

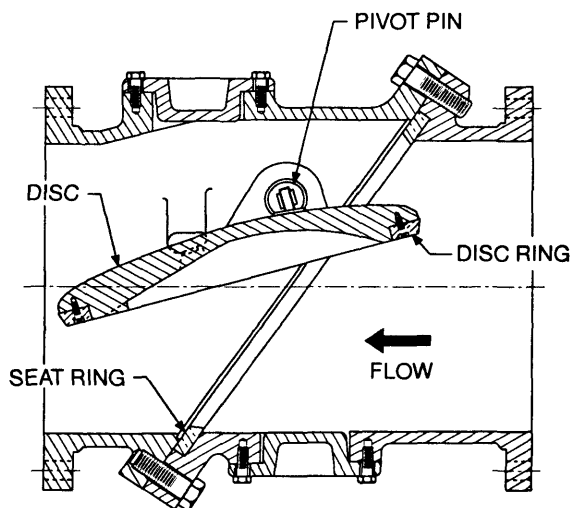


APPLICATION DATA SHEET

TILTED-DISC® CHECK VALVE FOR PUMP DISCHARGE

DESCRIPTION OF APPLICATION

Aurora, Illinois is a historic industrial town about 40 miles west of Chicago. The Water Treatment Plant of Aurora was built in 1992 to service the City and surrounding areas with a capacity of 28 MGD. The raw water is a mixture of water pumped from the nearby Fox River and from several deep wells. The water passes through Walker Process Claricone upflow solids contact clarifiers and sand filters. Two batteries of Byron Jackson vertical turbine pumps are installed in the pump room above the clearwell and are used to provide normal pressure and high service pressure water to the distribution system. Three pumps are also used to provide backwash water to the sand filters.



12" TILTED-DISC® CHECK VALVE

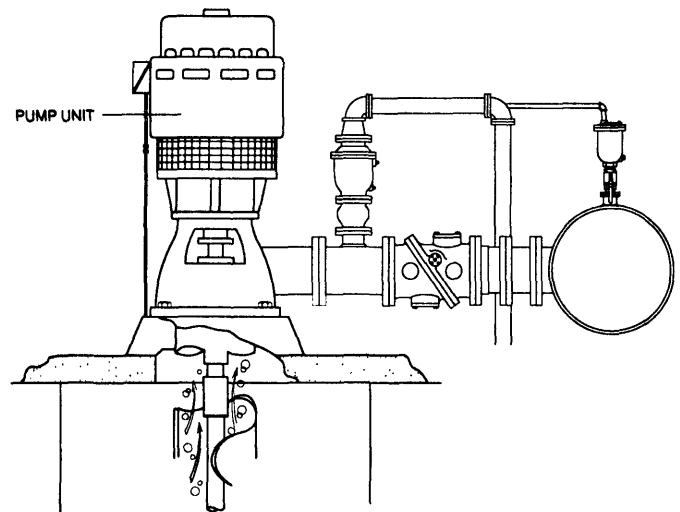
OPERATING DATA

| | |
|--------------------|------------------|
| Valve Size: | 12" |
| Shut Off Pressure: | 62 psig |
| Flow Rate: | 3000 GPM |
| No. Pumps: | 6 |
| Header Size: | 30" |
| Surge Relief: | 4" Control Valve |

VAL-MATIC® EQUIPMENT:

TILTED-DISC® CHECK VALVE: Each pump is equipped with a full line size 125# Class Tilted-Disc® Check Valve to prevent reverse flow through the pump. The Valve was specified by the owner to obtain the lowest possible headloss for a check valve. The valves are fully automatic and open and close as the pumps are started and stopped. The valves feature stable operation, rugged cast iron construction, and a gall-free aluminum-bronze seat. In operation, the valve closes without slamming because of the 40° disc stroke. There is no need for lever and weights as with a conventional swing check valve.

WELL SERVICE AIR VALVE: During each pump start, air between the clearwell and the check valve is exhausted through a 4" well service valve and 4" exhaust pipe. The valves are sized to rapidly release air from the line during pump startup so that air is not pumped into the distribution system. The rapid surge of water into the valve during pump start-up is dissipated with the anti-slam device consisting of a spring-loaded disc with flow ports to throttle the flow of water into the upper valve chamber.



