

Gentle and Reliable Drying of Food

HARTER CHAMBER DRYING SYSTEMS



Fruits & Vegetables



Meat & Sausage Products



Sweets



Medicinal & Spice Plants

Gentle and Reliable Drying

Your food is a sensitive commodity requiring and deserving best treatment. Priorities of the drying process are

Product Quality

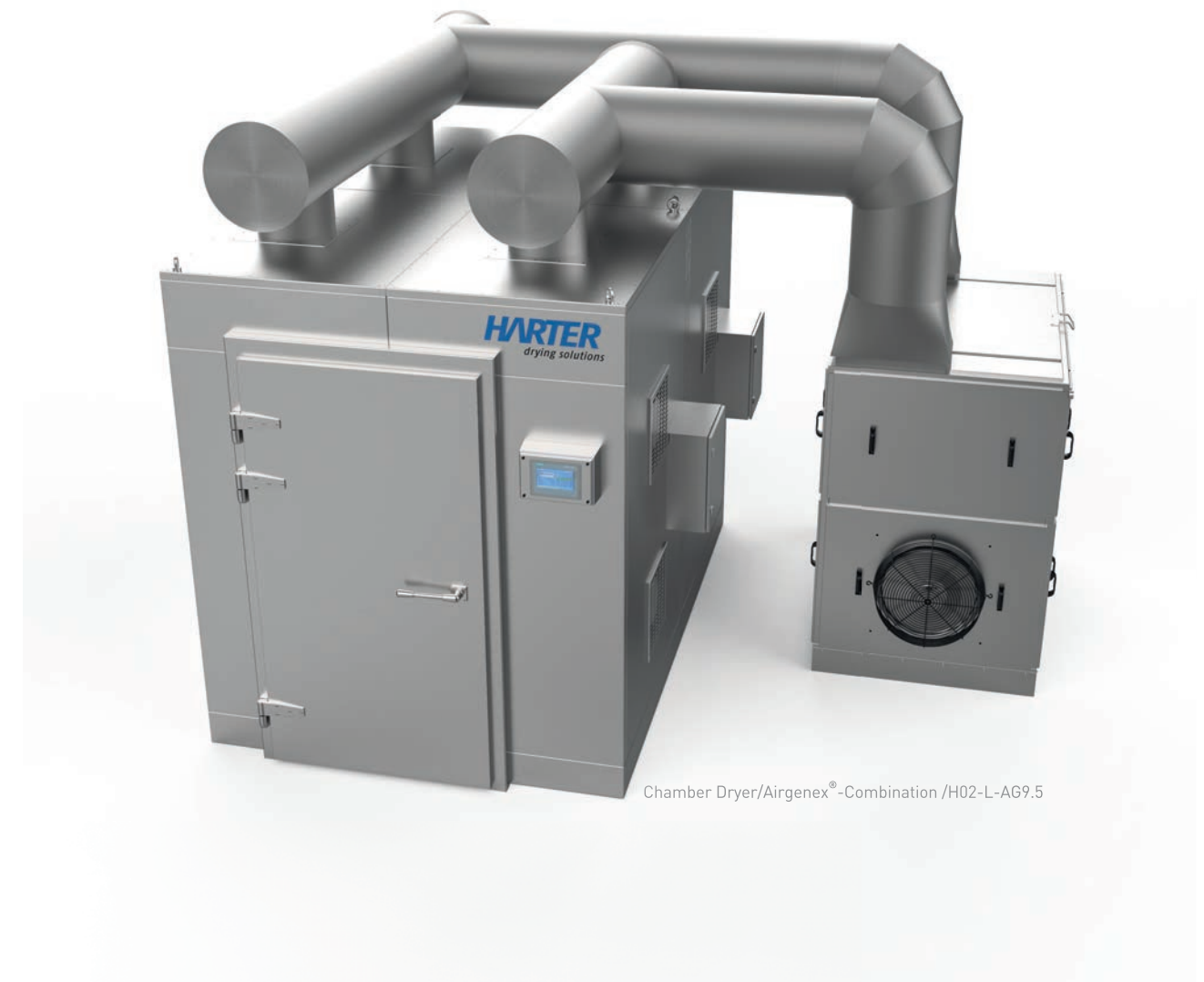
- Gentle product treatment by drying at moderate variable temperatures
- Drying parameters selected to meet quality requirements and reflect product properties
- Positive drying results in terms of
 - aroma | largely
 - appearance | retained
 - bioactivity

