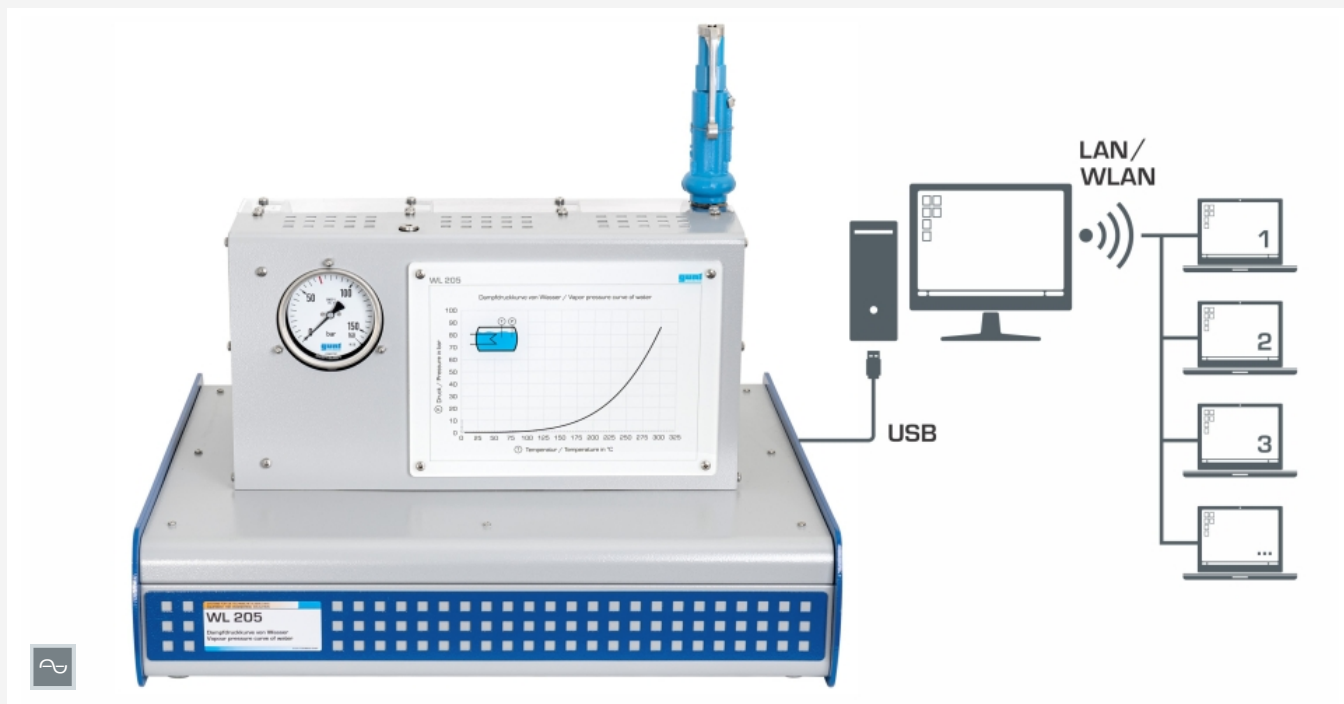# WL 205
Vapour pressure curve of water - Marcet boiler

Network capable GUNT software: control and operation via 1 PC. Observation, acquisition, analysis of the experiments at any number of workstations via the customer's own LAN/WLAN network.

Description

- **recording the vapour pressure curve of water**
- **saturation pressure of water vapour as a function of the temperature**
- **software-supported experiments and evaluation**

In a closed system filled with fluid, a thermodynamic equilibrium sets in between the fluid and its vaporised phase. The prevailing pressure is called vapour pressure. It is substance-specific and temperature-dependent.

When a fluid is heated in a closed tank, the pressure increases as the temperature rises. Theoretically, the pressure increase is possible up to the critical point at which the densities of the fluid and gaseous phases are equal. Fluid and vapour are then no longer distinguishable from each other. This knowledge is applied in practice in process technology for freeze drying or pressure cooking.

The WL 205 experimental unit can be used to demonstrate the relationship between the pressure and temperature of water in a straightforward manner. Temperatures of up to 280°C are possible for recording the vapour pressure curve.

The pressure can be continuously monitored via a Bourdon tube pressure gauge.

