

Review 9/24/08

Macroscopic vs microscopic

average behavior
of microscopic
behavior

motion of individual
atoms & molecules

Macroscopic quantities

$$V, T, P = \rho \quad \rho = \frac{dm}{dV}$$

Units of ρ bar, Pa, atm, Torr

$$\rho = \frac{dm}{dV} \quad \left[\frac{kg}{m^3} \right] = \left[\frac{g}{mm^3} \right]$$

Fluids \rightarrow gases, liquid, no long range order
Incompressible vs Compressible fluids

$$\lambda = -\frac{1}{V} \frac{dV}{dP} \quad \text{the compressibility}$$

λ very small for incompressible fluids

Static fluids

$$\frac{F_1}{A_1} = \frac{F_2}{A_2} \quad \text{w/ pressures are equal}$$

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Fluids in g - field

$$p(z) = p_0 + \rho g z$$

good for incompressible fluids

like H_2O . OK for small Δz for compressible fluids.~~Boa~~ Buoyancy

The buoyant force on a body has the same magnitude as the weight of the fluid displaced by the body.