Process Reliability

- Control of drying parameters
 - Control and monitoring of parameters
 - Various programmes may be set
 - Data may be analysed
- Drying takes place in a system closed air-wise
 - No interaction with ambient air
 - Independence from climate
 - Reproducible processes

Condensate

- Valuable substances may be retained in the condensate
- Condensate may be processed for further use
- Condensate may be the basis for new product ideas



SMART TO THE
SMALLEST DETAIL

This is how your dryer may look like

Two drying chambers in line. You invested in only one drying chamber when you started production. Meanwhile, you have increased your throughput and expanded your drying system accordingly.

On the right-hand side of the photograph above you can see the dehumidification module which produces the required process air and passes it to the drying chamber. It was designed to cope with an expanded system.

Refer to pages 6 and 7 to learn how exactly the drying process works. You can find our series models on pages 8 and 9. All variants and options are presented on pages 10 and 11.

Applications

We develop, design and manufacture drying systems for batch or continuous processing to meet your specific requirements. Before we do this, we determine the parameters for successful drying by trials in our in-house pilot plant station.

The basis for successful drying is a perfect combination of air dehumidification and air routing. Using low temperatures we pass extremely dry and thus unsaturated air exactly to the place where it is supposed to absorb moisture. We employ this process – our heat pump based condensation drying – in most different types of systems.

Our food drying systems are made from stainless steel by default and can be cleaned in accordance with applicable food standards.



**Do you have a different product?
Do you want to develop an upcycle product?
Or do you have a quite different idea?**

Whatever considerations you make – we are innovative and our pilot plant station is available to explore ways of meeting your drying needs. You can count on us as your technology partner.

Fruits and Vegetables

These products are gently dried at the temperature desired by you or the optimum temperature for the specific product, whichever applies, normally between 35 °C and 65 °C. If you want to dry raw food while retaining the vitamins and protein structures therein it is recommended to use drying temperatures below 42 °C. This ensures that raw food remains actually raw – with all its benefits for your special product idea.

Meat and Sausage Products

Do you wish to create a snack? With a very special residual humidity? While its colour is retained as best as possible? Sausage or meat chips, dried meat, beef jerky or any other unusual idea – with us at your side you can make a large step in your product development.

