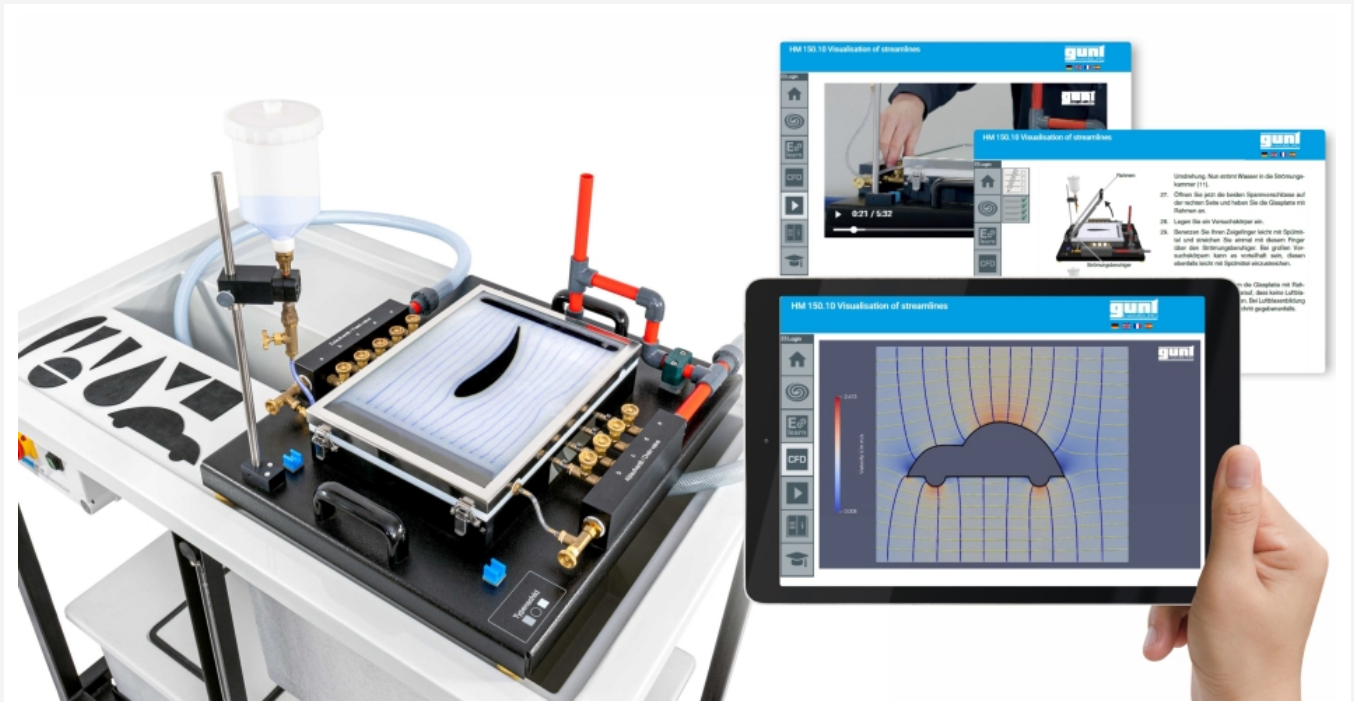


HM 150.10

Visualisation of streamlines



The illustration shows the experimental unit on the work surface of the HM 150 base module and the GUNT Science Media Center, tablet not included

Description

- **visualisation of streamlines with ink as a contrast medium**
- **various models included: drag bodies and changes in cross-section**
- **sources and sinks, individually or in combination**
- **flow visualisation using CFD technology**
- **multimedia teaching material online in the GUNT Science Media Center: E-Learning course, prepared CFD simulations, worksheets, videos**

The laminar, two-dimensional flow in HM 150.10 is a good approximation of the flow of ideal fluids: the potential flow.

HM 150.10 can be used to visualise streamline fields for flows around drag bodies and flow through changes in cross-section. The streamlines are displayed in colour by injecting a contrast medium (ink). Sources and sinks are generated via four water connections in the bottom plate. The streamlines can be clearly observed through the glass plate during flow around and flow through.

The water flow rate and the quantity of contrast medium injected can be adjusted by valves. The water connections are also activated by valves and can be combined as required. Individual models can be cut out of a rubber plate that is included.

The experimental unit is positioned easily and securely on the work surface of the HM 150 base module. The water is supplied by HM 150. Alternatively, the experimental unit can be operated by the laboratory supply.

