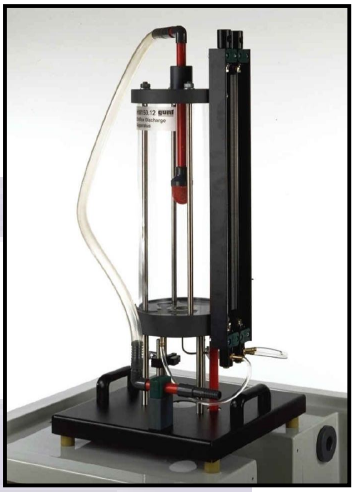
KFM-81

VERTICAL FLOW FROM A TANK APPARATUS



Features

- Determination of the diameter and velocity of the outlet jet
- Study of openings with different inlet and outlet contours
- Determining the contraction coefficient

Pressure losses in the flow from tanks are essentially the result of two processes: the jet deflection upon entry into the opening and the wall friction in the opening. As a result of the pressure losses the real discharge is smaller than the theoretical flow rate.

Vertical Flow from A Tank Apparatus Model KFM-81 determines these losses at different flow rates. Different diameters as well as inlet and outlet contours of the openings can be studied. Additionally, the contraction coefficient can be determined as a characteristic for different contours. The experimental unit includes a transparent tank, a measuring device as well as a pitot tube and twin tube manometers. An interchangeable insert is installed in the tank's water outlet to facilitate the investigation of various openings. Five inserts with different diameters, inlet contours and outlet contours are provided along with the unit.

The issued water jet is measured using a measuring device. A pitot tube detects the total pressure of the flow. The pressure difference (read on the manometer) is used to determine the velocity. The tank is fitted with an adjustable overflow and a measuring point for static pressure. In this way, the level can be precisely adjusted and read on the manometer. The experimental unit is positioned easily and securely on the work surface of the HM 150 base module. The water is supplied and the flow rate measured by HM 150. Alternatively, the experimental unit can be operated by the laboratory supply.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Specifications

- study of pressure losses in vertical flows from tanks
- determining the contraction coefficient for different contours and diameters
- tank with adjustable overflow
- 5 interchangeable inserts with different contours
- measuring device for determining the jet diameter
- pitot tube for determining the total pressure
- pressure display on twin tube manometers
- flow rate determined by HM 150 base module
- water supply using HM 150 base module or via laboratory supply

Technical Specifications

- Tank
  - capacity: approx. 13L
  - overflow height: max. 400mm
  - max. flow rate: 14L/min

- Inserts
  Inside diameters: d_1=inlet, d_2=outlet
  - 1x cylindrical hole, d=12mm
  - 1x outlet from the insert: cone
    d_1=24mm, d_2=12mm
  - 1x inlet to the insert: orifice plate
    d_1=24mm, d_2=12mm

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- 1x inlet to the insert: cone
  d_1=30mm, d_2=12mm
- 1x inlet to the insert: rounded, d=12mm

- Measuring ranges
  - pressure: 500mmWC
  - jet radius: 0...10mm

Experiments

- study of the outlet jet (diameter, velocity)
- determination of pressure losses and contraction coefficient for different outlet contours
- determination of flow rate at different discharge heads

Services required

- Mains power supply: 220-240V, 1Ph, 50Hz
- Closed water circuit or 'Hydraulic Bench KFM-100.

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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