in mind. The body seat is replaceable in the field without the need for special tools or equipment, thus reducing valve down time.

● External Position Indicator

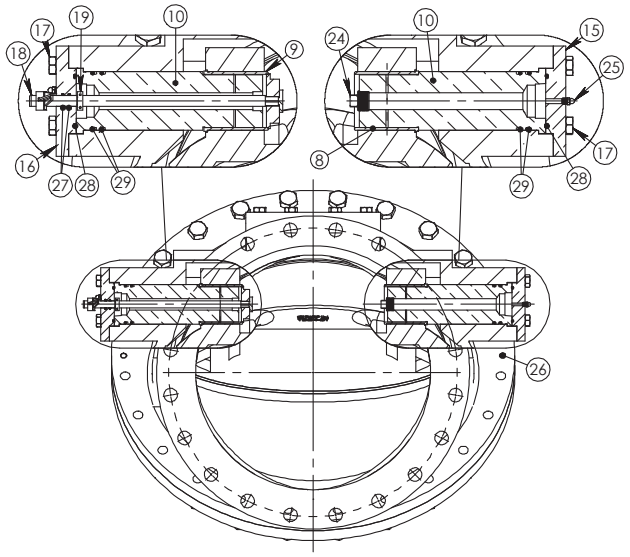
Directly attached to the disc itself through one pivot shaft, this indicator serves as an easy and positive reference for determining whether the valve is open or closed. This is standard on valves 10" and larger.

● Dual Inspection Ports

An inspection port is located on the top and bottom side of the seat for examination of normal wear. It also serves as the mounting point for optional dashpots.

● By-Pass Piping

Optional by-pass piping is available for special needs, including slow line filling and controlled line drain.



ITEM	DESCRIPTION	MATERIAL	ASTM
1	Outlet Body	Cast Iron	A126 Class B
2	Inlet Body	Cast Iron	A126 Class B
3	Body Seat Ring	Alum. Bronze	B271-954
4	O-Ring	Buna N	A5656A
5	Tilting Disc	Ductile Iron	A536 Gr 65-45-12
6	Disc Ring	Alum. Bronze	B271-955
7	O-Ring	Buna N	AS 568A
8	Disc Bushing	Stainless Steel	AISI Type 304
9	Bushing/Drive Pl.	Stainless Steel	Stainless Steel
10	Pivot Pin	17-4 PH	A564-630-H1025
11	Inspection Cover	Cast Iron	A126 Class B
12	Hex Head Bolt	Carbon Steel	A307 Gr. B
13	Inspection Cover	A126 Class B	A126 Class B
14	Hex Head Bolt	Carbon Steel	A307 Gr. B
15	End Bearing Cap	Cast Iron	A126 Class B

● Dashpots

Designed to control the opening and closing speeds of the valve, optional dashpots help eliminate line surges and valve wear. Available with top and bottom mountings, they are field adjustable and can often be added later. Both utilize a high quality hydraulic piston cylinder to control disc movement.

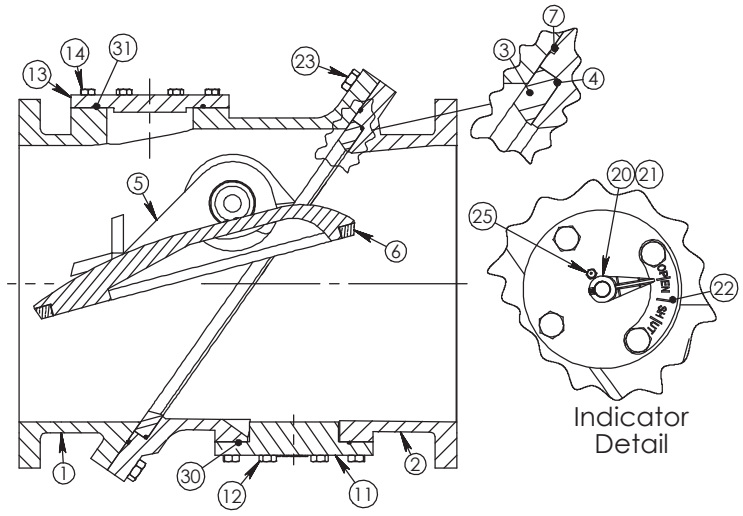
Bottom Side Dashpot

This dashpot features a rounded end shaft that projects through the 55 degree angled seat ring. It is not physically attached to the disc itself. It therefore cannot control the rate at which the valve opens, but rather controls the last 10% of the closing stroke.

