

## HM 240.05

### Pressure losses in pipe elements



#### Description

- **pressure losses in various pipe elements**
- **accessory for HM 240**

Pressure losses in the pipe flow of incompressible fluids cause pressure losses in pipes. Fundamental experiments demonstrate the pressure losses in straight pipe sections and the pressure losses due to flow separation in pipe elements such as pipe bends or enlargements.

Used in conjunction with HM 240, the HM 240.05 accessory makes it possible to record the pressure losses in various pipe elements. The pipe elements may be combined and assembled to create a variety of piping systems. The pipe is attached to the fan in place of the intake pipe in HM 240. A replaceable pipe element (sudden enlargement or uninterrupted air inlet) is attached at the pipe inlet.

Measuring points on the straight pipe sections enable measurement of the pressure losses. The velocity is detected at the pipe inlets. The measured values are analysed using the HM 240 software.

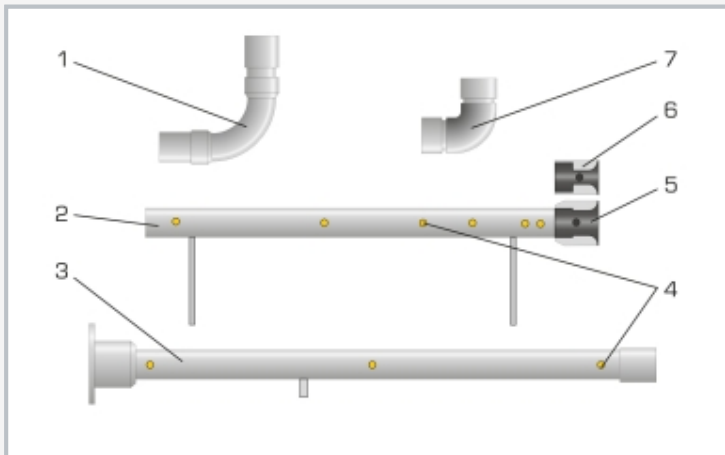
HM 240.05 is part of a series that allows experiments on the principles of incompressible air flow. The software for data acquisition and visualisation makes the experiments especially clear and enables fast execution of experiments with reliable results.

#### Learning objectives/experiments

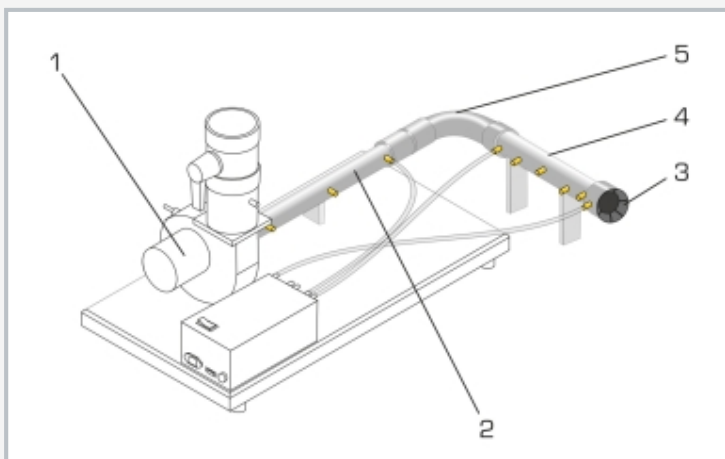
- in conjunction with HM 240
- measurement of pressure losses in
  - ▶ straight pipe sections
  - ▶ a 90° pipe bend
  - ▶ a 90° pipe angle
- investigate the effect of differently shaped pipe inlets
  - ▶ uninterrupted air inlet
  - ▶ sudden enlargement

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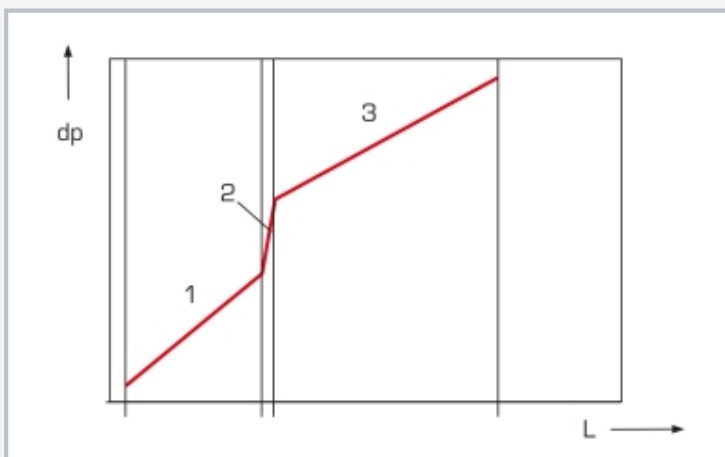
## Pressure losses in pipe elements



1 90° pipe bend, 2 pipe section with exchangeable pipe inlet, 3 pipe section with flange, 4 measuring point, 5 pipe inlet: uninterrupted air inlet, 6 pipe inlet: sudden enlargement, 7 90° angle



Possible experimental setup: 1 HM 240, 2 pipe section with flange, 3 pipe inlet, 4 pipe section with removable pipe inlet, 5 90° pipe bend



Pressure losses in pipe flow: 1 pipe section with uninterrupted air inlet, 2 90° pipe bend, 3 pipe section with flange; dp pressure losses, L pipe length

### Specification

- [1] investigate pressure losses in various pipe elements
- [2] accessory for HM 240
- [3] combine different pipes from pipe elements
- [4] two interchangeable pipe inlets: sudden enlargement or uninterrupted air inlet
- [5] measuring points on straight pipe sections for pressure measurement
- [6] measuring points at pipe inlets for velocity measurement
- [7] display and analysis of the measured values using the software in HM 240

### Technical data

Straight pipe section with flange

- length: 1235mm
- inner diameter:  $d=53,6\text{mm}$

Straight pipe section

- length: 991mm
- pipe inlets
  - ▶ uninterrupted air inlet: radius=22mm
  - ▶ sudden enlargement:  $d=35\dots53,6\text{mm}$

90° pipe bend

- inner diameter:  $d=53,6\text{mm}$
- radius:  $2xd$

90° pipe angle

- inner diameter:  $d=53,6\text{mm}$

Weight: approx. 5kg

### Scope of delivery

- 1 90° pipe angle
- 1 90° pipe bend
- 1 straight pipe section with flange
- 1 straight pipe section
- 2 replaceable pipe inlets
- 1 set of instructional material

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Required accessories

HM 240                    Principles of air flow