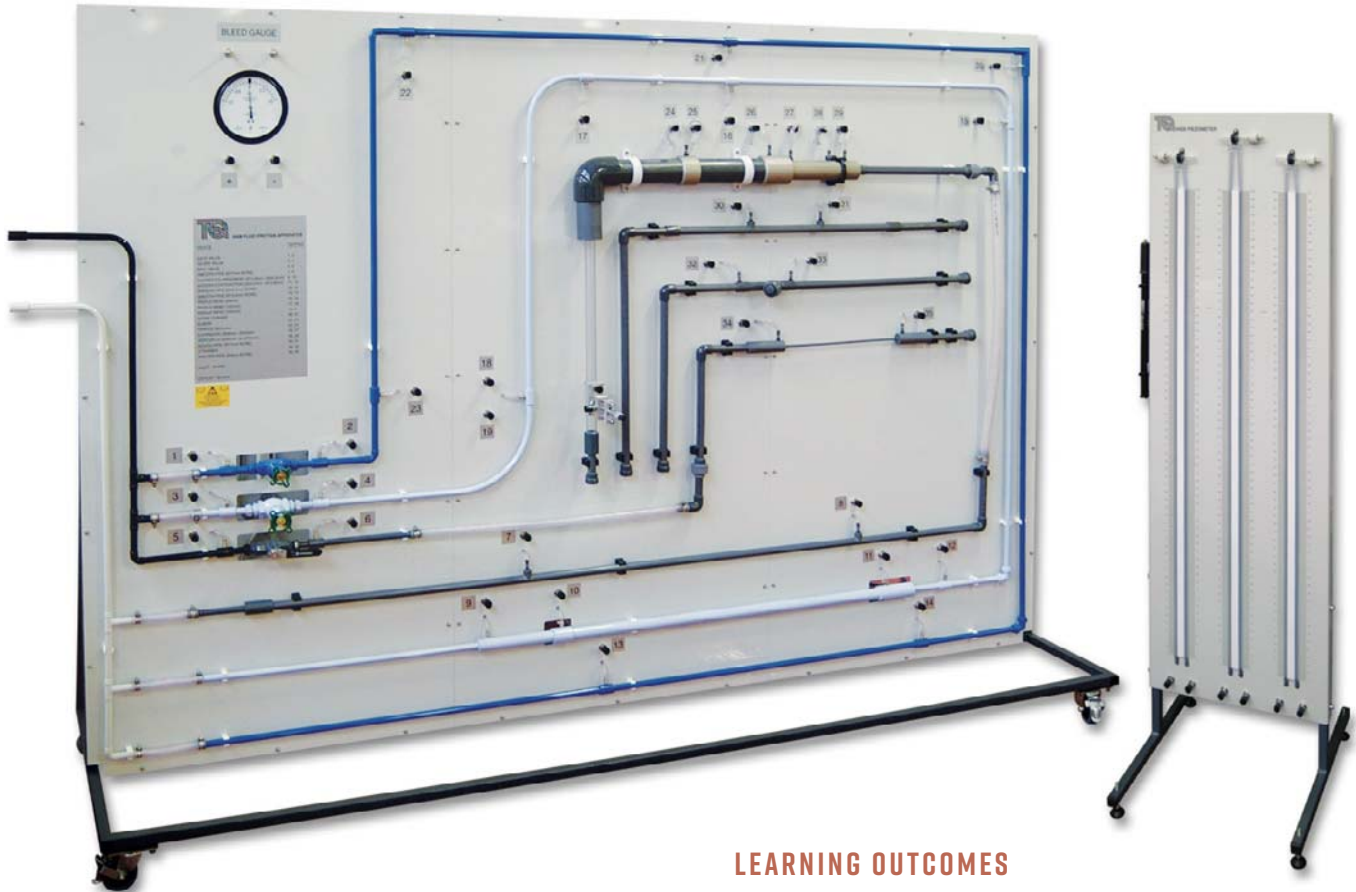


H408

FLUID FRICTION APPARATUS

Shows flow and losses in different pipes, fittings and valves.
Shows popular flow measurement instruments.



KEY FEATURES

- Works with TecEquipment's Hydraulic Bench for easy installation
- Includes different valves, pipes and fittings to show losses
- Includes experiments on roughened pipes
- Uses Bernoulli's equation for incompressible fluid flow
- Shows how to use Venturi and orifice meters to measure flow
- Includes a traversing Pitot tube to measure velocity profile and flow

LEARNING OUTCOMES

- Velocity profile and the Pitot-static tube
- Flow measurement using a Venturi meter and an orifice meter

Pressure (head) losses in:

- Smooth and roughened straight pipes
- Sudden expansion and contraction
- Bends and elbows
- Valves and in-line strainer
- Pipes of different diameter

KEY SPECIFICATIONS

- Venturi and orifice meters
- Three circuits
- Three downstream valves
- Three 90° bends
- Three-way piezometer
- Pressure gauge

FLUID FRICTION APPARATUS

DESCRIPTION

TecEquipment's Fluid Friction Apparatus allows detailed studies of flow, flow measurement techniques and losses in a wide variety of pipes and fittings.

