

## PHASE 1 INSTRUMENTS

### Project Write-up

Name:..... Group:.....

MODULE TITLE: Level Measurement

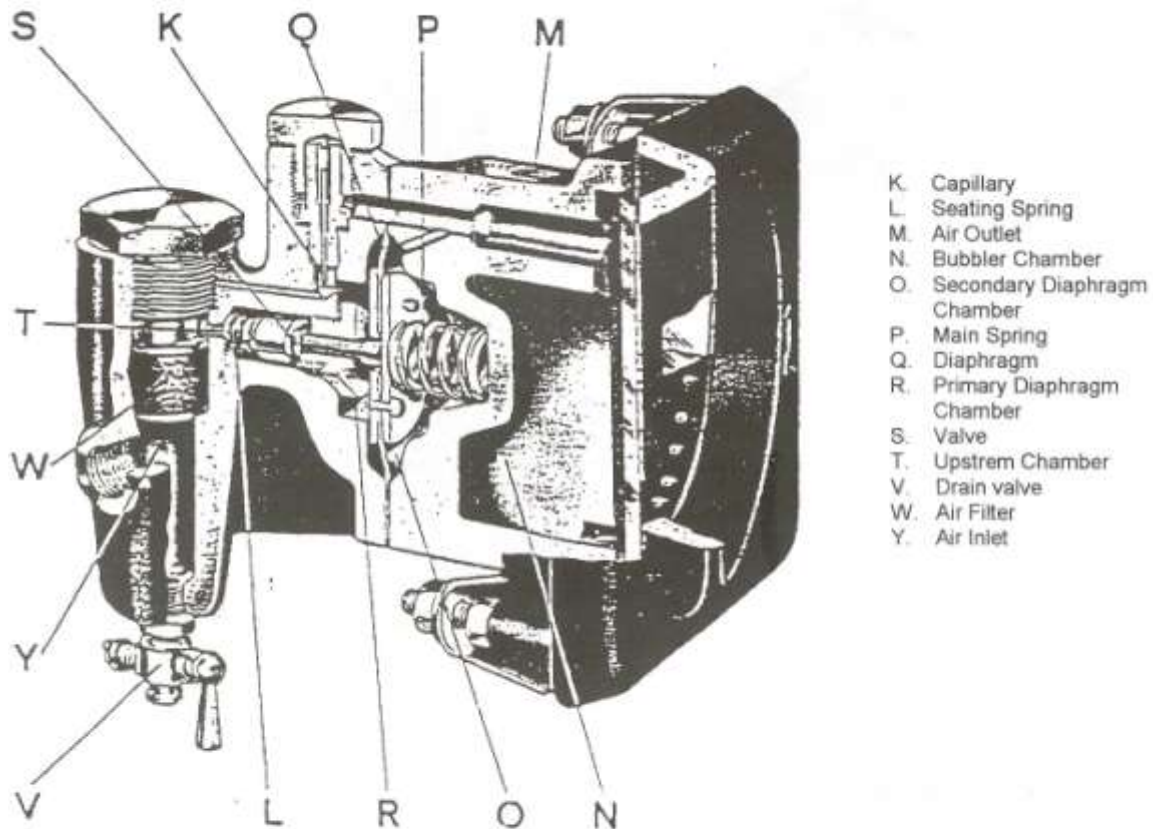
MODULE No: I-6

PROJECT DESCRIPTION: Pneumerstats

PROJECT No: L1

OBJECTIVE No: 5.

#### PNEUMERSTAT



**PROJECT WRITE UP SHEET**

**Principle/Theory of Operation**

**What are larger sized restrictors used for?**

**What type of material might cause the dip pipe to block?**

**What is the angle of the tip of the dip pipe and why is it placed 12mm from the bottom of the tank?**

**What type of diaphragm arrangement is used?**

## PHASE 1 INSTRUMENTS

### Project Write-up

Name:..... Group:.....