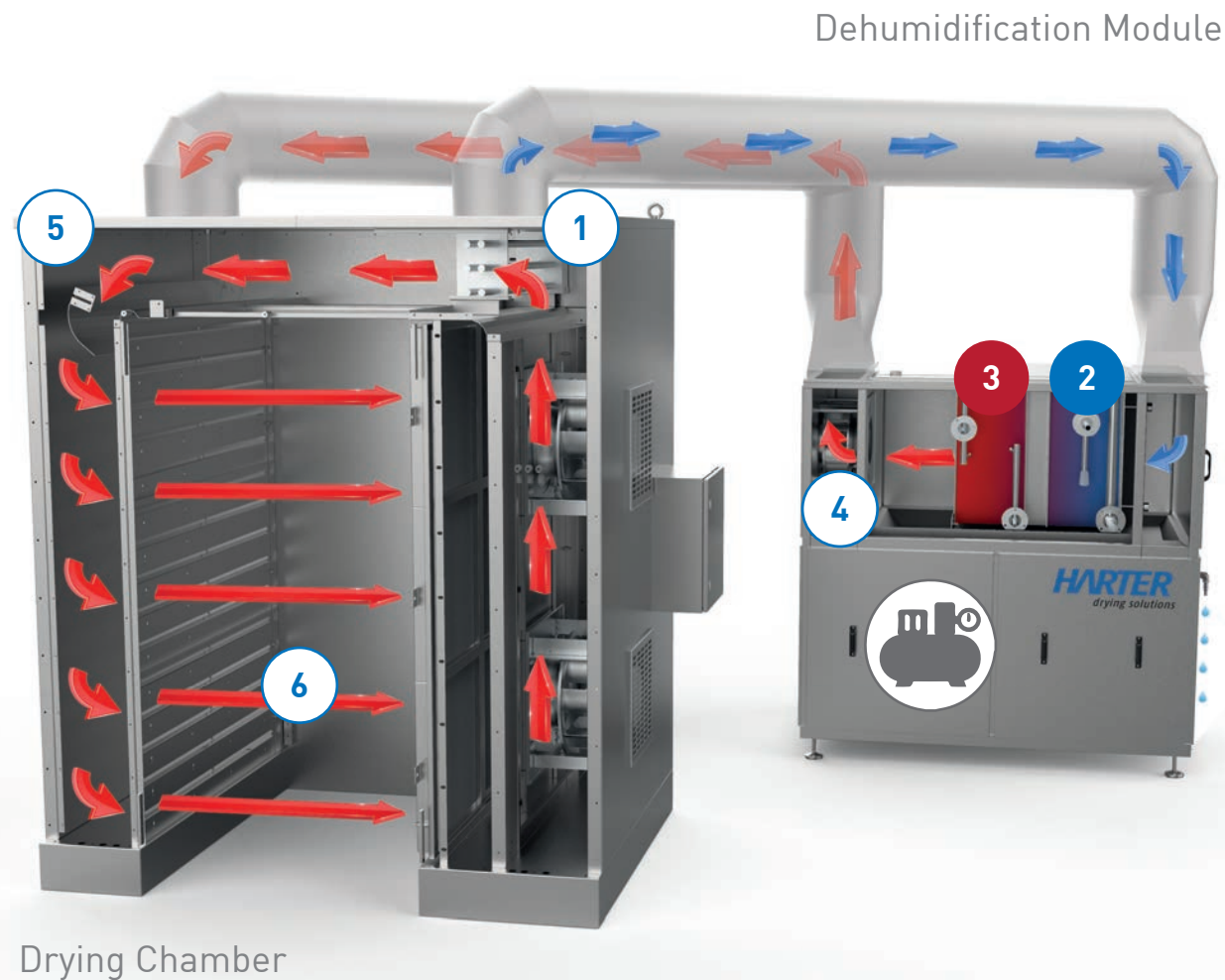
Medicinal and Spice Plants

Gentle, low temperature drying to retain the valuable ingredients of these goods is of utmost importance. As our system is closed air-wise, it goes a long way toward ensuring this requirement. Plus, it also enables the valuable condensate to be used for profitable purposes.

Sweets

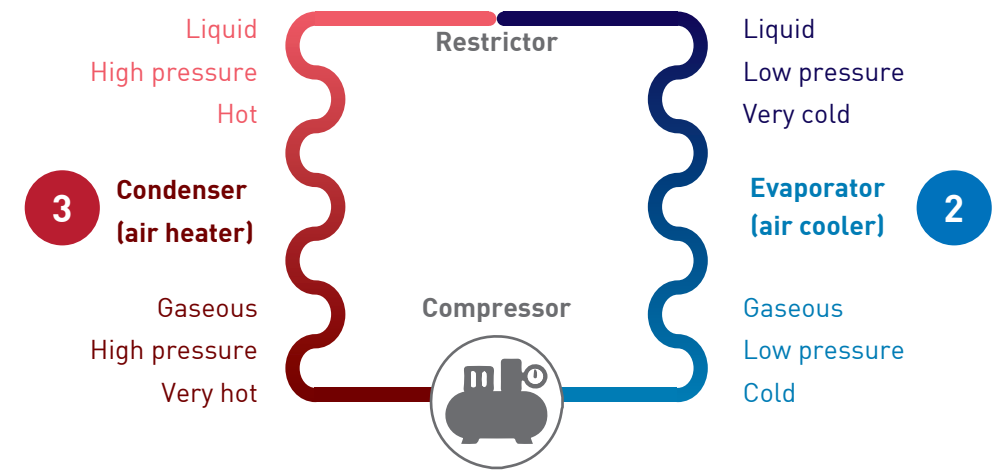
Do you wish to dry the raw mixture for your product in a gentle and uniform way? Or does your product have a coating that requires gentle drying? We develop and design batch systems or continuous solutions for your products.

