



## C10

Tilting Check Valve  
with Counterweight

### Product Description

DENZ-C10 Tilting Check Valve (also known as a tilting disc check valve) is used in pumping applications to prevent backflow into the system. The interior parts of all the parts are made of stainless steel or coated with an epoxy that is approved for drinking water use. Depending on the application, the valve can either be fully coated with ebonite or rubber if it is intended for sea water use.



### Application Areas

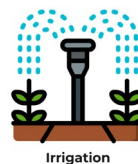
- Pumping stations
- Desalination plants
- Water treatment and distribution systems
- Pipelines
- Industry

### Operation Versions

- Lever and counterweight
- Bare shaft
- Hydraulic piston

### Production References

Size Range	DN100 - DN2400
Pressure Range	PN10/16/25/40
Temperature	EPDM: +80°C NBR: 60°C VITON: 120°C
Face to face	EN558 Series 14 / DIN 3202 F4
Design	EN12334
Connection	Flanged - EN1092-2
Coating	Electrostatic Powder Epoxy
Testing	EN 12266-1
Marking	EN 19

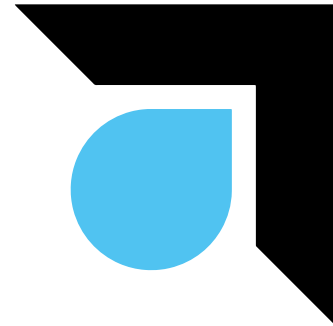




## Product Features

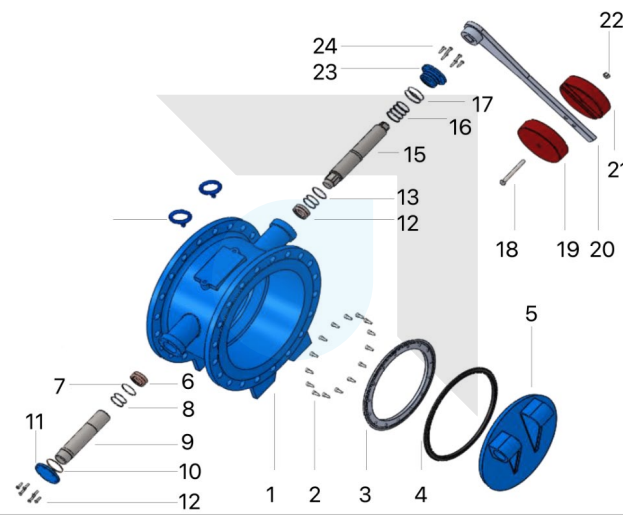


- ENGJS500-7 Ductile iron body and bonnet for high strength and impact resistance.
- This valve is designed as a resilient seated type. There is an option to order the metal seated type for specific orders.
- As a default, the sealing ring on the disc is EPDM. Various options are available, including NBR and VITON.
- Drop-tight sealing is extended with a solid/one-piece block molded T-shaped disc sealing ring.
- The counter lever length and weight can be adjusted to adjust the speed of the open/close. DENZ-C11 Tilting check valve with hydraulic damper is recommended for controlling speed.
- Both sides of the valve can be fitted with the arm and counterweight. Counterweights can be customized by the end user according to their usage. It is the responsibility of the DENZ technical team to provide the necessary support to the end user.
- When the valve is connected to the pipeline, the sealing can be easily replaced. For this process, the valve does not need to be removed from the pipeline. A new sealing can be installed by removing the bolts of the retaining ring.
- A welding seat made of SS308 LSI grade stainless steel is manufactured on the body using automatic welding machines and microfinished precision milling. The disc sealing ring applies equal pressure to all points of the welding seat once the disc is fully closed.
- The shafts are equipped with corrosion-resistant bronze or brass bushings.
- Due to the double shaft design, pressure loss is minimized and energy efficiency is increased.
- The pumps require less energy to operate due to the low torque advantage.
- Internal and external coatings with an average thickness of 250 microns are applied to the disc and body. Depending on the application, higher coating thicknesses can be applied.
- Coatings that meet WRAS hygienic standards are available upon request.
- During the installation process, it is important to consider the direction arrow on the body.
- AISI420 stainless steel spindle for high strength and corrosion resistance. Upper grade shaft materials can be used.
- 100% of the valves are subjected to Hydrostatic tests according to EN 12266-1. Pressure for seat: PN x 1.1 , for shell: PN x 1.5