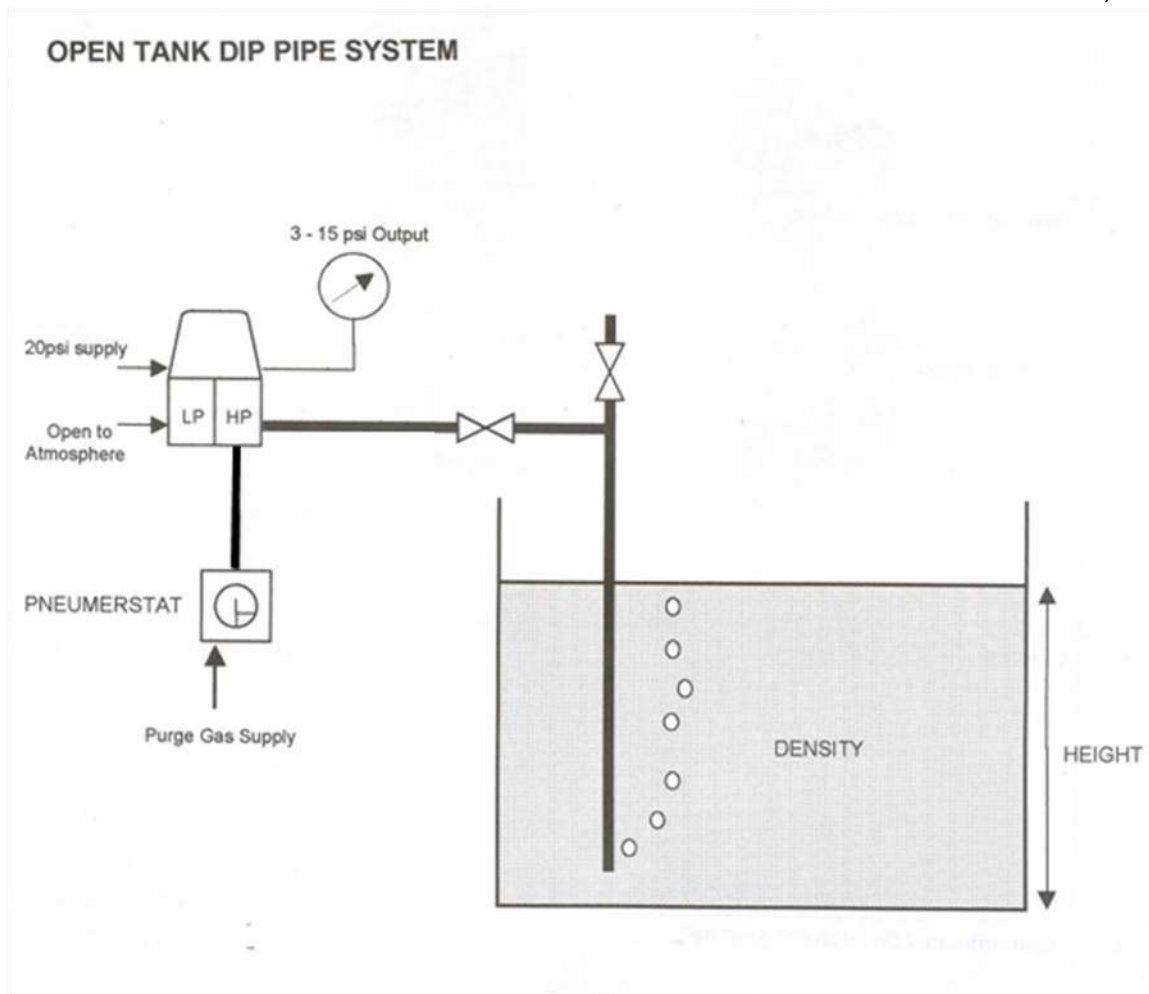
MODULE TITLE: Level Measurement

MODULE No: L1 001 1

PROJECT DESCRIPTION: Dip Pipe Systems (Open Tank Installation)

PROJECT No: L2

OBJECTIVE No's: 3, 4.



**PROJECT WRITE UP SHEET**

**Principle/Theory of Operation**

**How would the range of a pressure transmitter using a dip pipe in an open tank be calculated?**

**How would a blocked dip pipe be cleared?**

## PHASE 1 INSTRUMENTS

### Project Write-up

Name:..... Group:.....

