PDC
Process Development & Control, Inc.

Product Catalogue

Engineering Information
For PDC Butterfly Valves

Sizing for:

- Liquids
- Gases
- Saturated Steam Service
- Vapor Flow (other than steam)

Sizing For Liquids

SUBCRITICAL FLOW

$$C_v = Q\sqrt{\frac{G}{DELTA\ P}}$$

$$Q = C_v\sqrt{\frac{DELTA\ P}{G}}$$

$$DELTA\ P = G\left(\frac{Q}{C_v}\right)^2$$

Where:
C_v = Flow coefficient (number of U.S. gallons of water flowing through a valve with a pressure drop of 1 psig)

G = Specific gravity of flowing media at system temperature. (water = 1 @ 60 deg. F.)

DELTA P = Pressure drop, P1 -P2, psig

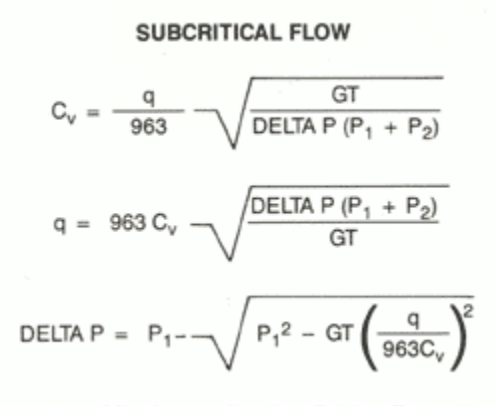
C_f = Critical flow factor (0.65 @ 60 deg.; 0.55 @ 90 deg.)

P_1 = Inlet pressure, psia

P_2 Outlet pressure, psia

Q = Flow, gallons per minute, GPM

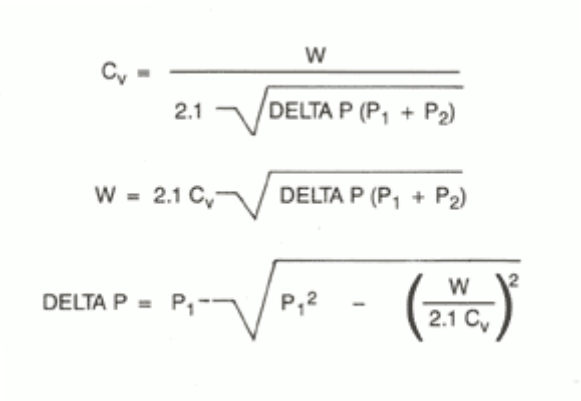
Sizing for Gases:



Where:
T = Absolute temperature of flowing media,
deg. R (deg. F + 460)

q = Flow, standard cubic feet per hour, SCFH

Sizing for Saturated Steam Service:



Where:
W = Flow, lbs./hr.

Add 7% to Cv for each 100° F of super heat.

Sizing for Vapor Flow (Other Than Steam):

$$C_v = \frac{W}{K\sqrt{\text{DELTA P}\,(P_1 + P_2)}}$$

$$W = K\,C_v\sqrt{\text{DELTA P}\,(P_1 + P_2)}$$

$$\text{DELTA P} = P_1 - \sqrt{P_1^2 - \left(\frac{W}{KC_v}\right)^2}$$

Where:
K = Constant for vapor

Vapor	K
Freon 11	7.4
Freon 12	7.1
Freon 14	8.4
Freon 114	8.3
Ammonia	2.7
Dowtherm A	5.6