HARTER
drying solutions

AIRGENEX® MedCann

# CONTROLLED DRYING OF MEDICAL CANNABIS

## GENTLE+RELIABLE+EFFICIENT+GMP READY


**For High Quality Results and Constant Processes**

AIRGENEX® MedCann

# Controlled and Efficient Drying in a Closed Air System

Long and uncontrolled drying times of medical cannabis become a thing of the past with innovative HARTER drying solutions.

Efficient AIRGENEX® MedCann condensation drying, based on the heat pump principle, takes place in an environment which can be controlled and ensures highest product quality.

In the AIRGENEX® MedCann dehumidification module the process air is dehydrated by cooling and reheated to the required temperature using a heat recuperation system. The unsaturated air is passed to the drying chamber where it absorbs the humidity of the product. The moist air is returned to the dehumidification process in a closed loop.

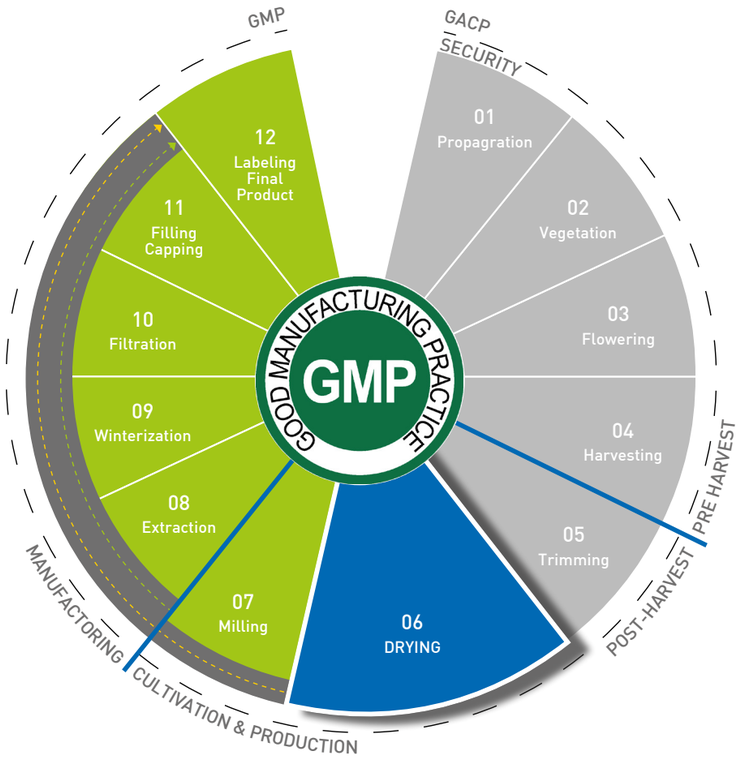
The drying process does not rely on the exchange of air with the ambient atmosphere and is thus independent of the climate present. Another benefit of the closed circuit is energy related – the full thermal energy is retained in the system. Thus, the environment inside the drying system may be controlled free from external influences.

## CONTROLLED DRYING OF MEDICAL CANNABIS EFFICIENT, RELIABLE, GMP READY FOR HIGH QUALITY RESULTS AND CONSTANT PROCESSES

# GMP READY

Being part of the manufacturing process drying must also be GMP compliant. For many years, HARTER has engaged itself in drying pharmaceutical products gather much experience related to GMP.

HARTER has thus established itself on the market as a long-standing reliable supplier of high quality and GMP conforming drying technology.




**Conformity with the manufacturing processes laid down in the GMP regulations is imperative for producing medical cannabis.**

# CUSTOMIZED DRYING PROFILES FOR INDIVIDUAL GENETICS AND USES

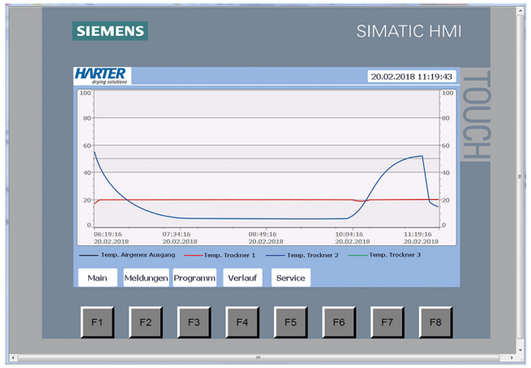
The various cannabis strains present individual challenges to achieving the perfect drying result.