The equipment has three water circuits with instruments, pipes and pipe fittings including a different valve on each circuit. The valves are downstream of each circuit to avoid upstream turbulence. The innermost of the three circuits has interchangeable sections that include the orifice, Venturi, Pitot, roughened pipe and the strainer. A mobile, space-saving vertical panel holds all the pipes and fittings for easy use.

TecEquipment's Digital Hydraulic Bench (H1F, available separately)* supplies the circuits with a controlled and measured flow of water.

To measure pressure loss across each part, students use a piezometer set and differential pressure gauge (included). To adjust the datum water level in the tubes of the piezometer set, students connect a hand-pump (included) to the air valve above the tubes.

To perform experiments students set the hydraulic bench to pump water through a circuit and measure pressure losses through the pipes and fittings. They also find the losses in a rapid enlargement and contraction. Several pipe sections are of different diameter to show how this affects pressure loss.

The Venturi meter and orifice plate instruments show students two common methods of measuring water flow. They also give applications of Bernoulli's equation for incompressible fluid flow. Students use them to measure flow and compare the losses of each.

The equipment also includes a Pitot-static tube. By traversing the Pitot across the pipe diameter, students can find the velocity profile and flow coefficients. They also find the relationship between the flow rate and pressure differential.

An artificially roughened pipe allows students to study friction factor at different Reynolds numbers. They can compare results to those predicted by Nickuradse's results and a Moody chart.