Drying in a closed air circuit – with no supply and exhaust air



The chamber drying system consists of one drying chamber and one dehumidification module minimum. The purpose of the dehumidification module is to provide the required process air. The drying chamber is the place where drying proper takes place.

Operating Principle of a Heat Pump



Humid air is passed from the drying chamber to the air dehumidification module.



The moisture condenses on the air cooler fins and runs through the collector to the condensate drain where it leaves the dehumidification module.



The air heater heats the dry air to the required process temperature.



The process air fan circulates the air between the dehumidification module and the drying chamber.



The dry, unsaturated air is passed to the drying chamber, where it mingles with the main recirculation air, and flows over or through the items to be dried.



The main recirculation air circulates within the drying chamber and ensures uniform drying.

Our All-in-one Series Models

Chamber Dryer H01*basic*

Many Products, Many Opportunities

The H01*basic* chamber dryer is an all-purpose dryer. Operating such a dryer you enjoy extreme flexibility – you may dry a large portfolio of your products.



H01*compact*

The Compact Dryer for Product Development and Laboratory Technology

Those who find our standard H01*basic* chamber dryer too big for their purpose may draw on the H01*compact*. This compact dryer is perfectly suited for laboratory testing very small quantities or for developing new products. It is also ideally suited for startups in the initial development of their product idea.



Specifications

| | <u>H01<i>basic</i></u> | <u>H01<i>compact</i></u> |
|----------------------|--|------------------------------|
| Temperature range: | 10 °C to 60 °C | 10 °C to 75 °C |
| Single layer drying: | Trays of various sizes and designs may be used. | |
| Usable surface area: | 48 m ² max. | 12 m ² max. |
| Bulk material: | Pans of various sizes and designs may be used. Maximum fill height is 200 mm. | |
| Usable volume: | 1.00 m ³ max. | 0.25 m ³ max. |
| Dimensions: | 2000 x 2500 x 2340 mm | 1500 x 1060 x 1950 mm |
| Power input max.: | 23.4 kW | 8.6 kW |
| Rated power: | 11.9 kW approx. | 4.2 kW approx. |
| Voltage/frequency: | 230/400 V, 50 Hz | 230/400 V, 50 Hz |
| Air volume: | 12,000 m ³ /h max. | 4,500 m ³ /h max. |

Our Combinable System Components

Our food drying systems may have modules added to grow with your needs for more throughput. With all these options available you may freely plan your future!

H01-L



H02-L



H03-L



▲ In line

▼ In parallel

= possible combinations

H01-P



H02-P



H03-P



Basic configuration:

All chamber dryer modules have standard components as follows.

- 1.4301 stainless steel housing, double wall, sound and heat insulated
- Integrated air recirculation system for forced air routing inside the drying chamber
- Airgenex® air ducting system for constant supply, distribution and return of Airgenex® conditioned process air inside the dryer
- Two process air fans
- Drying chamber door
- Temperature sensor(s)
- Humidity sensor(s) [rF%]
- Heater battery, electrical (6 kW)

Dehumidification Modules

AIRGENEX® 6.000



Basic configuration:

Heat pump based dehumidification component to condense water from the air, for direct attachment to the chamber dryer modules. The energy released in this process is returned to the system through a heat pump.

All Airgenex® modules have standard components as follows.

AIRGENEX® 9.500



— 1.4301 stainless steel housing, double wall, sound and heat insulated

— Coolant compressor (reciprocating piston type)

— Air cooler: Heat exchanger, fin type, with 1.4301 stainless steel core tubes, aluminium fins, epoxy resin coated

— Air heater: Heat exchanger, fin type, with 1.4301 stainless steel core tubes, aluminium fins, epoxy resin coated

AIRGENEX® 15.000



— Integrated fan for air exchange between Airgenex® and chamber dryer modules

— Air intake filter to protect the heat exchangers (filter class F7)

