Experiment Details

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| Department Name | Mechanical |
| Class | S.Y.B.Tech |
| Semester | I st |
| Subject Name | Fluid Mechanics |
| Experiment No. | 02 |
| Experiment Name | Calibration of Orifice Meter. |

Version History

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| --- | --- | --- | --- | --- |
| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.0 | Akash Salunkhe | Prof. Mr. Rohit Ghulanavar | 01/11/2020 |
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AIM:

To calibrate orifice meter.

THEORY:

It is device used for measuring flow of fluid through a pipe. It is work on Bernoulli’s Principle. It consists of flat circular plate which has a circular sharp edge pole for an orifice which is concentric with pipe generally orifice diameter is kept 0.5 times diameter of pipe.

Water mercury manometer is connected to measure the pressure difference between two points

i.e. at inlet & after orifice meter.

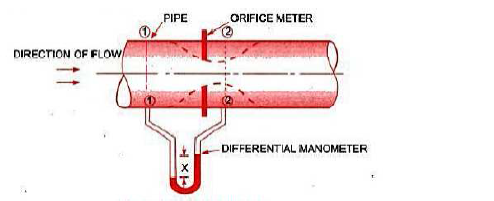


Figure: Flow through orifice meter

Apparatus:

Orifice meters are widely used for determine of flow of fluid. While using orifice meter their calibration is important. The equipment enables to determine coefficient of discharge of orifice meter.

Specification:

1. Supply pipe of Φ28mm connected to inlet manifold.

2. Orifice meter size inlet Φ28mm & throat Φ 14mm.

3. Differential mercury manometer tapping provided at inlet and throat of orifice meter. Manometer size-30cm height.

4. Measuring tank size = 500mm x 300mm x 300mm.

PRE TEST:

1. Which of the following instruments can be used to measure flow rate on the application of Bernoulli’s Equation
2. Venturimeter
3. Orifice plate
4. Pitot tube
5. All of the above - Ans
6. The length of the divergent portion of venturimeter in comparison to the convergent portion is
7. same
8. More - Ans
9. less
10. more or less depending on capacity
11. Vena-Contracta is the section at which the cross section area of water flow is \_\_\_\_\_\_\_\_\_
12. Maximum
13. Minimum - Ans
14. Intermediate
15. None of above.
16. The ratio of actual discharge to theoretical discharge through an orifice is
17. Cd / Cv
18. Cv / Cd
19. Cd \* Cv
20. Cc \* Cv - Ans
21. Differential manometer is used to measure \_\_\_\_\_\_\_\_
22. Atmospheric Pressure
23. Absolute Pressure
24. Gauge Pressure - Ans
25. None of the above

PROCEDURE:

1. Select the velocity of water (or fluid) which is flowing through pipe and orifice.
2. Note the readings of - Inlet diameter of pipe (cm), inlet diameter of orifice (cm), inlet area of pipe (cm2), inlet area of orifice (cm2), Differential manometer reading (cm of Hg) , differential manometer reading (cm of Water).
3. Calculate the value of actual discharge in cm3/sec using formula shown on screen and enter in block provided. If not correct try once again.
4. Calculate the value of Theoretical discharge in cm3/sec using formula shown on screen and enter in block provided. If not correct try once again. While calculating use h in terms of cm of Water.
5. Calculate the value of Coefficient of discharge using formula shown on screen and enter in block provided. If not correct try once again.

POST TEST:

1. What is the relationship between Orifice-meter diameter and pipe diameter
2. Orifice-meter diameter is 0.5 times the pipe diameter
3. Orifice-meter diameter is one third times the pipe diameter
4. Orifice-meter diameter is one fourth times the pipe diameter - Ans
5. Orifice-meter diameter is equal to the pipe diameter
6. Orifice Meter can only be used for measuring rate of flow in open pipe like structure.
7. True - Ans
8. False
9. In order to increase the sensitivity of the manometer, the liquid in manometer should be replaced with liquid having
10. Higher density than previous liquid
11. Low density than previous liquid - Ans
12. Density of fluid does not affect the pressure measurement
13. Can’t say
14. In order to increase the range of the pressure that can be measured using the manometer, the liquid in manometer should have
15. Low density
16. High density – Ans
17. Intermediate density
18. Can’t Say
19. In case of submerged orifice the discharge is substantially dependent on temperature of fluid  
    a) True  
    b) False - Ans

REFERENCES:

Fluid Mechanics by R.K Bansal.

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