

## FULL SCALE FREEZE DRYER

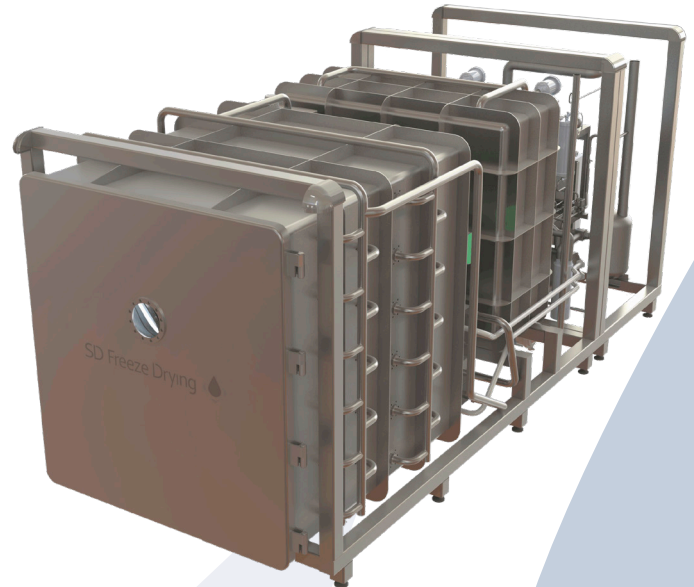
The freeze dryer, type FD500, is a hygienic bulk freeze dryer with an external condenser which can be isolated from the drying chamber.

Heating for sublimation is supplied by an external water heating system, circulation water inside the shelves. The water heating systems secure a uniform temperature gradient and pressure across the entire tray surface area.

The design is optimised for up-scaling and ease of maintenance. The FD500 dryer has as an option CIP nozzles installed for full coverage of CIP-liquid. It is manufactured from stainless steel (AISI 316), and all surfaces wetted by CIP-liquid are documented with either 3.1, FDA and/or FCM certificate.

## APPLICATIONS

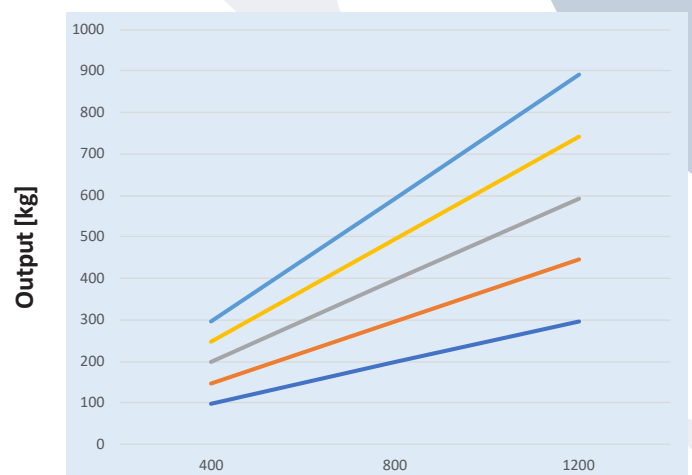
The FD500 freeze dryer is designed for drying of nutraceuticals, food and pharmaceuticals e.g. probiotic bacteria, enzymes, algae, coffee, ready to serve food as well as fruit and vegetable (sliced, puree or extract).



## TECHNICAL DATA

Total tray area 27 m <sup>2</sup>
Number of trays 48
Input/feed capacity 1.200 kg
Cooling coil capacity +500 kg H <sub>2</sub> O
Maximum sublimation capacity 80 kg H <sub>2</sub> O/hour
Product contact steel parts AISI 316
Unit dimensions, WxDxH 2,3x5,5x2,3 m

## DRIED PRODUCT OUTPUT



■ DM 20% ■ DM 30% ■ DM 40% ■ DM 50% ■ DM 60%

## BENEFITS OF THE FD500:

**Scalability:** Optimised flow, pressure and heat input secure a smooth up-scaling from FD30 pilot size to FD500 full scale

**Reduced utility investment and maintenance:** E.g. the heating for sublimation is done by electric heating elements, eliminating the need for a water or silicone heating system

**Improved product integrity:** The risk of contamination by leaking water or silicone oil is eliminated using electrical heating elements for sublimation

**Improved cleanability:** Isolated external condenser chamber and PTFE coated heating elements combined with a state of the art general hygienic design, means that the cleanability of the freeze dryer is very high

**Skid-mounted:** The freeze dryer is delivered as a skid-mounted assembly in a standard container – tested and ready for installation. This minimises the need for on-site fabrication and reduces the erection time

## EQUIPMENT:

### BASIC SYSTEM

- Fits in a 20' container
- Stainless steel drying chamber
- Stainless steel condenser chamber
- Stainless steel condenser coil
- Complete refrigeration system
- Vacuum pump system with roots and dry screw pump
- Pressure sensors (high and low)
- Electrical heating shelves/plates
- Wireless product temperature probes
- Touch screen control panel with PLC
- Data logging
- Stainless steel frame and cladding
- Defrost of condenser
- FAT, SAT and CE-documentation
- Hygienic design prepared for CIP
- Design prepared for robot automation
- Isolation valve

### OPTIONS

- CIP equipment for both chambers
- CIP return equipment
- Nitrogen purging
- Pre-cooling of drying chamber
- Sterile filters for in-/out-let flows
- Manual wire stainless steel sheeted thermocouples for product temperature measurement
- Double pressure sensor set
- cGMP software and documentation package

### OTHER VERSIONS

- SIP-able + equipment
- Silicone heating/cooling shelves/plates including system

