

# HM 225

## Aerodynamics trainer



The illustration shows HM 225 together with HM 225.02.

### Description

- flow velocities up to 40m/s possible
- homogeneous flow through the flow straightener and special nozzle contour
- matching accessories offer a wide range of experiments

Aerodynamics describes the behaviour of bodies during flow around or through bodies with a compressible fluid. The knowledge of experiments in aerodynamics has a significant influence on the development of means of transport (vehicles, ships, aircraft) and in architecture (skyscrapers, towers and bridges).

HM 225 offers – along with its accessories – typical experiments from the field of flow around, incident flow and flow through models, as well as further experiments in the field of steady incompressible flow.

The trainer includes a radial fan, which can be used to generate flow velocities up to 40m/s. The speed is infinitely adjustable by using a frequency converter. A stabilisation tank with flow straightener ensures a consistent, low-turbulence and reproducible flow in the measuring section. A carefully shaped nozzle provides a largely homogeneous velocity distribution of the air flow. The accessory is attached using quick release fasteners and can be interchanged quickly and easily. Measuring points along the measuring section allow pressure and velocity measurements to be taken. The tube manometers are used to show the pressures clearly.

### Learning objectives/experiments

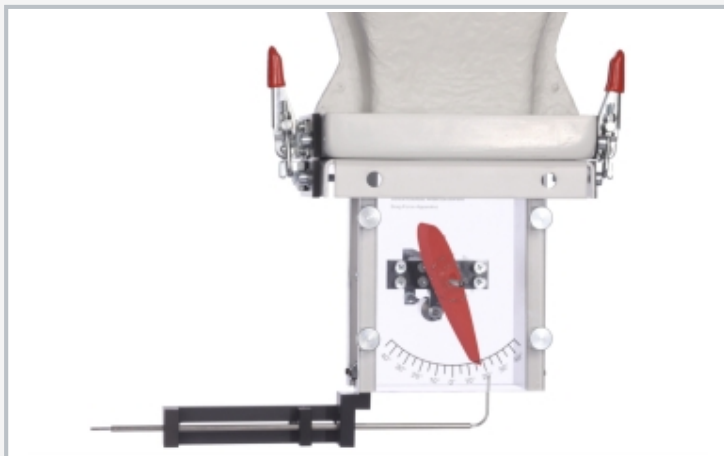
- together with appropriate accessories: experiments from the field of flow around bodies
  - ▶ velocity measurement of flows with Pitot tube
  - ▶ boundary layer analysis on a flat plate with flow along the plate
  - ▶ drag of bodies
  - ▶ demonstration of the Coanda effect
  - ▶ visualisation of streamlines
- together with appropriate accessories: experiments from the field of steady incompressible flow
  - ▶ velocity measurement of flows with Pitot tube and Pitotstatic tube
  - ▶ free jets
  - ▶ flow in a pipe elbow
  - ▶ proof of Bernoulli's principle

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1 nozzle, 2 installation measuring section, 3 thermometer, 4 exhaust air pipe, 5 radial fan, 6 tube manometers, 7 switch cabinet with speed adjustment, 8 stabilisation tank with flow straightener



Determining drag in various drag bodies using the accessory HM 225.04



Investigation of flow in a pipe elbow with the accessory HM 225.05

### Specification

- [1] aerodynamics experiments in the fields of flow around, incident flow and flow through models, as well as further experiments in the field of steady incompressible flow.
- [2] vertical measuring section with flow straightener and nozzle
- [3] radial fan infinitely variable via frequency converter
- [4] thermometer for measuring air temperature
- [5] accessory securely attached to HM 225 with quick release fasteners
- [6] 16 tube manometers for displaying pressures
- [7] inclination of tube manometers up to max. 1/10
- [8] accessories for the field of flow around bodies: boundary layers (HM 225.02), drag forces (HM 225.04), Coanda effect (HM 225.06), visualisation of streamlines (HM 225.08)
- [9] accessories for the field of steady incompressible flow: Bernoulli's principle (HM 225.03), flow in a pipe elbow (HM 225.05), free jets (HM 225.07)

### Technical data

#### Radial fan

- power consumption: 0,37kW
- max. volumetric flow rate: 15m<sup>3</sup>/min
- nozzle exit cross-section: 50x100mm
- max. flow velocity at the nozzle exit: 40m/s

#### Measuring ranges

- temperature: 1x 0...60°C
- manometer:
  - ▶ 16x 0...370mmWC, resolution: max. 1Pa
  - ▶ inclination: 1:1, 1:2, 1:5, 1:10

230V, 50Hz, 1 phase  
 230V, 60Hz, 1 phase  
 120V, 60Hz, 1 phase  
 UL/CSA optional  
 LxWxH: 1880x800x1900mm  
 Weight: approx. 220kg

### Scope of delivery

- 1 trainer
- 1 set of instructional material

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### Optional accessories

Experiments from the field of flow around bodies

HM 225.02      Boundary layers

HM 225.04      Drag forces

HM 225.06      Coanda effect

HM 225.08      Visualisation of streamlines

Experiments from the field of steady incompressible flow

HM 225.03      Bernoulli's principle

HM 225.05      Flow in a pipe bend

HM 225.07      Free jet