

HM 163

Experimental flume 409x500mm



The illustration shows HM 163 (experimental section 7,5m) with the wave generator HM 163.41 and the level gauge HM 163.52.

Description

- **experimental range from fundamentals up to research projects**
- **experimental section with transparent side walls, lengths between 5m and 12,5m available**
- **homogeneous flow realised with carefully designed inlet element**
- **models from all subjects of hydraulic engineering available**

Hydraulic engineering is an important part of technology. How do you establish the required depth of water for ships? How does open channel flow change during high-water? How far upstream do control structures affect the flow? How do you calculate the discharge at barrages or dams? Experimental flumes in laboratories enable to teach the fundamentals required to understand the answers to these questions and to develop possible solutions.

The experimental flume HM 163 has a cross-section of 409x450mm and includes a closed water circuit. The length of the experimental section is between 5m and 12,5m when using additional extension elements HM 163.10. The side walls of the experimental sections are made from hardened glass allowing optimal observation of the experiments.

All components in contact with water are made of corrosion-resistant materials (stainless steel, glass fiber reinforced plastic). The inlet element is designed in a way to ensure low turbulent flow inlet into the experimental section.

The experimental flume can be inclined continuously to simulate a slope and to establish a uniform flow with constant discharge depth.

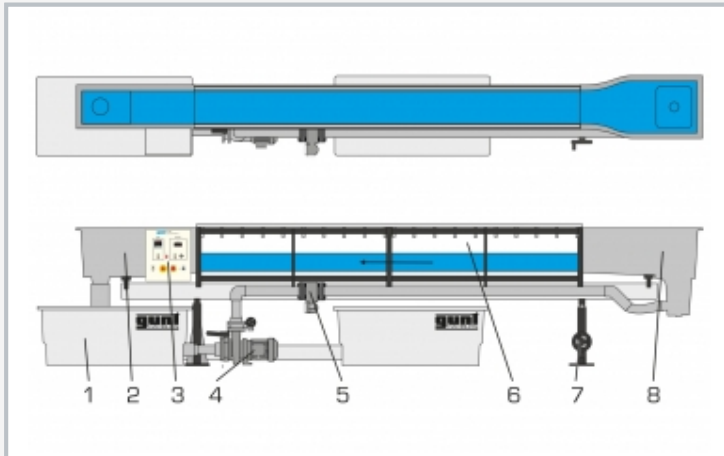
A large variety of models, i.e. weirs, pillars, flow-measuring flumes or a wave generator, are available as accessories and enable an extensive range of experiments. Most of these models are screwed quickly and safely to the bottom of the experimental section.

Learning objectives/experiments

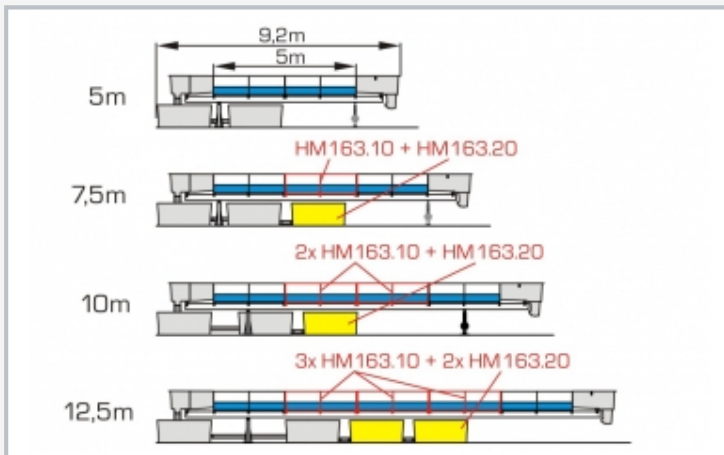
- together with optionally available models
 - ▶ uniform and non-uniform discharge
 - ▶ flow formulae
 - ▶ flow transition (hydraulic jump)
 - ▶ energy dissipation (hydraulic jump, stilling basin)
 - ▶ flow over control structures: weirs (sharp-crested, broad-crested, ogee-crested)
 - ▶ flow over control structures: discharge under gates
 - ▶ flow-measuring flumes
 - ▶ local losses due to obstacles
 - ▶ transient flow: waves
 - ▶ vibrating piles
 - ▶ sediment transport

