Hydrostatics Bench & Fluid Properties

BHI

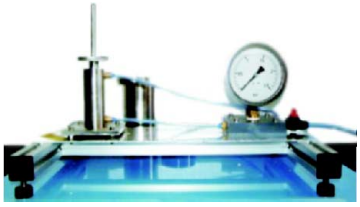
Technical Teaching Equipment

Modules included

FME11. Metacentric Height

FME02. Fluid Level Meter and flow over weirs

FME08. Hydrostatic Pressure



FME10. Dead Weight Calibrator

www.edibon.com
Products
Products range
Units
8.-Fluid Mechanics & Aerodynamics

DESCRIPTION

This unit enables the study of the main properties and the behaviour of liquids under hydrostatic conditions, with the aid of some accessories to make the different experiments.

This equipment is supplied as a compact unit, movable and independent.

It consist of a metallic structure assembled on wheels with a panel at the top. In the lower part of the bench there is a tank where water is stored. Water is then sent to a methacrylate tank placed at the upper part of the bench and to other plastic deposit, two hand-operated pumps are used for such distribution. The methacrylate tank is connected to two communicating tubes on the front panel, enabling to perform some practices; the other deposit placed on the horizontal surface of the bench is necessary for performing the rest of the practices. All water in excess is sent back to the storage tank by the drain.

The rest of the equipment consists of different elements and independent accessories (see specifications section).

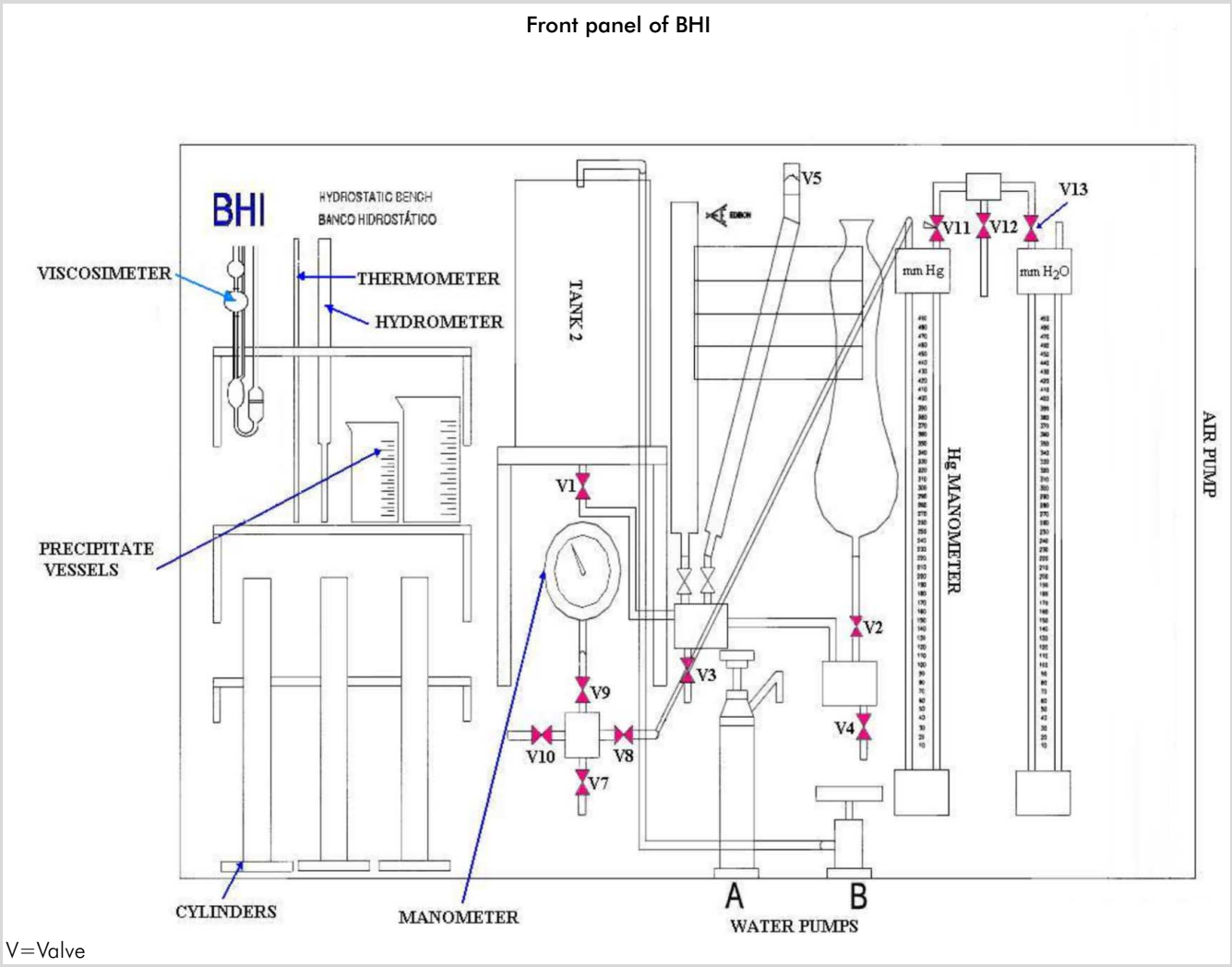
ISO:9001-2000 Certificate of Approval. Reg. No. E204034