Upon closure, the disc strikes the rounded end rod connected to the piston in the hydraulic cylinder. Oil in the cylinder is displaced into the accumulating tank. The rate of this oil displacement is the rate at which the valve closes during that last 10% of movement, and it is adjustable through the use of a needle valve. After closure, when the valve reopens, a spring pushes the rod

TD SERIES

Tilting Disc Check Valve



ITEM	DESCRIPTION	MATERIAL	ASTM
16	End Bearing Cap	Cast Iron	A126 Class B
17	Hex Head Bolt	Carbon Steel	A307 Gr. B
18	Indicator Rod	Stainless Steel	A582 Type 303
19	Shaft Collar	Stainless Steel	AISI Type 303
20	Indicator Pointer	Brass	N/A
21	Set Screw	Stainless Steel	N/A
22	Indicator Plate	Stainless Steel	AISI Type 304
23	Hex Head Bolt	Carbon Steel	A307 Gr. B
24	Pipe Plug	Carbon Steel	N/A
25	Grease Fitting	Carbon Steel	N/A
26	Locating Pin	Carbon Steel	B18.8.2
27	O-Ring	Buna N	AS 568A
28	O-Ring	Buna N	AS 568A
29	O-Ring	Buna N	AS 568A
30	O-Ring	Buna N	AS 568A
31	O-Ring	Buna N	AS 568A

back into position so that it is ready for the next cycle.

Top Side Dashpot

With top side dashpots, the piston is connected directly to the disc via a shaft, and links in order to control both the valve opening and closing. This operation's two chamber cylinder also has two separate accumulator tanks. When the valve opens, oil is displaced into the larger of the two chambers and can be adjusted as described above. This controls the full stroke of opening.

During closure, however, the design of the two chamber cylinder allows closing to be broken into two stages. The first stage of the closing stroke is much quicker, due to the pressurized air cushion in the larger tank. This air expands and forces the oil back into the chamber faster, creating pressure against the piston and closing the valve quicker.

The actual closure rate of this first stage is achieved by a combination of adjustments made to the two accumulator tanks—oil out of the large tank into the top chamber of the cylinder and oil out of the bottom chamber of the cylinder into the small tank. The second or final stage of closure is controlled by a small internal valve and an oil flow channel that controls the last portion of the oil flow into the smaller accumulator. Adjustment of this valve allows the disc to have a final "cushion" at the end of the closing stroke. ●

