

FLUID PRESSURE

- **Pressure head** : It is simply the **pressure** value divided by the fluid density.
- In fluid mechanics, **pressure head** is the internal energy of a fluid due to the pressure exerted on its container.
- It may also be called static **pressure head** or simply static **head** (but not **static head pressure**).
- w -Specific weight of the liquid.
- h -Height of liquid in the cylinder
- A –Area of the Cylinder base.
- Pressure ,
 $p = \text{Weight of the liquid in the Cylinder} / \text{Area of the Cylinder Base}$
 $= w \cdot h \cdot A / A = w \cdot h$, $1 \text{ pa} = 1 \text{ N/m}^2$.
- Tube gauges to Measure Fluid Pressure

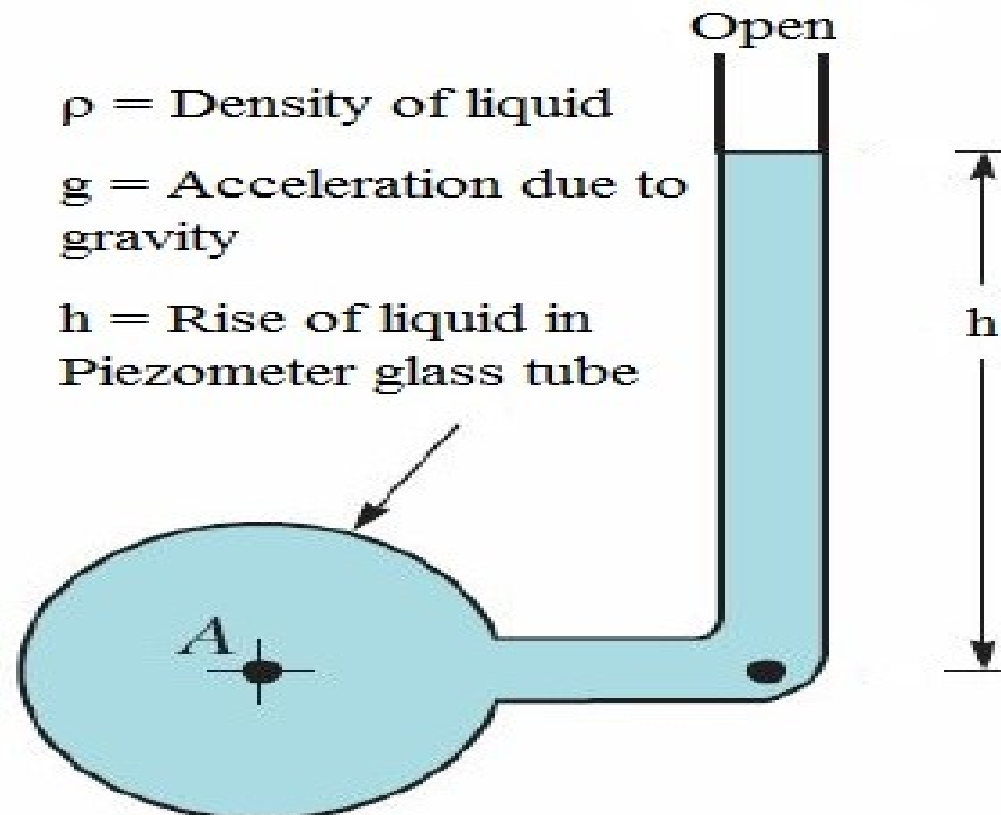
- **Pascal's Law:** It states that the intensity of Pressure at any point in a fluid at rest ,is same in all direction.
- **Atmospheric Pressure :** Pressure exerted by Atmospheric Air is 1.03 Kg/cm^2 (10.3 metres of water column or 76 cm of Hg column).
- **Gauge Pressure:** It is the pressure measured with the help of pressure measurement Instrument, in which atmospheric pressure is taken as datum. Generally this pressure is above the atmospheric pressure.
- **Absolute Pressure:** It is the pressure algebraic sum of atmospheric and gauge pressure.

$$P_{\text{absolute}} = P_{\text{atmosphere}} + P_{\text{gauge}}$$

Piezometer Tube:

A piezometer is either a device used to measure liquid pressure in a system by measuring the height to which a column of the liquid rises against gravity, or a device which measures the pressure (more precisely, the piezometric head) of groundwater at a specific point.

