

TECHNICAL ADVANTAGES OF SPECIFYING AND

QUALITY ASSURED

The Goodwin Dual Plate Check Valve is designed, manufactured and tested in facilities in the UK audited to BS EN ISO 9001. Goodwin's valve shop and foundry have been registered by the British Standards Institute to ISO 9000 series for some twenty two years. Approval for both companies was first obtained in 1984. The steel foundry, Goodwin Steel Castings Ltd., was the first in Europe to receive such accreditation.



CERT No. FM 00343
ISO 9001

RETAINERLESS DESIGN (Pat)

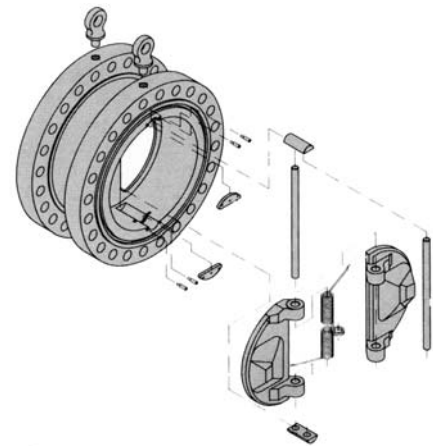
Goodwin was one of the first dual plate check valve manufacturers to offer a retainerless design. This original patented design has now been superseded by a technically superior solution which is available in all types of Goodwin check valve - wafer, flanged, hub-ended and butt-weld end. The engineer no longer needs to worry about whether spiral wound gaskets or ring joints are compatible as the Goodwin design accommodates both USA and European sealing elements.

Not only does the retainerless design provide a higher integrity pressure vessel - no screwed plugs, Goodwin's design enables the valve to be disassembled very quickly without the use of force or special tools other than an Allen wrench. The Goodwin retainerless check valve design concept is such that it is impossible for the valve to become disassembled in the line and does not utilise any springs or circlips.

With improved machining technology Goodwin are able to offer this superior design as standard at a price equal or less than competitors' valves with retaining plugs.

There is no intrusion into the gasket sealing element surface by the retaining mechanism on Goodwin check valves.

(Pat) = Patented Internationally



RETAINING PLUGS

On occasion, for technical reasons, e.g. compact flange and lined valves, Goodwin cannot supply its Retainerless design. In such instances, Goodwin will provide valves with retaining plugs. Retaining plugs have been successfully utilised on check valves for some 40 years.

Cv FACTORS

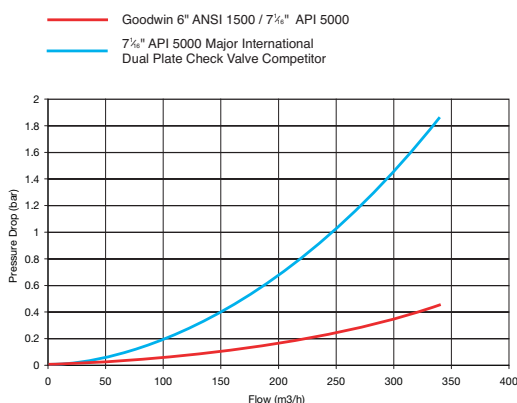


Diagram 1 (Feb. 1994)

From the adjacent graph it can be seen that the pressure drop in the Goodwin high pressure dual plate check valve is substantially less than that of other manufacturers.

This superior performance is achieved by the use of Goodwin's plates (Pat) which, through their slim design, offer less restriction to flow whilst in the fully open position. Also the plates by having a combination of rigidity in certain areas and flexibility in others make it possible to use larger throat areas in the body. This contributes to Goodwin's better flow efficiencies whilst maintaining seat sealing performance.

On conventional dual plate check valves there is typically a 50% reduction in valve throat area between a 150lb valve and a 1500lb valve, whereas there is only around 10% reduction on the Goodwin valve.

From the FLUENT® computer simulation (see page 41), it can be seen that the pressure drop is caused not only by a reduced flow area in the body but also by the plates constricting the flow path when in the open position. These constrictions are minimised in the Goodwin valve.