A temperature limiter and pressure relief valve are fitted as safety devices and protect the system against overpressure.
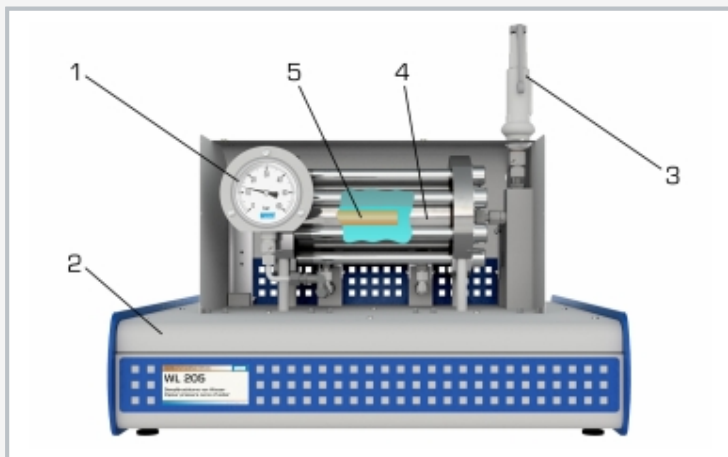
The measured temperatures and pressures are recorded, transmitted to the software and displayed. The GUNT software of WL 205 offers all the advantages of software-supported experimental procedure and analysis.

## Learning objectives/experiments

- recording the vapour pressure curve of water
- presentation of the relationship between pressure and temperature in a closed system
- temperature and pressure measurement
- Marcet boiler experiment

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Telefon (040) 67 08 54-0, Fax (040) 67 08 54-42, Email sales@gunt.de, Web www.gunt.de
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WL 205
Vapour pressure curve of water - Marcet boiler

1 Bourdon tube pressure gauge, 2 housing, 3 safety valve, 4 pressure boiler, 5 heater
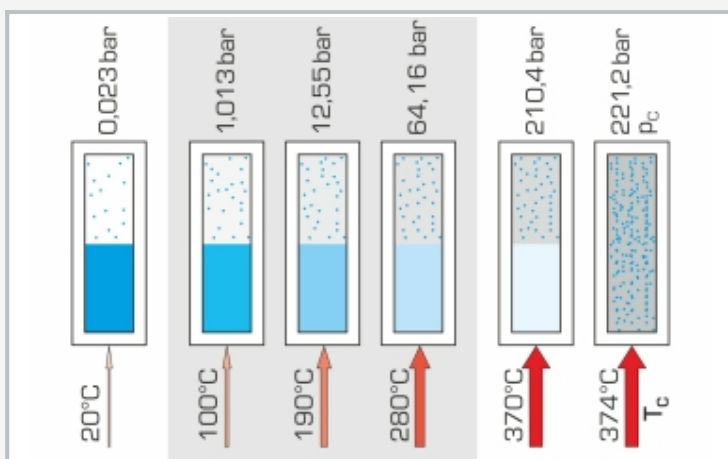
Heating up water in a closed tank: the pressure and temperature increase proportionally up to the critical point, at which fluid and vapour are no longer distinguishable from each other; critical point at T_c=374°C, p_c=221bar, grey area: temperature limit of the experimental unit
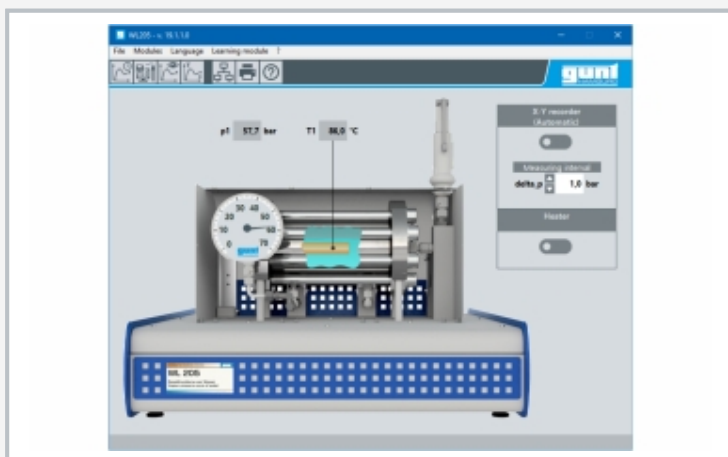
Software screenshot: display of temperatures and pressures

Specification

[1] measuring a vapour pressure curve for saturated vapour
[2] pressure boiler with insulating jacket
[3] temperature limiter and safety valve protect against overpressure in the system
[4] instrumentation: electrical pressure sensor, electrical temperature sensor, Bourdon tube pressure gauge to indicate pressure
[5] display of temperatures and pressures in the software
[6] GUNT software for data acquisition via USB under Windows 10

Technical data

Pressure boiler, stainless steel
- max. filling capacity: 1L
- max. working pressure rel.: 64bar
- max. working temperature: 280°C
- safety valve rel.: 70bar

Temperature sensor, type Pt100

Pressure sensor, type 520 relative pressure transmitter

Bourdon tube pressure gauge: 0...160bar

Heater: 1,8kW

Measuring ranges
- temperature: 0...300°C
- pressure: 0...160bar

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase
120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 670x590x610mm
Weight: approx. 67kg

Required for operation

PC with Windows

Scope of delivery

1 experimental unit
1 funnel
1 set of tools
1 set of instructional material
1 GUNT software + USB cable

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Optional accessories

020.30009	WP 300.09	Laboratory trolley

for Remote Learning

010.10000	GU 100	Web Access Box

with

060.20500W	WL 205W	Web Access Software