

## WL 110.04 Jacketed Vessel with Stirrer & Coil



- \* Jacketed vessel with stirrer and coil for connection to WL 110 service unit
- \* Stirrer for improved mixing of medium
- \* Heating using jacket or coiled tube

### Technical Description

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 jacketed heat exchanger 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. In conjunction with the WL 110 service unit, which has a hot and cold water circuit and all of the necessary connections, the experimental unit is ideally suited for investigating the functioning and behaviour of a jacketed heat exchanger in operation.

The WL 110.04 is connected to the WL 110 using quick-release couplings. The jacketed heat exchanger consists of a tank surrounded by a jacket. The 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 service unit are used to adjust the flow 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 tank.

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

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

### Learning Objectives / Experiments

In conjunction with WL 110 service unit

- Function and behaviour during operation of a jacketed heat exchanger
- Plotting time curves
  - \* heating mode with jacket
  - \* heating mode with coiled tube
- Influence of a stirring machine
- Comparison with other heat exchanger types

## WL 110.04 Jacketed Vessel with Stirrer & Coil



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

### Specification

- [1] Jacketed heat exchanger 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

- Tank
- nominal value: approx. 1,2L
- Stirring machine
- speed: 0...330rpm

### Heat transfer area

- jacket (stainless steel): approx. 0,05m<sup>2</sup>
- coil (stainless steel): approx. 0,05m<sup>2</sup>

### Measuring range

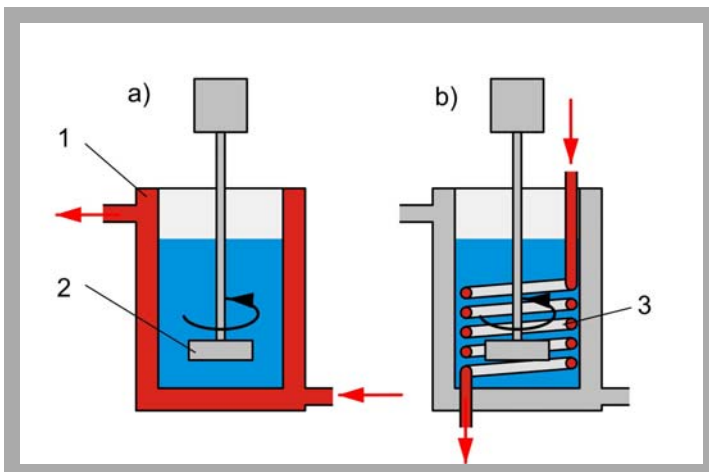
- temperature: 0...100°C

### Dimensions and Weight

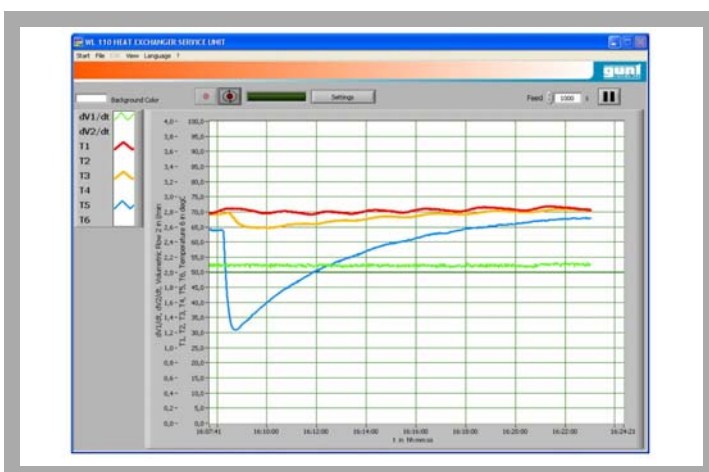
- LxWxH: 400x230x400mm
- Weight: approx. 8kg

### Scope of Delivery

- 1 jacketed vessel with stirrer & coil
- 1 set of instructional material



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 curve for heating using jacket

### Order Details

060.11004 WL 110.04 Jacketed Vessel with Stirrer & Coil