



Fluid Mechanics & Thermal Physics

A. Fluid Mechanics (Ch 9)

Hydrostatic Pressure:

Students should understand the concept of pressure as it applies to fluids, so they can:

- ◆ Apply the relationship between pressure, force, and area. (9.3 & 9.4)
- ◆ Apply the principle that a fluid exerts pressure in all directions. (9.4)
- ◆ Apply the principle that a fluid at rest exerts pressure perpendicular to any surface that it contacts. (9.4)
- ◆ Determine locations of equal pressure in a fluid. (9.4)
- ◆ Determine the values of absolute and gauge pressure for a particular situation. (9.4 & 9.5)
- ◆ Apply the relationship between pressure and depth in a liquid. (9.4 & 9.5)

Buoyancy:

Students should understand the concept of buoyancy, so they can:

- ◆ Determine the forces on an object immersed partly or completely in a liquid. (9.6)
- ◆ Apply Archimedes' principle to determine buoyant forces and densities of solids and liquids. (9.6)

Fluid Flow Continuity:

- ◆ Students should understand the equation of continuity so that they can apply it to fluids in motion. (9.7)

Bernoulli's Equation:

- ◆ Students should understand Bernoulli's equation so that they can apply it to fluids in motion. (9.7 & 9.8)

Equations – Fluid Mechanics (Ch 9):

$$\rho = \frac{m}{V}$$

$$P = \frac{F}{A}$$

$$P = P_o + \rho \cdot g \cdot h$$

$$F_{buoy} = \rho \cdot V \cdot g$$

$$A_1 \cdot v_1 = A_2 \cdot v_2$$

$$P + \rho \cdot g \cdot y + \frac{1}{2} \cdot \rho \cdot v^2 = const.$$