European Union Certificate

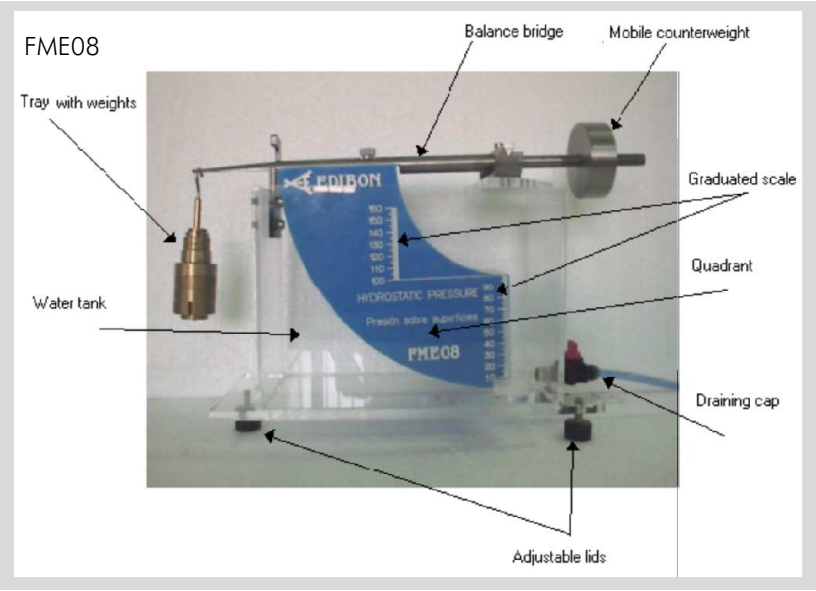
Certificates ISO 14001: 2004 and **ECO-Management and Audit Scheme**
(environmental management)

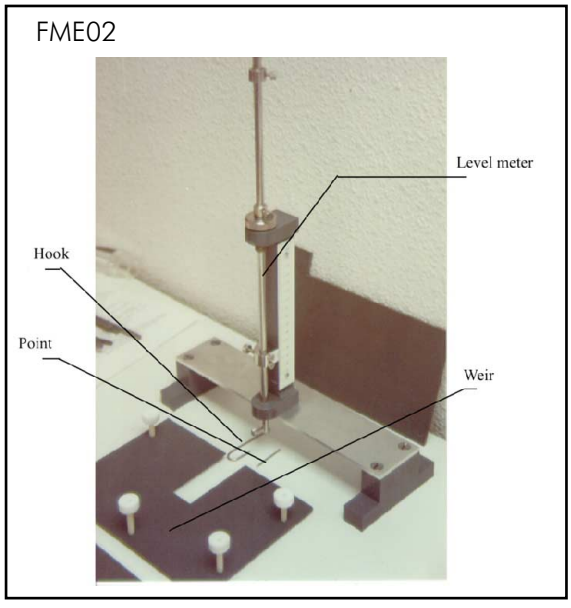
Worlddidac Quality Charter Certificate
Worlddidac Member