The smart HARTER control software allows to vary

- temperature profile
- drying time
- air flowrate
- recirculating air humidity
- residual return air humidity

to obtain the desired drying result of each specific cannabis strain.

Together with you, we will develop the perfect drying profile for your specific cannabis strain, if desired.



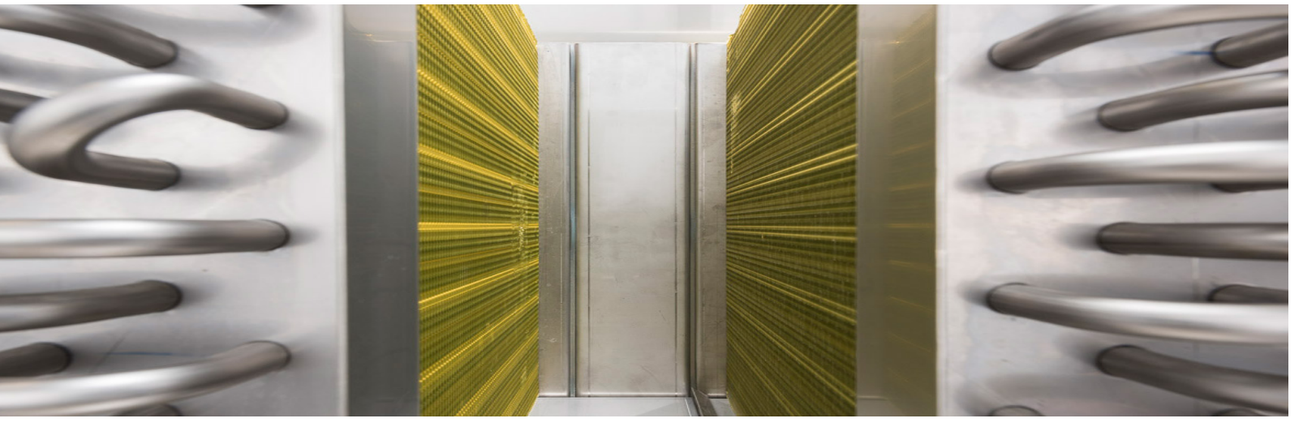

For medical cannabis, the drying process is crucial to the quality of the end product. HARTER can meet such requirements using special, customized drying techniques and process solutions. Owing to their long-standing expertise HARTER can also offer support in developing complex drying processes and implementing these processes in the regulated industry.

*Rainer Krüger*
*Manager of J&K Consulting, Germany*

# HYGIENIC DESIGN

Germs or pathogens may form if conventional cannabis drying areas are not sterile. Also, problem such as mildewing may occur again and again. HARTER drying systems are designed and built in accordance with hygienic design requirements.

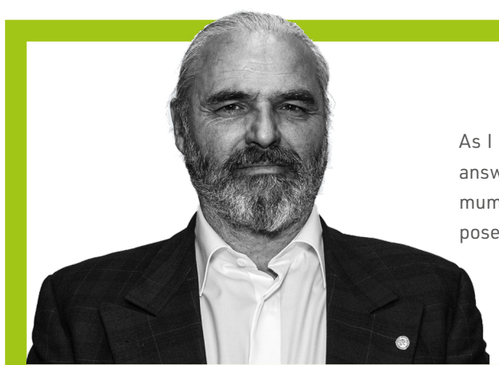
Ease of cleaning and conformance with hygienic standards was first reflected in the development of food drying systems and extended to the drying of medical cannabis. This ensures responsible drying of sensitive products.



Hygienic design precludes potential hygienic trouble spots by design. All materials and surfaces of HARTER drying systems can be easily cleaned or sterilized, if required. Contamination cannot accumulate in the first place or can be easily removed.

HARTER MedCann hygienic design ensures product reliability.

