



*Flowserve – Anchor Darling
Feedwater Heater Isolation Valves*

Feedwater Heater Isolation Valves

Problem

Feedwater Heater Isolation Valves that experience seat leakage or thermal binding.

Solution

Anchor Darling Double-disc gate valves provide the solution to both problems.

Wedge Gate Valves

Figure 1a

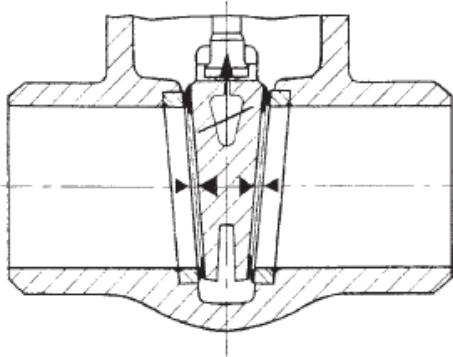
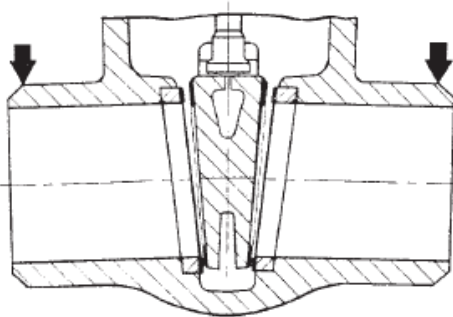


Figure 1b



Thermal Binding

Traditionally, wedge-type gate valves have been used for feedwater heater service. When heater isolation is required during “Online” operation, the valves are closed while the system is hot. Opening these valves after the system cools is difficult or impossible. Because of the way the body of a wedge gate valve is designed (Figure 1a), the seats move inward an amount that is proportionately greater than the wedge shrinkage when the valve cools after closing. Consequently, when the valve is closed hot and allowed to cool, the difference in thermal contraction can bind the wedge so tightly that reopening is impossible until the valve is reheated. There have been occurrences of stem failures and yokes cracking during attempts to reopen thermally bound valves.

Seat Leakage

Another problem encountered with wedge gate heater isolation valves is leakage across the seats. These valves are used to isolate high-energy fluid, making even small leaks serious. When one considers the proximity of workmen to these barriers, the importance of having leak-tight valves becomes apparent. Because of the frequency of leakage encountered with “commercial” valves in the past, it has become necessary to double-valve both the inlet and outlet heater lines. Even then, a drain tap between the two valves is used to check the integrity of the first seal prior to allowing workmen to enter the area.

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The leakage that's associated with wedge-type gate valves is the result of the large temperature change and severe pipe loads subjected on these valves. The wedge-type gate valve's sealing ability is dependent on the angular relationship between the wedge and seat faces (Figure 1b). Even an angular difference of a few seconds can cause leakage.

Using a flexible wedge can minimize the effect of some thermal transients. However, when the temperature change is great, the dimensional mismatch can exceed the deflection capabilities of even the most flexible designs.

Conclusion

Double-disc valves are not subject to thermal binding. The wedging mechanism between the disc collapses as the stem rises. This permits the parallel discs to move inward and be raised regardless of the change in system temperature (Figure 2a).

Double-disc gate valves are not susceptible to leakage resulting from severe thermal conditions. The independent discs automatically compensate for any changes in seat orientation. Neither thermal distortion nor pipe loads will prevent the discs from seating tightly against the seats (Figure 2b). The only criterion that must be met in order to achieve a tight seal is that the faces of the disc and the seat must be flat. This feature has enabled this particular valve to provide tight shutoff when subjected to temperature changes of up to 1700° Fahrenheit. For a valve with these kinds of capabilities, feedwater heater isolation is a relatively simple task.

Double Disc Gate Valves

Figure 2a

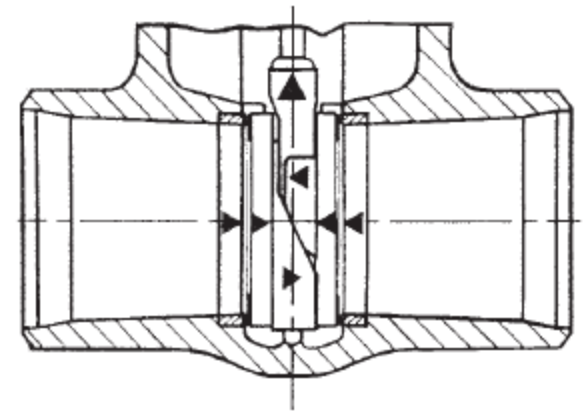
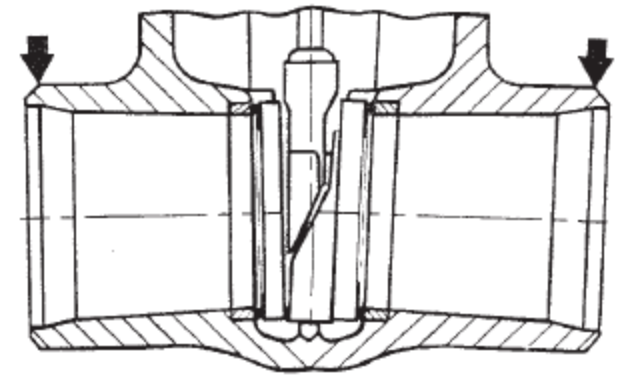


Figure 2b





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