Front panel of BHI

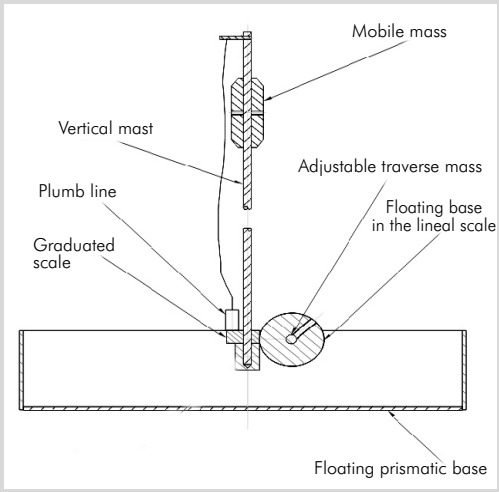


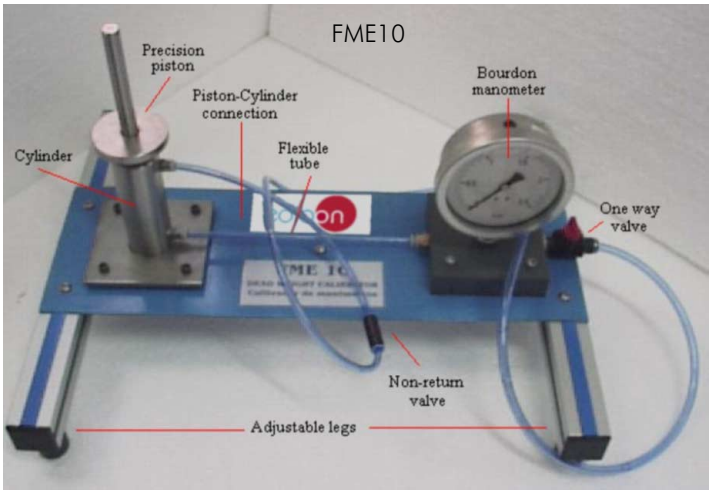
V=Valve





FME11





Module for studying Archimedes principle

SPECIFICATIONS

Self-contained and mobile unit for demonstration of the properties of fluids and hydrostatics.
Structure in anodized aluminium, assembled on wheels with a panel (painted steel) at the top (front panel).
Process diagram in the front panel.
Tank where water is stored, in the lower part of the bench.
Methacrylate tank at the upper part of the bench.
Plastic deposit.
Thermometer.
Ubbelhode capillary viscosimeter, 0.6-3 cp.
Ubbelhode capillary viscosimeter, 2-10 cp.
Ubbelhode capillary viscosimeter, 10-50 cp.
Ubbelhode capillary viscosimeter, 60-300 cp.
3 graduated cylinders.
Set of glass elements. Elements set for demonstration of free surface in static conditions (3 elements).
Bourdon manometers calibration Manometer range: 0-2.5 bar.
Manometers (range: 0-500mm).
Module to determine the Metacentric Height (FME11):

This module consists of a floating methacrylate prismatic base, with a vertical mast placed on it. An adjustable mobile mass has been added to alter the position of the center of gravity. An adjustable traverse mass lets modifying the inclination of the floating base. A plumb line, attached to the upper part of the mast is used to measure the inclination angle of the floating base with help of a graduated scale.

Maximum angle: +/-13.
Corresponding lineal dimension: +/- 90mm.
Dimension of the float: length=353mm, width=204mm, total height=475mm.

Module for studying the Hydrostatic Pressure (FME08):

The module consists of a quadrant assembled to the arm of a scale that swings around an axis. When the quadrant is immersed in the water tank, the force that acts on the flat rectangular front surface, exerts a momentum with respect to the supporting axis. The swinging arm is fitted with a tray and an adjustable counter balance. The tank has adjustable supporting legs for a right levelling. It has a drainage valve. The level reached by the water inside the tank is indicated by a graduated scale.

Tank capacity: 5.5 l.
Distance between suspended masses and the support point: 285 mm.
Area of the section: 0.007 m^2.
Total depth of submerged quadrant: 160 mm.
Height of support point on the quadrant: 100 mm.
Set of masses of different weights.

Dead Weight Calibrator Module (FME10):

This module consists of a hollow cylinder in whose interior a precision piston fits and slips. Using a system of calibrated weights, we produce predetermined pressures inside the cylinder. The Bourdon manometer that must be contrasted is connected to the cylinder by means of a flexible pipe.

Pressure manometer: Bourdon type. 0 - 2.5 bar.
Set of masses of different weights.
Piston diameter: 18 mm. Piston weight: 0.5 kg.
Module levelling through adjustable feet.

Fluid level meter (hook and point gauge) and flow over weirs (FME02):

A level meter consisting on a "nonius" adjusted to a mast, where the heights are pointed out on a caliber coupled to it. A small hook or point is attached to the bottom of the mast to carry out the measures. Two drains (a rectangular neckline and a V-shape).

