General Data

Flow Calculations for Valve Sizing:

Broadly speaking, the rate of flow of a liquid or gas through a given valve depends upon the temperature, gravity, and pressure drop of that liquid or gas through that particular valve.

The design style of each valve affects flow volume through the valve differently. The development of a "Factor" to adjust the relationship of temperature, gravity, and pressure drop through that particular valve enables us to predict the flow volume through that valve. This factor is called C_V — or Flow Coefficient — for the valve and it has been developed through actual flow tests or long time field results.

Most C_V factors for a particular valve style can be found in the individual valve catalog sheets. Approximate flow capacity can be determined for any of these valves by using the given C_V factor for that valve and applying them to the following formulas.

For Liquids:

$$Q = 34.3\, C_V \sqrt{\frac{\triangle P}{G}}$$

Where:

- Q = Flow (Barrels/Day)
- C_V = Flow Factor
- $\triangle P$ = Pressure Drop Across Valve
- G = Specific Gravity (Water=1.0)

For Gas:

$$Q = .0234\, C_V \sqrt{\frac{\triangle P (P_1+P_2)}{G\,T}}$$

Where:

- Q = Flow (MMSCFD)
- C_V = Flow factor
- P_1 = Inlet pressure (psia)
- P_2 = Outlet pressure (psia)
- $\triangle P$ = Pressure drop ($P_1 - P_2$). When P_2 is less than $1/2\ P_1$, use $1/2\ P_1$, for P_2 in formula.
- G = Specific gravity (air= 1.0)
- T = Flowing temperature absolute (°F + 460)

If flow capacity required is known and valve selection is desired, solve for C_V with the following formulas and select appropriate valve from C_V factor chart.

For Liquids:

$$C_V = \frac{Q}{34.3 \sqrt{\frac{\triangle P}{G}}}$$

For Gas:

$$C_V = \frac{Q}{.0234 \sqrt{\frac{\triangle P (P_1 + P_2)}{GT}}}$$