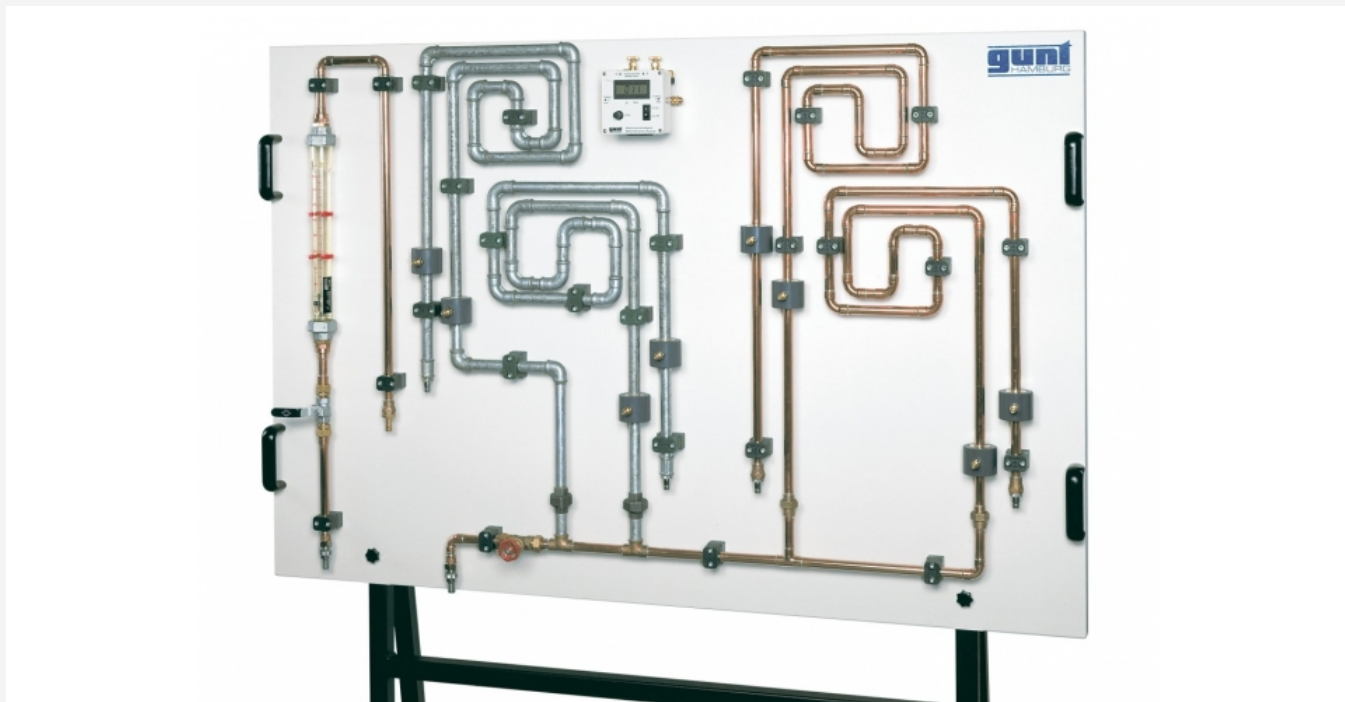


HL 103

Installation technology: losses in pipe bends



Description

- flow resistances in pipes
- measuring sections with different materials and deflections

In addition to pressure losses due to pipe friction, pipes through which water flows experience pressure losses at changes in pipe direction. In practice, various changes in pipe direction with different geometries are used in pipe networks.

HL 103 can be used to investigate how different changes in pipe direction made from different materials affect the pipe flow. The pipe elements used are commercially standard components in heating and sanitary engineering. The clear panel is mounted on a sturdy, movable frame.

The trainer consists of four pipe elements with ten deflections each with the same pipe length. Two measuring sections have different radii and are made of different materials. A hose connects the desired measuring section. The flow is adjusted using valves in the inflow and return and read on a rotameter.

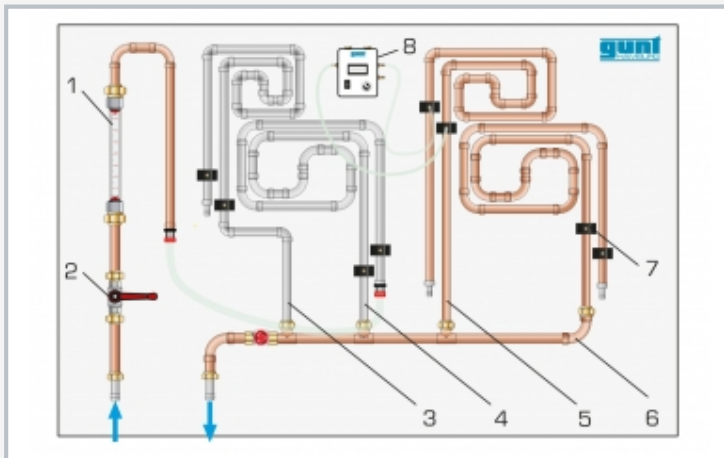
The pressure measuring points in the pipe system are designed as annular chambers and are located between the beginning and end of the measuring sections, ensuring a precise pressure measurement. The sensors are connected in pairs to a differential pressure meter and the respective differential pressure read on the display.

