

## PRESSURE AND FLOW EQUATIONS

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Q = Flow in gpm	$Q = 29.92 \times d^2 \times P^{1/2} \times Cd$
V = Velocity in ft/sec	$V = 12.186 \times P^{1/2} = Cd \times .4085 \times Q/d^2$
P = Pressure in psi	$P = .00112 \times Q^2/(d^4 \times Cd^2)$
Hp = Horsepower	$Hp = .0174 \times d^2 \times P^{3/2} \times Cd, \approx P \times Q/1714$
Cv = Flow Coefficient	$Cv = Q/ \Delta P^{1/2}, = 53 \times (D2.5/L^{1/2})$
$\Delta P$ = Pressure Drop	$\Delta P = (Q/Cv)^2$
F = Thrust in lb	$F = \pi/2 \times d^2 \times P \times Cd, = .052 \times P^{1/2} \times Q, \approx .0018 \times (Q/D)^2 \times Cd$
$\Delta T$ = Temp Change °F	$\Delta T = \Delta P/337.6$

### For all equations:

- L = Tube length in feet
- D = Tube ID in inches
- d = Orifice diameter in inches
- Cd = Discharge Coefficient
  - Cd = 0.90 for long cone orifice
  - Cd = 0.70 for drilled steel orifice
  - Cd = 0.65 for sapphire orifice