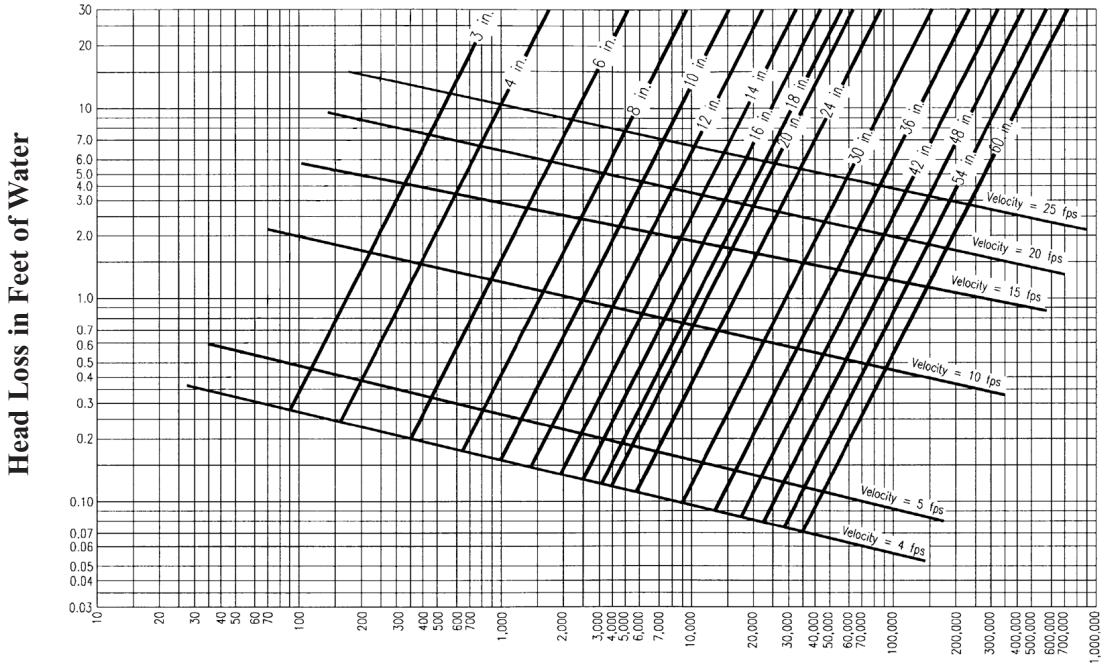
Additional Product Notes

- All valves are tested to AWWA Specification #C-508.
- Discs and disc seats in valves 10" and smaller are one-piece design.
- All valves are available in Class 125 and 250 gray iron, as well as Class 150 and 300 ductile iron.

  Please consult factory for additional material options.
- Valves should be located a minimum of three pipe diameters from the discharge of a pump.
- Crispin warrants all materials and workmanship through one year of purchase.
- Disc position indicators standard on valve sizes 10" and larger, as well as with any added dashpot option.
- Inspection ports are optional on valve sizes 3" thru 10."

Tilting Disc Check Valve

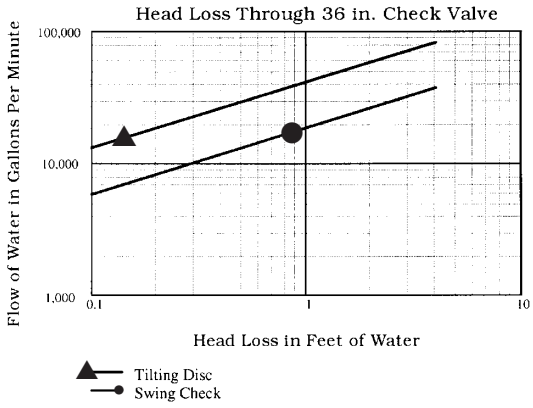
Head Loss Characteristics



Cost Savings Comparison

The TD Tilting Disc Check Valve offers unparalleled quality with extremely low energy consumption during operation. When compared to a conventional swing check valve, the Tilted Disc Valve delivers impressive electrical energy savings, due to its 40% larger flow area and its significantly lower head loss characteristics. To determine the cost savings as they would apply to your valve needs, see the formula below.

$$\text{Electrical Cost Savings Per Year (CS/Y)} = \frac{\text{gpm x hl x sg x C/Kwh x 24 hours x 365 days}}{\text{3960 x Ec}}$$



Cost Savings Formula Legend:

gpm =	Pump flow rate in gallons per minute
hl =	Head loss difference between conventional check valve and Crispin Tilting Disc Check Valve
sg =	Specific Gravity of Water (1.0)
C/Kwh =	Cost of electricity per Kilowatt hour
Ec =	Pump & Motor Efficiency (Combined)

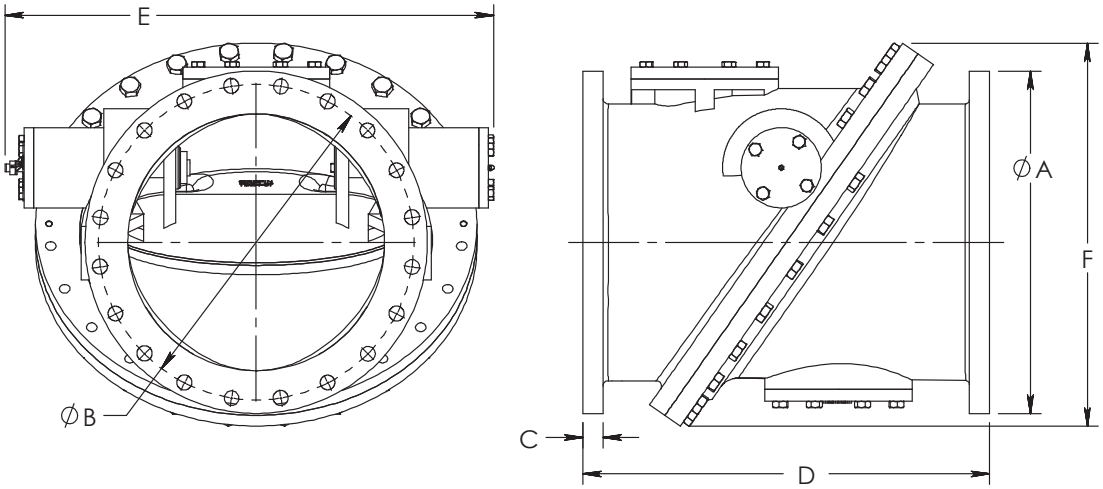
Example:

