

HM 145

Advanced hydrological investigations



Description

- seepage flows and groundwater flows in soils
- supply and drain (groundwater and running waters) over a large area and at individual points
- sediment transport and obstacles in running waters

HM 145 can be used to study seepage and groundwater flows after precipitation. Furthermore, sediment transport in courses of rivers is also presented in the context of flow obstacles. Variable precipitation density and areas and different groundwater supply and drain possibilities allow a wide variety of experiments.

HM 145 contains a closed water circuit with storage tank and pump. The core element is a sand-filled, stainless steel experiment tank with inclination adjustment. To study precipitation, a precipitation device is available, which is equipped with a timer to define the times of precipitation. The precipitation device consists of two groups of four nozzles. Water can flow in (groundwater) or out (drainage) via two chambers on the side. The experiment tank is separated from the chambers by fine mesh screens. To study the lowering of groundwater, two

wells with open seam tubes are available. By means of a small weir in the supply and drain, a course of a river can be generated. Different water levels can be generated. Water supply and water drain can be opened and closed, thus allowing a wide variety of experimental conditions. In addition, three different models make it possible to study the flow around obstacles and the resulting sediment transport in the river bed.

At the bottom of the experiment tank there are measuring connections to detect groundwater levels, which are displayed on 19 tube manometers. Two flow meters with different measuring ranges indicate the supply to the experiment tank. A measuring tank at the drain contains a measuring weir for determining the water level and a force sensor for determining the amount of sediment.

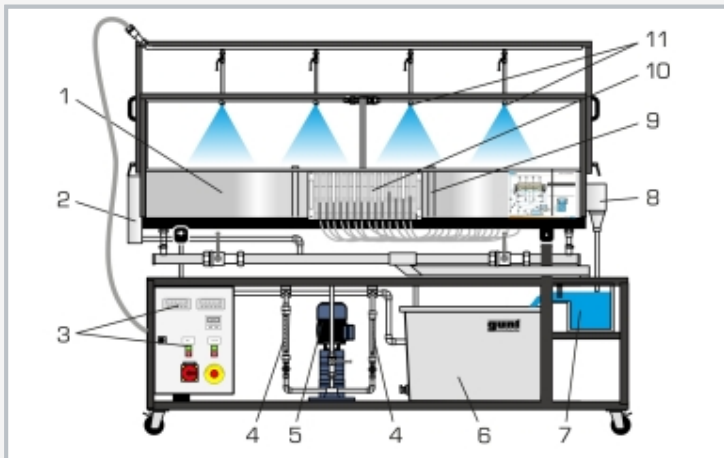
The measured values are indicated at the trainer. At the same time, the measured values can also be transmitted directly to a PC via USB. The data acquisition software is included.

Learning objectives/experiments

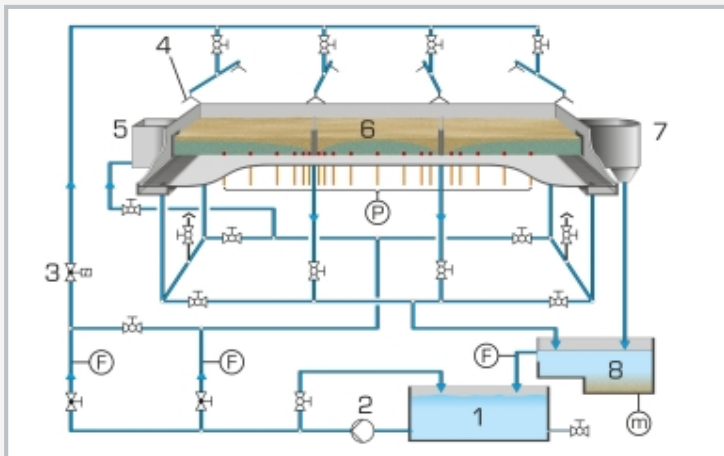
- investigating transient processes
 - ▶ effect of rainfall of varying duration on the discharge
 - ▶ storage capacity of a soil
- investigating steady processes
 - ▶ seepage flow
 - ▶ effects of wells on the groundwater level over time
- flow behaviour of rivers, obstacles in the river bed, sediment transport in rivers