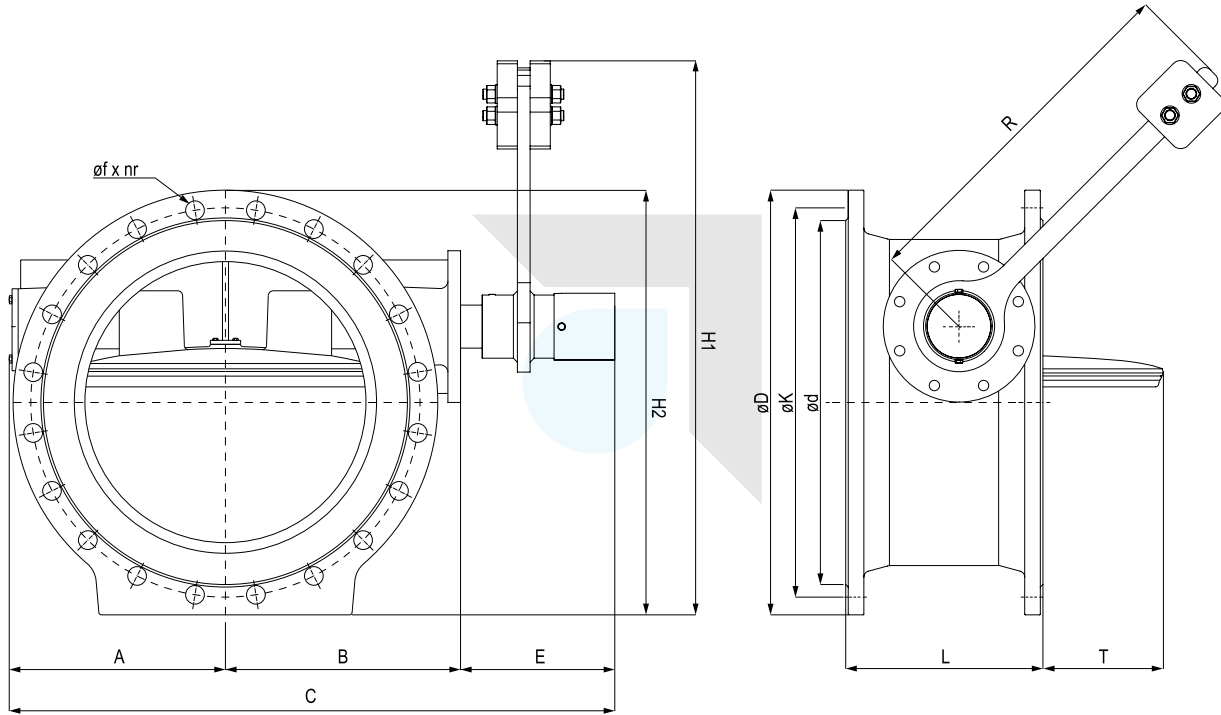


## Material List



#	Part	Material
1	Body	Ductile Iron EN-GJS-400/500 (GGG40/50)
2	Bolts	Stainless Steel A2 / A4
3	Retaining Ring	ST37 Steel / Stainless Steel 304 - 316
4	Sealing	EPDM / NBR / VITON
5	Disc	Ductile Iron EN-GJS-400/500 (GGG40/50)
6	Bushing	Bronze / Brass
7	O-Ring	EPDM / NBR
8	O-Ring	EPDM / NBR
9	Shaft	Stainless Steel AISI 420 / 304 / 316
10	O-Ring	EPDM / NBR
11	Cover	ST37 Steel / Ductile Iron
12	Bolts	Galvanized Steel 8.8 / Stainless Steel A2 / A4
13	Bushing	Bronze / Brass
14	O-Ring	EPDM / NBR
15	Shaft	Stainless Steel AISI 420 / 304 / 316
16	O-Ring	EPDM / NBR
17	O-Ring	EPDM / NBR
18	Rod	Galvanized Steel 8.8 / Stainless Steel A2 / A4
19	Countweweight	ST37 Steel / Ductile Iron
20	Lever	ST37 Steel / Ductile Iron
21	Countweweight	ST37 Steel / Ductile Iron
22	Nut	Galvanized Steel 8.8 / Stainless Steel A2 / A4
23	Cover	ST37 Steel / Ductile Iron
24	Bolts	Galvanized Steel 8.8 / Stainless Steel A2 / A4

