



FREEZE DRYERS RANGE LIO1000P-LIO2000P

INTRODUCTION:

CINQUEPASCAL's LIO1000P and LIO2000P series shelf freeze-dryers are especially designed for very short and reproducible production cycles, with full operational, product and environmental safety combined with maximum reliability and an extended operational life.

All **CINQUEPASCAL** systems are designed so as to facilitate operations according to GMP standards. Chemical, pharmaceutical, plasma and dietetic products, animal organs and fibres and vegetable fibres can be easily freeze-dried with these versatile freeze-dryers. The material can also be processed in a wide range of product containers with provision for additional sealing under vacuum or inert gas (for example, sterile air or anhydrous nitrogen).

In general, the LIO1000 and LIO2000 offer excellent versatility and the applications are so varied that it becomes difficult to classify them all. The type of drying that can be used is limited by the parameters of the cycle required by the product, whether in vials or in bulk. On the contrary, the fields in which these freeze-dryers are used are well-defined:

In research - the unit is used for a completely general application. Many products are dried in a wide range of containers by many researchers in series of projects that are not essentially correlated. Typical customers are hospitals, Universities and research laboratories.

Production - in this case very easy handling is required to manage a single product or a small number of products in a continuous and regular manner. The main considerations are: low cost per unit of area, regularity and ease of operations. Typical users are small companies operating in the Biotechnology field.

Pilot - in this case the unit is used to collect information. The information required concerns both the product (formulation) and the machine (cycle optimisation, simulation of performance of industrial units for large-scale productions). Sometimes it can be used for the production of small batches for clinical trials. The products used will tend to be similar, perhaps slightly different in the formulation, and an attempt will be made to use the system for a single project. Typical users are pharmaceutical industry research and development departments.

ESSENTIAL FEATURES

General: the freeze-dryer basically consists of a drying chamber containing one or two product shelves with a system of cooling, achieved through a direct expansion refrigerating circuit, and heating through sinking an electrical resistance operating at a safety voltage of 24V in the two plates, a medium-vacuum pumping unit, a vapour condenser, a control panel and regulation and safety devices.

Parallelepiped **drying chamber**, wholly constructed in stainless steel (AISI304), and featuring excellent accessibility and visibility through the transparent Perspex door; it is insulated with top-quality insulation to prevent dispersions and condensates. Inside are housed one or two light alloy plates (Avional 22 or 2024) cooled through a coil for the freon (direct expansion) and heated by an electrical resistance.

They are both sunk in the shelf, thereby ensuring excellent heat exchange.

Vapour condenser: cylindrical, constructed in stainless steel (AISI304), with an external copper coil, cooled by direct expansion with FREON R404, with a maximum condensing capacity of 6 kg of ice. The body is suitably insulated with the same material as the chamber. Defrosting takes place by reversing the refrigerating cycle of the service compressor to the condenser. In any case defrosting is possible by warm water entering through the opening in the upper section of the condenser and draining out by opening the special drain valve. A flange allows connection of accessories, such as manifolds with valves or nipples for fials, for freeze-drying cycles outside the chamber.

Vacuum pump: dual-stage rotary vane pump, Edwards model RV8 with displacement of 9.7 m³/h.

Ultimate vacuum without ballast (partial pressure) 3x10³ mbar
Oil charge: 0.75 litre, type Ultragrade 19

Refrigeration compressors: the refrigerating system in the LIO1000 and LIO2000 consists of two separate refrigerating units, one on the shelf / 's and one on the condenser, thereby guaranteeing greater system flexibility and safety. The compressors are the hermetic type with a power of 0.75 kW for low temperatures for FREON R404. Refrigerant charge: 2.5 kg.

Vacuum sensor: active type Pirani sensor scale from 1000 mbar to 10⁻² mbar model APG-M.

Vacuum lines: all the lines and connectors in contact with the vacuum are in AISI304 or in material compatible with high chemical inertia.

Thermoregulators: digital keyboard configurable with 2 relay outputs to which the shelf heating and cooling have been linked. The instrument incorporates a display that shows the plate temperature, whilst the corresponding selector has to be pressed to show and/or change the set point.

Accessories:

Manual stoppering system: designed to seal product vials of the same size.

Calibrated leak: a device that allows inert gas or sterile air to enter in a controlled manner through a micrometric valve. The pressure controlled in this way improves the thermal exchange at the sublimation or secondary drying stages.

Filter on drain: mist-guard oil filter to be installed at the vacuum pump drain to eliminate oil vapours in the environment. Our model EMF-10.

Cycle printer: 6-channel, one pressure and five temperature, to allow a graphic transcription of the cycle.

TECHNICAL DATA

Power supply and consumption	1000	2000	Materials and fluids used		
Power Supply	220V 50 Hz		Chamber	AISI304 (Uni X5 Cr Ni 1810)	
Installed Power	2,4 KW	2,6 KW	Condenser	AISI304 (Uni X5 Cr Ni 1810)	
Refrigeration compressor (shelf)	0,75 KW		Product shelf	Al (Uni 3579 P Al Cu Mg Mn)	
Refrigeration compressor (condenser)	0,75 KW		Teflon shelf detail	(PTFE puro)	
Vacuum pump	0,45 KW		Chamber Door	Perspex (Polymetacrylatodimethyl)	
Shelf heater	0,17 KW	2x 0,17 KW	Chamber Door OR seal	Silicone	
Compressed air (for isolation valve)	(4-6 bar)		Vacuum OR seal	Nitrile	
Specification			Refrigerant fluid	Freon R404	
Load area	0,1m ²	0,2m ²	Rotary pump oil	Edwards Ultragrade 19 o 70 oil	
Load shelf (n.)	1	2	Dimensions and weight	1000	2000
Shelf dimension mm. (WxDxH)	310x310x20		Overall dimensions mm. (WxHxD)	880 x 1500 x 750	
Shelf interdistance	125	75	(LIO1000 e LIO 2000)		
Shelf termoregulation range	-40°C ÷ +40°C		Total weight	250 Kg	270 Kg
Condenser capacity	6 Kg. Ice				
Max. capacity of vials Ø13=620, Ø15=460, Ø20=255	(LIO1000)				
Max. capacity of vials Ø13=1240, Ø15=920, Ø20=510	(LIO2000)				
Max. bulk capacity : (depends on thickness of load)					

GUIDE TO SELECTION

PRODUCT	CODE
LIO 1000P basic unit	5PA-MIN 001
LIO 2000P basic unit	5PA-MIN 002
LIO 1000P stoppering system	5PA-MIN 011
LIO 2000P stoppering system	5PA-MIN 012
Calbrated leak system	5PA-MIN 020
Chamber / condenser isolating valve	5PA-MIN 030
Tray for bulk	5PA-MIN 031
Loading & transfer tray	5PA-MIN 032
EMF10 filter assembly on pump discharge	5PA-MIN 040
Vacuum pump additional Pirani sensor assembly	5PA-MIN 041
6 channel cycle printer	5PA-MIN 050
LIO1000 automatic cycle microprocessor	5PA-MIN 061
LIO2000 automatic cycle microprocessor	5PA-MIN 062

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