Valve Size=36 in.	gpm=30,000	hl=2.08
sg = 1.0	C/Kwh = 0.062	Ec=0.73

Electrical Cost Savings Per Year = $11,723.64

Dimension Sheet for TD Series

Tilting Disc Check Valve



VALVE Size	ANSI No.	MODEL	A	B	C	D	E	F	G	H	I	J	K	L	BOLT Size	NO. Bolts	WT. Lbs.
3	125	TD31	7 1/2	6	15/16	9 1/2	11 1/2	7 1/2							5/8	4	60
	250	TD32	8 1/4	6 5/8	1 1/8	9 1/2	11 1/2	7 3/4							3/4	8	68
4	125	TD41	9	7 1/2	15/16	11 1/2	14 1/2	9 3/4							5/8	8	105
	250	TD42	10	7 7/8	1 1/4	11 1/2	11 1/2	9 3/4							3/4	8	121
6	125	TD61	11	9 1/2	1	14	16 1/2	11 7/8	22	12	15	3	9	12	3/4	8	165
	250	TD62	12 1/2	10 5/8	1 7/16	14	20	15	22	12	15	3	9	12	3/4	12	195
8	125	TD81	13 1/2	11 3/4	1 1/8	19 1/2	20 1/4	14 7/8	29	18	16	4	8	12	5/8	8	225
	250	TD82	15	13	1 5/8	19 1/2	21 1/3	15 1/4	29	18	16	4	8	12	7/8	12	267
10	125	TD101	16	14 1/4	1 3/16	24 1/2	25 1/4	17 3/4	31	18	17	4	5	9	7/8	12	415
	250	TD102	17 1/2	15 1/4	1 7/8	24 1/2	24 1/4	18 1/8	31	18	17	4	5	9	1	16	495
12	125	TD121	19	17	1 1/4	27 1/2	26 1/2	19 1/2	33	22	19	5	7	12	7/8	12	635
	250	TD122	20 1/2	17 3/4	2	27 1/2	27 1/2	21	33	22	19	5	7	12	1 1/8	16	717
14	125	TD141	21	18 3/4	1 3/8	31	29 3/8	22 3/8	36	22	20	5	5	9	1	12	990
	250	TD142	23	20 1/4	2 1/8	31	31 2/3	24 3/4	36	22	20	5	5	9	1 1/8	20	1370
16	125	TD161	23 1/2	21 1/4	1 7/16	30	33 2/3	25 3/4	44	24	22	5	5	9	1	16	1150
	250	TD162	25 1/2	22 1/2	2 1/4	30	34 7/8	27 1/2	44	24	22	5	5	9	1 1/4	20	1246
18	125	TD181	25	22 3/4	1 9/16	33	37 1/4	29	45	24	23	6	3	7	1 1/8	16	1500
	250	TD182	28	24 3/4	2 3/8	33	37	30	45	24	23	6	3	7	1 1/4	24	1696
20	125	TD201	27 1/2	25	1 11/16	32 1/2	39 3/4	31	51	27	24	7	5	10	1 1/8	20	1720
	250	TD202	30 1/2	27	2 1/2	32 1/2	41 1/2	31 2/3	51	27	24	7	5	10	1 1/4	24	2010
24	125	TD241	32	29 1/2	1 7/8	38	47	36 1/2	58	27	26	7	*-2	4	1 1/4	20	3200
	250	TD242	36	32	2 3/4	38	50 1/2	37 1/2	58	27	26	7	*-2	4	1 1/2	24	4420
30	125	TD301	38 3/4	36	2 1/8	52	54	45	68	34	34	7.5	*-2	6	1 1/4	28	6108
	250	TD302	43	39 1/4	3	52	54	45	68	34	34	7.5	*-2	6	1 3/4	28	7204
36	125	TD361	46	42 3/4	2 3/8	59 1/2	64	53 1/4	79	34	38	7.5	*-8	2	1 1/2	32	9005
	250	TD362	50	46	3 3/8	59 1/2	64	53 1/4	79	34	38	7.5	*-8	2	2	32	10533
42	125	TD421	53	49 1/2	2 5/8	62 1/2	67	60 1/2	90	42	44	7.5	*-8	4	1 1/2	36	12604
	250	TD422	57	52 3/4	3 11/16	62 1/2	67	60 1/2	90	42	44	7.5	*-8	4	2	36	14368
48	125	TD481	59 1/2	56	2 3/4	65	79	68 1/4	99	42	51	7.5	*-1	6	1 1/2	44	16243
	250	TD482	65	60 3/4	4	65	79	68 1/4	99	42	51	7.5	*-1	6	2	40	19289
54	125	TD541	66 1/4	62 3/4	3	78	83	75	112	60	58	7.5	*-4	6	1 3/4	44	20755
	250	TD542	*	*	*	78	83	75	112	60	58	7.5	*-4	6	*	*	25183
60	125	TD601	73	69 1/4	3 1/8	87	92	86 1/2	120	60	63	7.5	*-8	6	1 3/4	52	27555
	250	TD602	*	*	*	87	92	86 1/2	120	60	63	7.5	*-8	6	*	*	33018

