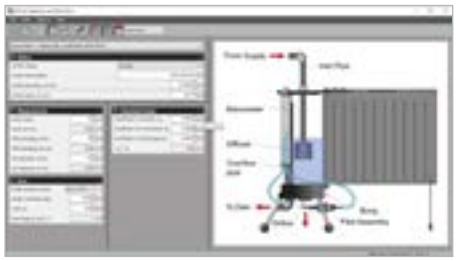
JET TRAJECTORY AND ORIFICE FLOW

HDMS H33

A constant head device, backboard, set of nozzles and Pitot tube. This apparatus demonstrates vertical flow and horizontal jet trajectories through different orifices (nozzles) and allows students to study the trajectory profiles of water jets from the nozzles when mounted horizontally.



SCREENSHOT OF THE HDMS SOFTWARE

KEY FEATURES

- Supplied with four interchangeable nozzles with different throat (or orifice) designs
- Nozzles mount vertically and horizontally
- Simple and clear plotting of horizontal jet trajectory
- Direct measurement of total head, head loss and diameter of a vertical water jet
- Integral Pitot traverse with blade to measure head in the vertical jet and diameter of jet
- Works with TecQuipment's Digital Hydraulic Bench (H1F)* for easy installation
- Works with TecQuipment's optional, free Hydraulics Data Management System Software (HDMS)

LEARNING OUTCOMES

- Determination of the contraction and velocity coefficients
- Calculation of the discharge coefficient
- Determination of the actual discharge coefficient by measurement of flow rate
- Demonstrates the influence of Reynolds number
- Determination of discharge characteristics (jet trajectory) for an orifice mounted in the side of a vertical tank

KEY SPECIFICATIONS

- Vertical and horizontal discharge
- Four nozzles included
- Integral Pitot traverse

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DESCRIPTION

With this apparatus students can measure the decrease in flow, contraction of the stream and energy loss as water discharges from four vertically mounted, interchangeable nozzles with different orifice designs. It also allows students to study the trajectory profiles of water jets from the nozzles when mounted horizontally.

It works with TecQuipment's Digital Hydraulic Bench (H1F, available separately)* and stands on the hydraulic bench worktop. The apparatus has a transparent cylindrical tank, with a mounting in the base for the nozzles. The nozzles either fit to the unit to discharge water vertically (down) or horizontally, dependent on the experiment taking place. They are easily interchangeable.

Water flows into the tank from the hydraulic bench through an adjustable diffuser. The flow rate and an overflow pipe set the water level. To change the level in the tank (and so the head on the orifice), students adjust the flow to the diffuser. Water leaves the tank through the nozzles. The jet that leaves the orifice discharges into the hydraulic bench measuring tank.

Manometers measure the total head on the orifice and under the jet. A traverse assembly allows students to position a Pitot tube anywhere in the jet. A sharp blade accurately measures the jet diameter, so students can find the contraction coefficient.

To measure trajectory of jets, students fit a nozzle to the side (horizontal) mounting and use a bung to seal the vertical exit. They then use the plotting board and depth gauge pins to plot the jet trajectory onto graph paper.

If required students can download TecQuipment's Hydraulics Data Management System (HDMS) software onto a suitable computer (not supplied) to aid with entering, evaluating and presenting their data.

STANDARD FEATURES

- Supplied with a comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union directives
- ISO9001 certified manufacturer

ESSENTIAL BASE UNIT

- Digital Hydraulic Bench (H1F)*

*This product will also work with an existing TecQuipment Volumetric Hydraulic Bench (H1D)

SHOWN WITH TECQUIPMENT'S HYDRAULIC BENCH (H1F, NOT INCLUDED)

