GRISWOLD CONTROLS INTRODUCES OPTIMIZED TEMPERATURE CONTROL

INNOVATION

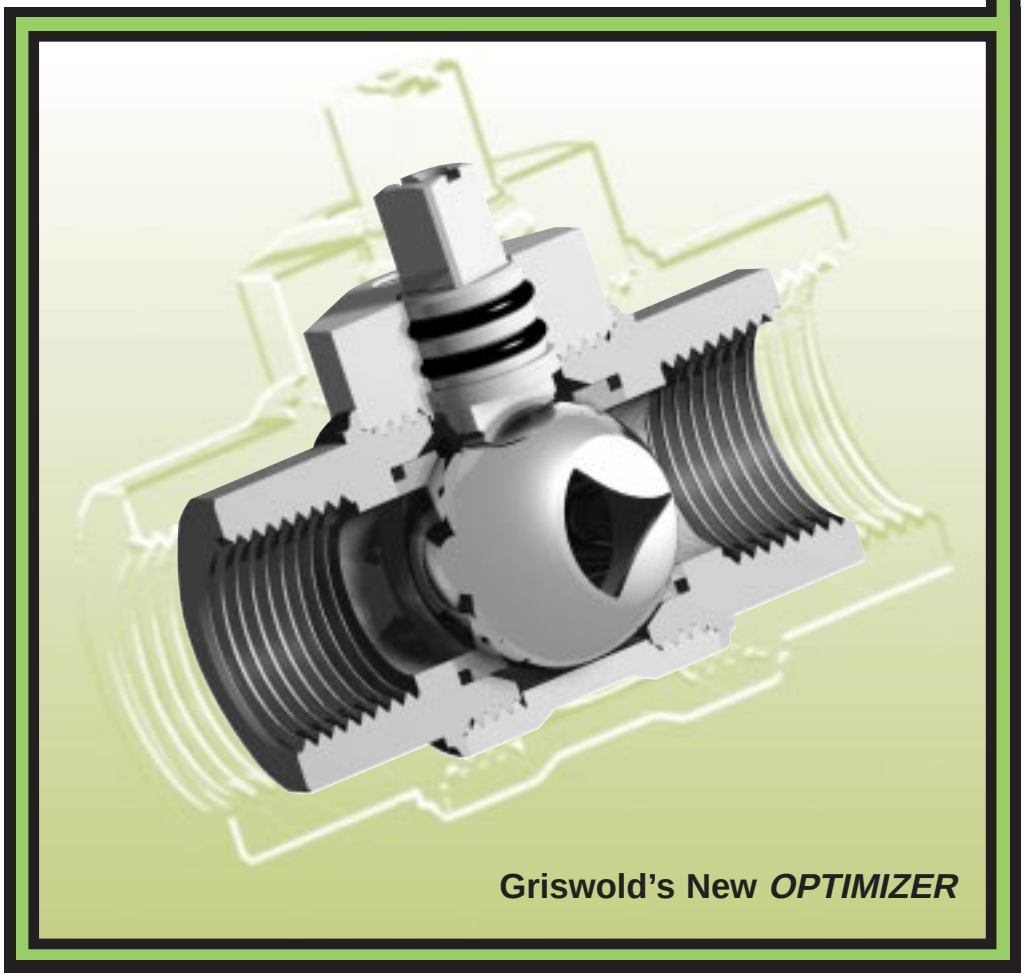
Griswold Controls has always championed innovation and experience. We are now bringing those two qualities to Temperature Control with our new line of Optimized Temperature Control Valves. These valves showcase Griswold's *OPTIMIZER* Flow Insert (patent #5,937,890), a device inserted into the port of the ball valve for Equal Percentage Flow. This insert has proven itself in our Quickset line of Manual Balance Valves and brings the same reliability to our new Temperature Controls. Thanks to the *OPTIMIZER* both valves have close-off pressure of 100 PSID.

UNIMIZER

The Unimizer is a truly accurate Electronically Actuated Ball Valve. It features the versatility of regular or union end connections and a Universal Mounting Plate for multi-actuator compatibility.

AUTOMIZER

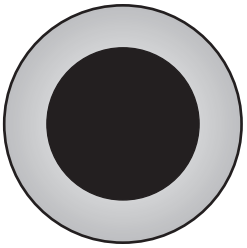
The Automizer combines the *OPTIMIZER* with the Griswold 100% Stainless Steel Flow Cartridge for Optimized Automatic Flow Limiting. The entire return side of the coil is represented in one valve for single-source responsibility. The Automizer also features the Universal Mounting Plate



Griswold's New *OPTIMIZER*

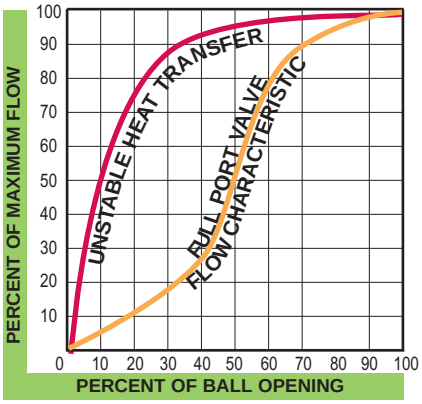
BALL VALVE CHARACTERISTICS

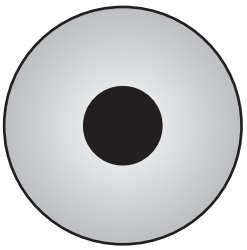
The most desirable flow characteristic in a ball valve is an Equal Percentage Flow Characteristic which mirrors the equal percentage flow of the coil, producing a linear heat transfer as the valve throttles open and closed. Historically the ball valve has been used in applications like heat pumps where linear heat transfer is not crucial to the system.



