Combination Valves and Water Flow Measurement

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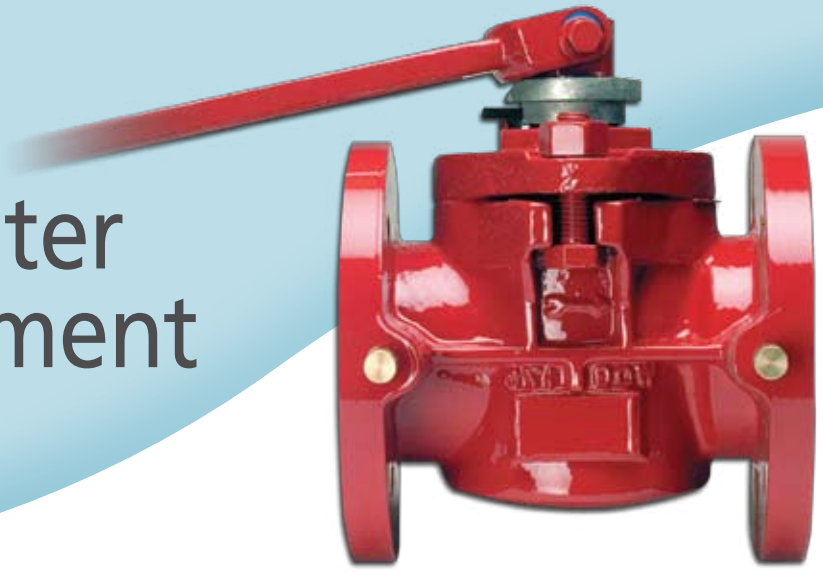

Photo: www.pattersonpumps.com

Combination valves, many times referred to as a Triple-Duty Valve® or Multi-Purpose Valve, are commonly used in piping arrangements and are sometimes called upon for measuring water flow rate.

If a combination valve is to be utilized for flow measurement, the following criteria must be followed:

The combination valve must be installed per manufacturer's recommendations. For many combination valves the minimum length of unrestricted straight pipe required to provide calibrated accuracy ranges from 5 to10 pipe diameters upstream and 3-5 pipe diameters downstream. This is a scenario that seldom occurs.

The combination valve must be sized for water flow, not nominal pipe size. In most "line-size" installations, the pressure drop that is read across the combination valve is too low for accurate flow determination.

If either of the above cannot be achieved then it would be recommended that a separate flow measuring device be used. The main criterion for flow measurement is a balancing valve or flow measuring device utilized and installed per manufacturer's recommendations. In some cases multiple flow measuring devices may be used to obtain a system or pump total flow. In addition, the separate flow measuring device provides the added benefit of accurate flow measurement at lower flows in a variable volume system.

As an example (see below), the flow rate of a 500 GPM pump on a VFD can be measured at 250 GPM using a 5" or 6" fixed venturi. Since a VFD is employed, the combination valve would be left wide open. In this example a 5" combination valve would be too large and a 3" combination valve would be too small. A flow rate of 500 GPM could be read on a 4" combination valve; however, at flow rates below 400 GPM measurement of water flow could not be accurately obtained due to the low pressure drop readings.

EXAMPLE:

Flow - GPM	Pressure Differential Measured at Flow Device for Listed Flow			
	Balancing Valve	Venturi Flow Station	Combination Valve	Combination Valve
	Griswold 6" Quickset	Flow Designs, Inc. 600L	B&G 3DS-4S Triple Duty® Valve (4")[1]	B&G 3DS-5S Triple Duty® Valve (5")[1]
500	65 in.	51 in.	4.5 Ft.	2.3 Ft.
300	23 in.	18 in.	2.8 Ft.	1.6 Ft.
250	16 in.	13 in.	2.6 Ft.	1.5 Ft.
200	10 in.	8 in.	2.4 Ft.	1.5 Ft.

B&G requires a minimum reading of 3 Ft. of pressure drop for accurate flow determination.