

**4.WEEK**

**CHE 212 FLUID MECHANICS**

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# FLUID STATICS and APPLICATIONS

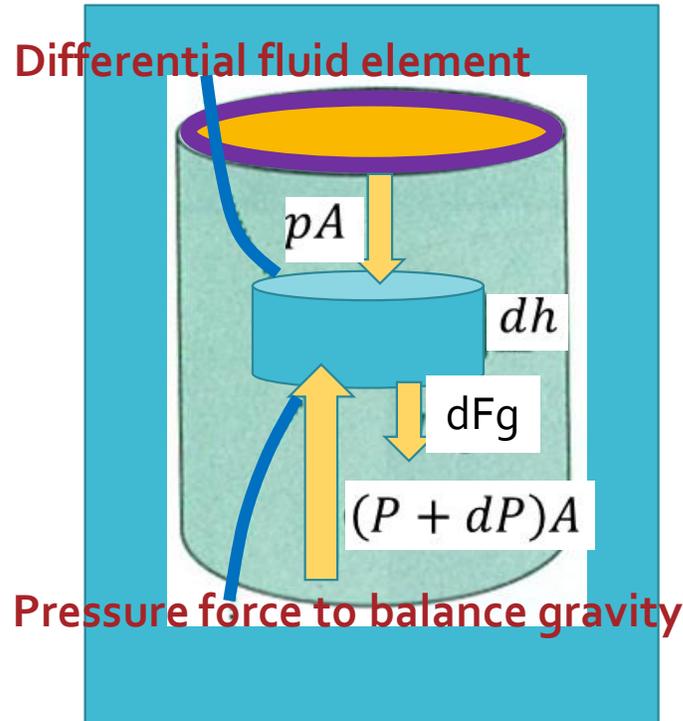
- Two general types of forces may be applied to a fluid:

Body forces (gravity)

Surface forces (pressure, shear stress)

In static fluids shear force or shear stress is zero.

