

WL 110.04

Stirred tank with double jacket and coil



Description

- stirred tank with double jacket for connection to WL 110 supply unit
- stirrer for improved mixing of medium
- heating using jacket or coiled tube

In many engineering processes, several basic operations are combined. For example, in a tank a chemical reaction takes place during which heat is to be supplied or removed. Such tanks are equipped with jacket or a coiled tube. Depending on the process, the medium in the jacket or in the coiled tubing is used for heating or cooling of the tank content. For a better mixing of the tank content and an even temperature distribution stirring machines are used. The product temperature at an even temperature distribution is precisely adjustable. Considered here, the stirred tank with double jacket and coil is a model for such tanks.

The WL 110.04 is part of a series of units enabling experiments to be performed on different heat exchanger types. The experimental unit is ideally suited for investigating the functioning and behaviour of a stirred tank with double jacket and coil in operation.

The WL 110.04 is connected to the supply unit WL 110 using quick-release couplings. The jacketed stirred tank is fitted with a coiled tube. In heating mode with jacket the hot water flows through the jacket and transfers a part of the thermal energy to the cold water in the tank. In heating mode with coiled tube the hot water flows through the coil and heats the cold water in the tank. A stirring machine can be used in all modes. Valves on the supply unit are used to adjust the flow rate of hot water.

The temperature sensors for measuring the inlet and outlet temperature are located at the supply connections on the WL 110. An additional temperature sensor measures the temperature in the stirred tank.

During experiments, time functions are plotted and displayed graphically. Additionally, the measured values can be recorded and processed using data acquisition software.

Learning objectives/experiments

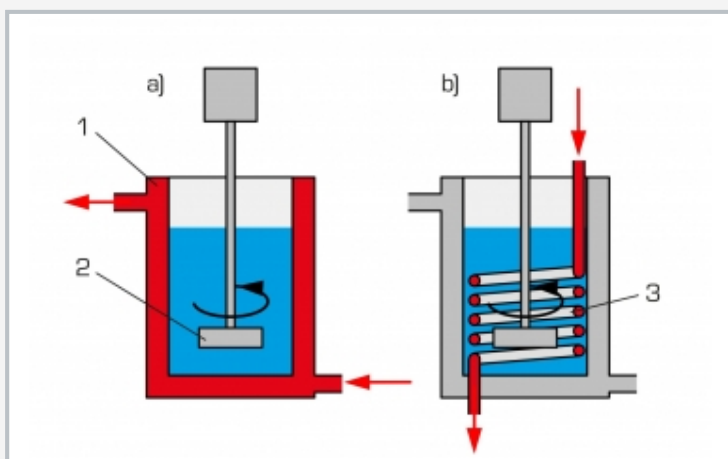
- in conjunction with WL 110 supply unit
 - ▶ function and behaviour during operation of a stirred tank with double jacket and coil
 - ▶ plotting time functions:
 - heating mode with jacket
 - heating mode with coiled tube
 - ▶ influence of a stirring machine
 - ▶ comparison with other heat exchanger types

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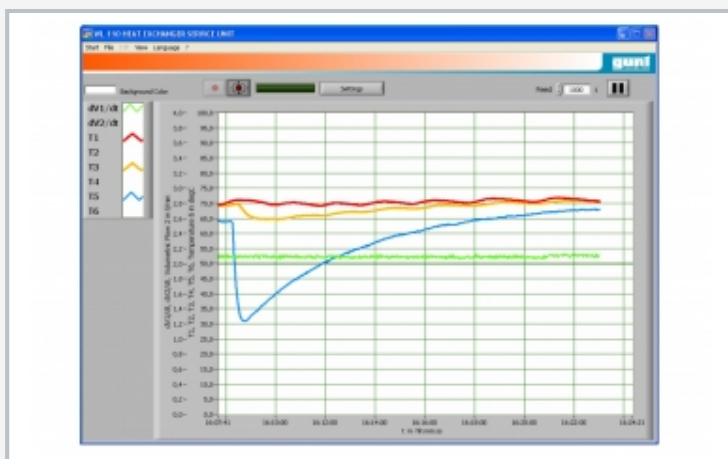
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1 stirring machine, 2 stirred tank, 3 stirring machine connection, 4 temperature sensor connection, 5 jacket water connection, 6 water outlet and inlet in stirred tank, 7 coiled tube water connection, 8 temperature sensor



a) heating using jacket: 1 jacket, 2 stirrer
b) heating using coiled tube: 3 coiled tube;
red: hot water, blue: cold water



Software screenshot: Time function for heating using jacket

Specification

- [1] stirred tank for connection to WL 110
- [2] hot and cold water supply from WL 110
- [3] heating using jacket or coiled tube
- [4] stirring machine can be used in all modes
- [5] speed of stirring machine adjustable using WL 110
- [6] visible working area due to transparent cover
- [7] recording of temperature using WL 110 and additional temperature sensor for measuring temperature in tank

Technical data

Stirred tank

- nominal capacity: approx. 1200mL

Stirring machine

- speed: 0...330min⁻¹

Heat transfer surface

- jacket (stainless steel): approx. 500cm²
- coil (stainless steel): approx. 500cm²

Measuring ranges

- temperature: 0...100°C

LxWxH: 400x230x400mm

Weight: approx. 8kg

Scope of delivery

- 1 stirred tank

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Required accessories

060.11000 WL 110 Heat exchanger supply unit