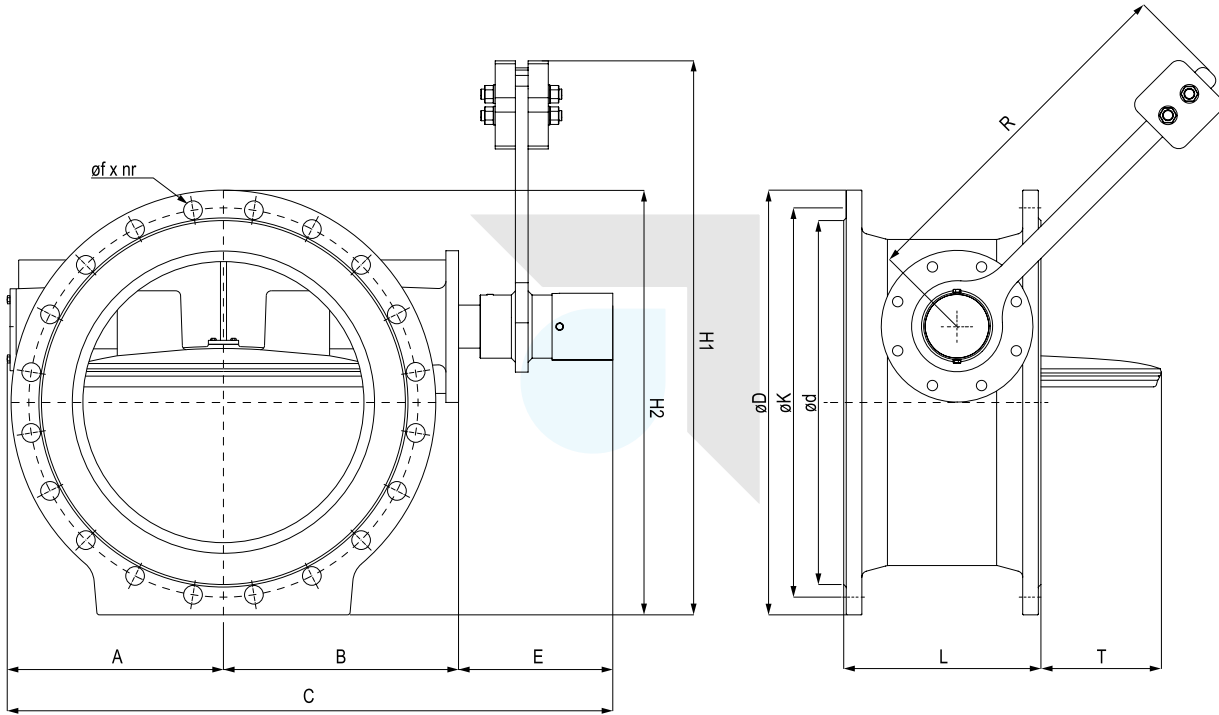
## Dimensions



DN	L	A	B	C	T	PN10		PN16		PN10		PN16		PN10		PN16		KG					
						H1	H2	H1	H2	$\varnothing D$	$\varnothing K$	$\varnothing F$	nr	M	$\varnothing D$	$\varnothing P$	$\varnothing K$	$\varnothing F$	nr	M	$\varnothing D$	PN10	PN16
150	210	175	240	415	40	365	300	365	300	285	240	23	8	M20	211	285	240	23	8	M20	211	30	30
200	230	185	260	445	40	535	355	535	355	340	295	23	8	M20	266	340	295	23	12	M20	266	44	45,5
250	250	215	285	500	44	575	410	590	430	395	350	23	12	M20	319	405	355	28	12	M24	319	66,5	65
300	270	250	350	600	69	613	460	620	475	445	400	23	12	M20	370	460	410	28	12	M24	370	86	89
350	290	280	390	670	101	755	520	762	535	505	460	23	16	M20	429	520	470	28	16	M24	429	139	146
400	310	315	425	740	124	798	580	805	595	565	515	28	16	M24	480	580	525	31	16	M27	480	159	174
450	330	350	465	815	140	935	630	947	655	615	565	28	20	M24	530	640	585	31	20	M27	548	218	230
500	350	365	480	845	165	980	685	1003	730	670	620	28	20	M24	582	715	650	34	20	M30	609	253	295
600	390	430	560	990	215	1155	795	1185	855	780	725	31	20	M27	682	840	770	37	20	M33	720	345	413
700	430	480	630	1110	255	1338	910	1345	925	895	840	31	24	M27	794	910	840	37	24	M33	794	559	570
800	470	560	715	1275	314	1523	1030	1528	1040	1015	950	34	24	M30	901	1025	950	41	24	M36	901	725	775
900	510	620	755	1375	359	1698	1130	1703	1140	1115	1050	34	28	M30	1011	1125	1050	41	28	M36	1011	896	940
1000	550	740	865	1605	405	1780	1245	1793	1270	1230	1160	37	28	M33	1112	1255	1170	44	28	M39	1112	1140	1200
1200	630	850	1050	1900	530	2043	1470	2058	1500	1455	1380	41	32	M36	1328	1485	1390	50	32	M45	1328	2086	2618
1400	710	935	1140	2075	617	2403	1690	2408	1700	1675	1590	44	36	M39	1530	1685	1590	50	36	M45	1530	2268	2954
1500	750	1020	1225	2300	491	2483	1800	2500	1835	1785	1700	44	36	M39	1640	1820	1710	57	36	M52	1640	2800	3664
1600	790	1045	1285	2340	648	2573	1930	2580	1945	1915	1820	50	40	M45	1750	1930	1820	57	40	M52	1750	3200	4376