— Condensate drain

— Switch cabinet for basic functions

Specifications

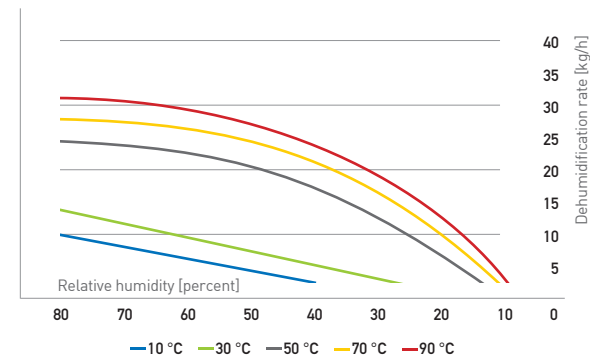
Chamber Dryer (H01 module)

Standard temperature range: 10 °C to 60 °C
 Airflow rate: 10,000 m³/h max.
 Supply voltage: 230/400 V/50 Hz
 Connected load max: 9.8 kW

Operating power: 4.0 kW approx.
 Dimensions ext.: 2000 x 1500 x 2340 mm
 Dimensions int.: 900 x 1300 x 1950 mm

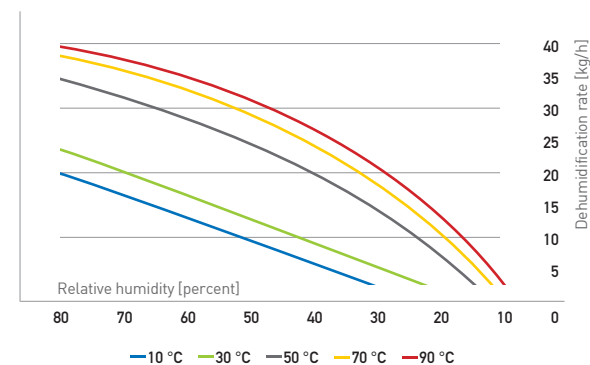
Airgenex® 6.000

Standard temperature range: 10 °C to 60 °C
 Airflow rate: 2,000 m³/h max.
 Supply voltage: 400 V/50 Hz/3 Ph
 Connected load max: 13.6 kW
 Operating power: 7.9 kW approx.
 Dimensions: 1500 x 950 x 1600 mm



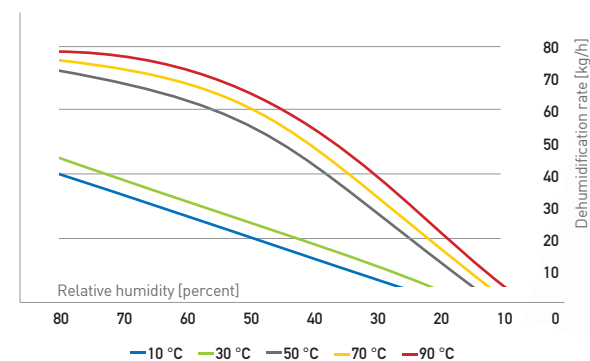
Airgenex® 9.500

Standard temperature range: 10 °C to 60 °C
 Airflow rate: 3,000 m³/h max.
 Supply voltage: 400 V/50 Hz/3 Ph
 Connected load max: 19.9 kW
 Operating power: 10.0 kW approx.
 Dimensions: 2100 x 1020 x 1650 mm



Airgenex® 15.000

Standard temperature range: 10 °C to 60 °C
 Supply voltage: 4,900 m³/h max.
 Supply voltage: 400 V/50 Hz/3 Ph
 Connected load max: 31.6 kW
 Operating power: appx. 17.0 kW
 Dimensions: 2300 x 1250 x 2000 mm



Control – Smart in Every Detail

- _ PLC-Control Siemens Simatic S7-1200
- _ Siemens Simatic KTP700 Basic 7" TFT Display

The following drying parameters may be controlled in interrelation with each other:

