

WL 372

Radial and linear heat conduction



Description

- study of heat conduction in solids
- linear and radial heat conduction
- GUNT-Software to represent the temperature profiles

Heat conduction is one of the three basic types of heat transfer. Kinetic energy is transferred between two neighbouring atoms or molecules. The heat transport is substance-bound. This type of heat transfer is an irreversible process in which the heat is transferred from a higher energy level, i.e. a level with a higher absolute temperature, to the lower level with a lower temperature. If the heat transport is kept up constantly by applying heat, this is called stationary heat conduction. In technology, heat conduction is mostly used in heat exchangers.

The WL 372 experimental unit enables users to experimentally determine basic laws and characteristic variables of heat conduction in solids. The experimental unit includes a linear and a radial experimental setup, each equipped with a heating and cooling element. Various measuring objects with different heat transfer characteristics can be incorporated in the experimental setup for linear heat conduction. The experimental unit is delivered together with a display and control unit.

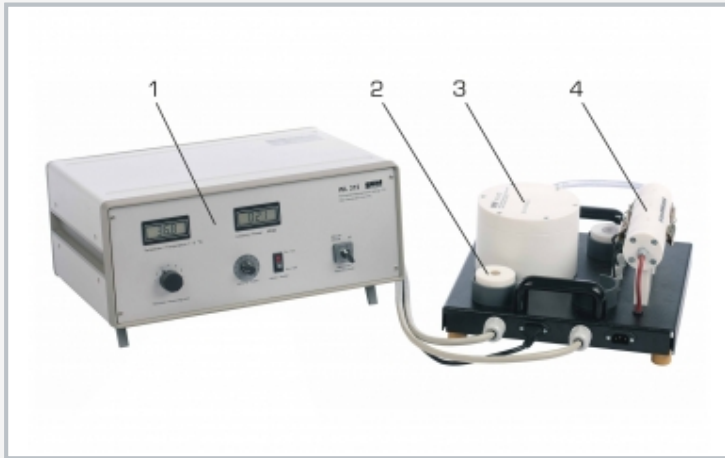
Sensors record the temperatures at all relevant points. The measured values can be read on digital displays. At the same time, the measured values can also be transmitted directly to a PC via USB. The data acquisition software is included.

Learning objectives/experiments

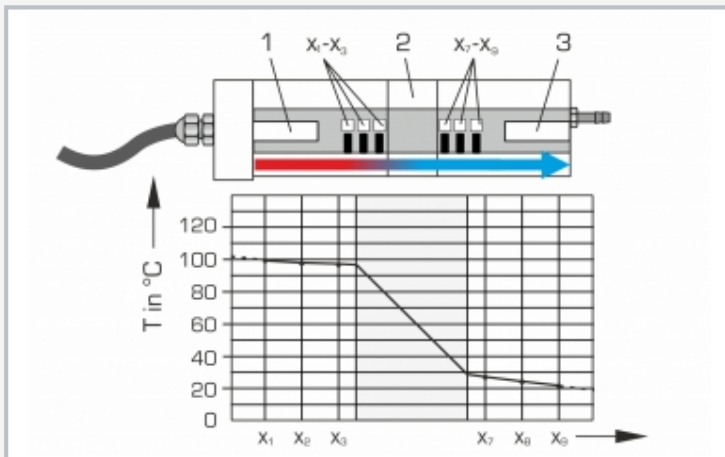
- linear heat conduction (flat wall)
 - ▶ determination of temperature profiles with different materials
 - ▶ determination of the temperature profile during a malfunction
 - ▶ determination of thermal conductivity k
- radial heat conduction
 - ▶ determination of the temperature profile
 - ▶ determination of thermal conductivity k

WL 372

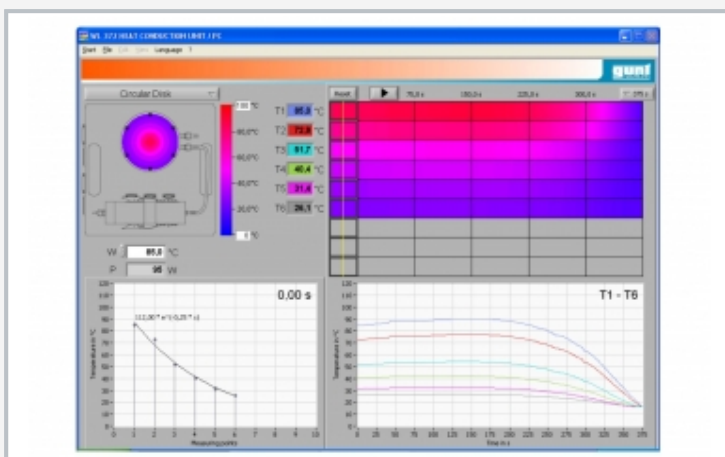
Radial and linear heat conduction



1 display and control unit, 2 measuring object, 3 experimental setup for radial heat conduction, 4 experimental setup for linear heat conduction



Experimental setup for linear heat conduction with graphical display of the temperature profile: 1 heater, 2 measuring object, 3 cooling element; x_1-x_3 and x_7-x_9 measuring points



Software screenshot: temperature profile for radial heat conduction

Specification

- [1] study of heat conduction in solids
- [2] experimental setup consisting of experimental unit and display and control unit
- [3] linear heat conduction: 3 measuring objects, heating and cooling element, 9 temperature measuring points
- [4] radial heat conduction: brass disc with heating and cooling element, 6 temperature measuring points
- [5] cooling with mains water
- [6] electric heating element
- [7] representation of the temperature profiles with GUNT software
- [8] GUNT software for data acquisition via USB under Windows 7, 8.1, 10

Technical data

Linear heat conduction

- 3 measuring objects, insulated
- 1x DxL: 25x30mm, steel
- 1x DxL: 15x30mm, brass
- 1x DxL: 25x30mm, brass
- heater: 140W

Radial heat conduction

- disc DxL: 110x4mm
- heater in the middle of the disc: 125W
- cooling coil at outer diameter of disc

Measuring ranges

- temperature: 0...100°C
- power: 0...200W

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase

120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: 400x360x210mm (experimental unit)

LxWxH: 470x380x210mm (display and control unit)

Weight: approx. 22kg

Required for operation

water connection, drain

PC with Windows recommended

Scope of delivery

- 1 experimental unit
- 1 display and control unit
- 1 set of measuring objects
- 1 set of hoses
- 1 GUNT software CD + USB cable
- 1 set of instructional material

WL 372

Radial and linear heat conduction

Optional accessories

020.30009

WP 300.09

Laboratory trolley