# 7.5. Valves

## 7.5.1. Valve Selection

Manufacturer data must be considered when selecting and sizing valves. The following general items must be considered in selecting valves:

- Temperature: The valve bodies, trim, and operating parts must be capable of withstanding the highest temperature expected during sustained normal and transient operating conditions
- Pressure: The valve must be rated for the highest transient pressure that might be expected
- Shutoff: The degree of allowable shutoff must be known. No leakage must be allowed.
- Valve operation: It must be determined whether the valve be used only for ON/OFF use or for throttling
- Pressure drop: Allowable pressure drop must be established and the size selected
- Velocity: The velocity of the fluid through the valve must be considered to avoid cavitation in any operating condition



## 7.5.2. Valve Losses

There may be occasions where precise determination of the pressure drop through valve (check valve or flap valve) shall be required. This is done by using the standard measure of valve flow, the coefficients Kv or Cv. These coefficients are determined by the valve manufacturer using actual flow tests. With the Kv or Cv known, the pressure differential can be found.

Kv value is defined as the rate of flow of water in $m^3$/hr in temperature range from 5°C to 30°C at a pressure drop of 1 bar across the valve. Thus for a given Kv and Q the pressure drop across a valve is calculated as:

$$\Delta P = \left(\frac{Q}{K_v}\right)^2$$

Where:

Kv = valve coefficient

Q = flow through the valve in m3/h

ΔP = pressure drop in bar

Cv value is defined as the rate of flow of water in US gallons per Minute at 15°C at a pressure drop of 1 psi across the equipment. Thus for a given Cv, the Kv value is calculated as:

Kv = 0.86488 Cv

## 7.5.3. Flushing Flow

The flushing flow (qf) for scouring and cleaning can be calculated by the following formula:

$$q_f = 0.012524 \; x \; d^2 \sqrt{\frac{10.195 \; x \; MDP}{K}}$$