

Climate and thermostatic chambers from -75°C to $+180^{\circ}\text{C}$
BULKFROST Series



OUR COMMITMENT

in the world of the Bulk industry



ANGELANTONI LIFE SCIENCE has developed a line of climate and thermostatic chambers that ensures high performance in a temperature range between -75°C and $+180^{\circ}\text{C}$.

The main feature of this range of models is to allow the customer to **set up the temperature curve according to their needs**, i.e. the possibility of modulating the rate of temperature descent and ascent, with respect to the starting value, to optimise biological material freezing.

Since the world of research and industry is highly heterogeneous, the temperature curve for each type of sample will be equally heterogeneous.

This instruments ensure virtually any kind of product can be tested, from electronic components, to food, cosmetics and pharmaceuticals.

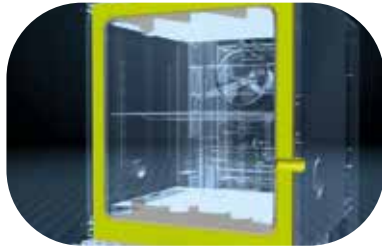


THERMOSTATIC CHAMBERS: for freezing and thawing Bulk materials

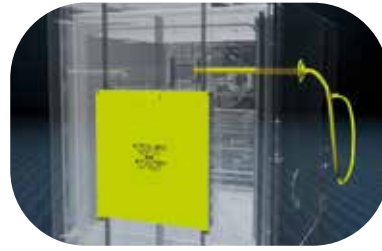
- The pharmaceutical sector is one of the categories where tests are more stringent, as these products will directly affect people's health.
- For this reason, it is necessary to control the temperature curves, both during freezing and thawing, ensuring maximum safety of the final product.
- Any uncontrolled change in temperature can alter the nature of the product, generating substances that are potentially dangerous or non-performing for their intended purpose.
- Pharmaceuticals, cosmetics, building materials and food industry products undergo different freezing/thawing procedures, depending on different chemical/biological starting points and end applications.
- **"A pharmaceutical, cosmetic or food product is considered safe or effective if its essential properties do not change as a result of a procedure involving a change in temperature."**
- In order to preserve these properties indefinitely, **the substance produced in the laboratory**, be it a drug or herbal product, must be frozen. The temperature drop must be monitored and controlled, each element will have a customised curve in relation to degrees centigrade and time. This relationship is extremely important as it ensures the validity and safety of the product; if it fails, the 'unsafe' product cannot be marketed.
- The **freezing/thawing rate** is one of the essential parameters for the production of biopharmaceuticals. Since biological nature is highly diversified (proteins, amino acids, lipids, glycerides, etc.), the control rates will also be manifold.
- What should be prevented is the **formation of intracellular ice**, as this could lead to the rupture of cell membranes during freezing or membrane protein melting during heating/thawing, causing the loss of the production batch.



- Several studies showed that working with **programmed and controlled temperature curves**, compared to protocols without such monitoring, results in different protein concentration in the final product, **i.e. speed monitoring increases protein survival, that is to say the quality of a biopharmaceutical product.**



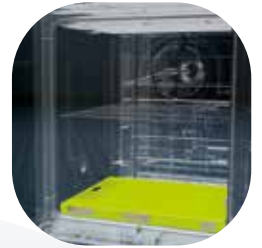
Internal chamber with double ceiling, axial fan and rounded corners



UV lamp for internal lighting of the test compartment



Through holes for inserting temperature probes



Internal guide rails for assembling rack shelves, adjustable in height



Mechanical cooling system



Water condensation system (only available for Bulkfrost 340)



TECHNICAL FEATURES

The **Bulkfrost** series consists of a body made of RAL 7044 grey powder-coated steel, which provides excellent protection against corrosion.

The electromagnetic lock provides maximum safety for the operator and enables access management and control. Environmentally friendly refrigerant gases in line with European Regulation 517/2014 are used in the cooling circuit.

The front of the machine houses a 10" touchscreen panel with an intuitive and userfriendly interface.

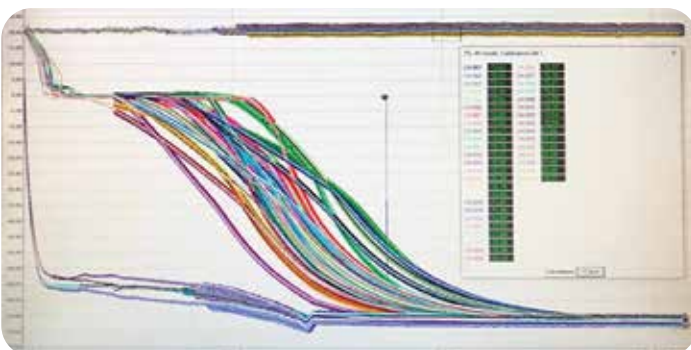
It offers a wide range of optional and customised functions to meet most biological material cooling requirements. The ergonomic design ensures easy access to the chamber wherever it is located, including for maintenance.

It ensures precise control of the climate parameters inside the chamber with minimum thermal inertia; an axial fan enables rapid temperature changes of both the air and the material to be frozen or thawed.