- Conformance with high hygienic standards
- Ease of cleaning operations
- Reduction of downtime



As I came to know HARTER I instantly knew they were the perfect answer to our requirements. In a very close co-operation the optimum, multifunctional, GMP certified drying system was created, purpose made for the controlled drying process of the cannabis plant.

*Daniele Schibano*
*Schibano Pharma Group AG, Switzerland*



For medical cannabis, the HARTER drying technology offers the great benefit of gentle drying at various temperature ranges so that the precious volatile ingredients are retained. The optional controlled decarboxylation of the cannabinoids in the drying system reduces the number of production steps required and produces a high quality product.

*Prof. Dr. Simone Graeff-Hönninger*
*University of Hohenheim, Germany*

Airgenex® heat pump based condensation drying systems have demonstrated to reduce carbon emission considerably.

Also, the process parameters can be maintained constant with these systems.

## High Carbon Savings with HARTER Drying Systems

An important quality feature of cannabis is a homogenous dried bud. Thus, drying homogeneity plays an important role for the end product. Rehumidification can add humidity to the cannabis bud surfaces to obtain the desired residual humidity.

## Optional Rehumidification for Homogenous Residual Humidity at Low Temperature

# OUR SERIAL MODELS

## Chamber Dryer H01 Series

**Many Opportunities**

The H01 Series module is ideally suited to drying medical cannabis in a gentle and homogenous manner. This model is ready for drying GMP compliant.


## H01*compact*

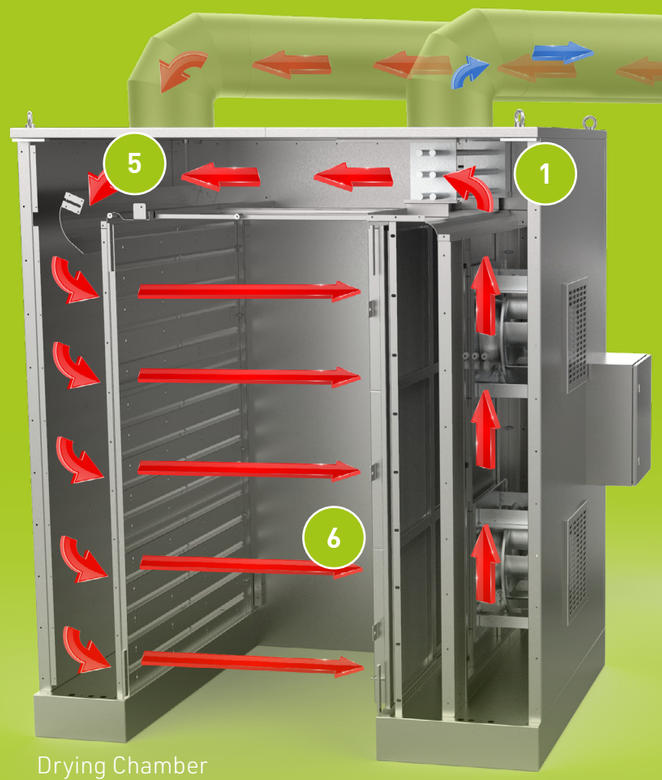
The compact dryer for product development and laboratory technology

Those who find our standard H01 module 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.


| **Technical Data** | H01 Module | H01*compact* |
|---|---|---|
| Temperature range | 15 °C to 60 °C | 15 °C to 75 °C |
| Single layer drying | Trays of various sizes and designs may be used | |
| Usable surface area | 48 m² max. | 12 m² max |
| Bulk material | Pans and baskets of various sizes and designs may be used. Maximum fill height is 175 mm. | |
| Usable volume | 1.00 m³ max. | 0.2 m³ max. |
| Dimensions [L x W x H] | 2,000 x 1,500 x 2,340 mm | 1,500 x 1,060 x 1,950 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 flowrate | 10,000 m³/h max. | 4,500 m³/h max. |

