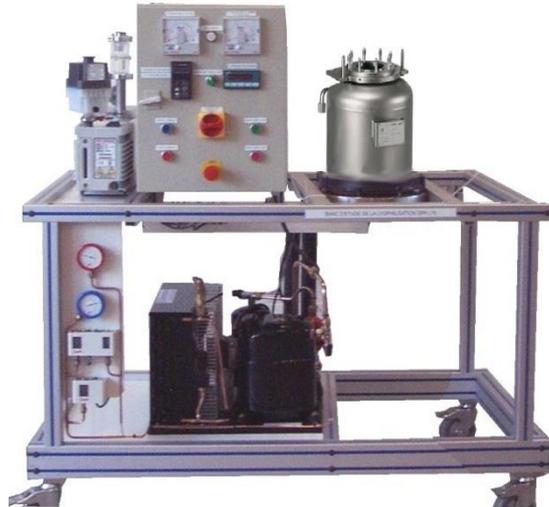


FREEZE DILIZATION TRAINER



Experimental capabilities

- **Commissioning of a freeze-drying unit**
- **Determination of the Eutectic Temperature of a Substance**
- **Control of the internal and surface temperature of the product during freeze-drying and determination of the optimal cycle**
- **Study of the operation of a refrigeration circuit and its components**
- **Plotting the refrigeration cycle on an enthalpy diagram**
- **Power calculation and heat balances**

Operating principle

The bench allows you to study the freeze-drying process, which is the best system for preserving perishable products. It determines the optimal cycle, from a quality and cost perspective, for any product, by using vacuum to keep the product's temperature below its eutectic temperature.

The robust design of this device makes it suitable for use in schools.

The equipment is set up on an Anodized aluminium frame on casters wheels. This gives it great strength and a flexibility of integration into your premises. The manufacture of this equipment complies with the European standard for machinery manufacturing.

Technical details

1. Aluminium profile structure mounted on 4 directional castors with brake
2. Hermetic type compressor
3. Forced-air condenser, pressure switch controlled
4. Coil evaporator
5. Thermostatic expansion valve
6. Compressor control thermostat
7. Liquid Tank Bottle
8. Shut-off valves, liquid sight glass, filter drier
9. Valve for draining, recuperating and charging the refrigerant
10. Connecting pipes between the individual components, varnish
11. Vacuum pump
12. Vacuostat to impose the desired vacuum level
13. Vacuum Burst Valve
14. Freeze-drying cell
15. Icing Cell
16. Double safety pressure switches
17. Electrical box including all the safety features:
 - General disconnecter
 - voltage presence indicator light
 - RCD 30mA
 - grounding components
 - thermal magneto circuit breaker
 - Emergency stop button
18. Instrumentation for the acquisition of plant operating data, with:
 - refrigerant flow meter
 - High and low pressure gauges
 - probes for controlling the internal and surface temperature of the product
 - temperature sensors on the refrigeration circuit and on the air
 - 1 Pirani vacuum gauge for precise vacuum measurement
 - Power meter for power consumption measurementAll measurements are displayed on a 7-inch color touchscreen
19. Data acquisition software:
 - WIFI type connection
 - Licensed free software
 - Data visualization page on a schematic
 - Data visualization page on a real-time graph
 - Real-time enthalpy diagram visualization page
 - Recording of data in an Excel type file

Services required

- Electrical supply : 230 Vac – 50 Hz – 16 A
- Electrical network : 1 phase(s) + Neutral + Earth.
- Dimensions: (LxWxH mm): 1800 x 800 x 1800
- weight (Kg): 180

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

Documentation

- User's manual
- Technical documentation of the components
- Lab exercises
- Wiring diagram
- Fluidic diagram
- Enthalpic diagram
- Software :
- Certificate of conformity CE