

## Study of Freeze-Drying

### DESCRIPTION

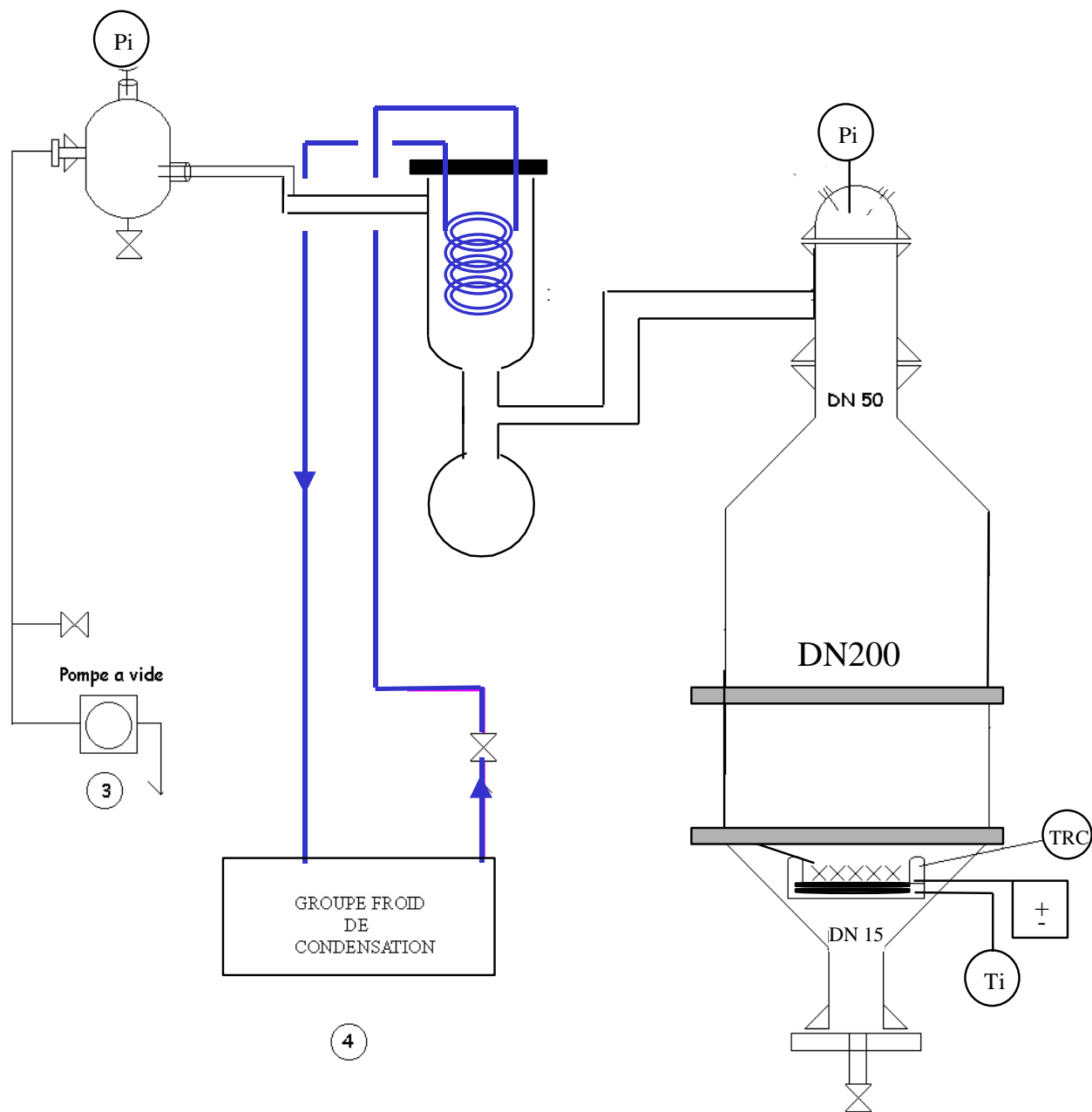
- This unit is designed to study the freeze-drying of foods.
- The main components are made of borosilicate glass.
- Technical documentation and instructions are provided.
- This unit is designed for various levels of study.



### SUGGESTED APPLICATIONS

- Material and thermal balance
- Study of the freeze drying process
- Complete observation of the process
- Freeze drying of foods
- Outputs and efficiencies

## SCHEMATIC DIAGRAM



## TECHNICAL CHARACTERISTICS

### 1. DN 300 belt

Borosilicate glass (2 parts) easily dismountable (316 L stainless steel ring)

Consists of:

- a) 1 electric heating plate – stainless steel  
P = 600 W (0-120°C)– Ø 145 mm  
Pt 100 probe with a regulator with microprocessor for PID regulation
- b) 1 Pt 100 probe with indicator for temperature measurement of the product
- c) 1 stainless steel (316 L) dish for collecting the sample
- d) 1 head with three taps:
  - Temperature tap for stainless steel Pt 100 and its display
  - Pressure tap
  - Tap for Cryogenic vacuum trap

### 2. Vacuum trap (cryogenic)

- a) Upper part: volume 1L – double-walled with Pt 100 temperature sensor (stainless steel) and indicator
- b) Lower part: 500 mL balloon – cyclonic trap with pressure tap

### 3. Vacuum pump

2-step vane pump – flow rate 9.7 m<sup>3</sup>/h  
Motor 0.45 kW  
Maximum vacuum : 10<sup>-4</sup> mm of Mercury  
Voltage: 220 single phase VAC  
Pressure adjustment system

### 4. Condensation group

Cryogenic power : 600 W  
Refrigerating fluid: R 404 at  
- 40°C / + 165°C

## INSTRUMENTS

- 3 temperature sensors - Pt 100 (304 L stainless steel)
- 2 digital displays - Class of accuracy 0.2
- 2 piezoresistive pressure sensors  
Data scale 0-1bar (0 – 14.5 psi)  
Outlet 4-20mA

# GPA L10

## **FRAME**

Galvanized aluminum extruded section  
On small wheels and brake

## **ELECTRIC BOX**

- Emergency stop
- Main switch
- Differential breaker 30 mA
- All the needed elements for a good working of the unit

## **UTILITIES**

Electricity : 230 V / 50 Hz single phase - 16A

## **DIMENSIONS :**

Length : 1450 mm  
Width : 550 mm  
Height : 1650 mm  
Weight : 70 Kg