# DRYING IN A CLOSED AIR LOOP – WITH NO AIRFLOW FROM AND TO THE AMBIENT ATMOSPHERE



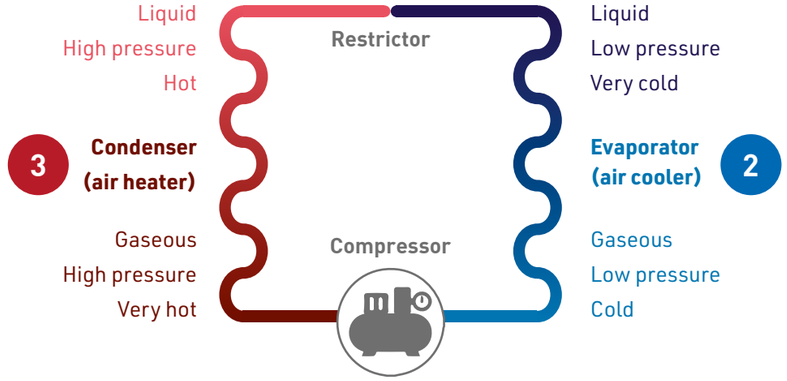

Drying Chamber


Dehumidification Module

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 dehydrated process air. The drying chamber is the place where drying takes place.



# Operating Principle of a Heat Pump




**1**

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

**2**

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

**3**

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

**4**

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

**5**

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.

**6**

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

# THE SYSTEM COMPONENTS YOU MAY COMBINE

## Drying Chambers

Our dryers may have modules added to grow with your needs for more throughput. You can connect up to 5 drying chambers and combine it with one or more Airgenex® modules. With all these options available you may freely plan your future!

**Basic Configuration:**

All chamber dryer modules include the following components:

- Housing made of stainless steel 1.4301 (AISI 304); double-walled insulated and soundproof
- Integrated air circulation system for steady air circulation in the drying chamber
- Airgenex® air duct system for steady air circulation of process air between dehumidification module and drying chamber
- Two process air fans
- Drying room door
- Temperature sensor(s) [°C]
- Humidity sensor(s) [rH%]
- Electrical heating (6 kW)


H01-L


H02-L


H03-L – H05-L

## Dehumidification Modules


Airgenex®6.000


Airgenex®9.500


Airgenex®15.000

**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.

- Frame made of heat-insulated profiles, RAL 9006 profile powder-coated coating with FDA approval
- Double-walled insulated side panels made of stainless steel 1.4301 (AISI 304)
- Coolant compressor (reciprocating piston type)
- Air cooler: heat exchanger with epoxy resin covered aluminium lamellas pipes out of stainless steel 1.4301 (AISI 304)
- Air heater: heat exchanger with epoxy resin covered aluminium lamellas pipes out of stainless steel 1.4301 (AISI 304)
- Integrated fan for circulating air between Airgenex® and dryer
- Airfilter for protection of heat exchangers (filter class F7)
- Condensate drain
- Switch cabinet for basic functions

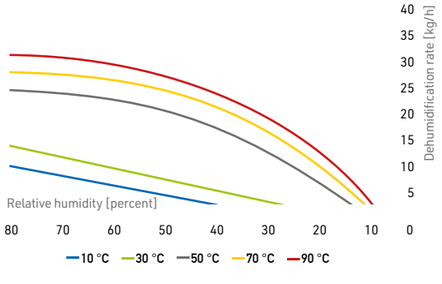
# Specifications

## Chamber Dryer [H01 Module]

| | |
|---|---|
| Standard temperature range: | 15 °C to 60 °C |
| Air flow: | 10,000 m³/h max. |
| Supply voltage: | 230/400V/50Hz |
| Connected load max.: | 9.8 kW |
| Operating power: | 4.0 kW approx. |
| Dimensions, ext. [LxWxH]: | 2,000x1,500x2,340 mm |
| Dimensions, int. [LxWxH]: | 900x1,300x1,950 mm |

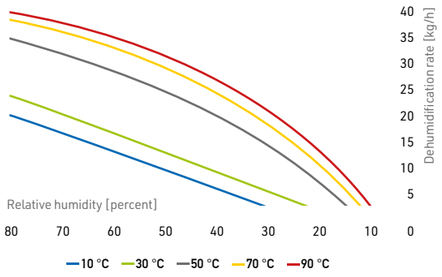
## Airgenex®6.000

| | |
|---|---|
| Standard temperature range: | 15 °C to 60 °C |
| Air flow: | 2,000 m³/h max. |
| Supply voltage: | 400V/50Hz/3Ph |
| Connected load max.: | 13.6 kW |
| Operating power: | 7.9 kW approx. |
| Dimensions [LxWxH]: | 1,500 x 950 x 1,600 mm |



