

## HDMS HI9

A compact experiment for use with the Hydraulic Bench (H1F) to demonstrate how a Pelton turbine works and to test its performance.





SCREENSHOT OF THE HDMS SOFTWARE



## **KEY FEATURES**

- Works with TecQuipment's Digital Hydraulic Bench for easy installation
- Includes dynamometer to load the turbine and help find the power absorbed (needs an optional tachometer to find speed)
- Transparent window so students can see the Pelton wheel working
- Includes band brake to measure turbine torque
- Includes pressure gauge to measure inlet • pressure
- Screw-controlled spear valve for precise inlet flow control
- Works with TecQuipment's optional, free Hydraulics Data Management System Software (HDMS)

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## LEARNING OUTCOMES

- Performance charts of power, speed, torque and efficiency
- The effect of spear valve position

## **KEY SPECIFICATIONS**

- 3.5 watt nominal power
- Band brake
- Adjustable spear valve
- Inlet pressure gauge





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## DESCRIPTION

Shows students how an impulse (Pelton) turbine works and tests its performance. The Pelton wheel is an important and efficient fluid power machine, used in many applications.

The product consists of a Pelton wheel mounted in a corrosion-resistant enclosure. A transparent front panel allows students to see the turbine working. An optional Stroboscope (ST1, available separately) can 'freeze' the image of the turbine to help students better understand how it works.

An adjustable spear valve directs a jet of water through a nozzle to the buckets of the Pelton wheel to make it turn. Manual adjustment of the spear valve controls the water jet from the nozzle.

The turbine includes all pipes and fittings to connect it to TecQuipment's Digital Hydraulic Bench (H1F, available separately)\*, for flow measurement.

The Optical Tachometer (OT1, available separately) measures the speed of rotation of the turbine.

A simple mechanical brake and spring balance assembly attached to the shaft of the Pelton wheel applies a variable mechanical load (torque). Students use this with the speed (from the optional tachometer) to find power absorbed by the turbine. A gauge measures inlet pressure.

Students adjust the spear valve and measure inlet pressure, flow rate and torque (and speed with the

optional tachometer). They plot these values to find the turbine performance.

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)

## **ESSENTIAL ANCILLARY**

• Optical Tachometer (OT1)

## **RECOMMENDED ANCILLARY**

• Stroboscope (ST1)



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## **TYPICAL WORK ASSIGNMENT**

#### PERFORMANCE TEST

This experiment asks students to test the turbine with the spear valve at different settings, from fully open to 25% open. The results produce charts of efficiency, power and torque against turbine speed.







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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, <u>click here</u>.

## **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:

510 mm x 320 mm x 280 mm and 5.5 kg

#### APPROXIMATE PACKED DIMENSIONS AND WEIGHT:

0.07 m<sup>3</sup> and 10 kg (approximate weight)

#### MAXIMUM SPEED:

Approximately 1000 rev.min<sup>-1</sup>

## MAXIMUM BRAKE POWER:

Typically 3.5 W at 500 rev.min<sup>-1</sup>

## **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

#### OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

## **SOUND LEVELS**

Less than 70 dB(A)