MODULE TITLE: Level Measurement

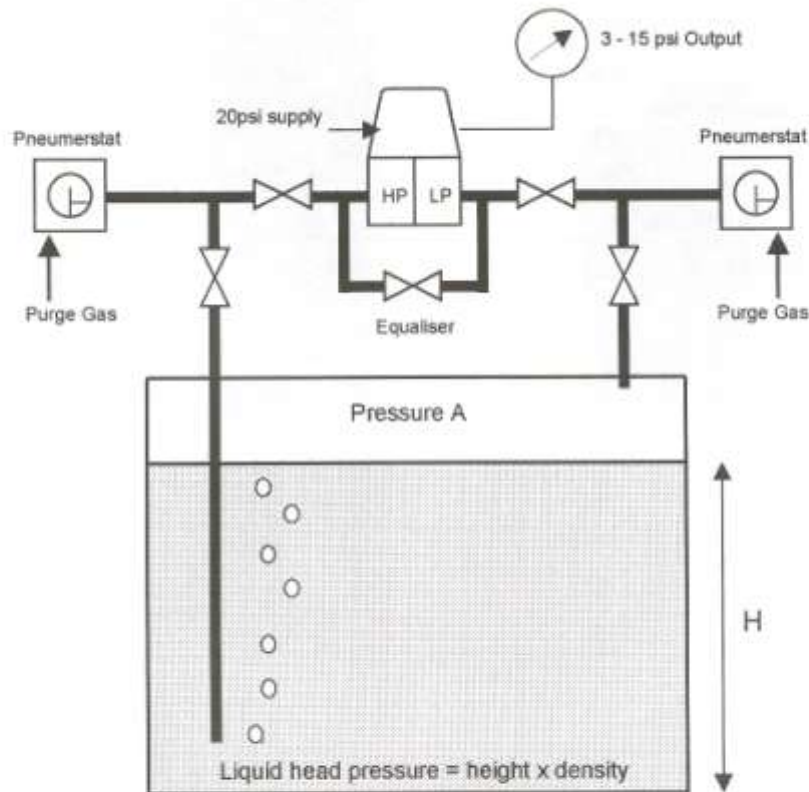
MODULE No: L1 001 1

PROJECT DESCRIPTION: Dip Pipe Systems (Closed Tank Installation)

PROJECT No: L3

OBJECTIVE No's: 3, 4.

#### CLOSED TANK DIP PIPE SYSTEM



HP Reading = Liquid head ( $H \times D$ ) + Pressure A  
LP Reading = Pressure A  
D/P therefore = Liquid head only.

**PROJECT WRITE UP SHEET**

**Principle/Theory of Operation**

**How would the range of a pressure transmitter using a dip pipe in a closed tank be calculated?**

**Why would the purge gas be passed through the D.P. cell instead of being connected as shown in the diagram?**

## PHASE 1 INSTRUMENTS

### Project Write-up

Name:..... Group:.....

