CE 130
Convection drying

Description

- **convection dryer for drying experiments on granular solids**
- **plotting of drying curves**

Convection dryers are often used for drying solids in food technology. The CE 130 can be used to investigate and demonstrate the process of convection drying of granular solids.

Four corrosion resistant removable plates are available for drying the solid. They are placed in a drying channel. The plates containing the solid to be dried are exposed to an air flow in the channel. The air flow heats the solid and also removes any moisture released. Air velocity can be adjusted by the speed of a fan. An adjustable heater allows the heating of the air. The transparent door in the drying channel allows the drying process to be observed.

A digital balance can be used to follow the changes in weight of the solid due to evaporation or vaporisation of moisture during operation. The air temperature and the relative humidity of the air are measured and digitally displayed by a single combined temperature and humidity sensor before and after the air flow passes over the solid. A further sensor measures the air velocity.
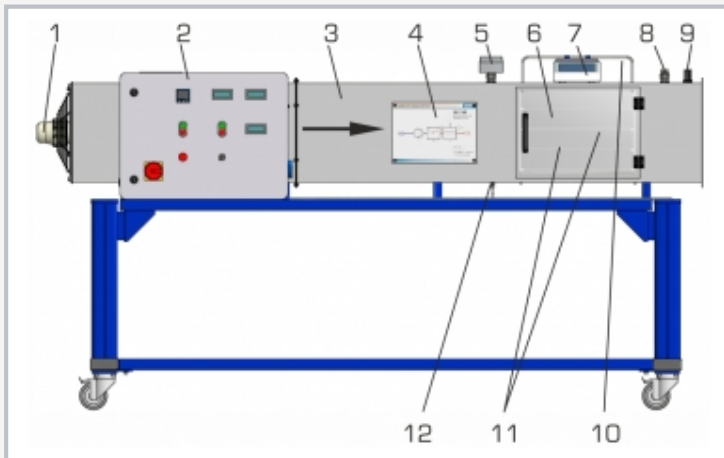
The relevant measured parameters (changes in weight, humidity, temperature, air velocity) can be transferred directly to a PC, where they can then be further processed.

Learning objectives/experiments

- influence of air temperature and humidity on drying intensity
- plotting of drying curves with constant external conditions
- determination of drying rate with different air parameters and different solid properties
- evaluation of drying processes using energy and mass balances

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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Page 1/2 - 06.2019

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1 fan, 2 switch cabinet with digital displays, 3 drying channel, 4 process schematic, 5 measuring point with humidity and temperature sensor, 6 transparent door, 7 digital balance, 8 measuring point for humidity and temperature, 9 air velocity sensor, 10 bracket for drying plates, 11 drying plates, 12 temperature sensor of the controller
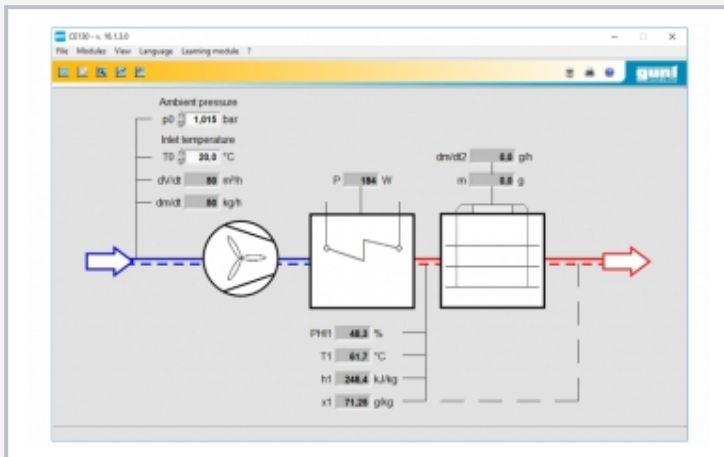
Software screenshot
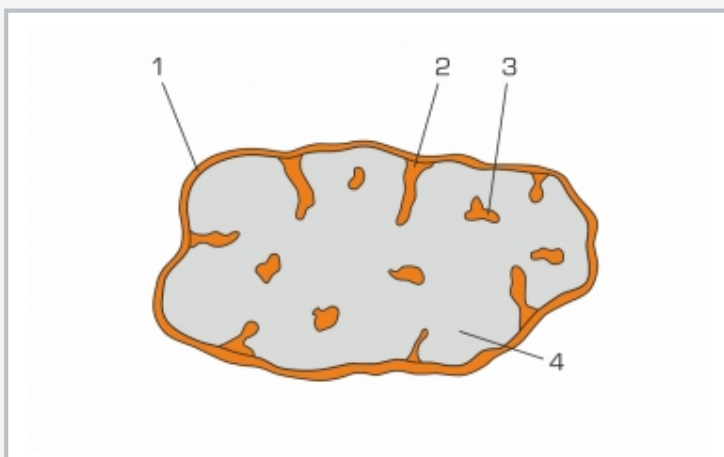
Humid drying material: 1 surface moisture, 2 capillary moisture, 3 pore moisture, 4 crystal water

Specification

[1] drier for investigating convection drying of solids
[2] drying on 4 corrosion resistant plates in a drying channel with an air flow
[3] adjustment of air velocity via speed of fan
[4] air heating with controlled heater
[5] digital balance for measuring the change of weight during drying
[6] 1 combined sensor for measurement of humidity and temperature before and after the solid sample
[7] 1 air velocity sensor
[8] GUNT software for data acquisition via USB under Windows 7, 8.1, 10

Technical data

Drying channel
- length: 2340mm (with fan)
- internal dimensions: 350x350mm

Fan
- power: 33W
- max. output: 700m^3/h
- max. speed: 950min^{-1}

Heater
- power: 0...6750W
- with adjustable temperature limiter

Balance
- measuring range: 0...10000g
- resolution: 0,1g

Measuring ranges
- air humidity: 0...100% r.F.
- temperature: 0...125°C
- flow velocity: 0...2,5m/s

400V, 50Hz, 3 phases
400V, 60Hz, 3 phases
230V, 60Hz, 3 phases
UL/CSA optional
LxWxH: 2350x800x1200mm
Weight: approx. 175kg

Required for operation

PC with Windows recommended

Scope of delivery

1 trainer
1 balance
4 drying plates
1 GUNT software CD + USB cable
1 set of instructional material