HM 145

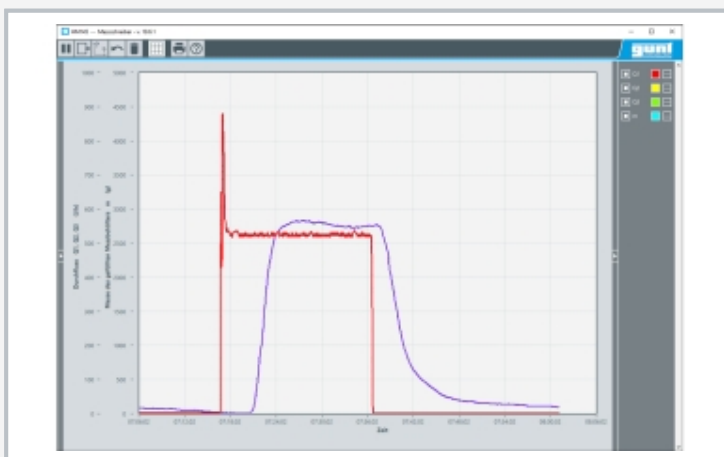
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1 experiment tank, 2 chamber, 3 display and control elements, 4 flow meter(supply), 5 pump, 6 storage tank, 7 measuring tank (drain), 8 chamber, 9 well, 10 tube manometers, 11 nozzles of the precipitation device



1 storage tank, 2 pump, 3 solenoid valve with timer, 4 nozzle, 5 chamber, 6 experiment tank, 7 chamber, 8 measuring tank; m mass, F flow rate, P pressure



Software screenshot: water drain for persistent rain with saturation of the soil: red: precipitation, purple: drain

Specification

- [1] investigation of precipitation-discharge relationships, storage capacity of soils, seepage flows, groundwater flows and sediment transport
- [2] closed water circuit
- [3] inclinable stainless steel experiment tank contains 19 measuring connections to detect groundwater levels, transparent splash guard and screens for separating the chambers
- [4] 2 wells with open seam tubes in the experiment tank
- [5] adjustable precipitation device
- [6] precipitation time can be adjusted via timer
- [7] water supplies and drains can be selected individually
- [8] transparent measuring tank (flow) and force sensor (determining the amount of sediment)
- [9] 3 models for pillars: round, square, oval
- [10] instruments: tube manometers (groundwater), flow meter (2x at the supply) and measuring weir in the measuring tank (1x at the drain)
- [11] GUNT software for data acquisition via USB under Windows 10

Technical data

Experiment tank, inclination adjustment: -1...5%
 ■ area: 2mx1m, depth: 0,2m, max. sand filling: 0,3m³
 Precipitation device
 ■ 8 nozzles, switchable in 4 groups of 2 nozzles
 ■ flow rate: 1...4,7L/min, square spray pattern

Pump
 ■ power consumption: 0,55kW
 ■ max. flow rate: 1500L/h

Storage tank, stainless steel: 220L

Measuring ranges
 ■ pressure: 19x 0...300mmWC
 ■ flow rate:
 ▶ 0...1050L/h, 0...320L/h (water supply)
 ▶ 0...1000L/h (water drain)
 ■ sediment mass: 0...5000g

230V, 50Hz, 1 phase
 230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
 UL/CSA optional
 LxWxH: 2300x1100x1950mm
 Empty weight: approx. 350kg

Required for operation

sediment: sand (grain size: 1...2mm)
 PC with Windows recommended

Scope of delivery

- 1 trainer
- 1 set of models
- 1 GUNT software + USB cable
- 1 set of instructional material

HM 145

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Optional accessories

for Remote Learning

GU 100 Web Access Box

with

HM 145W Web Access Software