

**Ministry of Higher Education
& Scientific Research**
Al-Isra'a University College
Civil Engineering
Fluid Mechanics Lab.



Second Class

Experiment No. (2)

Pressure Devices Calibration

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Exp.2: Pressure Devices Calibration

Theory:

It is used to measure the pressure of a particular fluid if the liquid or gas a lot of devices that developed over time and according to scientific and practical need in order to give accurate results when measuring fluid pressure, the device must be calibrated.

Pressure Gauges:-

1. **Pizeometric tube:** The piezometric tube is one of the simplest measuring instruments. It is a vertical tube open from the top and connected to the tube or container containing the compressed liquid. When pizeometric tube connect to the vessel as shown in Fig. 1, the liquid will rise by an amount of h under effect the pressure p_A in the tube and the pressure value

$$p_A = \gamma h$$

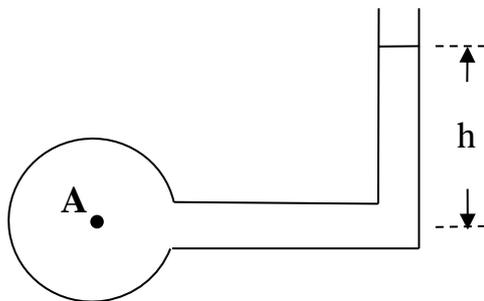


Fig.1

2. **Simple manometer:** Since the piezometric tube is not suitable for measuring the high pressures of liquids, the simple manometer is a suitable way to do this task. The manometer consists of a U-shaped tube, as shown in Fig. 2, which contains a fluid of weight. During measurement, the end of the manometer tube is connected to the tube or vessel containing the liquid or gas to be measured where we can find the pressure value from the displacement calculation obtained in the manometer.

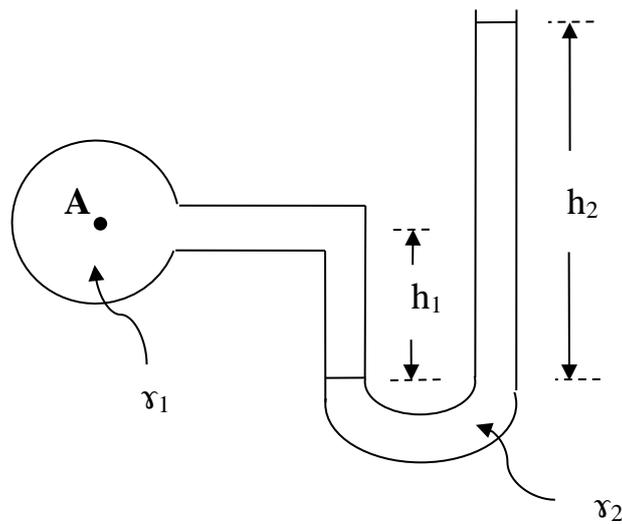


Fig.2

3. **Inclined manometer:** When the difference in pressure between two points is relatively small it is noted that the use of the normal manometer of measurement leads to a large error due to the small deviation of the fluid in the manometer it is therefore appropriate to use the inclined manometer shown in Figure (3) by which the sloping distance which is usually relatively large can be measured and we do not measure the vertical distance of the liquid due to its smallness.

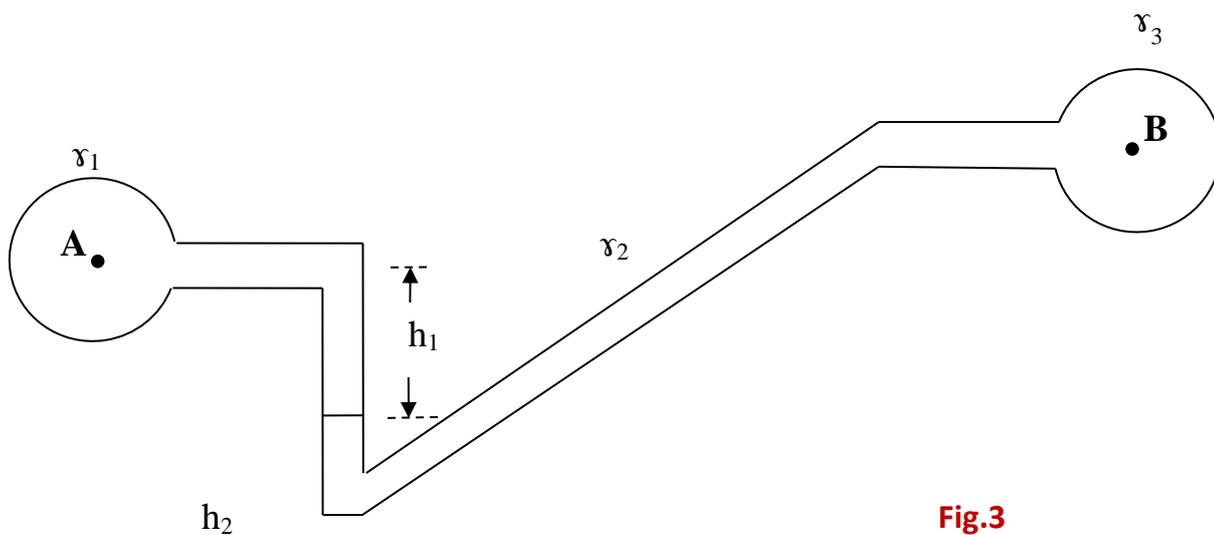


Fig.3

Objective:

Correct readings or settings read the device to measure the pressure used and called Borden device where it is done in two ways:

1. The pressure gauge is calibrated using different weights where the standard pressure is extracted and compared to the reading of the device.
2. The use of the pressure device where the readings are accurate and compared to the other device to be calibrated.

Procedures:

1. The standard reading device and the device to be calibrated.
2. We pressure the fluid and read the pressure from the two devices and compare them.
3. We repeat the process and take more than reading and find the error percentage to read the calibration device from the following equation:

$$\text{error percentage} = \frac{\text{Calibrated reading} - \text{Standard reading}}{\text{Standard reading}} * 100 \%$$

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No.	Mass	F	P	Calibrated Reading	Error %

$D = 8 \text{ cm}$

No.	Standard Reading	Calibrated Reading	Error %

Discussion:

1. What is the benefit of calibration for pressure gauges?
2. What types of pressure gauges? Compare them.
3. Describe the pressure relationship of a given fluid with the radius of the Borden's curvature?
4. Describe why the curve resulting from intersection the standard reading and the calibrated is a straight line?