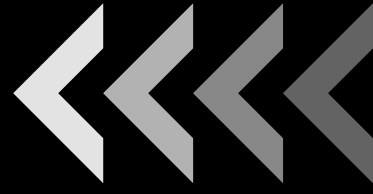
Units: mm / indicative dimensions & weights

## Dimensions



DN	L	A	B	C	T	PN25		PN25						KG	
						H1	H2	øD	øK	øf	nr	M	ød	PN25	
150	210	175	240	415	40	372	315	300	250	28	8	M24	211	30	
200	230	185	260	445	40	545	375	360	310	28	12	M24	274	44	
250	250	215	285	500	44	590	440	425	370	31	12	M27	330	66,5	
300	270	250	350	600	69	633	500	485	430	31	16	M27	389	86	
350	290	280	390	670	101	780	570	555	490	34	16	M30	448	139	
400	310	315	425	740	124	825	635	620	550	37	16	M33	503	159	
450	330	350	465	815	140	962	685	670	600	37	20	M33	548	218	
500	350	365	480	845	165	1010	745	730	660	37	20	M33	609	253	
600	390	430	560	990	215	1188	860	845	770	41	20	M36	720	345	
700	430	480	630	1110	255	1370	975	960	875	44	24	M39	820	559	
800	470	560	715	1275	314	1558	1100	1085	990	50	24	M45	928	725	
900	510	620	755	1375	359	1733	1200	1185	1090	50	28	M45	1028	896	
1000	550	740	865	1605	405	1825	1335	1320	1210	57	28	M52	1112	1140	
1200	630	850	1050	1900	530	2080	1545	1530	1420	57	32	M52	1350	2086	
1400	710	935	1140	2075	617	2443	1770	1755	1640	62	36	M56	1560	2268	
1500	750	1020	1225	2300	491	2523	1880	1865	1750	62	36	M56	1678	2800	
1600	790	1045	1285	2340	648	2603	1990	1975	1860	62	40	M56	1780	3200	

Units: mm / indicative dimensions & weights



## Advantages of Check Valves With Tilting Type Disc <<<<

- System that closes quickly and easily.
- A high degree of stability when the flow is low and pulsating.
- An average pressure drop of moderate magnitude is observed.
- Metal seats are sealed tightly. Disc seats and closes before seat contact occurs.

## Double Offset <<<<

- » 6
- A high performance tilting disc check valve has a double offset pivot. With hinge pins located behind the centerline of the sealing surface and slightly to one side of the pipe centerline, pivot offsets are made at the manufacturing stage of valves.
  - As the valve moves, the offset reduces rubbing between the seat and seal, thus reducing wear.

## Materials of The Valve <<<<

Cast iron is the material of construction of the standard Tilted Disc Check valve. Aluminium bronze or stainless steel are the metals that make up the internal components.

## Lubrication <<<<

DENZ Tilting check valves are equipped with grease fittings on the pivot pin covers. A waterproof, health and hygienic grease must be applied to the valve's pivot trunnions at least monthly or as conditions dictate. Use a cartridge grease gun to inject grease into each grease fitting using several full strokes.



## Storage of DENZ Check Valves

The process of unloading must be carried out carefully in order to avoid any damage. It is important to place the load gently on the ground without letting it drop. Lifting is only accomplished by using shackles in the flange bolt holes or by slings around the body casting. There should be a valid inspection certificate on the forklift if one is used and the capacity of the forklift must be sufficient to lift the required weight.