Time | recirculating air humidity | temperature over time | airflow rate

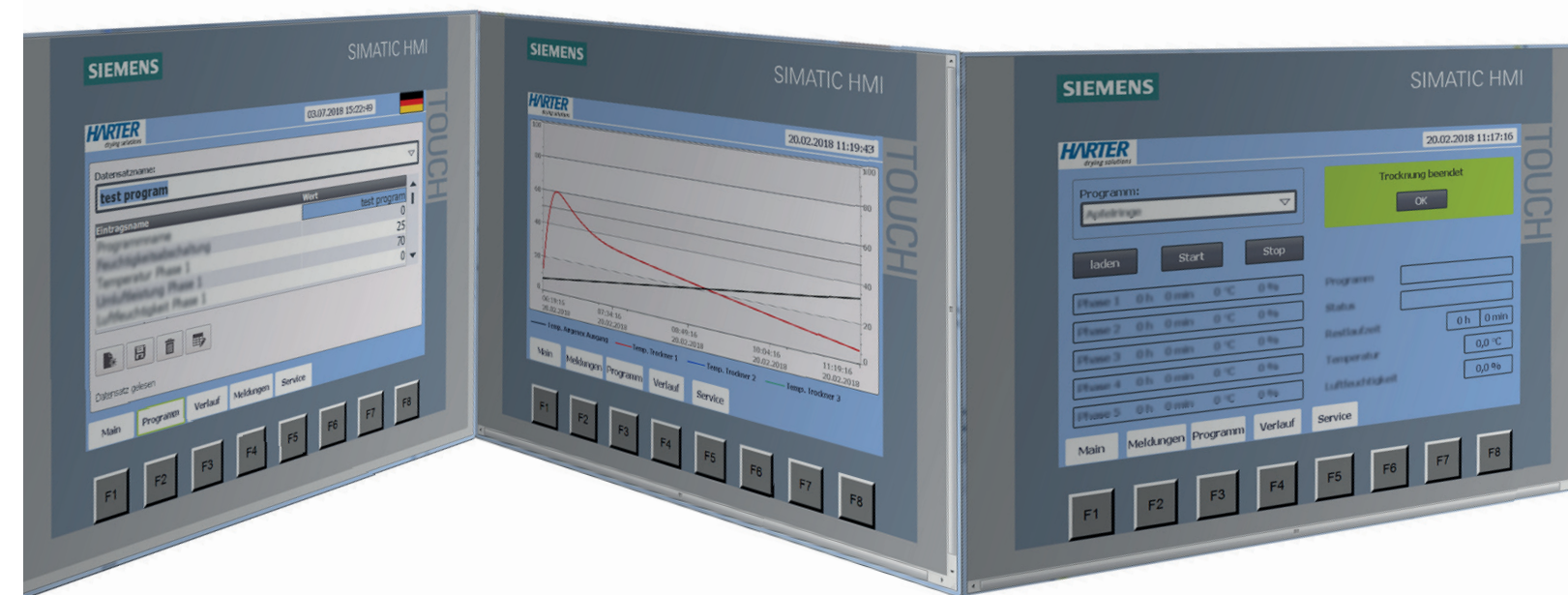
Any number of product specific recipes may be programmed and stored. Once started, the process runs in fully automatic mode until its end.

Real-time data transmission and process control:

The controller may be operated and the drying process monitored in real time through the in-built HMI or external devices such as PC, tablet or smartphone. Drying parameter output or reading is possible at any time.

Options:

- _ Weighing cell to determine the current residual humidity of the product
- _ Moistening unit to produce a defined climate inside the dryer
- _ Germicidal stage raising the temperature level temporarily
- _ Expert mode for product development



Equipment and Options

| | H01compact | H01basic | H01 / H02 / H03 line | H01 / H02 / H03 parallel | AG 6.000 | AG 9.500 | AG 15.000 |
|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Heat pipe | | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Air filter (WP) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Excess energy transfer | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Process air fans up to 75 °C | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| Process air fans up to 100 °C | | | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Additional drying chamber door | | | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Additional HMI | | | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Additional heater, electrical, 15 kW | | | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Temperature sensor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Humidity sensor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Humidification unit | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Air filter wall, H01 module | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Weighing provision, H01 module | | <input type="checkbox"/> | | <input type="checkbox"/> | | | |
| Remote servicing module | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Optional
 Standard, equipment may vary as possible