**** For valves over 60", please contact the factory.***

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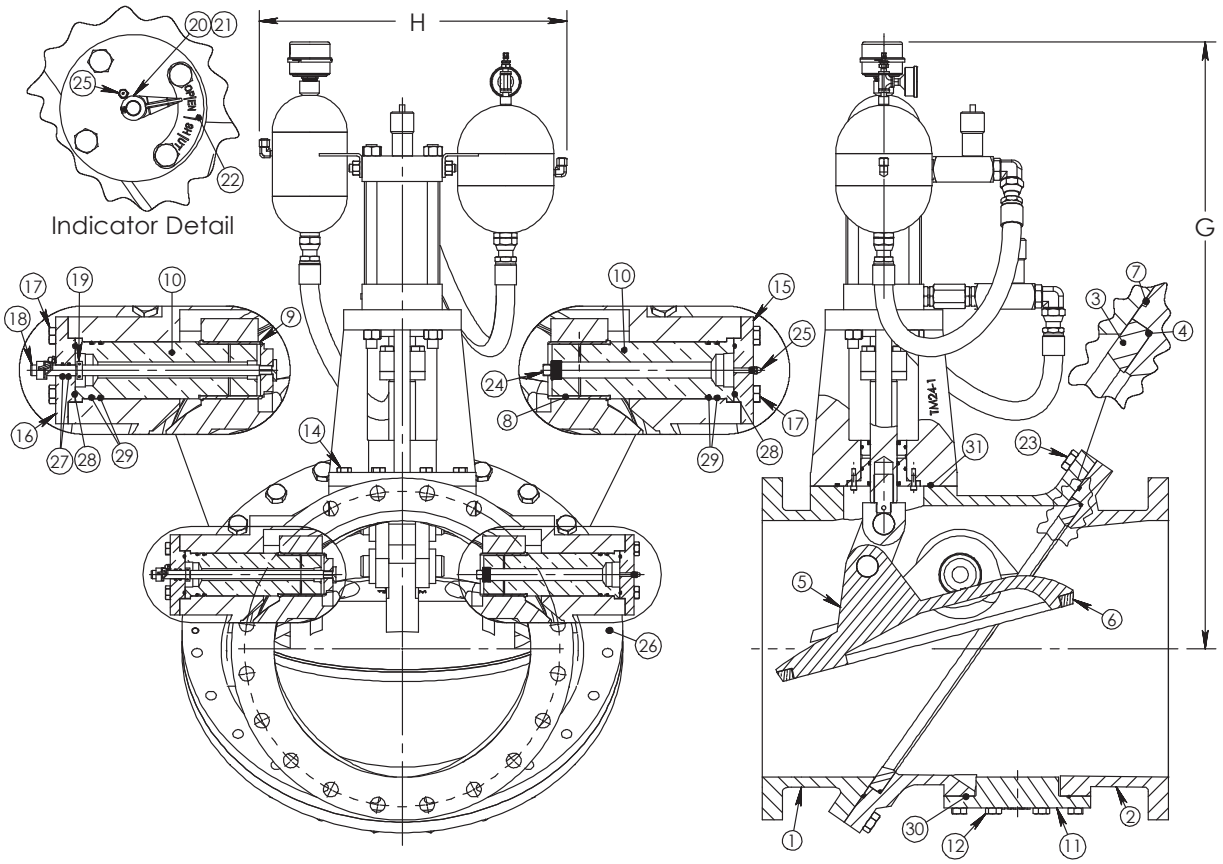
6”–72” Cl. 125 TD Valve (top dashpot)