The unloading workers must all be able to perform their duties. During the course of the work, they are required to wear safety boots, safety vests, safety goggles and hard hats.

There should be sufficient strength in all the slings used to lift the material. They should be stored in a cool, dry place away from sunlight and chemical elements, and they should perform as expected.

It is important to inspect the item immediately after unloading for compliance with specifications and for damage that may have occurred in shipment. As a minimum, the specification check should include size, pressure class, and so on. There are at least the following components that should be checked for damage in shipment: coating, seating and sealing surfaces, accessories, or any other evidence of mishandling during shipment. In the position in which each item will be installed, each item should be opened and closed one time.

DENZ Valves should be stored in a dry, cool environment, free from direct sunlight and any corrosive or chemically active atmosphere. It is very important that the valves are stored in an upright position and in an almost closed position in order to prevent long-term compression of the wedge rubber on the valve. In the event that valves are stored in cold storage, they must be protected from freezing. It is recommended to follow the rule of "first in, first out".

## Markings on DENZ Check Valves

- DENZ Logo (or the logo of the OEM client)
- Product dimension (DN)
- Pressure class (PN)
- Material standard
- Casting batch number (Date of the casting)



## Before Installation



Ensure working conditions are within the specified capacity of the product being installed. Refer to the certified Engineering drawings to assist in determining these values.

Make sure that the construction material of the DENZ Check Valve is chemically compatible with the media flowing in the pipeline

Before installation, rotate the counterweight to check whether valve rotation is flexible and positioning accuracy.

Make sure valve inside and the pipeline are clean. Any foreign material such as pipe scale, metal chips etc. can obstruct disc movement or damage the valve.

Make sure packing seals, the packing should be compressed tightly before installation, meanwhile do not prevent the stem rotation.

The distance between pipe flanges should be checked to assure sufficient clearance for valve.

Wedge should be full opened or closed when under pressure. Can't use the wedge to regulate the flow rate.

At usage, stem screw should be in-pouring lubrication usually.

Regular check on valve's seals surface, stem and gasket, packing etc. parts. If any parts broken, should repair or replace in time.

## Installation



This information is provided as a recommendation to the customer for the proper use and installation of DENZ tilting type check valves.

Make sure that all pressurized lines involved in the installation are isolated, depressurized, and drained before starting work. The failure to do so may cause sudden pressure release and severe injury or death.

It is essential to protect DENZ Check valves during transportation, loading, and handling. Using a crane or any other lifting device should only be done through the flange holes, lifting eyes, or appropriate straps. The valve should never be suspended in the lever or counterweight.

It is important to perform a visual check of the system before it is installed. Checking the stem, valve seat area, flanges, and coating is an area that should be paid special attention to. Check for defects, bended parts, dents, scratches, and other damage. If defects are detected, the valves should be repaired or replaced.

It is essential to use the right gaskets, bolts, washers, and nuts when installing DENZ Check valves with flanges. It is important to tighten bolts in a criss-cross pattern and to apply torque to bolts. For an even pressure on the gasket surface, the valve flanges should be aligned. To find out the sizes of bolts and nuts, please contact our sales team.





It is important to ensure that the connecting flanges of the pipeline, which come into contact with the check valve, are arranged parallel to one another and exactly aligned to avoid tension loads acting upon the valve body during installation. The connecting bolts must also be tightened regularly in a cross pattern for the same reason, and to ensure regular sealing of the flanges. The gasket supplier must inform you of the bolt tightening torques.

The trench should be pressure tested before it is closed after installation. Make sure the check valve and pipe are secured against movement. Ensure that the pipeline and valve are drained prior to gas/air tests if they are tested with water. DENZ valves are designed to resist a test pressure of 1.5 times of the PN value at open position and 1,1 times of the PN value at closed position.

## Testing <<<<

Check to see that all valve joints and pressure-containing bolts are tight. After testing, relieve excess pressure from the upstream side of the valve.

## Warning <<<<

Special care should be taken in the installation, inspection and repair of pressure containing devices such as valves and hydrants. Failure to follow proper practice and guidelines can result in serious injury. Do not make repairs while check valve is under pressure.

## Operation <<<<

1. On check valves without lever or weight, there are no special instructions regarding the operation since the valve is actuated by line flow.
2. If supplied with a lever or weight, the check valve can be adjusted to counteract slamming and/ or surge. Adjustment may be accomplished by adjusting the tension on the spring, or the position, and/or amount, of weight on the valve.

