

# HM 135

## Determination of the settling velocity



### Learning objectives/experiments

- influence of the following parameters on the settling velocity of spheres:
  - ▶ diameter of the sphere
  - ▶ density of the sphere
  - ▶ density of the fluid
  - ▶ viscosity of the fluid

### Description

#### ■ settling velocity of spheres of various diameters and densities

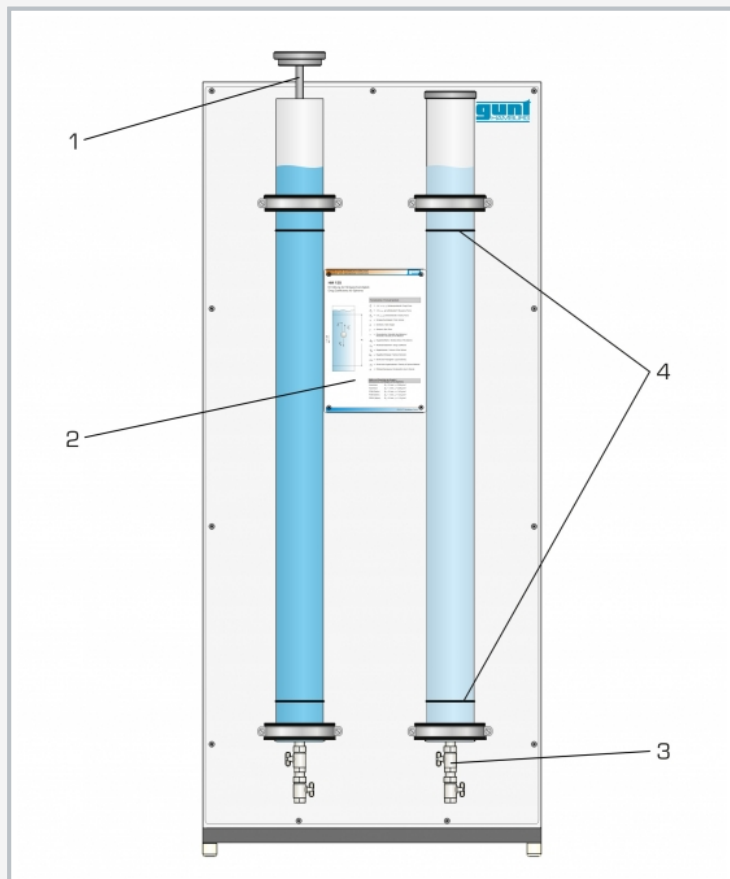
The settling velocity of solids in fluids is an important factor in fluid mechanics and process engineering. For example, the settling velocity is the decisive factor when planning sedimentation tanks for water treatment.

HM 135 contains two transparent cylinders for comparative examinations. The two cylinders enable comparing the influence of the sphere diameter, sphere density and different fluids on the settling velocity. Guide tubes in the cover of the two cylinders enable safe insertion of the sphere. Two O-rings per cylinder mark the measuring section. At the lower end of the cylinder there is a sluice through which the spheres can be removed again without significant loss of fluid.

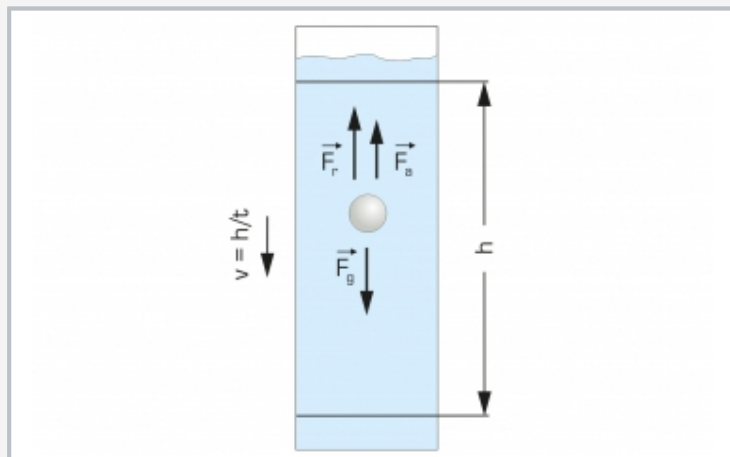
A stopwatch measures the sedimentation time. Two areometers with different measuring ranges enable the determination of the fluid densities.

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1 cover with guide tube, 2 info panel, 3 sluice, 4 marking of the measuring section



Determination of the settling velocity  
 $v$  settling velocity,  $h$  sink height,  $t$  sedimentation time,  $F_g$  weight,  $F_a$  lift,  $F_r$  drag

### Specification

- [1] experimental unit to determine the settling velocity of different spheres
- [2] 2 transparent cylinders
- [3] marking of the measuring section
- [4] cover with guide tube to insert the sphere
- [5] sluice to remove the spheres from the cylinder
- [6] 10 spheres of various densities and diameters
- [7] 2 areometers to determine the density of the fluids
- [8] stopwatch to measure the sedimentation time

### Technical data

2 cylinders

- inner diameter: 92mm each
- height: 1330mm each
- sink height: 1000mm each

Spheres

- aluminium (density:  $2,7\text{kg}/\text{dm}^3$ )
  - 2x 5mm diameter
  - 2x 10mm diameter
- polyoxymethylene (POM), density:  $1,41\text{kg}/\text{dm}^3$ 
  - 2x 5mm diameter
  - 2x 10mm diameter
- polyamide (PA), density:  $1,13\text{kg}/\text{dm}^3$ 
  - 2x 10mm diameter

Measuring ranges

- density:  $1 \times 0,8 \dots 1,0\text{kg}/\text{dm}^3$ ,  $1 \times 1,0 \dots 1,2\text{kg}/\text{dm}^3$

LxWxH: 720x640x1650mm

Weight: approx. 45kg

### Scope of delivery

- 1 experimental unit
- 1 set of spheres
- 2 areometers
- 1 glass cylinder for areometer
- 1 stopwatch
- 1 set of instructional material