Specifications

The Tilting Disc Check Valve fitted with a Top Mounted Dashpot shall be designed to allow media flow forward and downstream of the pump, but disallow flow reversal. The valve shall consist of two body halves bolted together at 55-degree angle, forming a center flange. Inspection ports are to be located in each body half. A body seat ring shall be clamped between the inlet and outlet body halves at the center flange and must be beveled on the seating surface. The outlet body half will contain a Disc onto which is bolted a disc seat ring. The disc seat ring will be beveled to meet the seating surface of the body seat ring. The Disc shall be held in place by two pivot pins that insert through both sides of the outlet body half. The pins will hold the disc in place at bushings on the disc. The bushings are to be located such that approximately 2/3 of the disc weight is below the pivot pins on seating.

The disc is to be designed so that, at the fully opened position, the media will flow over both the top and bottom sides due to its "aerofoil" shape. The disc will pivot away from the body seat in a manner that allows no contact of the two seat rings except at the end of the sealing stroke. The entire flow area through the valve will meet or exceed the nominal pipe diameter. The body halves will be designed to gradually enlarge to achieve at least a 40% increase over the nominal pipe diameter at the seat area. This will minimize valve head loss. The valve shall be tested to the operating characteristics of AWWA specification # C-508. The valve shall be Crispin series "TD", as manufactured by Crispin-Multiplex Manufacturing Co., Berwick PA, or approved equal.

The Top Mounted Oil Dashpot will be installed through the top inspection port. The device is to be directly connected to the valve disc. The dashpot will provide controlled opening of the valve, while also allowing two stage control of the disc closure. Both functions are to be fully adjustable in the field in order to meet diverse system requirements, and reduce the effects of surges and water hammer. The dashpot shall consist of a 5000 psi hydraulic cylinder, two external oil reservoirs (one pressurized), two adjustable flow control valves, and piping. The cylinder shall have an internal flow control and the unit will have two external flow controls. The dashpot will be connected to the valve by means of a spacer containing an air gap, so that hydraulic fluid does not enter the system. The spacer will also contain o-rings serving as "wipers" for the same result. A rod connected to the cylinder will extend down through the spacer bushing, and be attached directly to the valve disc by heavy gauge links and pins.

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SUBMITTAL SHEET TD SERIES

Submittal Sheet for Crispin TD Series

3"–10" Cl. 125 TD Valve (top dashpot)

Manufactured in compliance with ANSI/AWWA C508 Date: 2016

Tilting Disc Valve (Top Mounted Dashpot) Parts List

ITEM	DESCRIPTION	MATERIAL	ASTM
1	Outlet Body	Cast Iron	A126 Class B
2	Inlet Body	Cast Iron	A126 Class B
3	Body Seat Ring	Alum. Bronze	B271-955
4	O-Ring	Buna N	A5656A
5	Tilting Disc	Alum. Bronze	B271-954
7	O-Ring	Buna N	AS568A
8	Disc Bushing	Stainless Steel	AISI Type 304
9	Bushing/Drive Pl.	Stainless Steel	Stainless Steel
10	Pivot Pin	17-4 PH	A564-630-H 1 025
11	Inspection Cover	Cast Iron	A126 ClassB
12	Hex Head Bolt	Carbon Steel	A307 Gr, B
13	Inspection Cover	A126 Class B	A126 Class B
14	Hex Head Bolt	Corbon Steel	A307 Gr, B
15	End Bearing Cap	Cast Iron	A126 Class B
16	End Bearing Cap	Cast Iron	A126 Class B
17	Hex Head Bolt	Carbon Steel	A307 Gr. B
18	Indicator Rod	Stainless Steel	A582 Type 303
19	Shaft Collar	Stainless Steel	AISI Type 303
20	Indicator Pointer	Brass	N/A
21	Set Screw	Stainless Steel	N/A
22	Indicator Plate	Stainless Steel	AISI Type 304
23	Hex Head Bolt	Carbon Steel	A307 Gr. B
24	Pipe Plug	Carbon Steel	N/A
25	Greose Fitting	Carbon Steel	N/A
26	Locating Pin	Carbon Steel	B18.8.2
27	O-Ring	Buna N	AS568A
28	O-Ring	Buna N	AS568A
29	O-Ring	Buna N	AS568A
30	O-Ring	Buna N	AS568A
31	O-Ring	Buna N	AS568A