Learning objectives/experiments

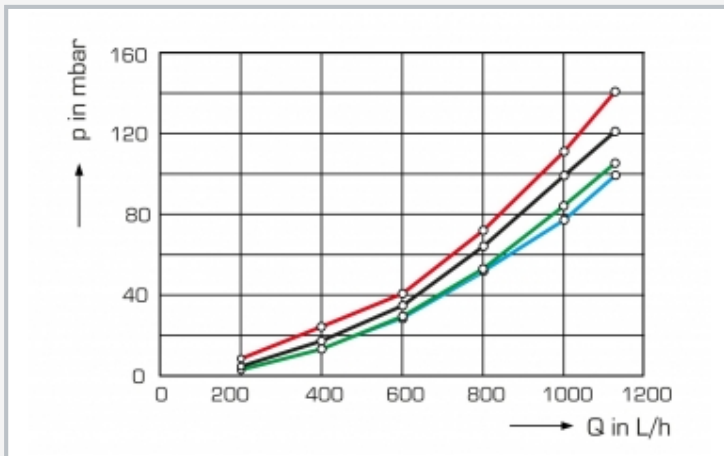
- flow measurement
- differential pressure measurement
- effect of flow and surface roughness
- effect of the flow velocity
- effect of changes in pipe direction

HL 103

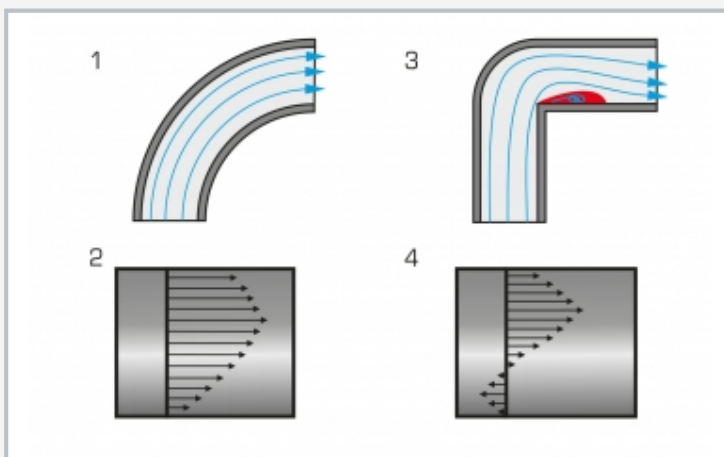
Installation technology: losses in pipe bends



1 flow meter, 2 inflow valve, 3 steel/pipe angle measuring section, 4 steel/ pipe bend measuring section, 5 copper/pipe angle measuring section, 6 copper/ pipe bend measuring section, 7 pressure measuring point, 8 differential pressure meter



Measured differential pressures at different flow rates: red: pipe angle/steel, black: pipe bend/steel, green: pipe angle/copper, blue: pipe bend/copper; Q flow rate, p pressure



1 flow course in the pipe bend, 2 flow profile at the outlet of a pipe bend, 3 flow course in the pipe angle, 4 flow profile at the outlet of a pipe angle

Specification

- [1] investigation of the pressure loss at pipe elements with different changes in pipe direction and materials
- [2] pipe elements are commercially standard components in heating and sanitary engineering
- [3] clear panel mounted on a sturdy, movable frame
- [4] simple selection of the measuring sections via hose connection with quick-release couplings
- [5] flow can be adjusted via valves
- [6] flow measurement using rotameter
- [7] differential pressure measurement via differential pressure meter with display

Technical data

Measuring sections, length: 2300mm

- pipe section 1: steel, diameter: 1/2", 90° pipe angle
- pipe section 2: steel, diameter: 1/2", 90° pipe bend
- pipe section 3: copper, diameter: 18x1mm, 90° pipe angle
- pipe section 4: copper, diameter: 18x1mm, 90° pipe bend

Measuring ranges

- flow rate: 150...1600L/h
- differential pressure: ±350mbar

LxWxH: 1650x700x1850mm

Weight: approx. 100kg

Required for operation

water connection 1700L/h, drain

Scope of delivery

- 1 trainer
- 1 differential pressure meter
- 1 set of connecting hoses
- 1 set of instructional material