Hydraulic Valves

Flow control valves and flow shut-off valves come in a variety of different designs that have different suitabilities in different applications. Some designs are primarily intended for tight shut-off, some are better at sustaining large pressure differences, some are intended for and provided accurate flow control, some allow installation in limited space and some are less expensive than others. Here we will not attempt any comparison of the various types but rather provide a very brief presentation of some of the more common types.

Gate valves, like that shown in Figure 1 are often used for shutting off flow for they provide a tight shut-

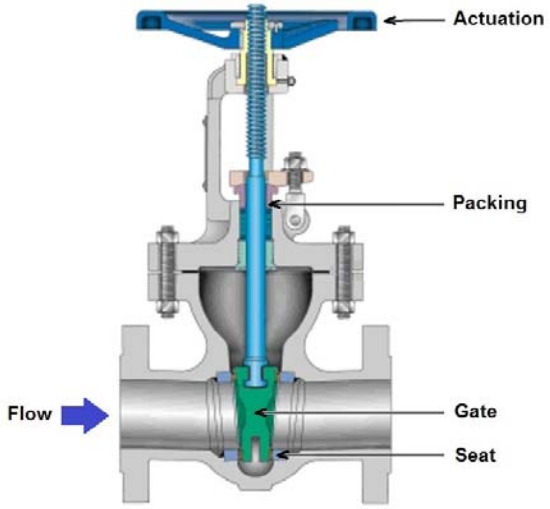

Figure 1: Typical gate valve.

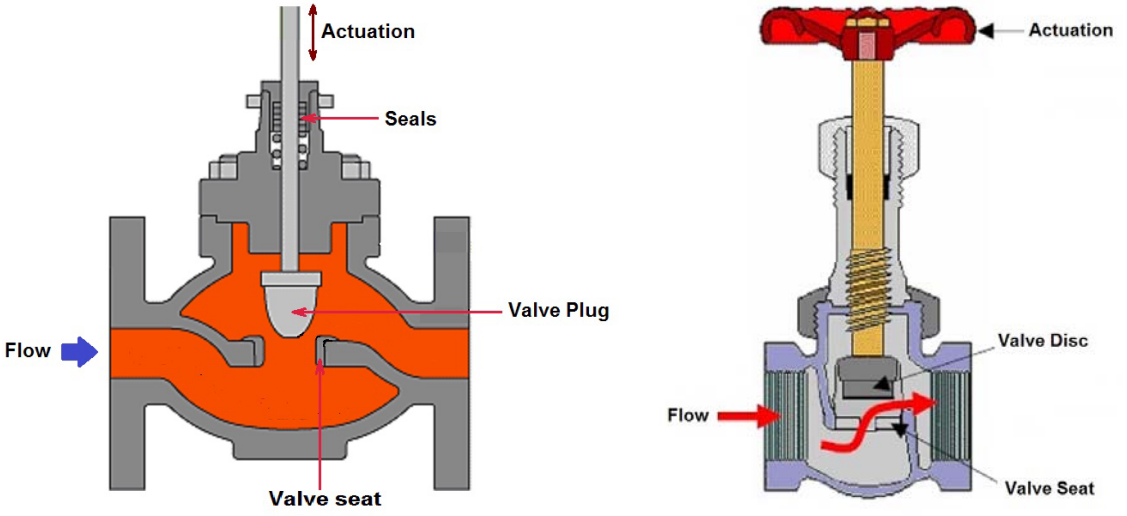

Figure 2: Typical globe valves.

off and, when open, generate little pressure drop. Globe valves are quite commonly used for flow control purposes because of their suitability for throttling flow and the ease their sensitivity. Two examples are

presented in Figure 2. Ball valves incorporate a spherical ball located between two sealing rings in a simple

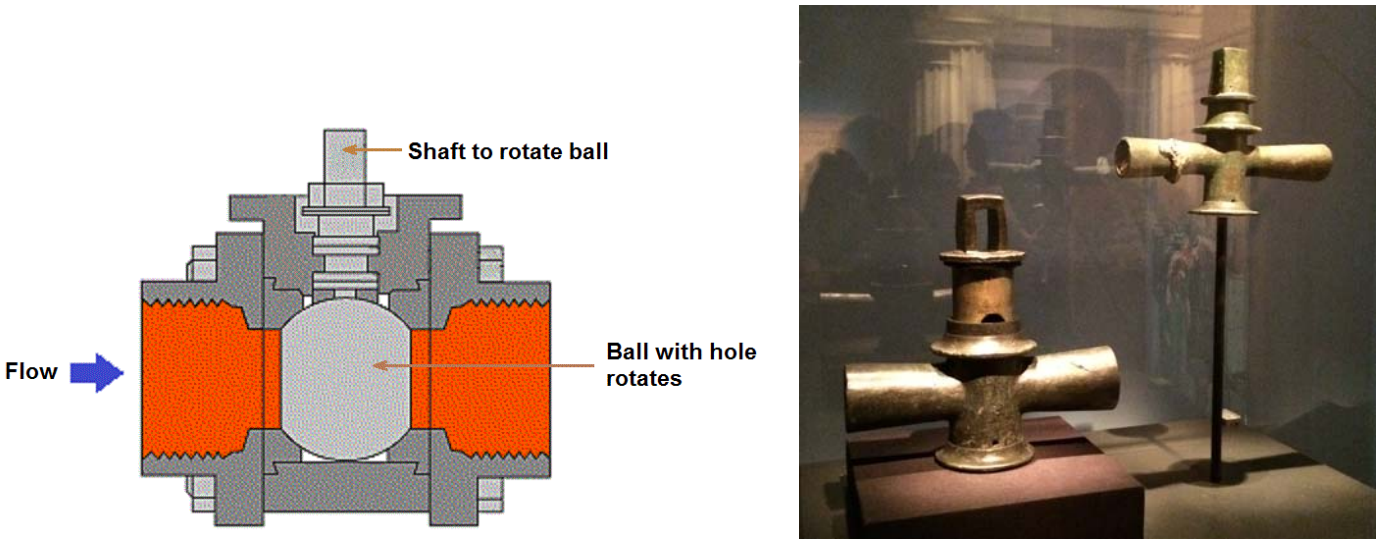

Figure 3: Left: Typical ball valve. Right: Roman ball valves for water supply systems (from the ruins of Pompeii).

body as shown in Figure 3 (left). The ball has a hole allowing fluid to pass through. When aligned with the pipe ends, this allows unimpeded flow through the valve with little pressure drop. Rotating the ball opens and closes the flow passage. Ball valves are primarily used for flow control purposes. They provide are an economic way of controlling the flow rate with tight shut-off for many fluids including steam at high temperatures. Ball valves date back to Greco-Roman times as can be seen from the examples shown in Figure 3 (right), unearthed from the ruins of Pompeii. Though these used a rotatable cylinder rather than a ball the principle and characteristics are the same.

Butterfly valves are usually limited to low pressures and temperatures because of the inherent limitations

Figure 4: Typical butterfly valve.

of the seals and seats surrounding the closed gate. Moreover, the the valve presents little resistance to

flow when open and is therefore of limited use in adjusting the flow rate. They do, however, take little axial space and are therefore more readily installed in existing piping systems when a line shut-off option is needed.