



Orifice is a simple device used to measure fluid flow in pipes. Tesca Orifice Discharge Apparatus Model has been designed to enable students to determine the coefficient of discharge of sharp edged orifice and nozzles. It consists of a vertically mounted cylindrical transparent plastic water tank. Water is supplied from the hydraulic bench or any closed circuit controlled water supply system. The orifice is fitted in the base of the tank using special fittings flush with the inside surface. The head above the orifice is maintained constantly 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 pitot tube with a traversing device is provided to measure the jet diameter and locate the vena contract to enable determination of contraction coefficient. The pitot head and the total head over the orifice is measured using manometer tubes fixed adjacent to the tank. A set of four nozzles is also provided in addition to the sharp edged orifice to study the effect of geometry on the coefficient of discharge.

Note: Specifications are subject to change.

Tesca Technologies Pvt. Ltd.

IT-2013, Ramchandrapura Industrial Area, Sitapura Extension,
Near Bombay Hospital, Vidhani Circle, Jaipur-302022, Rajasthan, India,
Tel: +91-141-2771791 / 2771792; Email: info@tesca.in, tesca.technologies@gmail.com
Website: www.tescaglobal.com

The Orifice Discharge Apparatus 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.

Options

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

Experiments

1. Study of flow through orifice.
2. Investigation of water jet through orifice.
3. Locating vena contract in water jets.
4. Determination of coefficient of velocity for orifice.
5. Determination of contraction coefficient for orifice.
6. Determination of coefficient of discharge for orifice.
7. Study of coefficient of discharge of orifice at various heads over orifice.
8. Study of coefficient of discharge of different nozzles.
9. Comparison of coefficient of discharge of orifice and nozzles.
10. Repeat of experiments (1-7) for various nozzles.

Important Features And Component Specifications

1. Sharp Edged Orifice, 13mm diameter.
2. Circular orifice dimensions:
 - Length 13 mm, with 60° contraction and 60° diverging section
 - Length 13 mm, with 29 mm diameter bell-mouth approach to 60° diverging section, Length 60 mm, with 29 mm diameter bell-mouth approach to 51 mm long parallel section, Length 60 mm, with 29 mm diameter bell-mouth approach, to 30° diverging section and 25 mm long parallel section
 - Triangular orifice dimensions: Each side

nominally 12.1 mm, including 1.5 mm corner radius

- Square orifice dimensions: 9 mm square
3. Orifice material: Aluminum
 4. Square Plexiglas tank, clear transparent, 300 x 300mm. 500mm height, Supported on tripod legs with provision for leveling, removable with adjustable constant head.
 5. Maximum constant head: 420mm.
 6. Max. Flow rate: 14 Lpm
 7. Pitot tube, positioning and traversing unit with micrometer with 0.01mm division, to measure jet diameter and pitot head profiles.
 8. Level Indicator: 500mm WC.
 9. Optional Computer based learning software is included to enable students

Options

1. A self contained unit of Orifice Discharge Apparatus mounted on a mobile platform with a flow controlled closed circuit water circulation unit consisting of a centrifugal pump, flow meter, corrosion resistant sheet metal measuring tank and a sump tank will be supplied on request.
2. Orifices and Nozzles of different geometries will be supplied on request.

Services Required

1. Water Supply.
2. Hydraulic Bench
3. Electrical Supply, 240 V, single-phase, 50 Hz.

Overall Dimensions

Height: 0.8m, Width: 0.45m, Length: 0.45m.

Instruction Materials

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

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