CEN 212 FLUID MECHANICS

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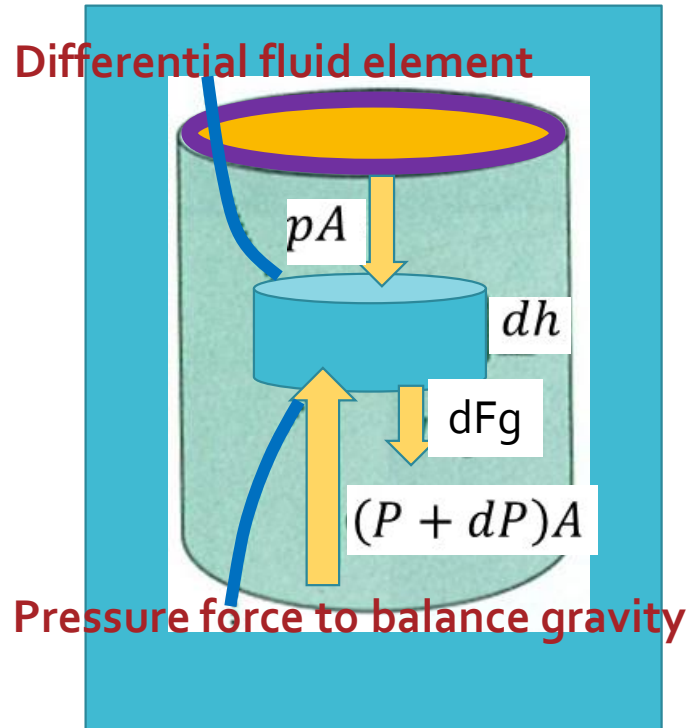# FLUID STATICS and APPLICATIONS

- Two general types of forces may be applied to a fluid:

Body forces (gravity)

Surface forces (pressure, shear stress)

In static fluids shear force or shear stress is zero.

HYDROSTATIC EQUILIBRIUM

Differential fluid element

pA

dh

dFg

$(P + dP)A$

Pressure force to balance gravity
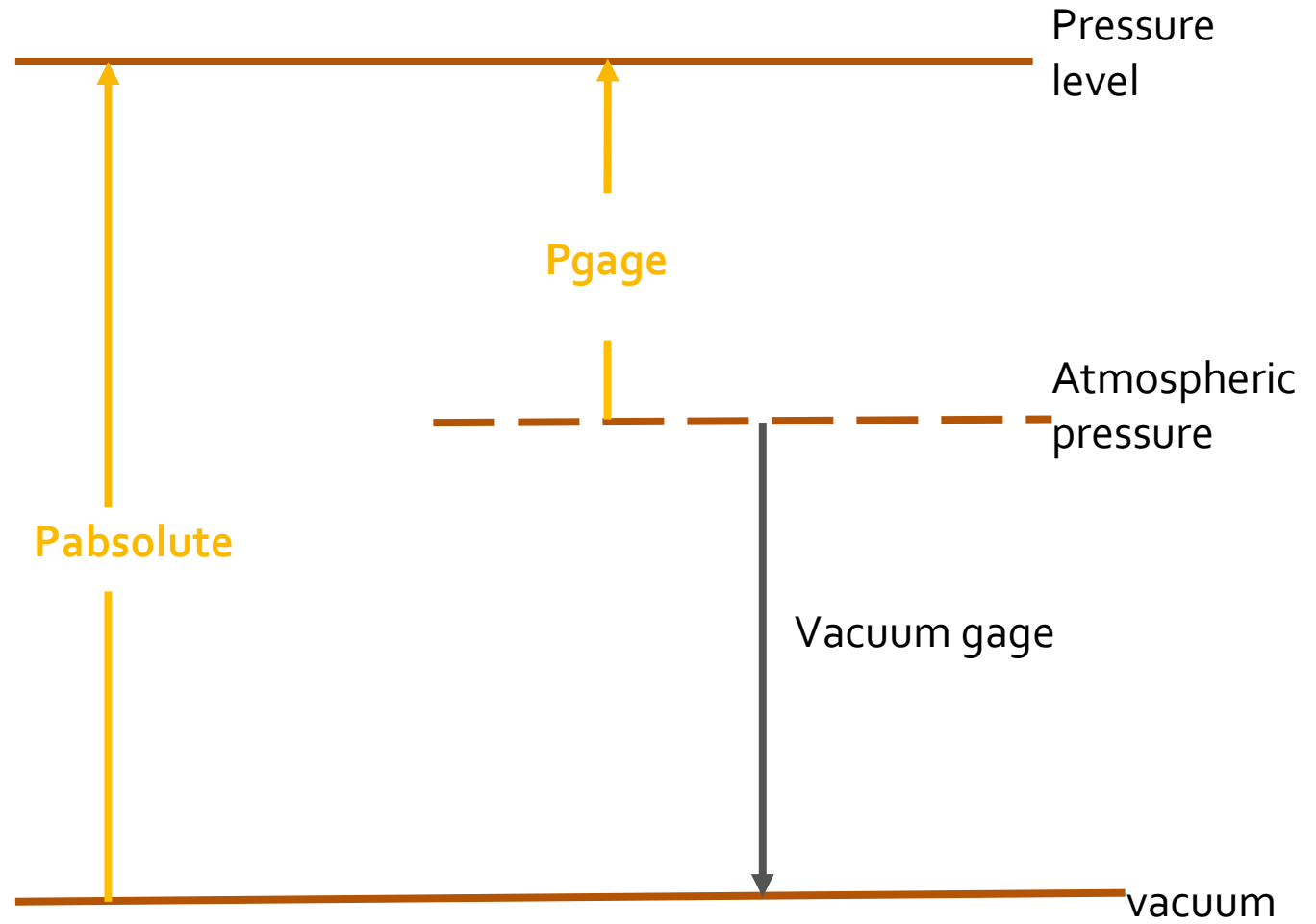
$$(P + dP)A - pA = mg$$