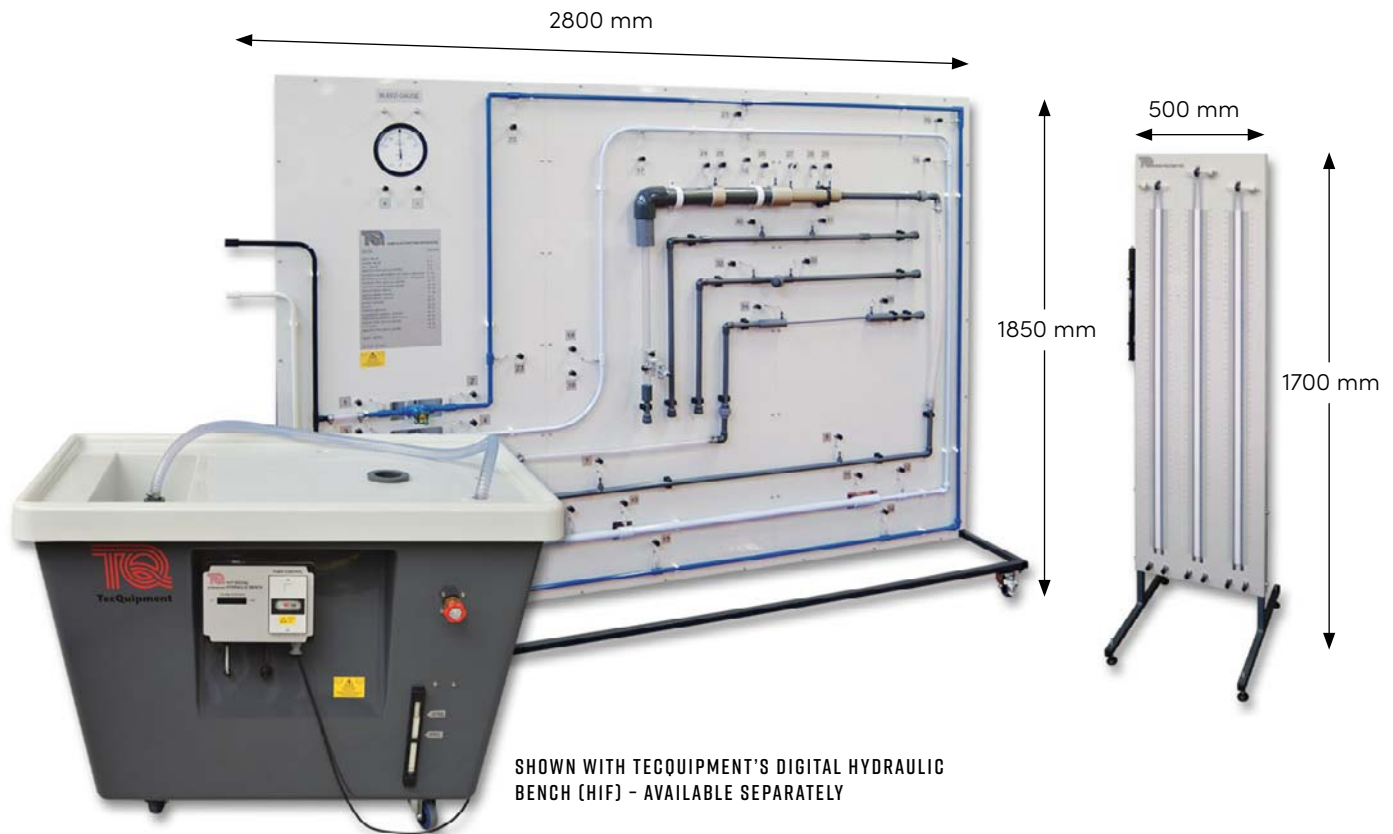
STANDARD FEATURES

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

ESSENTIAL BASE UNIT

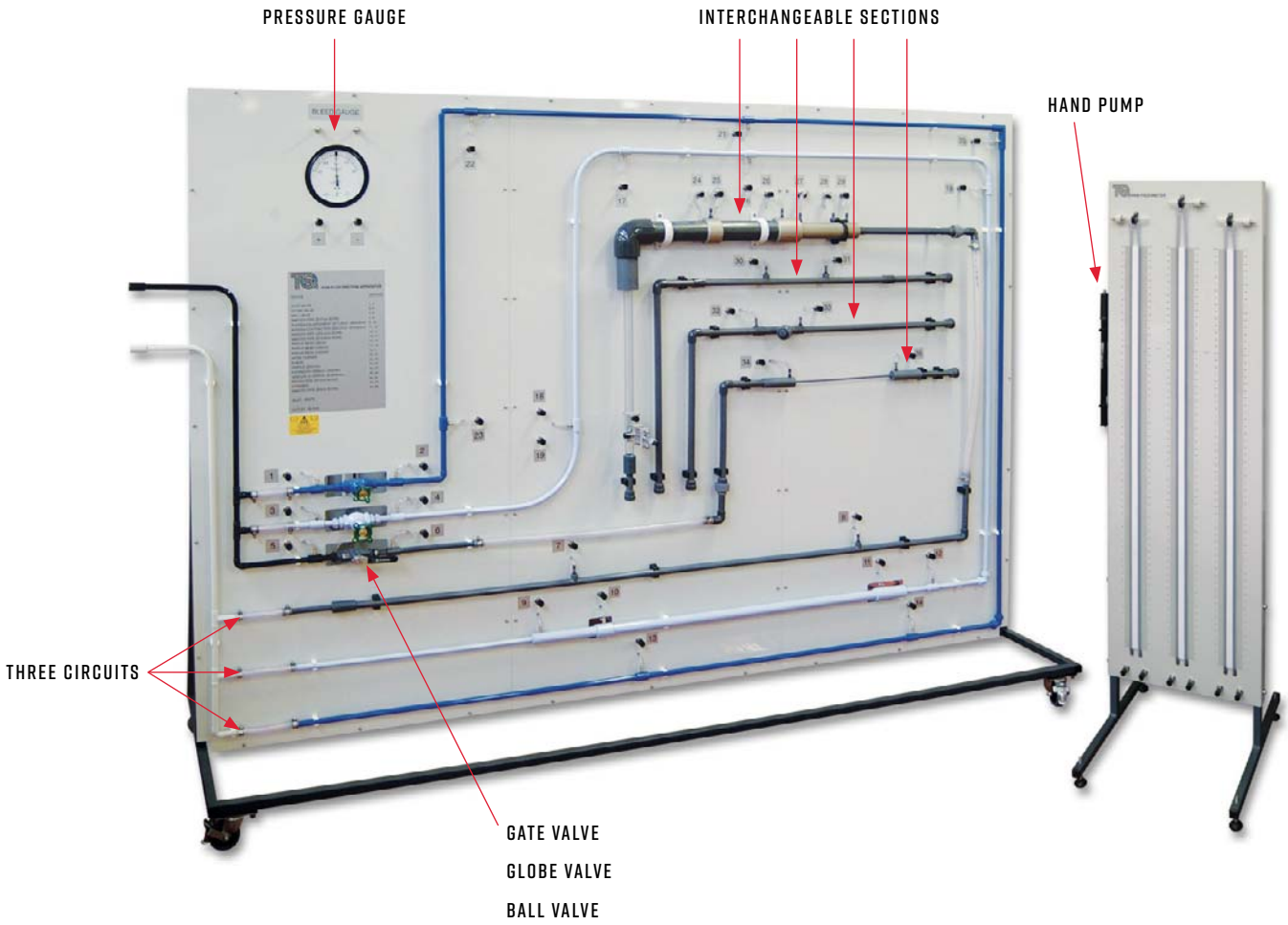
- Digital Hydraulic Bench (H1F)*

*This product will also work with existing TecEquipment Gravimetric and Volumetric Hydraulic Benches (H1 and H1D)



H408

FLUID FRICTION APPARATUS



FLUID FRICTION APPARATUS

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 OF MAIN UNIT:

2.8 m long (assembled) x 1.85 m high x 0.8 m front to back and 130 kg

NETT DIMENSIONS AND WEIGHT OF PIEZOMETER SET:

500 mm wide x 500 mm front to back x 1.7 m high (assembled) and 27 kg

APPROXIMATE TOTAL PACKED DIMENSIONS AND WEIGHT:

5 m³ and 250 kg

MAIN PARTS:

- Smooth pipes of various lengths and internal diameters from 4 mm to 17 mm
- Artificially roughened pipe
- 90-degree mitre and elbow
- 90-degree smooth bends (up to 150 mm radius)
- Sudden enlargement
- Sudden contraction
- Gate valve, globe valve and ball valve
- Venturi meter and orifice meter
- Pitot-static tube
- In-line strainer

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