FULL PORT

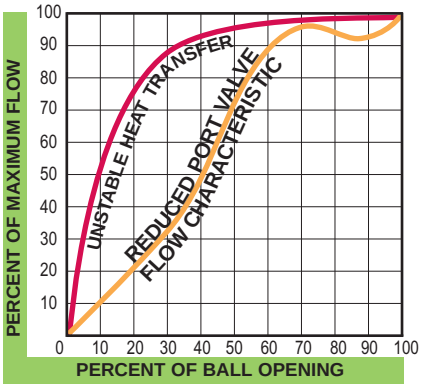
The large Cv rating of Full Port Ball Valves is caused by the shape and size of the orifice and results in a distorted flow characteristic, an unstable heat transfer and an "all or nothing" flow. The valve opens quickly and has a very small pressure drop. This works for heat pumps, but not for fan coils which require accuracy and a range of lower Cv's.

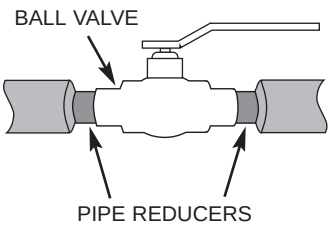




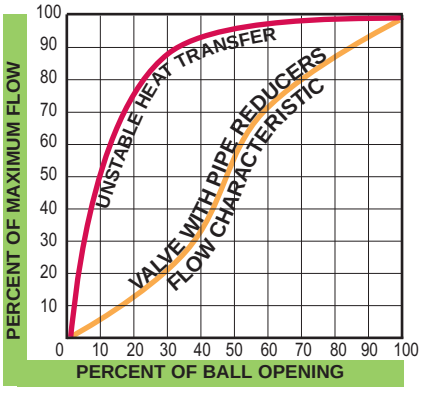
REDUCED PORT

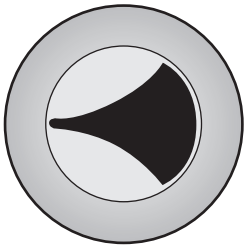
To achieve more and lower Cv's, a reduced port ball was introduced. In this scheme, the opening through the ball is narrower, and a smaller Cv is achieved with a higher pressure differential. Unfortunately, the flow characteristic is still distorted and the heat transfer just as unstable.





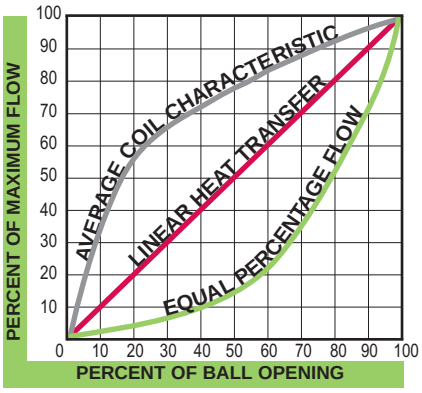
Pipe reducers have also been tried as a solution. The result is not far from the characteristic of the full port ball. The Cv is reduced due to the piping geometry, but this also distorts the characteristic. As in the full and reduced port ball valves, pipe reducers cause unstable heat output, with heat output increasing far too quickly as the valve opens.





OPTIMIZER

Griswold's *OPTIMIZER* (patent #5,937,890) insert finally achieves True Equal Percentage Flow. The parabolic shape of the orifice allows a slowly opening valve. Equal movements of the valve stem at any point of the flow range change the existing flow an equal percentage regardless of the existing flow. As you can see in the graph at right, our valve mirrors the equal percentage characteristic of the coil, resulting in linear heat transfer. For 1/2" - 2" sizes, Griswold offers 30 Cv selections.



OPTIMIZER ADVANTAGES

- Equal Percent Flow Characteristic.
- Griswold's new *OPTIMIZER* is available in a variety of sizes for **the most Cv choices in the industry**.
- The *OPTIMIZER* is an insert that is press fit into the ball, giving it higher shutoff pressure capability than a disc which sits outside the ball.
- Proven effective by three years in Quickset Manual Balance Valves

MATERIALS

The *OPTIMIZER* is made from a rigid Noryl polymer instead of the soft, flexible Teflon used in other products. This material is very stable in environments where extreme temperatures occur. Noryl is regularly selected for use in pump impellers in the HVAC industry.