$$dP\, A = \rho\, A\, dh\, g$$

$$\frac{dP}{dh} = \rho g$$

$$P = P_0 + \rho g h$$

The fluid at any point like h must support all fluid above it.
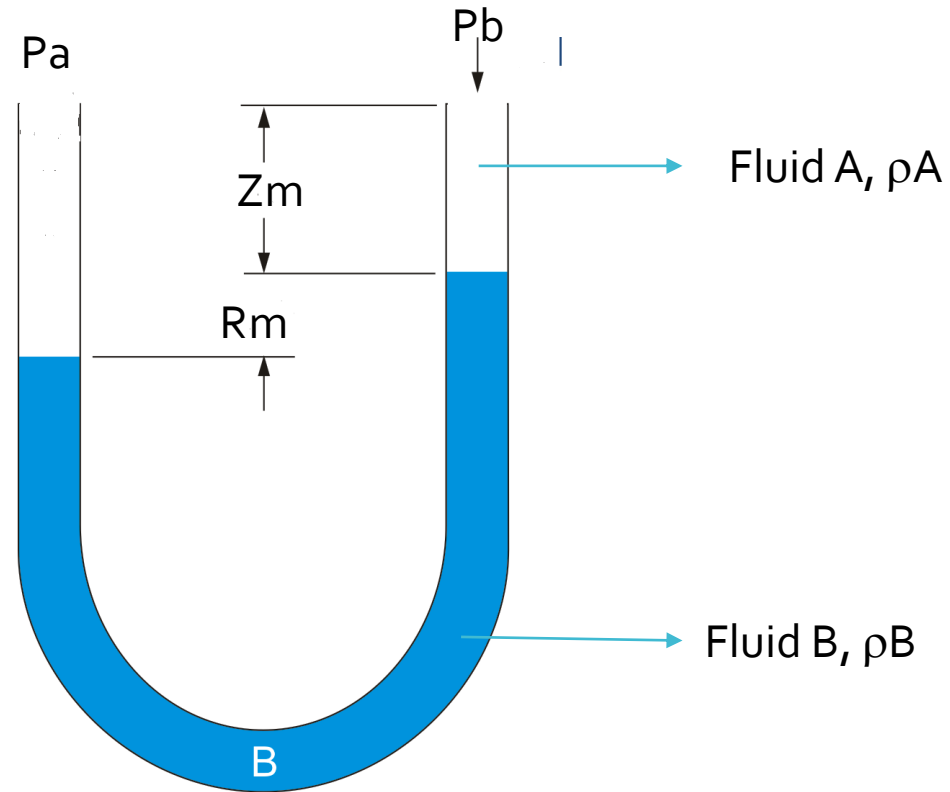
HYDROSTATIC EQUILIBRIUM

APPLICATIONS OF FLUID STATICS

MANOMETERS

The manometer is an important device for measuring pressure diffrences.

$$Pa - Pb = Rm.g.(\rho A - \rho B)$$