HM 163

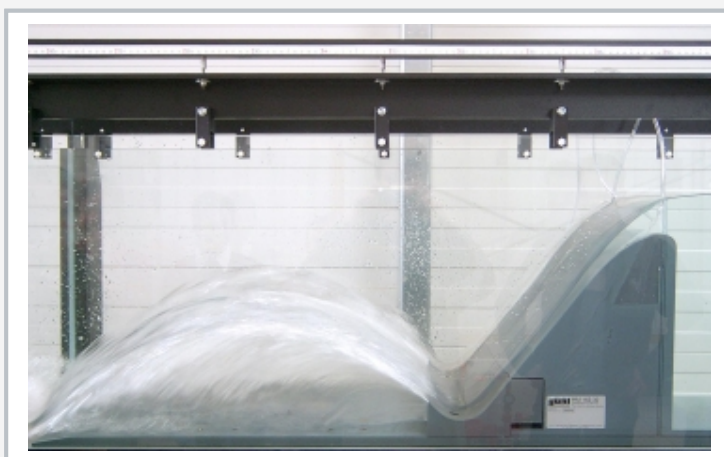
Experimental flume 409x500mm



1 water tank, 2 outlet element, 3 switch box, 4 pump, 5 flow rate sensor, 6 experimental section, 7 inclination adjustment, 8 inlet element



HM 163 with experimental sections of different lengths (5...12,5m). Depending on the desired length, additional extension elements HM 163.10 and water tanks HM 163.20 are required.



Overfall at the ogee-crested weir with ski-jump weir outlet HM 163.32.

Specification

- [1] fundamentals of open channel flow
- [2] experimental flume with experimental section, inlet and outlet elements and closed water circuit
- [3] length of the experimental section 5m, can be extended up to 12,5m by using additional extension elements HM 163.10
- [4] experimental section can be inclined continuously
- [5] bottom of the experimental section fitted with 20 evenly distributed threaded holes for the mounting of models or for pressure measurement
- [6] side walls of the experimental section made of hardened glass to ensure optimal observation of the experiments
- [7] experimental section fitted with guide rails for the optionally available instrument carrier HM 163.59
- [8] all contact surfaces with water made of corrosion-resistant material
- [9] inlet element optimised for low turbulent inlet flow into the experimental section
- [10] closed water circuit with 3 water tanks, pump, electromagnetic flow sensor and flow control
- [11] models from all subjects of hydraulic engineering available as accessory

Technical data

Experimental section

- possible length:
 - ▶ 5m
 - ▶ 7,5m
 - ▶ 10m
 - ▶ 12,5m
- flow cross-section BxH: 409x500mm
- inclination adjustment: -0,5...+2,5%

2 tanks

- made of glass fiber reinforced plastic
- 1100L each

Pump

- power consumption: 7,5kW
- max. flow rate: 130m³/h
- max. head: 30m
- speed: 2800min⁻¹

Measuring ranges

- flow rate: 5,4...130m³/h

400V, 50Hz, 3 phases

LxWxH: 9170x1000x1900mm (experimental section 5m)

Empty weight: approx. 1700kg

Scope of delivery

- 1 experimental flume
- 1 set of tools
- 1 set of instructional material

HM 163

Experimental flume 409x500mm

Optional accessories

Control structures

070.16329	HM 163.29	Sluice gate
070.16340	HM 163.40	Radial gate
070.16330	HM 163.30	Set of plate weirs, four types
070.16331	HM 163.31	Broad-crested weir
070.16333	HM 163.33	Crump weir
070.16336	HM 163.36	Siphon weir
070.16338	HM 163.38	Rake
070.16334	HM 163.34	Ogee-crested weir with pressure measurement
070.16332	HM 163.32	Ogee-crested weir with two weir outlets
070.16335	HM 163.35	Elements for energy dissipation

Change in cross-section

070.16344	HM 163.44	Sill
070.16345	HM 163.45	Culvert
070.16346	HM 163.46	Set of piers, seven profiles
070.16377	HM 163.77	Flume bottom with pebble stones

Flow-measuring flumes

070.16351	HM 163.51	Venturi flume
070.16355	HM 163.55	Parshall flume
070.16363	HM 163.63	Trapezoidal flume

Other experiments

070.16361	HM 163.61	Vibrating piles
070.16371	HM 163.71	Closed sediment circuit
070.16372	HM 163.72	Sediment trap
070.16373	HM 163.73	Sediment feeder
070.16341	HM 163.41	Wave generator
070.16380	HM 163.80	Set of beaches

Measuring instruments

070.16352	HM 163.52	Level gauge
070.16391	HM 163.91	Digital level gauge
070.16364	HM 163.64	Velocity meter
070.16350	HM 163.50	Pitotstatic tube
070.16353	HM 163.53	Ten tube manometers
070.16213	HM 162.13	Electronic pressure measurement, 10x 0...50mbar
070.16359	HM 163.59	Instrument carrier

Other accessories

070.16212	HM 162.12	System for data acquisition and automation
070.16357	HM 163.57	Electrical inclination adjustment
070.16310	HM 163.10	Extension element of the experimental flume, 2,5m
070.16320	HM 163.20	Water tank