It is not suitable for negative pressure

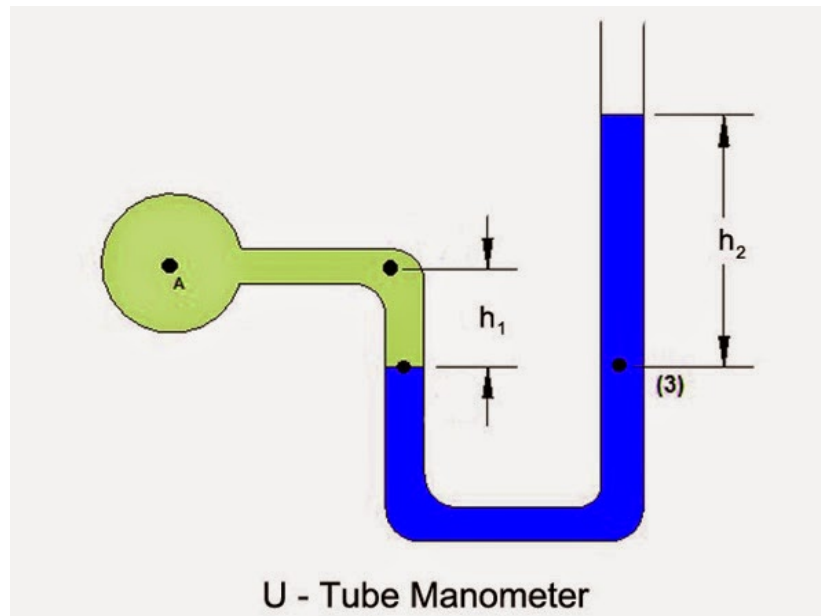


Manometer: A Manometer is a device used for the measurement of pressure of a fluid by balancing it with against a column of a liquid.

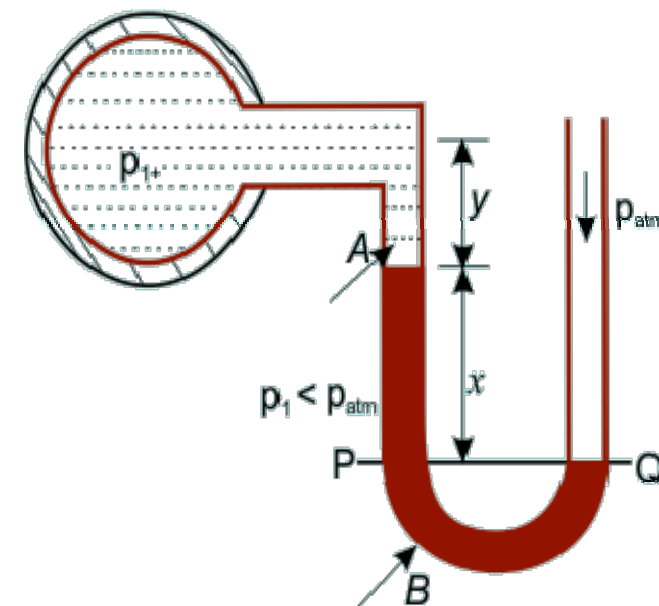
U-Tube Manometer:

It consists a U – shaped bend whose one end is attached to the gauge point ‘A’ and other end is open to the atmosphere. It can measure both positive and negative (suction) pressures. It contains liquid of specific gravity greater than that of a liquid of which the pressure is to be measured.

a) Positive Manometer:-



b) Negative Manometer

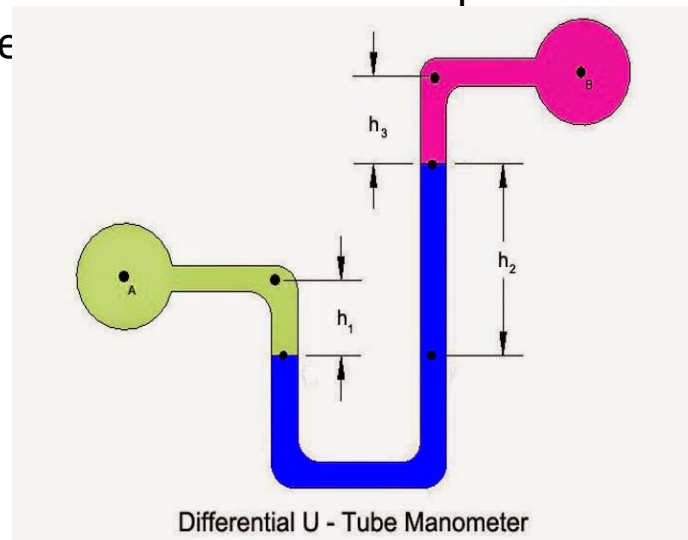


Micro Manometer : A sensitive manometer that can measure very small differences in pressure.

$$h = \frac{s_2 h_2 - s_1 h_1 + a h_2 (s_2 - s_1)}{A}$$

Differential U-Tube Manometer: A U-Tube manometric liquid heavier than the liquid for which the pressure difference is to be measured. The manometric liquid is immiscible with it.

$$h_A + s_1 h_1 = s_2 h_2 + s_3 h_3 + h_B$$



Inverted U-Tube Manometer:

Inverted U-Tube manometer consists of an inverted U – Tube containing a light liquid. This is used to measure the differences of low pressures between two points where better accuracy is required. It generally consists of an air cock at top of manometric fluid type.