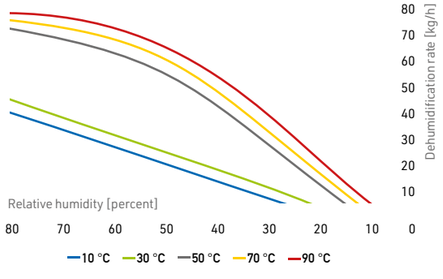

## Airgenex®9.500

| | |
|---|---|
| Standard temperature range: | 15 °C to 60 °C |
| Air flow: | 3,000 m³/h max. |
| Supply voltage: | 400V/50Hz/3Ph |
| Connected load max.: | 19.9 kW |
| Operating power: | 10.0 kW approx. |
| Dimensions [LxWxH]: | 2,100 x 1,020 x 1,650 mm |




## Airgenex®15.000

| | |
|---|---|
| Standard temperature range: | 15 °C to 60 °C |
| Air flow: | 4,900 m³/h max. |
| Supply voltage: | 400V/50Hz/3Ph |
| Connected load max.: | 31.6 kW |
| Operating power: | 17.0 kW approx. |
| Dimensions [LxWxH]: | 2,300 x 1,250 x 2,000 mm |






# Control – Smart in Every Detail

__ Siemens Simatic S7-1200 PLC
__ Siemens Simatic 7" TFT display

**These drying parameters may be controlled in interrelation with each other**

Time / recirculating air humidity / temperature profile / air flowrate

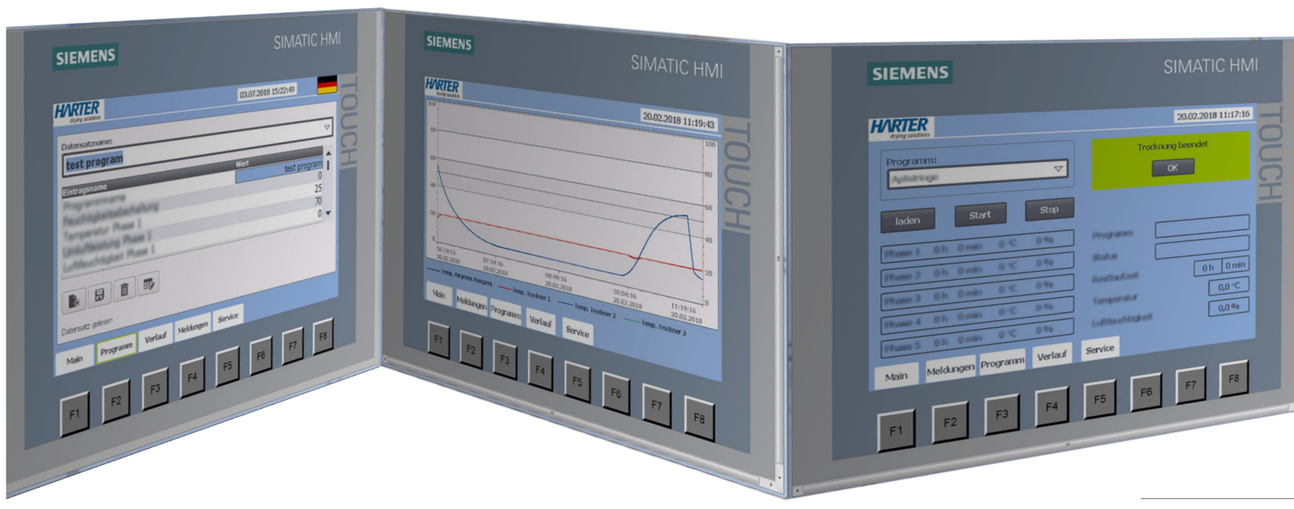
Any number of product specific recipes may be programmed and stored. Once started, the process runs in fully automatic mode until its end.

