SiccaDania Freeze Drying

# Factory setup

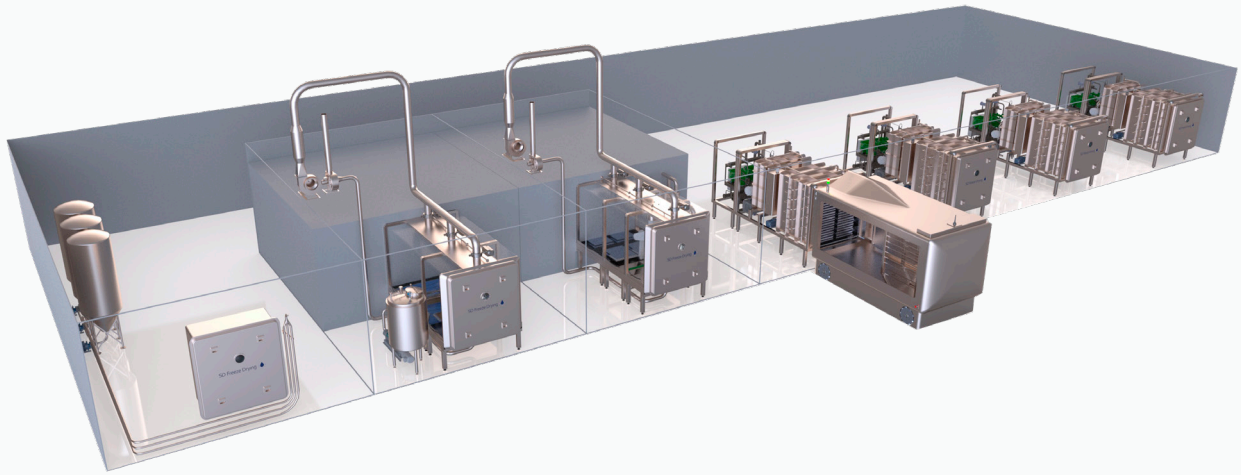
## FREEZE DRYING FACTORY

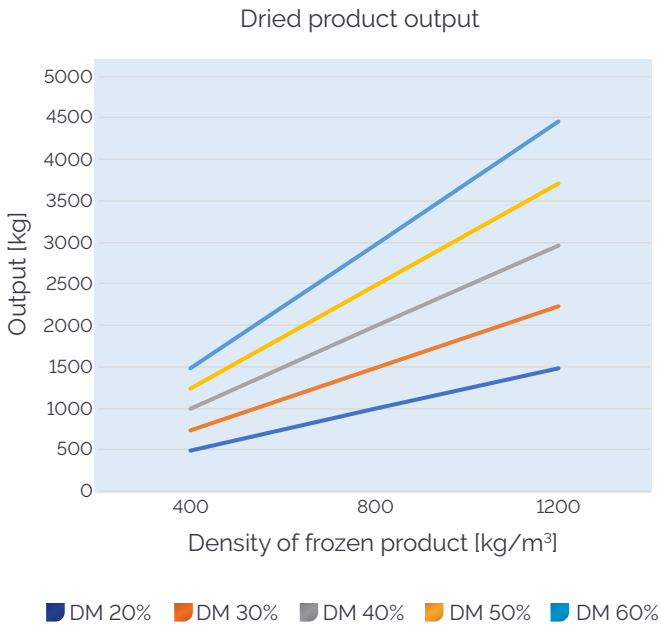
For an automated and continuous production, several FD500 standard freeze dryer units can be arranged in a system, e.g. 5 in a row, representing an input capacity of 2500 kg product per cycle. The loading and unloading of the freeze dryers is automated and requires no manual labor. Capacity can be raised or lowered simply by adding or removing FD500 dryer units to or from the system. The automation system is capable of handling up to 20 units.

## Applications

The factory is designed for drying of nutraceuticals, food and pharmaceuticals:

- **Probiotic bacteria**
- **Enzymes**
- **Algae**
- **Coffee**
- **Ready to serve food**
- **Fruit and vegetable (sliced, puree or extract)**






| TECHNICAL DATA - 5 x FD500 UNITS | |
|---|---|
| Total tray area | 135m² |
| Number of trays | 240 |
| Input/feed capacity (density 0,5 g cm3) | 2500 kg/cycle |
| Cooling coil capacity | +4000 kg $H_2O$ |
| Maximum sublimation capacity | 400 kg $H_2O$/hour |
| Unit dimensions, W x D x H | 19 x 6 x 4.1 m |

Example: The technical data and output graphs shown below is for a factory setup with 5 x FD500 freeze dryer units.

# Benefits of the factory setup

## Fast and low-cost capacity increase

Capacity can be increased by adding standard FD500 freeze drying units to the system

## No risk when up-scaling production

Using a standard FD500 dryer unit and known recipe parameters results in identical output products from all chambers

## Production flexibility

Different products can be dried simultaneously.

## Reduced utility investment costs

E.g. size of the CIP unit is minimised since only one drying unit is CIP'ed at a time

## Manual operations are reduced

The fully automatic system reduces the need for manual labour and OPEX.

## Foot-print flexibility

The layout of the freeze drying units, emptying station etc. is tailored to customer needs, allowing large systems to be fitted into existing buildings. Units can even be in 2 levels

## Clean and hygienic

The trays are transported to and from the drying chambers in a sealed enclosure (the Clean-Factory-System) - all equipment is designed based on the highest hygienic standards.

## Easy maintenance

One unit can be shut down for maintenance while the remaining units are in use.

## For GMP applications

Lower qualifying costs - the qualifying documentation for the first unit can be used as a template for the subsequent units.

# Equipment

| STANDARD EQUIPMENT |
|---|
| 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 |
| Natural anodized aluminium product trays |
| Touch screen control panel with PLC |
| Data logging |
| 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-/outlet flows |
| Manual wire stainless steel sheeted thermocouples for product temperature measurement |
| Double pressure sensor set |
| GMP software and documentation package |

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