Ministry of Higher Education and Scientific Research
Al-Mustaqbal University College
Department of Chemical Engineering and Petroleum Industries

Control Laboratory

Experiment No. 4
Level Measurement by Bubbler Method

اعداد:
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Number of Experiment: 4

Name of Experiment: Level measurement by bubbler method

Purpose of Experiment: Determination of liquid level measurement by bubbler method.

Equipment of Experiment: Level measurement Training by bubbler method device which consist of:

1. Pressure gauge(WC)
2. Pressure sensor
3. level tank
4. Air Pump
5. Air regulator
6. Voltmeter

Theory of Experiment:

Measuring liquid level in a tank or vessel can be accomplished in a number of ways, all of which require some arrangement of instrumentation to either infer the liquid level from the measurement of a related physical property, or directly deliver the liquid level visually using a scaled gauge arrangement. One indirect method of level measurement is often referred to as the bubbler method, so named because it employs a purging gas that continually vents from the bottom of a tube extending into a tank of liquid. Through a simple apparatus, the level of a liquid can be inferred by the amount a back pressure exerted upon the gas flowing through the tube.

Probably the greatest advantage of this method of liquid level measurement is that the liquid does not contact the sensing instrumentation. The only portion of the apparatus in contact with the liquid is a tube immersed into the tank. Basically, a purge gas flows through the immersion tube and may bubble out the immersed end of the tube, which is open to allow the contained liquid to exert a hydrostatic pressure on the purge gas. The back pressure on the gas that is exerted by the liquid contained within the tank will vary directly with the depth of the liquid. The back pressure can be correlated to a liquid level. Further calculations, which would include the tank shape, dimensions, and the liquid density can provide an indication of the volume and mass of the liquid.

Procedure:

1. Fill the tank with water.
2. Open water pump.
3. Open air pump.
4. Fill level tank with water to a certain level (about ¼ from the level tank).
5. Open air valve and allow bubbles to flow in the level tank.
6. Record the water level with voltage.
7. Continue with this operation of increase level of water and air bubbles until it reaches to 400 mm water level and bubble.
8. Draw curve between the level and output voltage.

NO.	Level in mm	Output voltage /V	Air bubbles
1	0	0	Max
2	100	11	
3	200	21	
4	300	30	
5	400	42	min

Discussion:

1. What is the aim of using air supply?
2. Explain briefly the process of level measurement by bubbles?