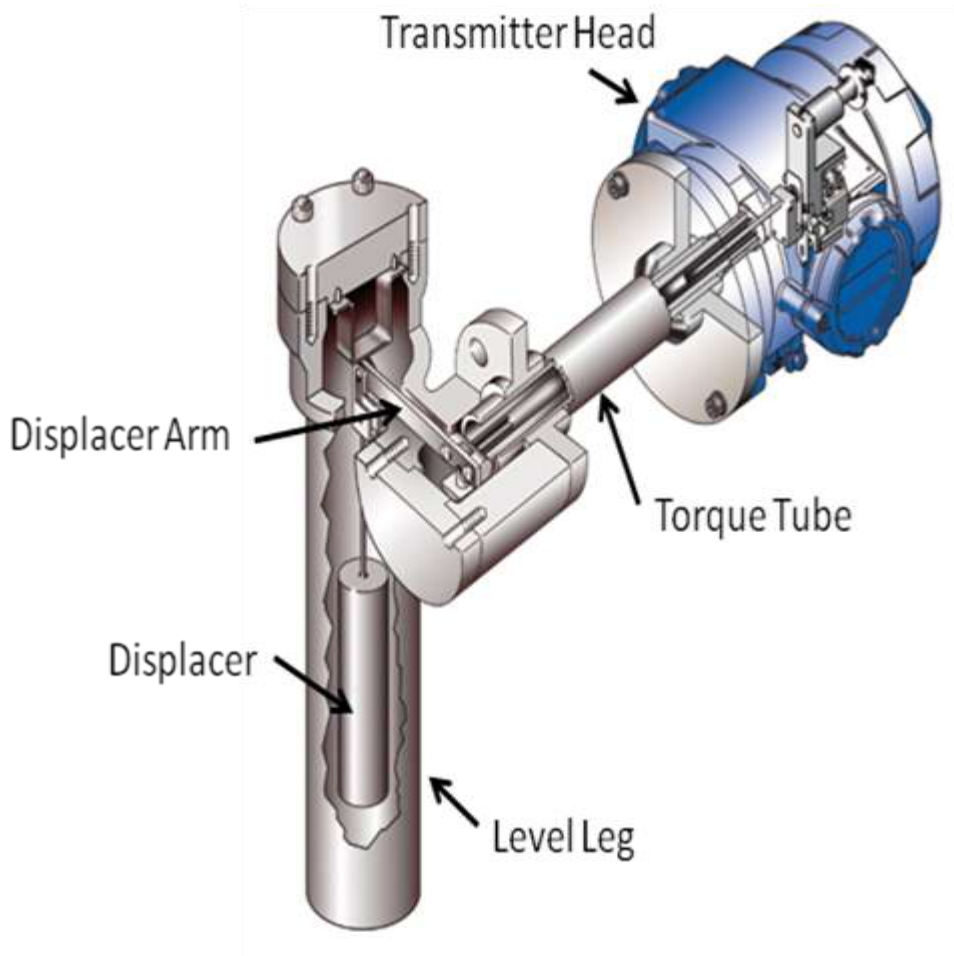
MODULE TITLE: Level Measurement

MODULE No: L1 001 1

PROJECT DESCRIPTION: Buoyancy Type Level Transmitter

PROJECT No: L4

OBJECTIVE No's: 6.



**PROJECT WRITE UP SHEET**

**Principle/Theory of Operation**

**Besides level, what else is this type of level measurement sensitive to?**

**List two manufacturers of this type of level device?**

**What determines the measurement range of these instruments and what is that range?**

**How can density be measured?**



## PHASE 1 INSTRUMENTS

### Project Write-up

Name:..... Group:.....

MODULE TITLE: Level Measurement

MODULE No: L1 001 1

PROJECT DESCRIPTION: Electrical Methods

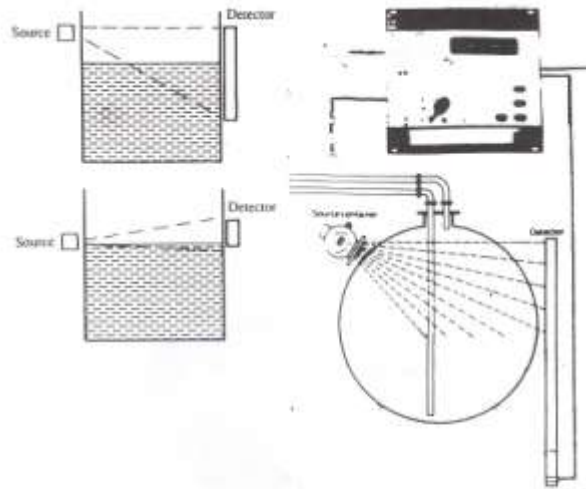
PROJECT No: L5

OBJECTIVE No's:

#### PROJECT L5 – ELECTRICAL METHODS:

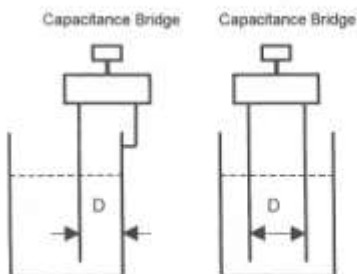
##### 1. Nucleonic / Radio Active Methods.

Operation and typical applications.

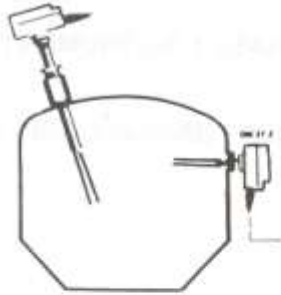


##### 2. Capacitance Method

Operation and typical applications.