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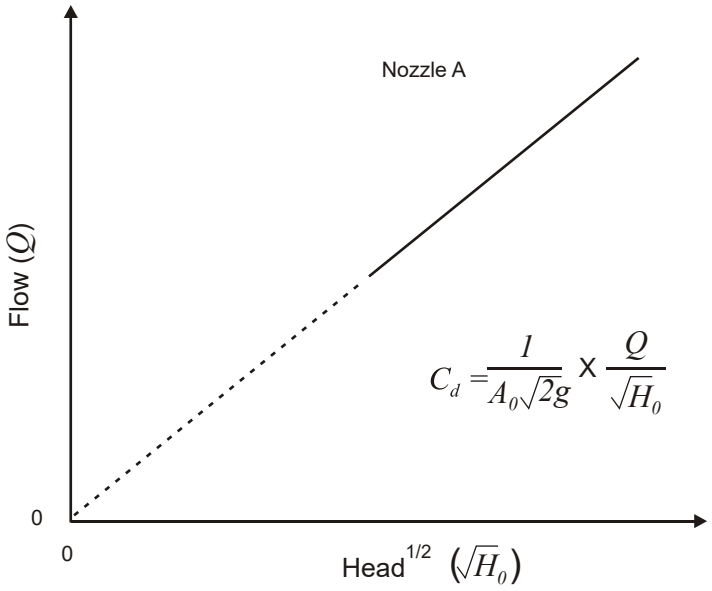
TYPICAL WORK ASSIGNMENTS

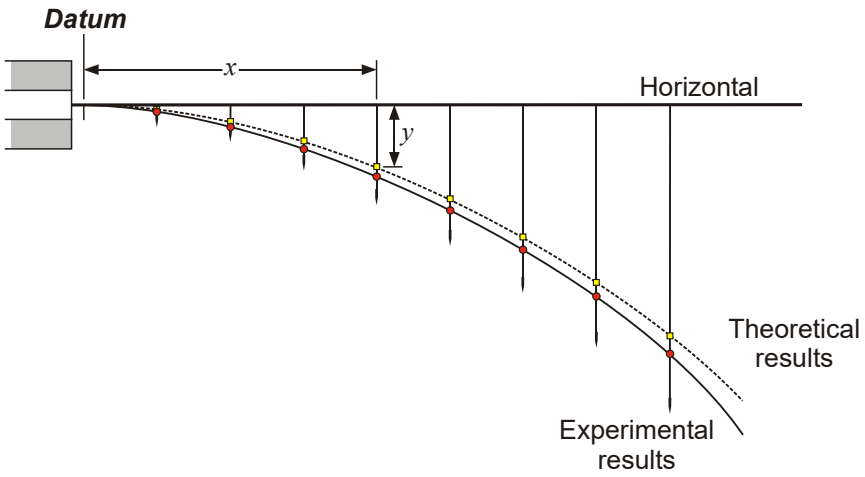
HEAD AND FLOW

This experiment asks the students to test a nozzle at a range of flows, producing linear results when plotted as flow against the square root of head. This chart should also produce an average value for the discharge coefficient (Cd).



HORIZONTAL JET TRAJECTORY

This experiment asks students to measure the actual trajectory of the jet and compare it with the theoretical trajectory.



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HYDRAULICS DATA MANAGEMENT SYSTEM

The HDMS is a complimentary software tool designed to help students accurately record data from experiments associated with this apparatus. The software is intuitive and easy to use, with clear and convenient data display options, enabling students to run automatic calculations and export charts and results for further investigation.

To find out more, click here.

DETAILED SPECIFICATIONS

TecQuipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

NETT DIMENSIONS AND WEIGHT:

700 mm x 700 mm x 400 mm

10 kg including nozzles

APPROXIMATE PACKED DIMENSIONS AND WEIGHT:

0.3 m^3 and 15 kg

MAXIMUM HEAD:

Approximately 365 mm

MAXIMUM FLOW RATE:

Nominally 22 litres per minute

ORIFICE/NOZZLES:

One sharp-edged orifice and three nozzles

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

–25°C to +55°C (when packed for transport)

OPERATING TEMPERATURE RANGE:

+5°C to +40°C

SOUND LEVELS

Less than 70 dB(A)

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