Internal Pressure Equalizing Vents in Gemini Ball Valves

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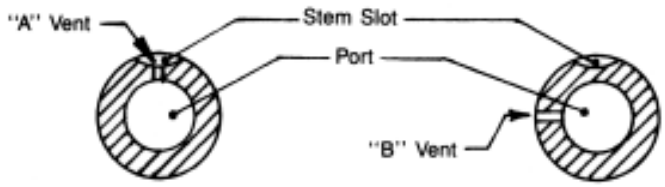
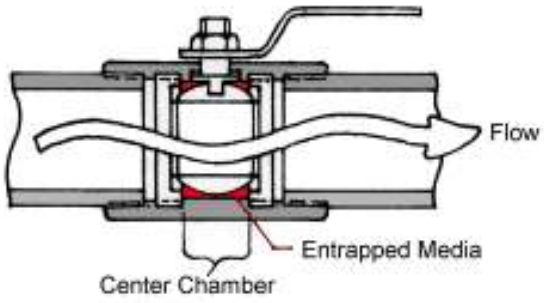
Pressure relief vents in ball valves serve to prevent the damaging pressure build up which is inherent in certain valve applications. Two types of vents are available for Gemini Valves; the 'A' type which connects the ball slot with the port, and the 'B', or upstream type, which connects the port and the upstream face of the ball.



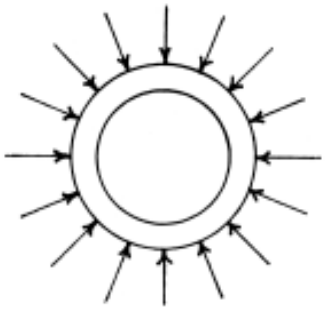
Cross-sectional view of valve ball with "A" vent (ball cavity vent hole)

Cross-sectional view of valve ball with "B" vent (upstream pressure relief vent hole)

Heating of liquid media trapped within the valve body center chamber can cause the internal pressure to rise to levels which can permanently distort the seats. Damage is progressive: the cycle begins when the valve body, filled with liquid, is heated usually through conduction from hot flowing media. As the trapped media expands it applies intense pressure to the outside rim of the seats forcing them inwardly toward the port.



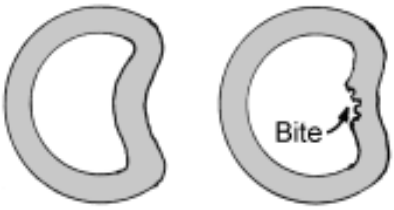
Note: The center chamber, in which the ball and seats are housed, is effectively sealed from the port area when the valve is fully opened or when it is fully closed.



Seats are forced inward

Only a small amount of deformation is sufficient to drop the internal pressure and stop further deformation, but when applied pressure is relieved the seats don't quite regain their original shape.

Suceeding cycles admit fresh liquid to the center chamber, filling the space now enlarged through seat distortion from proceeding cycles. The process usually continues by stages until one of the seats collapses, the buckled section intruding into the port area. When the valve is operated after the seat buckles, the ball port may shear a piece from the inside diameter as the valve is operated leaving the seat with the appearance of having been bitten.



There are a few precautions that can be taken to prevent these seats failures:

1. If possible, mount the valve so as to prevent media entrapment (in steam systems, mount the valve above the boiler water-level so that the valve does not flood with condensate during cool-down: If possible, install the valve in a vertical run).

2. Use a valve with a relief hole drilled in the steam slot ('A' vent). This works when the heated media is the culprit (Figure 1).

3. Provide a relief hole in the upstream side of the valve ball. This is effective whether the heat is applied externally or internally. However, care must be take to make sure that the hole is on the upstream side; if the vent hole is turned toward the downstream side the valve may leak. For this reason 'B' vents should only be used where absolutely necessary (Figure 2.)

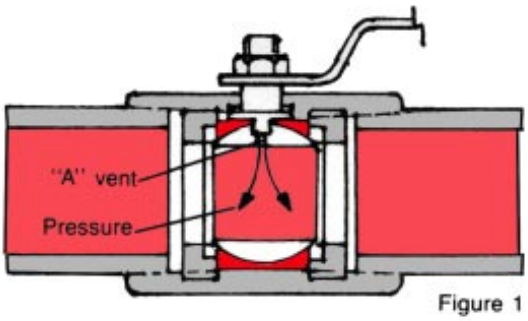


Figure 1

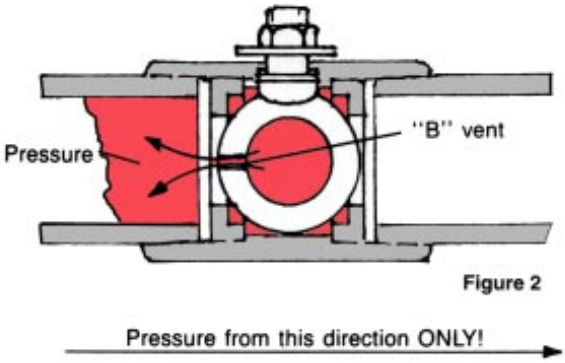


Figure 2