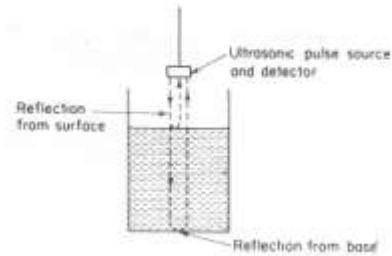


### 3. Tuning Fork Method.



Operation and typical applications.

### 4. Ultrasonic Method - Operation and typical applications



### 5. Thermal Method

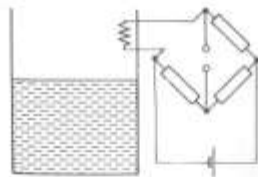
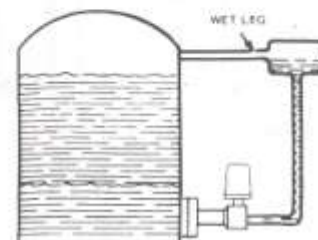
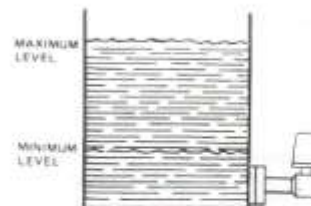


Figure 17.18 Hot wire element

Operation and typical applications

### 6. Limpet Cell - Operation and typical applications





## Level Measurement

Operating Principles Types of Instrument	Direct dipping Dip Stick	Column of liquid Sight Glass	Manometers & Pressure Gauges	Pressure Operated Diaphragm	Capsules	Surface Follower Floats	Buoyancy Displacer	Pneumatic Purged pipe	Force Balance Transmitters	Electric Capacitor System	Weighing Machine
<b>Range</b>	Liquid depth up To 8 metres	0.2 to 2 metres depending upon static pressure and temperature	Up to 10 Metres Depth of Liquid Depending On liquid Density	Up to 6 metres depending upon size and material of diaphragm	Normally used in tanks up to 10 metres deep	Typical range up to 10 metres depth	Ranges up to 15 metres depth	Typical range up to 10 metres using a manometer as an indicator	Ranges up to 20 metres depending upon pattern	Can be designed for ranges up to 100 metres depth	Up to a total weight of 50 tonnes depending on pattern
<b>Limitations</b>	For use In open Vessels Only	Reading obtained Local to Vessel	Process liquid Must not react with indicating liquid	Limited to detection rather than measurement of level	May require correction for temperature changes	Are affected by turbulent conditions	Displacer may have to be built in sections when head room is limited	Purge gas must not contaminate process fluid	Clean dry air supply is required for pneumatic patterns	Material being measured must act as a dielectric medium	Weight must be transposed into units of level for a given density
<b>Typical Applications</b>	Liquid Level Measurement only	Liquid Level Measurement On open Or sealed vessels	For use on Open or sealed vessels by using DP methods (Liquids Only)	Level of liquid or solid measurement	Measurement of liquid level on open vessels (Indicator may be located a short distance from vessel)	Liquid level on open or sealed vessels depending on pattern	Is used where the reading has to be transmitted (Liquids Only)	Often used on multi vessel installations for economy	Applied where the reading has to be transmitted (Liquids Only)	Used for remote indication (Liquids or solids)	Often used where transfer of liquids or solids is involved

LEVEL PROJECT  
Module I-6 – Level Measurement  
Project No: 1

## **Calibrate open tank dip tube level transmitter**

Obtain transmitter range and check the calibration of the transmitter by applying minimum and maximum pressure values to the input. Note down the transmitter output readings.

Calibrate the transmitter using the appropriate values and note down the readings at appropriate intervals.

***T.O. to check calibration***

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## **EQUIPMENT**

Pressure calibration device  
mA current measuring device

LEVEL PROJECT  
Module I-6 Level Measurement  
Project No: 2

## **Calibrate Masoneilan level transmitter**

Obtain transmitter range and check the calibration of the transmitter by applying minimum and maximum pressure values to the input. Note down the transmitter output readings.

Calibrate the transmitter using the appropriate values and note down the readings at appropriate intervals.

***T.O. to check calibration***

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## **EQUIPMENT**

Pressure calibration device  
mA current measuring device