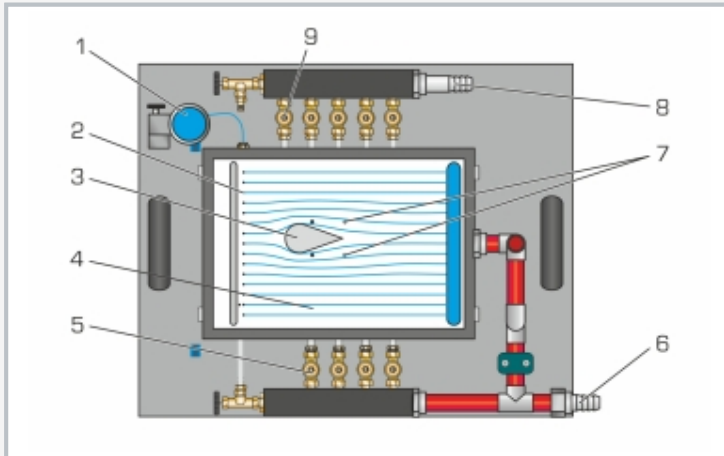
In order to perform a virtual analysis of flow behaviour, CFD simulations are often used in practice. Such simulations allow, for example, flow visualisations in areas that cannot be visualised experimentally. In the GUNT Science Media Center, flow visualisations based on CFD calculations are available 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

- **visualisation of streamlines in**
 - ▶ flow around drag bodies
 - ▶ flow through changes in cross-section
 - **influence of sources and sinks**
- GUNT Science 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 150.10

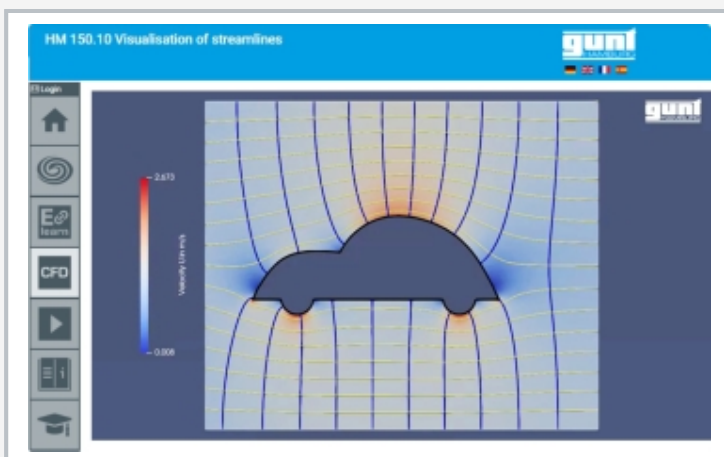
Visualisation of streamlines



1 tank for contrast medium, 2 holes for injecting the contrast medium, 3 drag body, 4 experiment area, 5 valves for sinks, 6 water drain, 7 holes for sources and sinks, 8 water supply, 9 valves for sources



Included models
car, triangle, square, 2 triangles for change in cross-section, 2 semi-circles, droplet, streamlined body, guide vane profile



Screenshot of the GUNT Science Media Center

Specification

- [1] visualisation of streamlines
- [2] water as flowing medium and ink as contrast medium
- [3] upper glass plate, hinged for interchanging models
- [4] bottom plate with water connections for generating sources/sinks
- [5] sources/sinks can be combined as required
- [6] different drag bodies and changes in cross-section included
- [7] rubber plate for creating your own models included
- [8] flow velocity, water supply and water drain in sources/sinks as well as dosage of the contrast medium can be adjusted by using valves
- [9] water supply using HM 150 base module or via laboratory supply
- [10] flow visualisation using prepared CFD simulations
- [11] digital multimedia teaching material online in the GUNT Science Media Center: E-Learning course, prepared CFD simulations, worksheets, videos

Technical data

- Flow chamber contains two plates
- distance between the plates: 2mm
 - upper plate made of glass
 - bottom glass plate with four water connections for sources/sinks
 - size experiment area: LxW: 400x280mm

10 drag bodies and changes in cross-section

Rubber plate for your own models

- LxH: 300x400mm
- thickness: 2mm

Injection of the contrast medium (ink)

- 15 holes

Tank for contrast medium: 500mL

LxWxH: 640x520x520mm

Weight: approx. 24kg

Required for operation

HM 150 (closed water circuit) or water connection, drain;
PC or online access recommended

Scope of delivery

- 1 experimental unit
- 1 set of models
- 1 rubber plate
- 1 ink (2x 30mL)
- 1 set of hoses
- 1 set of instructional material
- 1 online access to GUNT Science Media Center

HM 150.10

Visualisation of streamlines

Optional accessories

HM 150 Base module for experiments in fluid mechanics