| Description | Variants / Remarks |
|-------------------------------------|--|
| Heat pipe | Additional heat exchanger system, required for process temperatures up to 90 °C |
| Air filter (WP) | Filter classes G4 - F9 |
| Excess energy transfer | -air-air heat exchanger -plate heat exchanger, water |
| Process air fans up to 75 °C | Internal motors |
| Process air fans up to 100 °C | External motors |
| Additional drying chamber door | To provide an air lock (separation from production area) |
| Additional HMI | To provide an air lock (separation from production area) |
| Additional heater, electrical 15 kW | For temperature equalization processes up to 100 °C |
| Temperature sensor | Pt100 (number may vary) |
| Humidity sensor | Rel. humidity reading [rF] (number may vary) |
| Humidification unit | Ultrasonic humidifier for humidification process, humidification rate 2 - 6 kg/h |
| Air filter wall, H01 module | Filter classes G4 - F9 |
| Weighing provision, H01 module | Inline weighing integrated in software control |
| Remote servicing module | External access through LAN interface |

The Multifunctional Tray Trolley

Single Layer Tray Drying

Products are dried on trays using air routed horizontally.

Basic configuration: 1.4301 stainless steel rack, two castors, two fixed castors, one pair of rails per tray

Dimensions (length x width x height):
1225 x 800 x 1950 mm

Trays: Perforated base from 1.4301 stainless steel or plastic, perforation style as required for the specific product



The trolley has Europallet size (1200 mm long, 800 mm wide) and is designed to hold standardized small load carriers (SLC). Existing baskets and trolleys may, of course, also be used for drying.

| | Number per trolley max. | Useful area per tray | Total useful area per trolley | Tray size (length x width) |
|------------------------------|-------------------------|----------------------|-------------------------------|----------------------------|
| Tray, stainless steel, small | 200 | 0.24 m ² | 48 m ² | 400 x 600 mm |
| Tray, stainless steel, large | 100 | 0.48 m ² | 48 m ² | 600 x 800 mm |
| Tray, plastic, small | 200 | 0.21 m ² | 42 m ² | 365 x 570 mm |

Bulk Drying in Pans or Baskets

Products which can be dried in bulk may be loaded 200 mm max. high. The direction of airflow is modified such that the air entering the chamber horizontally is diverted to flow vertically through the pans to finally leave the chamber horizontally again. This is the only way to ensure uniform drying of bulk products.



Basic configuration: 1.4301 stainless steel rack, two castors, two fixed castors, one pair of rails per container, two air deflector plates for vertical air routing for each layer

Dimensions (length x width x height):
1225 x 800 x 1950 mm

Pans: Perforated base from 1.4301 stainless steel or plastic, perforation style as required for the specific product

A collection system for liquids may be integrated optionally, where frozen products are to be dried. It can be used to reclaim valuable liquids for further processing into profitable secondary products.

| | Fill height max. | Number of containers per trolley | Useful volume per container | Total useful volume per trolley | Container size, length x width |
|-----------------------------|------------------|----------------------------------|-----------------------------|---------------------------------|--------------------------------|
| Pan, stainless steel, small | 100 mm | 32 | 24 l | 768 l | 400 x 600 mm |
| Pan, stainless steel, small | 200 mm | 20 | 48 l | 960 l | 400 x 600 mm |
| Pan, stainless steel, large | 100 mm | 16 | 48 l | 768 l | 600 x 800 mm |
| Basket, plastic, small | 70 mm | 40 | 14.5 l | 580 l | 365 x 570 mm |
| Basket, plastic, small | 132 mm | 28 | 27.5 l | 770 l | 365 x 570 mm |
| Basket, plastic, small | 175 mm | 24 | 36.5 l | 876 l | 365 x 570 mm |

Optional Solutions

Belt Dryer

Fully automatic systems for large production volumes.