**** For valves over 60", please contact the factory.***

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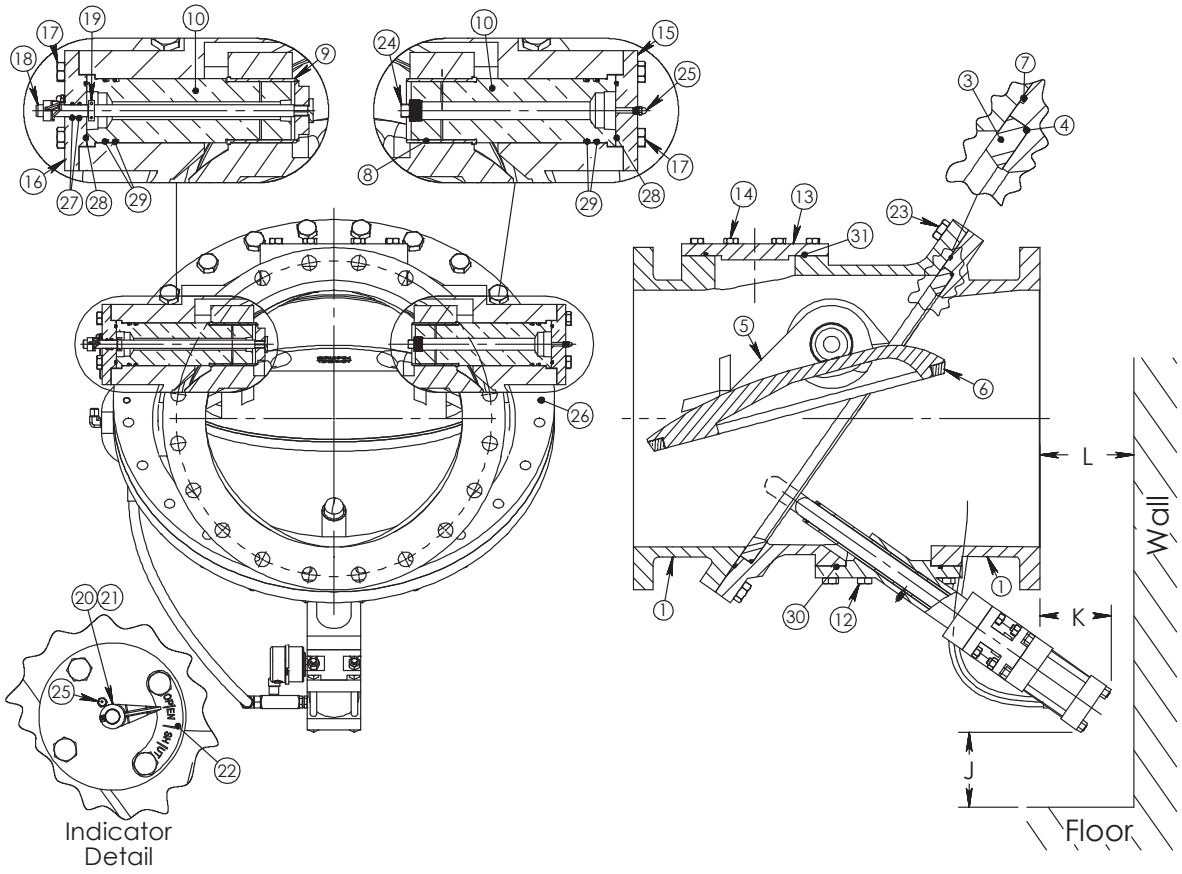
6”–72” Cl. 125 TD Valve (bot. dashpot)