**Real-time data transmission and process control**

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

**Optional possibilities**

__ Moistening unit to produce a defined environment inside the dryer
__ Expert mode for product development



# Configuration and Options

## Drying Chambers and Dehumidification Modules

| Description | Variants / Remarks |
|---|---|
| **Air filter (Airgenex®)** | Filter classes F7 to F9 |
| **Excess energy transfer** | _ air-air heat exchanger<br>_ plate heat exchanger, cooling water |
| **Additional drying chamber door** | To provide an air lock<br>(separation from production area) |
| **Additional HMI** | To provide an air lock<br>(separation from production area) |
| **Temperature sensor** | Pt100 [°C] (number may vary) |
| **Humidity sensor** | Rel. humidity reading [rH] (number may vary) |
| **Moistening unit** | Ultrasonic humidifier for humidification process, integrated in the air circuit; 2 to 6 kg/h humidification rate |
| **Air filter wall, H01 module** | Filter classes G4 to F9 |
| **Remote Maintenance** | External access through LAN interface for process control and support |
| **Recipe management for GMP-Applications** | Management of specific recipes or drying profiles |
| **User administration for GMP-Applications** | Administration of different user levels |
| **Audit trail function for GMP-Applications** | Incl. Licence |

## Documents for GMP Qualification

| Description | Variants / Remarks |
|---|---|
| **Basic Package Qualification Documentation** | _ Manual according to European Machinery Directive 2006/42/EC<br>_ CE Marking and Declaration of Conformity<br>_ Clearing instructions<br>_ Maintenance instructions<br>_ Plant layout<br>_ P & ID<br>_ Spare and wear parts list |
| **Documentation Package 1 (for GMP-Qualification)** | _ Material certificates 2.1 / 2.2 (after detailed clarification)<br>_ Material certificates 3.1 (in direct contact with the product)<br>_ FDA compliance (in direct contact with the product) |
| **Documentation Package 2 (for GMP-Qualification)** | _ Design specification (DS)<br>_ Functional specification (FS)<br>_ Hardware design specification (HDS)<br>_ Software design specification (SDS) |
| **Documentation Package 3 (for GMP-Qualification)** | _ FAT protocol<br>_ Installation Qualification (IQ)<br>_ Operation Qualification (OQ)<br>_ SAT protocol<br>_ According to Harter Templates |
| **Service for the execution and support of the qualification work (On site or online)** | |

# THE MULTIFUNCTIONAL TRAY TROLLEY

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

**Dimensions (mm):** 1,317 (L) x 805 (W) x 1,960 (H)

## Bulk Drying in Pans or Baskets


Products which can be dried in bulk may be loaded 175 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.

| | Fill height max. | Number of containers per trolley | Useful volume per container | Total useful volume per trolley | Container size (L x W) |
|---|---|---|---|---|---|
| **Pan, stainless steel, small** | 70 mm | 40 | 14.5 l | 580 l | 400 x 600 mm |
| **Pan, stainless steel, small** | 100 mm | 32 | 24.0 l | 768 l | 400 x 600 mm |
| **Pan, stainless steel, small** | 150 mm | 28 | 36.0 l | 1.008 l | 400 x 600 mm |
| **Pan, stainless steel, large** | 150 mm | 14 | 72.0 l | 1.008 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 |

## Tray Drying of Items Placed in One Layer


Products are dried on trays using air routed horizontally.

| | Number per trolley max. | Useful area per tray | Total useful area per trolley | Tray size (L x W) |
|---|---|---|---|---|
| **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 |

perforated area, Perforation specific to the product, minimum between trays 30mm



# YOUR FULL SERVICE PARTNER FOR DRYING

GMP — GMP READY

$CO_2$ — SAVING CO2

PILOT PLANT STATION

GOVERNMENT SUBSIDY

AFTERSALES SERVICE

# AIRGENEX® MedCann by HARTER

THE STATE-OF-THE-ART DRYING SOLUTION

_ controlled and efficient
_ GMP ready
_ customized drying profiles
_ hygienic design

MedCann
by HARTER

www.harter-medcann-dryers.com