Barrel Dryer

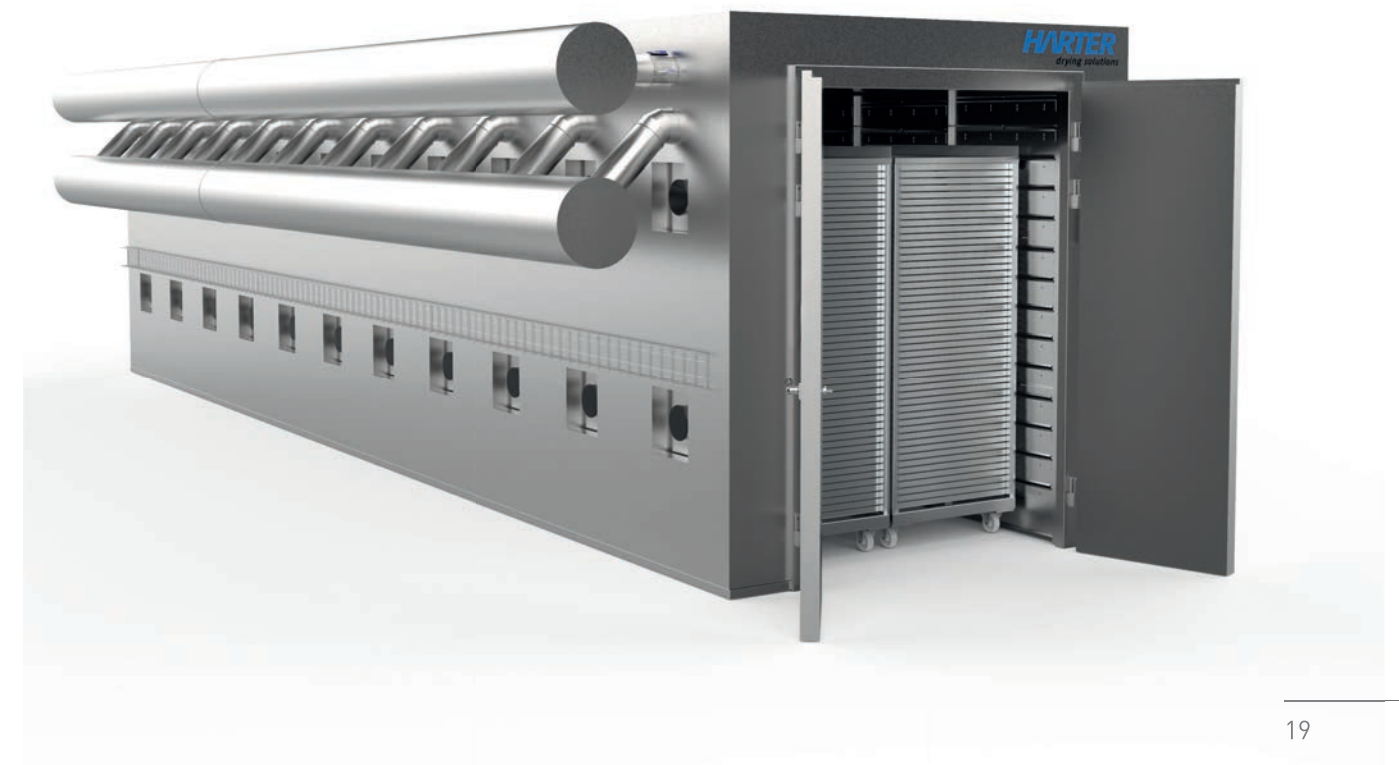
The optional solution for bulk material.

Uniform drying of less sensitive products such as edible seeds and nuts, tubers, pomace etc.



Chamber drying systems – Drying in large chambers

Customized drying system to meet special large size and throughput requirements.



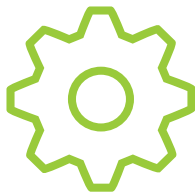


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Your Full Service Partner for Drying



PILOT PLANT STATION

One of our specials – We run trials to determine the parameters required for optimum drying of your product.



PRODUCT SAMPLES

We test your product – Pleasant surprises may be expected as far as aroma, taste, ingredients and appearance is concerned!



GOVERNMENT PROMOTION

Our heat pump based dryers are energy efficient enough to be eligible for government promotion.



AFTERSALES SERVICE

Installation, maintenance and spares service – fully guaranteed by us.