VALVE AUTHORITY

Cv is the quantity of water, in GPM at 60°F, that will flow through a given valve with a pressure drop of 1 PSI (also called capacity index).

$$Q = Cv\sqrt{\Delta P} \qquad \text{Valve Authority} = \frac{\Delta P\ (ATC)}{\Delta P\ (Branch)}$$

Valve authority is the ratio of the ΔP of the control valve to the ΔP of the branch at design flow. It is good practice to make the valve authority higher than 40% to guarantee adequate control of the fluid. This usually corresponds to a pressure drop across the ATC valve of 1-1/2 times the pressure drop through the coil (generally between 3 and 5 PSI and never greater than 10 PSI).

The smallest area or lowest Cv controls the flow of water. Smaller pipe sizes require more pressure than larger pipe sizes. **The *OPTIMIZER*'s low Cv valves ensure temperature control valve authority.**

SIZING FLOW LIMIT AND TEMPERATURE CONTROL VALVES

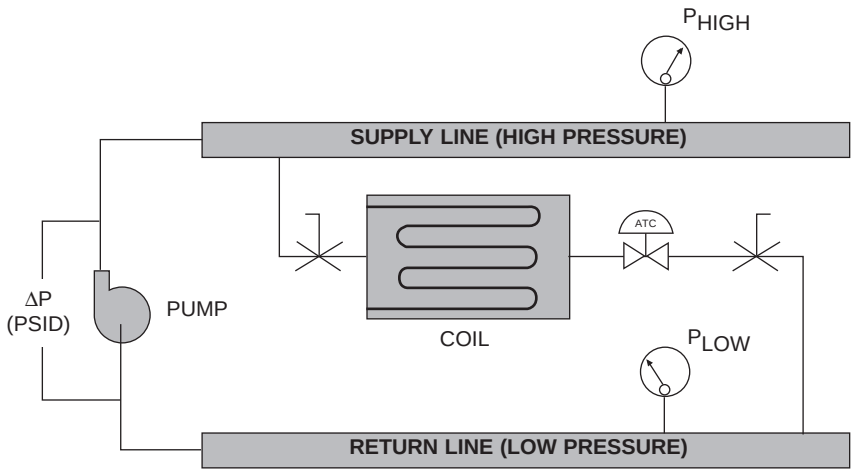
Flow limit valves are selected by the GPM requirement of the coil, zone or system, the PSID of the valve location and the piping sizes and types of connections.

Temperature control valves are selected by the branch Cv (pipe lengths, ball valves, strainer, coil, union, temperature control valve and flow limit valve) and the piping sizes and types of connections.

HVAC TECHNOLOGY REVIEW

SHUTOFF

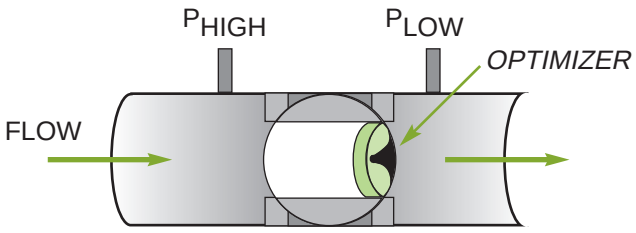
The shutoff pressure is the amount of pressure in the system that a valve can close against without any fluid leak-by (Acceptable leak-by for temperature controls is defined as .01% of the Cv). Energy conservation occurs when the valve can be shut off against the system pressure. Water does not leak-by the valve to the coil; there is no heat loss or gain; there is no extra flow requirement for the pump. Pumps in typical HVAC systems provide a maximum of 70 PSI in a system. Globe valves by design can only shut off against 30-50 PSID. Standard ball valves can shut off against 50 to 150 PSID. Because of their "Floating Ball Design", Griswold Ball Valves can shut off against at least 100 PSID **with less than 50 inch-lbs. of torque.** With a safety factor of almost 1.5, 100 PSID shut off is sufficient for almost every HVAC system. You can have a higher shut off pressure with a higher torque actuator.



Shutoff is against pump head pressure. Typical HVAC pump produces about 70 PSID maximum. The valve sees PH-PL which is the supply line pressure and return line pressure. The pressure differential is expressed in PSID. The valve is throttling the flow.

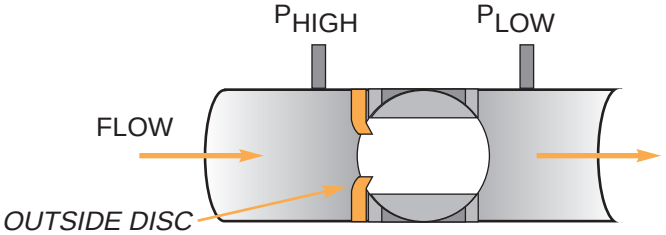
Distributors show 50, 100 and 150 PSID shut off for small, medium and large valves. One manufacturer shows 200 PSID "inlet" close-off pressure, then qualifies their "outside disc" valves to only 30 PSID and their full port valves to 150 PSID shut off. This could cause misapplication.

OPTIMIZER INSERT



High differential pressure does not affect rigid *OPTIMIZER*.

OUTSIDE DISCS



High differential pressure (above 30 PSID) causes:

- Change in orifice area resulting in inaccurate throttling control.
- Deformation of disk into port, creating physical obstruction to shutoff.
- System noise as valve throttles

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