## Maintenance <<<<

Normally there is very little maintenance on a check valve. On standard check valves it is suggested the valve be checked and controlled once a year. Depressurize the valve for inspection. Check for wear at all oscillating locations.

On the DENZ Series C Check Valves with extended shaft valves, every six months add a recommended grease between O-rings until resistance to flow is felt on the grease gun lever. If leakage occurs due to oscillation, replace O-rings by removing retainer plug. Be sure to pressurize space between o-rings with grease after reassembly. Look for excessive wear on extended shaft and bearing bore that would prevent O-ring sealing.





## Spare Parts

Under most conditions the only spare parts needed for swing check valves would be bonnet gasket, and any applicable retaining plug gaskets and O-rings, if valve is equipped with extended shaft.

Under conditions where very frequent oscillation of a clapper is experienced, and/or severe, service conditions, other parts may be kept in stock.

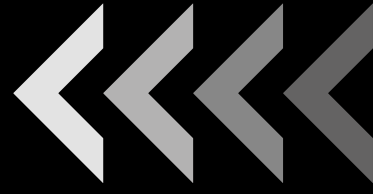
## Caution

Before removing the valve, the line must be drained to prevent pressure from being released.

1. The inlet flange of the valve should be facing down on a flat surface or bench.
2. Drive out both locating pins using a flat-nosed punch
3. A jam nut, a lockwasher, a pointer, pivot pin cover bolts, and covers should be removed from the indicator.
4. It is necessary to remove the pivot pins from the pivots. It has a tapped end for the insertion of threaded rods and a tapped hole on the other end for the pin.
5. Remove the diagonal flange bolts from the outlet body section of the valve using a hoist attached to the outer flange of the valve.
6. The outlet body section of the valve can be raised using the hoist. With a soft-blow hammer or block of wood, hammer down the inlet body section if the valve sections are joined tightly by the gasket. Putting the outlet section on a wooden skid after separating the body sections will allow the outlet section to clear the pivot trunnions.
7. If the Loctite is too hard, heat the disc trunnions with a propane torch to soften the Loctite. Remove the pivot pin bushings on 12" and larger valves.
8. With a nylon sling passing through the disc trunnions and eye bolt, raise the disc while maintaining its 55-degree tilt by threading an eye bolt into one of the threaded holes in its rectangular pad.
9. Put the disc on a wooden skid and turn it over with the disc ring facing up using the nylon sling attached to just the eye bolt.

As a result, all parts can now be inspected for wear or damage and replacement parts can be ordered as needed. It is recommended that you replace the seat and disc ring as a set if you are replacing them. Ideally, pivot pins should fit tightly inside the body while leaving plenty of space between them and the bushings.





## Troubleshooting



A power source is not required to open the valve to allow forward flow. In spite of the fact that the valve may not open to full open, it will ensure minimal headloss even when it does not open to the full open position as a function of the fluid velocity. In order to prevent reverse flow through the pump, the valve will automatically close. A moderate bang during closing is normal if the valve has metal seats.

### **There is a leak at the valve inspection covers:**

Replace non-asbestos sheet gaskets or retighten bolts evenly.

### **The leak occurs at the grease fitting:**

The grease fitting needs to be injected with grease or replaced

### **Flange leakage:**

Replace or retighten the mating flange gasket or retighten bolts using the cross-over method. Flange gaskets are typically made from 70 durometer material. Make sure that the pipe mating is aligned correctly.

### **Leaks in valves when they are closed:**

It is recommended that you cycle the valve in order to flush debris from the seat. Ensure that the isolation butterfly or gate valve is open when the valve is closed and subject to a minimum differential pressure of 10 psi. The interior of the valve should be inspected if leakage persists. Make sure the seating surfaces are clean. In combination with a power-operated control valve, there may not be sufficient reverse flow to seat the valve. Power outages are required for these types of installations to ensure that the valve seats properly so that the pump trips while the control valve is open.

### **Failure to open valve:**

Ensure that there is a pressure differential across the disc. It is necessary to have a higher downstream pressure than an upper downstream pressure. Check that all shutoff valves are open for suction and discharge, and that there are no obstructions in the line. Inspect the disc ring and seat ring for damage and debris wedges on both sides of the valve as well as draining both sides of the valve.

### **Operating at a high level of noise:**

It is normal to hear flow noise during the flow process. Cavitation may cause loud flow noise similar to hammering caused by dropping high pressures across valves. Analyze the velocity of flow through valves and pump applications.

