**Practical No. 07**

**Object:** To measure the pressure head with the help venture metre.

**APPARATUS:** The apparatus consist of a flow bench that allows water flow to the venture meter.

**THEORY:**

The apparatus consist of a flow bench that allows water flow to the venture meter. Inside

the flow bench is weighing tank connected to one end of a lever arm. The end of the lever

arm protrudes from the side of the flow bench so that the amount of weight on this end of

the lever arm may be adjusted (as shown in Figure 12.2). The purpose of the lever arm is

to measure the actual mass flow rate of water flowing through the measuring devices.

When using the hydraulic bench, placing weight on the lever arm closes the trip valve of

the inner tank. When water entering the tank is sufficiently heavy enough to

counterbalance the weight on the arm, the arm will rise and the trip valve will open.

Dividing the mass of water contained in the tank by the amount of time it takes for the

internal tank to fill will yield the actual mass flow rate. Since the adjustable weight end of

the lever arm has a three-to-one advantage over the water tank end, the mass of the water

in the tank will equal three times the mass added to the lever arm. The weight of the

hanger is accounted for in the design of the equipment; therefore, do not add the weight

of the hanger to weights placed on the hanger.

**Procedure:**

1- Make sure the air purge valve on the upper manifold is tightly closed.

2- Set both apparatus flow control and bench supply valve to approximately 1/3 their

 fully open positions.

3- Switch on bench supply valve and allow water to flow. (Tap manometer tubes in

 order to remove air bubbles from apparatus.)

4- Close apparatus flow control valve.

5- Release air purge valve to allow water to rise approximately 2/3 the way up the

 Manometer tubes.

6- Open apparatus flow control valve to obtain full flow. (At this condition the pressure

 difference between the Venture inlet [A] and throat [D] is approximately 240mm.

7- Make 10 runs, being sure measure and calculate flow rate. Also measure h1 and h2,

 where h1 is the height of water in manometer tube A (inlet) and h2 is the height of

 water in manometer tube D (throat). Vary the flow rates so that (h1 – h2) goes from

 approximately 240mm to 0mm. It is advisable to use enough weight on the arm that

 the weighing tank takes about 60-90 seconds to fill.

8- Make an additional two runs (at relatively high flow rates) taking pressure readings

 from all tubes along the length of the Venture meter.

**Observations:**

E

D

L

C

F

K

J

H

G

B

A

Figure1

Schematic diagram of the Venturi meter

Table 3

Pressure tap locations and diameters at pressure tap locations

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pressure location | A | B | C | D | E | F | G | H | J | K | L |
| Diameter (mm) | **26** | **23.2** | **18.4** | **16** | **16.8** | **18.47** | **20.16** | **21.84** | **23.53** | **25.24** | **26** |
| x (mm) | **0** | **20** | **32** | **46** | **61** | **76** | **91** | **106** | **121** | **136** | **156** |

**Result:**  The study of observed values has been tabulated in the above table.