



Class :4th stage

Subject: Control

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Experiment No. 3

Flow Measurement by Orifice Method

اعداد:

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Number of Experiment: 3

Name of Experiment: Flow Measurement by Orifice Method

Purpose of Experiment: Determination of flow measurement by orifice method

Equipment of Experiment: Flow Measurement Training by Orifice Method device which consist of:

1. Orifice plate.
2. Power supply.
3. Voltmeter.
4. Pressure gauge.
5. Pressure sensor.
6. Pump.
7. Rotameter.
8. U-tube manometer.
9. Sump tank.
10. Measuring flow tank.



Theory of Experiment:

There are many situations in the engineering field where it is necessary to know the flowrate in a pipe. There are various flow-measuring devices that all determine the flow rate in a pipe but the most common is the obstruction-type flowmeter. Obstruction flowmeters operate on the idea that a decrease in flow area in a pipe causes an increase in velocity that in turn decreases pressure. This correlation of pressure difference and velocity provides the means of measuring flowrate. The different obstruction-type flowmeters consist of the orifice meter, the nozzle meter, and the Venturi meter. In this lab we will be measuring the flow through an orifice meter. A schematic of a standard orifice meter can be seen below in Figure 1.



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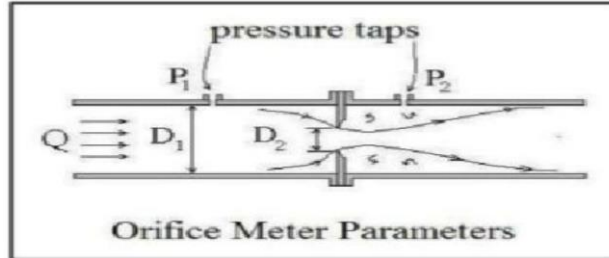


Figure 1. Schematic of Standard Orifice Meter

An orifice meter is defined to be a plate having a central hole that is placed across the flow of a liquid, usually between flanges in a pipeline. The pressure difference generated by the flow velocity through the hole enables the flow quantity to be measured. As seen in Figure 1 the fluid flows through the left side of the pipe at the pipe diameter D_1 and it is restricted down to D_2 as it flows through the restricting plates, this is known as the orifice. The pressure difference is measured at P_1 and P_2 . This pressure can be measured using any different measurement devices such as piezometer tubes or pressure gages.

Procedure:

1. Fill the tank with water.
2. Open the device.
3. By the pump the water will rise toward the rotameter.
4. Control manually the valve of rotameter and change it from 0 to 200 LPH.
5. Record voltage with LPH.
6. Draw curve between voltage and LPH.

Discussion:

1. What is orifice plate?
2. Explain how does the flow measurement device work.
3. What is the manometer?
4. What is the rotameter?