



Orifice is a simple device used to measure fluid flow rate in pipes. The flow rate is obtained by measuring the pressure loss across the calibrated orifice. Calibration of the orifice plate consists of determining the coefficient of discharge which is the ratio of the measured actual discharge through the orifice to the theoretical discharge obtained from calculations. Study of the trajectory profiles of water jets issuing from the orifice and comparison with the calculated profile shapes is an interesting exercise to the student of hydraulics and fluid mechanics. Tesca Orifice and Free Jet Flow Apparatus has been designed to enable students to determine the coefficient of discharge of sharp edged orifice and to study the trajectory profiles of water jets issuing from the orifice. It consists of a vertically mounted constant head transparent water tank. Water is supplied from the hydraulic bench or any closed circuit controlled water supply system. The orifice is installed with the axis horizontal on the wall at the base of the tank using special fittings flush with the inside surface. The head above the orifice is maintained constant using adjustable overflow pipe and the level is indicated by the level scale. The flow rate through the orifice can be varied by adjusting the level of the overflow pipe suitably and hence the head over the orifice. Water emerging from the orifice is collected in the measuring tank of the hydraulic bench to make actual discharge measurements. A jet trajectory tracking device with a plotting board and a number of depth gauge pins enables to plot the jet trajectory directly on the graph paper. The equipment is designed to fit into the 32096 Hydraulic Bench or any other standard hydraulic bench models. Adjustable feet are provided to permit accurate leveling of the equipment before use. The complete unit is manufactured from corrosion resistant materials.

**OPTION:**

Computer Based Learning Software is included to enable students to understand and conduct experiments, tabulate results and plot graphs. The Tesca Orifice and Free Jet Flow Apparatus is an important experimental set-up for any Fluid Mechanics and Hydraulics Laboratory of an educational institution.

Note: Specifications are subject to change.

**Tesca Technologies Pvt. Ltd.**

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### Experiments:

Following is the list of experiments that can be carried out using the Orifice and Free Jet Flow Apparatus:

1. Determination of coefficient of velocity for an Orifice.
2. Determination of coefficient of discharge for an Orifice.
3. Study of the coefficient of discharge of Orifice with flow under constant head and flow under varying head.
4. Study of coefficient of discharge at various values of head over the Orifice to study the influence of flow Reynolds number.
5. Comparison of the measured trajectory of the jet with the trajectory calculated from simple theory.
6. Study of trajectory of jet at various values of head over the Orifice.
7. Comparison of results obtained for two different diameter orifices.



### Important Features and Specifications:

1. Sharp Edged Orifice, Two Nos., diameters: 3.0mm and 6.0mm.
2. Quadrant Edge Orifice
3. Sharp Edge Orifice
4. Cylindrical methacrylate tank, clear transparent, 300mm diameter, 500mm height, Supported on tripod legs with provision for leveling.
5. Maximum constant head: 420mm.
6. Max. Flow rate: 14LPM.
7. Jet Trajectory Tracking Device with silkscreen printed scale, No. of Jet trajectory probes: 8.
8. Pitot tube, positioning unit and manometer to measure the actual head over the Orifice.
9. Optional Computer Based Learning Software is included to enable students to understand and conduct experiments, tabulate the results and plot graphs.

(OPTION: Two Nozzles of standard dimensions and different geometries can also be supplied on request to enable conducting experiments for the determination of coefficient of discharge and jet trajectory at various flow conditions. The nozzles can be mounted flush with the inside surface of the tank.)

The manual describing the theoretical and practical aspects of the apparatus, operation and analysis of results will be supplied along with the equipment.

### Overall Dimensions:

700mm X 550mm X 500mm.

### Manuals and Study Material:

1. Manual of Experiment
2. Sample of Experimental results.
3. Instructor guide.

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