# HYDROSTATIC EQUILIBRIUM



$$(P + dP)A - pA = mg$$

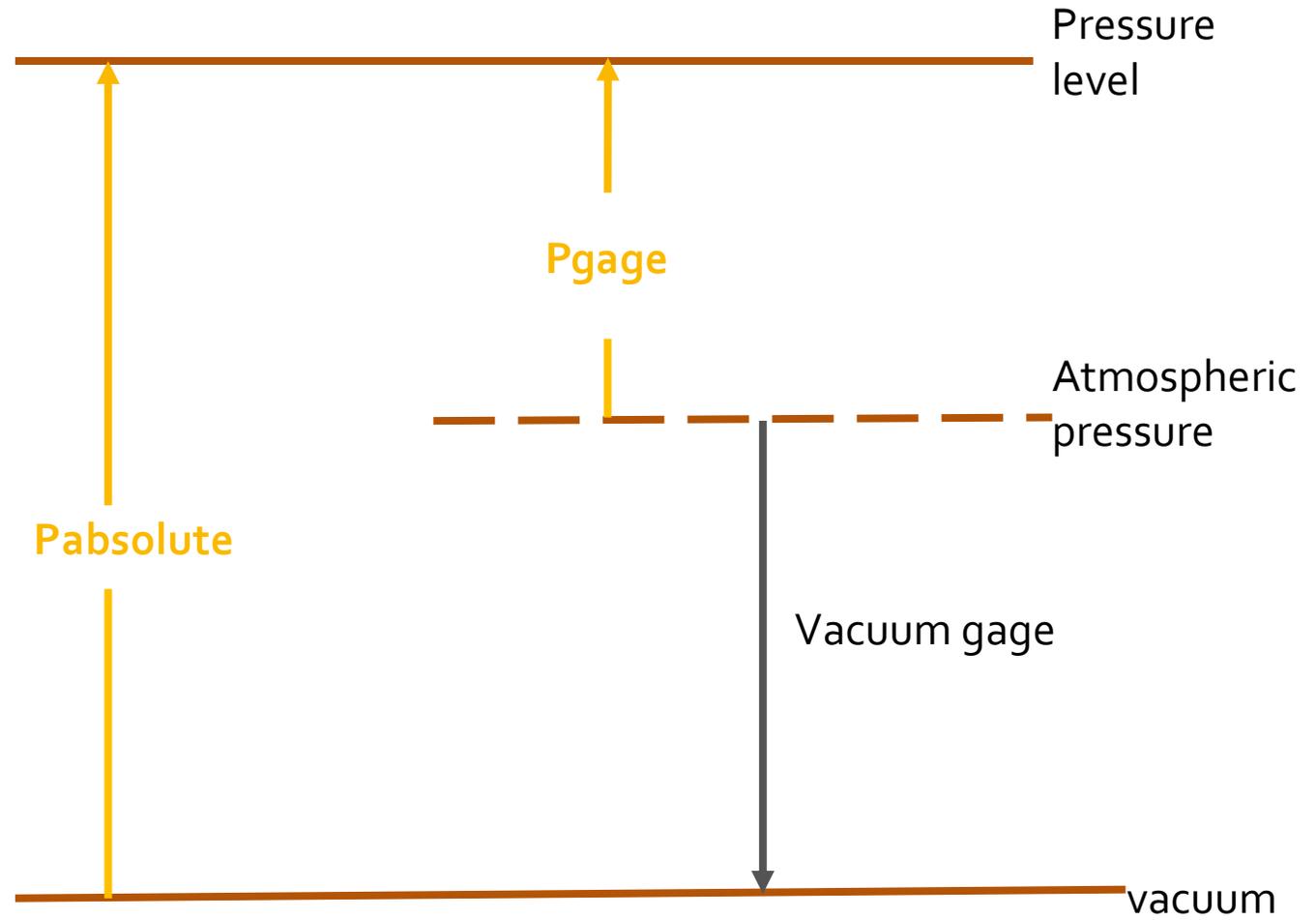
$$dP A = \rho A dh g$$

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

$$P = P_0 + \rho gh$$

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

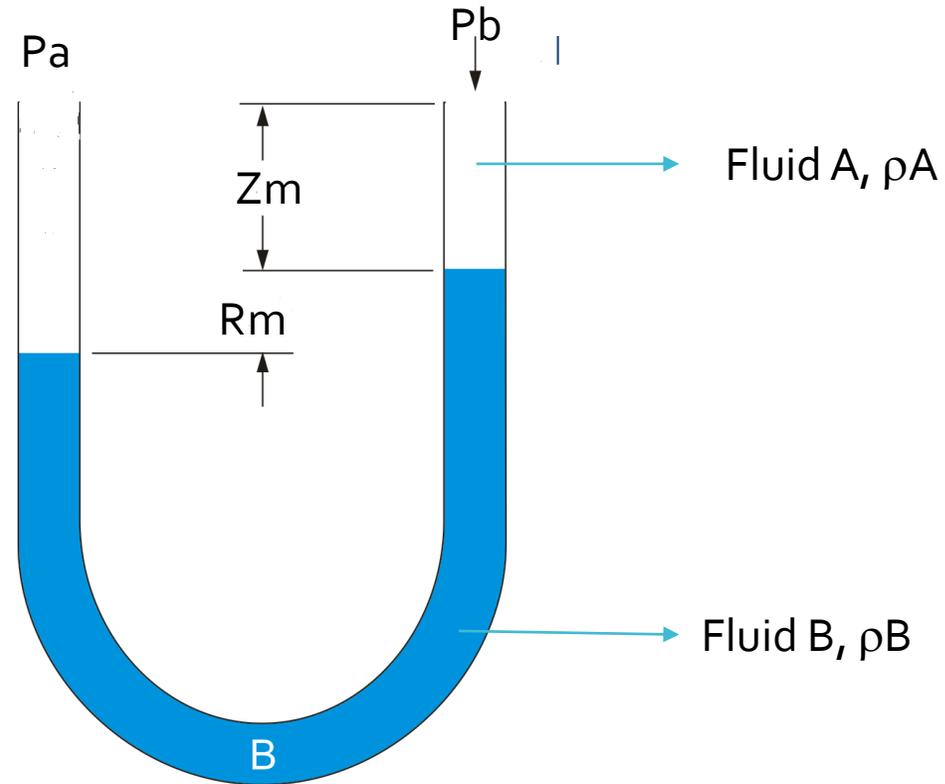
# HYDROSTATIC EQUILIBRIUM



# APPLICATIONS OF FLUID STATICS

## MANOMETERS

The manometer is an important device for measuring pressure differences.



$$P_a - P_b = R_m \cdot g \cdot (\rho_A - \rho_B)$$