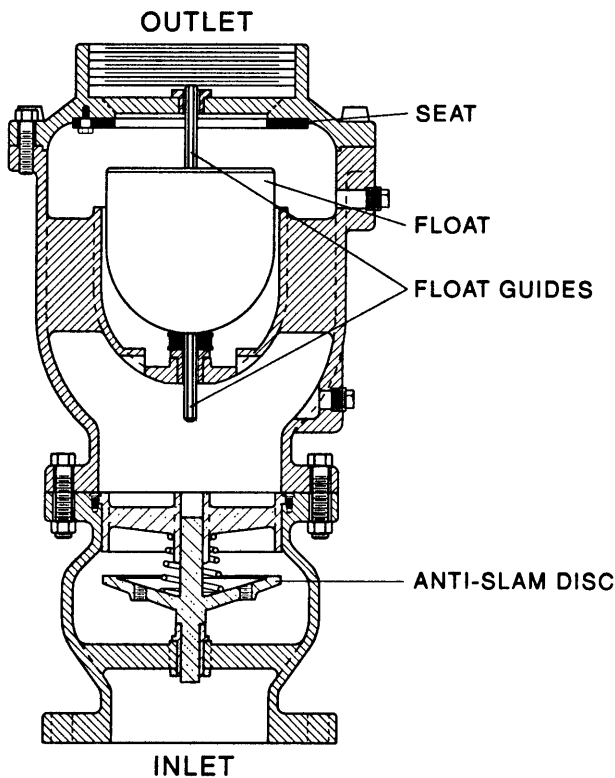
PUMP DISCHARGE DIAGRAM

TILTED DISC® CHECK VALVE FOR PUMP DISCHARGE

DESCRIPTION OF OPERATION

Eight pumps deliver water from a clear-well to a 30" discharge header at 60 psig. Depending on the demand, all or as few as one of the pumps may be running. If the plant operator determines that additional capacity is needed, a signal is sent to the pump motor controller to initiate a pump start sequence as follows.

1. The pump motor is powered and develops pressure in the discharge piping.
2. The air in the 12" line upstream of the check valve is vented through the 4" Well Service Air Valve. The air is piped to return back to the clearwell.



WELL SERVICE AIR VALVE

3. After the air has been vented, water rapidly enters the Well Service Air Valve which closes the Anti-Slam disc. The water then passes through ports in the Anti-Slam disc and fills the float chamber above.
4. The buoyancy of the float then causes it to lift and seal against the resilient seat. The valve will remain closed until the pump stops and the water drains from the float chamber.
5. The rising discharge pressure then exerts an opening force on the check valve disc. Because the pivot pin is 1/3 from the top, the pressure will rotate the valve 40 degrees to the full open position.
6. The pump delivers 3000 GPM or 8.5 fps through the check valve, expansion coupling, and 12" manual butterfly valve into the 30" header.

ENERGY CALCULATIONS

The Tilted-Disc® Check Valve was specified for this application to provide low energy consumption. When compared to other types of check valves, the energy savings can be significant. The equation for calculating the yearly energy costs based on 100% usage is as follows:

$$ECS/Y = \frac{GPM \times HLD \times S_g \times C/Kwh \times 1.65}{PE \times ME}$$

Where:

- | | | |
|----------------|---|---------------------------------|
| ECS/Y | = | yearly energy cost, \$ |
| GPM | = | flow rate, gal/min |
| HLD | = | head loss, ft of water |
| S _g | = | specific gravity, (water = 1.0) |
| C/Kwh | = | cost of electricity, \$/Kw-hour |
| PE | = | Pump efficiency, (.85 typ) |
| ME | = | Motor efficiency, (.85 typ) |

Substituting 3000 GPM, 0.7 ft of water, \$.08 yields an annual energy cost of \$384. The energy cost for a globe-style control check valve with a head loss of 2.9 ft would be \$1590 per year. The savings over 40 years based on 50% usage would be over \$24,000 per valve. The Tilted-Disc® Check Valve was an excellent choice for this application.

VAL-MATIC®

VAL-MATIC® VALVE AND MANUFACTURING CORP.

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