

HM 150

Base module for experiments in fluid mechanics



Description

- **water supply for experimental units for fluid mechanics**
- **volumetric flow rate measurement for large and small flow rates**
- **comprehensive range of accessories allows a complete course in the fundamentals of fluid mechanics**

The HM 150 series of devices permits a varied experimental cross-section in the fundamentals of fluid mechanics. The base module HM 150 provides the basic equipment for individual experiments: the supply of water in the closed circuit; the determination of volumetric flow rate and the positioning of the experimental unit on the working surface of the base module and the collection of dripping water.

The closed water circuit consists of the underlying storage tank with a powerful submersible pump and the measuring tank arranged above, in which the returning water is collected.

The measuring tank is stepped, for larger and smaller volumetric flow rates. A measuring beaker is used for very small volumetric flow rates. The volumetric flow rates are measured using a stop-watch.

The top work surface enables the various experimental units to be easily and safely positioned. A small flume is integrated in the work surface, in which experiments with weirs (HM 150.03) are conducted.

Together with the accessories HM 150.01 – HM 150.29: In order to perform a virtual analysis of flow behaviour, CFD simulations are often used in practice. Such simulations allow, for example, flow visualisations in areas that cannot be visualised experimentally. In the GUNT Media Center, flow visualisations based on CFD calculations are available online. There are also multimedia teaching materials including E-Learning courses on basic knowledge and calculations. Videos show a complete experiment with preparation, execution and evaluation. Worksheets with solutions supplement the teaching material.

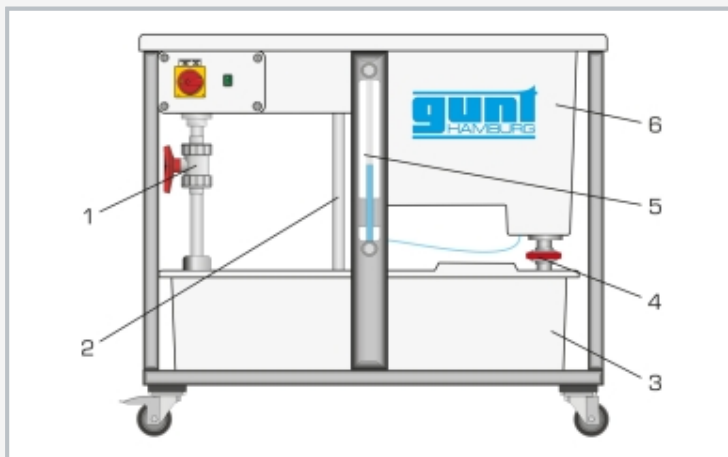
Learning objectives/experiments

Together with the accessories HM 150.01 – HM 150.39:

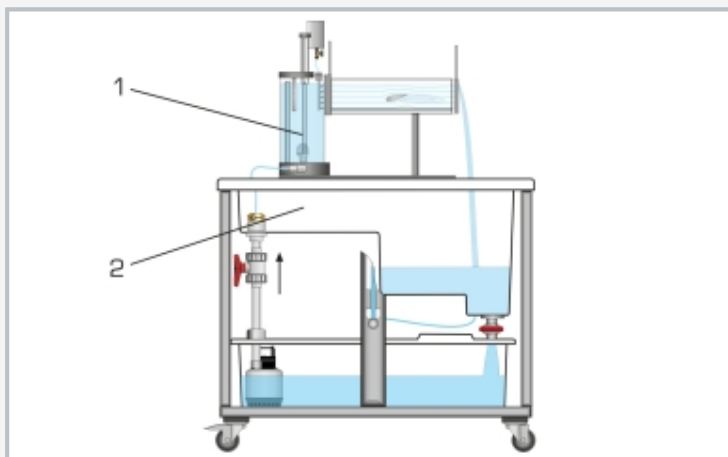
- introduction to the fundamentals of fluid mechanics
- GUNT Media Center, develop digital skills
 - ▶ E-Learning course with fundamental knowledge and calculations
 - ▶ prepared CFD simulations for flow visualisation
 - ▶ videos with detailed demonstration of the experiments: preparation, execution, evaluation
 - ▶ assured learning success through digital worksheets
 - ▶ retrieve information from digital networks

HM 150

Base module for experiments in fluid mechanics



1 flow control valve, 2 overflow, 3 storage tank with submersible pump, 4 gate valve for emptying the measuring tank, 5 measuring tank level indicator, 6 measuring tank



HM 150.21 (1) placed on the base module HM 150 (2)



Base module for experiments in fluid mechanics with plate weir HM 150.03

Specification

- [1] base module for supplying experimental units in fluid mechanics
- [2] closed water circuit with storage tank, submersible pump and measuring tank
- [3] measuring tank divided in two for volumetric flow rate measurements
- [4] measuring beaker with scale for very small volumetric flow rates
- [5] measurement of volumetric flow rates by using a stopwatch
- [6] work surface with integrated flume for experiments with weirs
- [7] work surface with inside edge for safe placement of the accessory and for collecting the dripping water
- [8] storage tank, measuring tank and work surface made of GRP

Together with the accessories HM 150.01 – HM 150.29:

- [1] flow visualisation using prepared CFD simulations
- [2] digital multimedia teaching material online in the GUNT Media Center: E-Learning course, prepared CFD simulations, worksheets, videos

Technical data

Pump

- power consumption: 250W
- max. flow rate: 150L/min
- max. head: 7,6m

Storage tank, capacity: 180L

Measuring tank

- at large volumetric flow rates: 60L
- at small volumetric flow rates: 10L

Flume

- LxWxH: 530x150x180mm

Measuring beaker with scale for very small volumetric flow rates

- capacity: 2L

Stopwatch

- measuring range: 0...9h 59min 59sec

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: 1230x765x1065mm

Weight: approx. 85kg

Scope of delivery

- 1 base module
- 1 stopwatch
- 1 measuring cup
- 1 set of accessories
- 1 manual

HM 150

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Optional accessories

Principles of hydrostatics

- HM 150.02 Calibration of pressure gauges
- HM 150.05 Hydrostatic pressure in liquids
- HM 150.06 Stability of floating bodies
- HM 150.39 Floating bodies for HM 150.06

Principles of hydrodynamics

- HM 150.07 Bernoulli's principle
- HM 150.08 Measurement of jet forces
- HM 150.09 Horizontal flow from a tank
- HM 150.12 Vertical flow from a tank
- HM 150.14 Vortex formation
- HM 150.18 Osborne Reynolds experiment

Flow in pipes

- HM 150.01 Pipe friction for laminar / turbulent flow
- HM 150.11 Losses in a pipe system
- HM 150.29 Energy losses in piping elements
- HM 150.13 Methods of flow measurement

Open-channel flow

- HM 150.03 Plate weirs for HM 150
- HM 150.21 Visualisation of streamlines in an open channel

Flow around bodies

- HM 150.10 Visualisation of streamlines

Fluid machinery

- HM 150.04 Centrifugal pump
- HM 150.16 Series and parallel configuration of pumps
- HM 150.19 Operating principle of a Pelton turbine
- HM 150.20 Operating principle of a Francis turbine

Transient flow

- HM 150.15 Hydraulic ram – pumping using water hammer