H8

IMPACT OF A JET

Investigates the force generated by a jet striking plates (representing turbine vanes)

SHOWN MOUNTED ON THE DIGITAL HYDRAULIC BENCH (HIF) - AVAILABLE SEPARATELY

KEY FEATURES

- Includes flat and hemispherical plates
- Clear vessel so that students can see what is happening
- Extra (optional) angled and conical plates
- Quick and accurate force measurements
- Works with TecQuipment's Hydraulic Bench for easy installation

LEARNING OUTCOMES

- Measurement of the impact force on flat and hemispherical plates and comparison with momentum change
- Measurement of the impact force on an angled flat plate and conical plate (available separately) and comparison with momentum change

KEY SPECIFICATIONS

- Flat plate
- Hemispherical plate

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DESCRIPTION

To understand correctly how a turbine (a Pelton wheel for example) works, students need to understand how jet deflection produces a force on turbine vanes. They also need to know how this force influences the rate of momentum flow in the jet.

This product shows students the force produced by a jet of water as it strikes a flat plate or hemispherical cup. They can then compare this to the momentum flow rate in the jet. To extend the range of investigations, the 120-Degree Conical Plate and 30-Degree Angled Plate (H8a) are available separately. TecQuipment's hydraulic bench (H1F, available separately)* provides the water source for experiments.

The Impact of a Jet consists of a transparent cylinder containing a vertically tapered nozzle and a test plate. The cylinder is on legs and mounts on the top of the hydraulic bench. The nozzle, supplied by the hydraulic bench, produces a high-velocity jet of water which hits the test plate. The test plate connects to a weigh beam assembly with jockey weight which measures the jet force. A drain tube in the base of the cylinder directs water back into the hydraulic bench, allowing accurate flow rate measurement.

All test plates are all easily interchangeable, taking only a few seconds and needing no tools.

To perform experiments, students level the apparatus and zero the weigh beam assembly. They set the flow from the hydraulic bench to maximum, and measure the jet force. They reduce the flow from the hydraulic bench in several increments. At each increment they record the force of the jet on the plate and the flow rate. They then repeat the experiments for different test plates. Students compare their experimental results to those calculated from theory, working out charts of rate of force on plate and rate of delivery of momentum.

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 existing TecQuipment Gravimetric and Volumetric Hydraulic Benches (H1 and H1D)

RECOMMENDED ANCILLARIES

- 120-degree Conical Plate and 30-degree Angled Plate (H8a)

120 DEGREE CONICAL PLATE

30 DEGREE ANGLED PLATE

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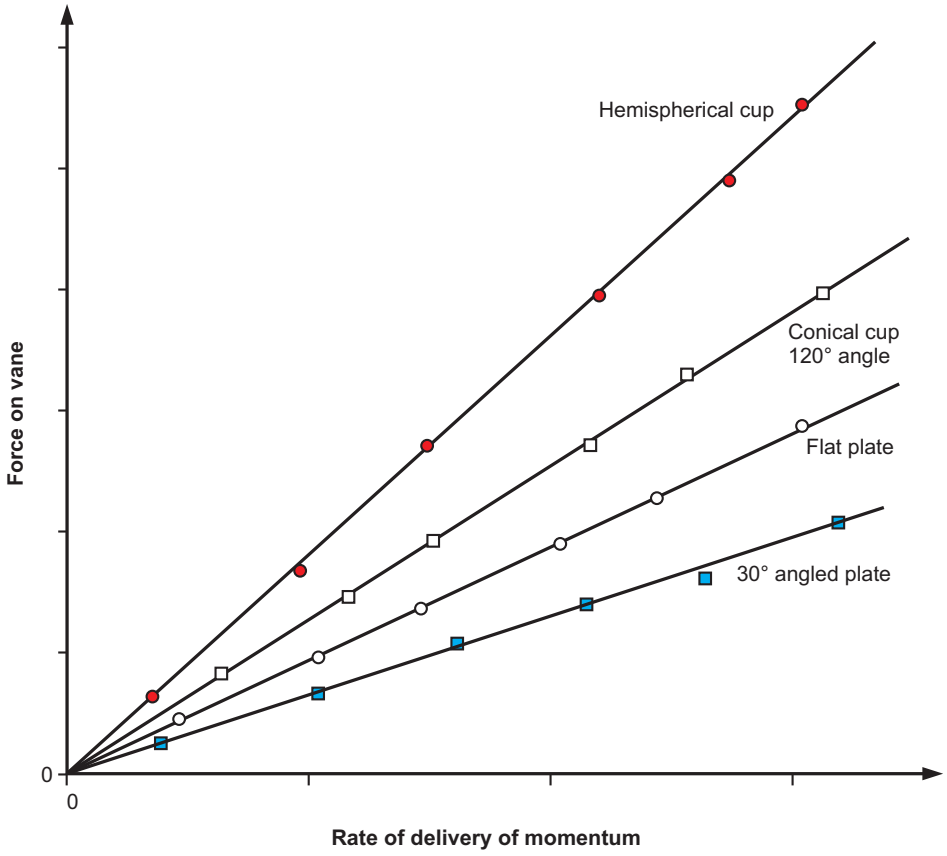
TYPICAL WORK ASSIGNMENT

This experiment asks the student to measure the force on the plates for different flow rates and calculate the rate of delivery of momentum. The results should be linear, producing gradients that are unique to the design of the plate.



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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:

740 mm high x 420 mm wide x 310 mm and 6 kg

APPROXIMATE PACKED DIMENSIONS AND WEIGHT:

0.176 m^3 and 13 kg

FLAT PLATE:

74 mm diameter, normal to and coincident with the jet axis

HEMISPHERICAL PLATE:

60 mm diameter

ANCILLARIES (INCLUDED):

All necessary pipe clips and tubing

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

SPECIFICATION – H8A

PACKED WEIGHT:

1 kg

CONICAL PLATE:

75 mm diameter 120°

ANGLED PLATE:

75 mm diameter 30°