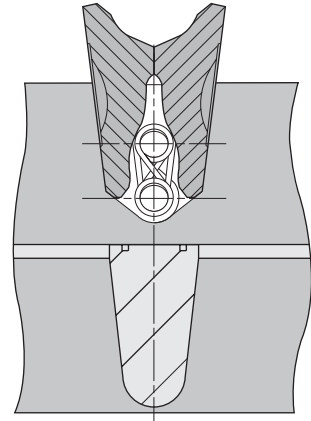
USING GOODWIN DUAL PLATE CHECK VALVES

PLATE SHOCK BUMPERS

For many years Goodwin produced dual plate check valves with plate shock bumpers located at the extreme edge of the curve of the plate. Goodwin's plate (Pat) now incorporates the plate bumper at the centre of mass of the plate approximately one-third the way in from the curved edge. With the plate bumper at the centre of mass, when the bumper of each plate collides, there is an equal and opposite force acting on the plates which prevents significant bending moments acting on the hinge pin of the plate. Plate bumpers are supplied as standard on all sizes, pressures and types of Goodwin Dual Plate Check Valves.

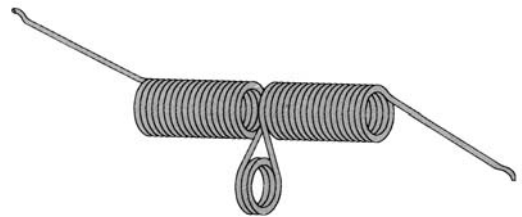
It is an accepted fact that there will be occasions when the plates do not arrive fully open at the same instance. Clearance on the bumper allow and ensure the plates to hit each other rather than the stop pin. This helps prevent large forces being exerted on the stop pin which could cause damage.

The stop pin has only one purpose, to stop a plate going over top dead centre when reverse flow occurs. If this did occur both plates would be on the same side of the valve leaving one port open, thereby stopping the valve performing its sole function of preventing reverse flow.



INDEPENDENT PLATE CLOSING ACTION

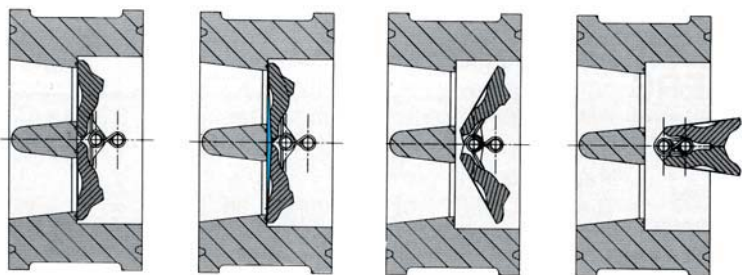
The independent spring action optimises the equal closing rates of each plate especially when friction coefficients are uneven due to one plate resting upon another. The springs have been designed to ensure stresses are kept to a level so that the spring should have a theoretical infinite life. Spring designs utilised in Goodwin valves have undergone accelerated laboratory testing and are proven to be capable of operating without failure over 2,000,000 cycles.



SEAT LIFE

Increased seat life is obtained by eliminating the problem of the plates dragging on the seat when opening.

Due to the clearance between the plate hinge and the hinge pin, the heel of the plate lifts with the initial flow as the foot of the spring acts beyond the centre of pressure of the plate. As the flow then increases through the valve the plates open without the heels of the plate scuffing the body seat.



SEAT LEAKAGE - METAL TO METAL SEATS

The dual plate check valve is tested to API 598 which has a metal to metal seat permitted seal leakage of 3 cc/inch of bore/min. This small but significant amount arises because it is more difficult to obtain a perfect seal on a D shaped seat compared to a circular seat. The Goodwin plates (Pat) have been specifically designed to overcome this problem and to be better at sealing than earlier designs, such that near zero leakage can be economically achieved on metal to metal seats. This is particularly useful on high temperature gas applications and cryogenic applications where it is not possible to use resilient seats.

In contrast to other dual plate check valves the seat sealing characteristics of the Goodwin valve are enhanced as line pressure increases unlike competitors valves which can significantly deteriorate in higher pressure classes. This characteristic enables Goodwin to provide dual plate check valves with substantially lower leakage rates than specified in API 598.