Specifications

The Tilting Disc Check Valve fitted with a Bottom Mounted Dashpot shall be designed to allow media flow forward and downstream of the pump, but disallow flow reversal. The valve shall consist of two body halves bolted together at 55-degree angle, forming a center flange. Inspection ports are to be located in each body half. A body seat ring shall be clamped between the inlet and outlet body halves at the center flange, and must be beveled on the seating surface. The outlet body half will contain a Disc onto which is bolted a disc seat ring. The disc seat ring will be beveled to meet the seating surface of the body seat ring. The Disc shall be held in place by two pivot pins that insert through both sides of the outlet body half. The pins will hold the disc in place at bushings on the disc. The bushings are to be located such that approximately 2/3 of the disc weight is below the pivot pins on seating. The disc is to be designed so that, at the fully opened position, the media will flow over both the top and bottom sides due to its "aerofoil" shape. The disc will pivot away from the body seat in a manner that allows no contact of the two seat rings except at the end of the sealing stroke. The entire flow area through the valve will meet or exceed the nominal pipe diameter. The body halves will be designed to gradually enlarge to achieve at least a 40% increase over the nominal pipe diameter at the seat area. This will minimize valve head loss. The valve shall be tested to the operating characteristics of AWWA specification # C-508. The valve shall be Crispin series "TD", as manufactured by Crispin-Multiplex Manufacturing Co., Berwick PA, or approved equal.

The Bottom Mounted Oil Dashpot will be installed through the bottom inspection port. The device is not to be connected to the valve disc.The dashpot will provide controlled closure of the valve during the last 10% of the valve stroke. This function is to be fully adjustable in the field in order to meet diverse system requirements and reduce the effects of surges and water hammer. The dashpot shall consist of a 5000 psi hydraulic cylinder, an external pressurized oil reservoir, an adjustable flow control valve, and piping. The dashpot will be connected to the valve by means of a spacer containing an air gap so that hydraulic fluid does not enter the system. The spacer will also contain o-rings serving as "wipers" for the same result. A snubber-rod connected to the cylinder will extend up through the spacer bushing and directly into the valve seating area. Upon closure, the disc will strike the snubber-rod and its travel will be cushioned by the oil cylinder.

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Submittal Sheet for Crispin TD Series

12"–72" Cl. 125 TD Valve (bot. dashpot)

Manufactured in compliance with ANSI/AWWA C508 Date: 2016

Tilting Disc Valve (Bottom Mounted Dashpot) Parts List

1	Outlet Body	Cast Iron	A126 Class B
2	Inlet Body	Cast Iron	A126 Class B
3	Body Seat Ring	Alum. Bronze	B271-955
4	O-Ring	Buna N	A5656A
5	Tilting Disc	Ductile Iron	A536 Gr. 65-45-12
7	O-Ring	Buna N	AS568A
8	Disc Bushing	Stainless Steel	AISI Type 304
9	Bushing/Drive Pl.	Stainless Steel	Stainless Steel
10	Pivot Pin	17-4 PH	A564-630-H1025
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13	Inspection Cover	A126 Class B	A126 Class B
14	Hex Head Bolt	Carbon Steel	A307 Gr, B
15	End Bearing Cap	Cast Iron	A126 Class B
16	End Bearing Cap	Cast Iron	A126 Class B
17	Hex Head Bolt	Carbon Steel	A397 Gr. B
18	Indicator Rod	Stainless Steel	A582 Type 303
19	Shaft Collar	Stainless Steel	AISI Type 303
20	Indicator Pointer	BRass	N/A
21	Set Screw	Stainless Steel	N/A
22	Indicator Plate	Stainless Steel	AISI Type 304
23	Hex Head Bolt	Carbon Steel	A307 Gr. B
24	Pipe Plug	Carbon Steel	N/A
25	Grease Fitting	Carbon Steel	N/A
26	Locating Pin	Carbon Steel	B18.8.2
27	O-Ring	Buna N	AS568A
28	O-Ring	Buna N	AS568A
29	O-Ring	Buna N	AS568A
30	O-Ring	Buna N	AS568A
31	O-Ring	Buna N	AS568A

**** For valves over 60", please contact the factory.***

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