Scale of the level meter: 0 to 160 mm.
Dimensions of the weirs: 160x230x40mm.
Neckline angle in the V-shape weir: 90°.
Dimension of rectangular notch: 30x82mm.

Module for studying Archimedes principle (lever balance with displacement vessel, bucket and cylinder).
Set of weights (5, 10, 50, 100, 400, 1000, 2000, 5000 gr.).
Air pump.
2 water pumps.
Universal hydrometer (0-70 Baumé , 0.700 - 2.000 Sp/gr).
Weather Station:

Barometer up to 1040 hPa.
Thermometer (-40 to 60°C).
Hygrometer (0 to 100%).

Stop clock.
Two 600ml beakers.
Spare parts for the viscosimeter elements.
Valves.
The following manuals are supplied with this unit: Required services, Assembly and Installation, Starting-up, Safety, Maintenance, and Practices manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

Some practical possibilities of the Unit:

1.- Density and specific gravity measurements.
2.- Viscosity measurement.
3.- Capillarity effect observation.
4.- Capillarity raising measurement.
5.- Free surface of a static liquid.
6.- Effect of a liquid on a free surface.
7.- Measurement of liquid levels.
8.- Pressure center in a smooth surface.
9.- Center of pressures for partial immersion.
10.-Center of pressures for total immersion.
11.-Calibration of a Bourdon manometer.
12.-Hysteresis curve determination.
13.-Use of a water manometer.
14.-Use of an air manometer.
15.-Use of a U-shaped manometer for determining the differential pressure.
16.-Archimedes principle.
17.-Determination of the metacentric height.
18.-Study of stability of a floating body. Angular displacements.
19.-Study of stability of a floating body. Different positions of the center of gravity.
20.-Operation and comparison of results obtained with different measuring instruments.

Other possible practices:

21.-Table of the atmospheric pressure in function of the height.
22.-Use instructions of the scale of Archimedes.

REQUIRED SERVICES

- Mains water supply for filling the tank.
- Drainage.

DIMENSIONS & WEIGHT

- Dimensions approx.: 1500 x 800 x 1900 mm.
- Weight approx.: 200Kg.

COMPLEMENTARY PRODUCTS

•LIFLUBA. Basic Fluid Mechanics Integrated Laboratory:
- -FME00. Hydraulics Bench.
- -FME00/B. Basic Hydraulic Feed System.

Modules:

- -FME01. Impact of a Jet.
- -FME03. Bernoulli's Theorem Demonstration.
- -FME04. Orifice Discharge.
- -FME05. Energy Losses in Bends.
- -FME06. Osborne-Reynolds' Demonstration.
- -FME07. Energy Losses in Pipes.
- -FME09. Flow Visualization in Channels.
- -FME12. Series/Parallel Pumps.
- -FME13. Centrifugal Pumps Characteristics.
- -FME14. Free and Forced Vortices.
- -FME15. Water Hammer.
- -FME16. Pelton Turbine.
- -FME17. Orifice and Free Jet Flow.
- -FME18. Flow Meter Demonstration.
- -FME19. Cavitation Phenomenon Demonstration.
- -FME20. Laminar Flow Demonstration.
- -FME21. Radial Flow Turbine.
- -FME22. Venturi, Bernoulli and Cavitation Unit.
- -FME23. Basic Pipe Network Unit.
- -FME24. Unit for the study of Porous Beds in Venturi Tubes (Darcy's Equation).
- -FME25. Flow Channel, 1m. length.
- -FME26. Depression Measurement System (Vacuum gauge).
- -FME27. Axial Flow Turbine.
- -FME28. Francis Turbine.
- -FME29. Kaplan Turbine.

•HVB. Falling Sphere Viscosimeter and Drag Coefficient.
•UVF. Flow Visualization Unit.
•HMM. Manometer & Multimanometers:
- HMM-W500. U-shape Double Manometer.
- HMM-U1000. U-shape Manometer.
- HMM-I1000. Inclined Multimanometer with 20 manometric tubes of 250 mm. length.
- HMM-V500. Multimanometer with 8 manometric tubes of 500mm. length, vertical position.
- HMM-4B. 4 Bourdon type Manometers Unit.

✱ Specifications subject to change without previous notice, due to the convenience of improvements of the product.

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