The chamber is fitted with a PLC, used to manage all its functions and safety locks.

POSSIBILITY OF SETTING TEMPERATURE RAMP RATES

Thanks to specific probes, placed either in the chamber or directly in the bulk materials, temperature cascade control allows monitoring the entire freezing/thawing cycle programmed for each type of batch loaded.



Freezing test



BASIC CONFIGURATION

- ▶ Single-leaf door
- ▶ Touch screen panel on the front
- ▶ Electromagnetic lock
- ▶ Inside in AISI 304
- ▶ Ethernet port and USB port

ACCESSORIES

- ▶ Uninterruptible power supply for PLC
- ▶ 80 mm through hole
- ▶ Water condensation
- ▶ Additional audible optical alarm
- ▶ Cascade temperature control

SOFTWARE MYKRATOS™

- **MyKratos™** is the supervision and management system operating on any mobile and desktop device. It can control a variable number of chambers according to the PC resources. It can control switching on and off the internal chamber light and electromagnetic opening of the chamber's safety door (if any).
- It learns the connectivity and operating/stop status of the chambers, alerting the operators when there is an extant alarm and indicating which chamber it refers to. The grid display can show any web-compatible application (e.g.: camera software or other equivalent instruments).
- The wireless connection (WiFi) enables the use of different types of tablets and smartphones (compatible with iOS 8 and Android 4.2.1 or later) and the multiple Password levels ensure safe access.
- It is also possible to access the operator interface remotely via the customer's LAN connections and send e-mail notifications to various recipients.

MAIN SPECIFICATIONS OF THE SOFTWARE

▶ Display and graphic analysis of measurements and records	▶ Chamber program and operating methods
▶ Mimic diagrams of the entire system	▶ Delayed start of a program
▶ Multilingual support	▶ Selection of several chambers from a single tablet
▶ High configurability of the chamber settings	▶ Automatic notifications of events and alarms
▶ Unlimited possibility of recording measurements	▶ Archive management for easy access to records

On request, the Bulkfrost chamber can be equipped with a software compliant with the CRF part 11 regulations in order to:

- **Store data safely to prevent their modification or loss;**
- **Track data changes;**
- **Identify data distortion and prevent it.**

This type of software is able to assure greater safety to the sensitive data handled, through:

- ▶ System validation;
- ▶ Possibility to generate identical and controlled copies of data;
- ▶ Data protection;
- ▶ Limited and controlled access to the system;
- ▶ Use of audit trails;
- ▶ Controlled operating systems;
- ▶ Controlled access;
- ▶ Compliance with SOPs (standard operating procedures);
- ▶ Controlled documentation.



Various types of connection:
PC, Smartphones and Tablets

	Model			
	BULKFROST 340*	BULKFROST 600	BULKFROST 1200	BULKFROST 1600
Useful capacity (L)	337	553	1076	1439
Internal dimensions approx. (mm)(WxDxH)	601x810x694	850x730x892	1000x1130x953	1000x1510x953
External dimensions approx. (mm)(WxDxH)	875x1786x1765	1124x1768x2049	1278x2222x2111	1278x2600x2111
Temperature range (°C)	-75 ... +180	-75 ... +180	-75 ... +180	-75 ... +180
Temperature fluctuation (K)	±0.5 ... ±1	±0.1 ... ±0.3	±0.1 ... ±0.3	±0.1 ... ±0.3
Heating temperature change speed	8 K/min	6 K/min	6 K/min	4,5K/min
Cooling temperature change speed	5,5 K/min	5,5 K/min	5 K/min	2,3K/min
Maximum thermal load (W)	3000			
Rated power (kW)	12	14.3	20.9	15
Rated current input (A)	21	29.2	41	28
Weight (kg)	755	1090	1280	1300
Sound pressure level dB(A)	63	66	68	63
Supply voltage (Vac)	400V ±10%/50Hz/3+N+G			

(*) Only available with water condensation



Bulkfrost Series

AS

AG

STERIL

AIC

Angelantoni Life Science (ALS) is a world leader in the supply of refrigeration equipment and in the design of technological solutions in the biomedical sector, constantly engaged in innovation and safety, both biological and environmental.

AS brand provides for a wide range of refrigerators cabinets, ultra-low temperature freezers, blood banks refrigerators, freezers to preserve blood components, mortuary prefabricated rooms, stability tests and plant growth chambers, refrigerators and freezers for COVID-19 vaccines.

AG brand supplies standardized brine chilling units for pharmaceutical and chemical applications or pharma process, manual or automated solutions allow to reach -70°C for special walk-in chambers and shelters to storage vaccines or other farmaceutical products.

STERIL brand provides for equipment able to meet any product protection need, as well as the product, operator and environment safety requirements, for any level of concentration and for any kind of substance (horizontal and vertical laminar flow cabinets, biohazard and cytostatic safety cabinets, laminar flow pass boxes with UV, sanitized hydrogen peroxide pass boxes, weighing, sampling and dispensing cabinets and isolators designed in accordance with the latest international standards (GMP).

AIC brand provides Waster, and an automated treatment system for hospital and contaminated waste.



Angelantoni Plants



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