



# Bespoke modular climatic chamber





## What constitutes a modular climatic chamber?



A **modular climatic chamber** is a **versatile testing solution** constructed from **distinct and interchangeable components**. In contrast to compact models, **its system is divided into various modules** (air handling unit, refrigeration unit, and control unit) that can be assembled **to precisely align with the user's requirements**.

It frequently necessitates a **specialized technical installation**, allowing the cooling or heating units to be positioned remotely to minimize noise and thermal pollution in the workspace.

It **facilitates the development of intricate** and expansive climatic environments, capable of adapting to future testing campaigns.



Caelis: Tailored climate control designed to fulfill your requirements.

CAELIS, a French company specializing in design and manufacturing, ensures safety in the most demanding climatic conditions. We provide high-precision solutions to leading firms in the pharmaceutical and industrial sectors, guaranteeing comprehensive control of temperature and humidity. Whether in the testing, qualification, or production phases, we transform your technical constraints into sustainable performance.

## Why choose Caelis climatic chamber ?

In pharmaceutical and regulated environments, a climatic chamber transcends its function as mere technical equipment.

It is an essential tool for ensuring the reliability of stability studies and compliance with development programs.

At Caelis, we create customized climate chambers to meet the needs of the pharmaceutical, biotechnology, and regulated environment industries.

### Climate control adjusted for stability research.

Pharmaceutical stability studies require exceptionally stable and reproducible environmental conditions.

Caelis speakers have been designed to ensure:

- Outstanding thermal stability over time.
- A consistent climate throughout the usable volume,
- An optimized airflow distribution that reduces variations among different measurement points.

This regulation of climatic conditions ensures the stability of the studies and prevents deviations that could compromise a development program.



### Equipment designed for uninterrupted operation.

Stability programs may span several months or even years. As a result, the climatic chamber must operate continuously and reliably.

Caelis equipment has been designed for:

- It operates continuously, 24 hours a day, 7 days a week.
- Ensuring the continuous evaluation of long-term programs,
- Mitigate the risks associated with alterations or deviations in climatic conditions.

The robustness of the components and the design of the systems ensure reliable performance over time.





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### *Specialized knowledge in the pharmaceutical industry.*

Caelis climatic chambers are designed to meet the requirements of controlled environments.

Our solutions are executed within the framework of:

- Stability studies performed in **compliance with ICH guidelines**,
- **GMP/GLP** configurations
- Laboratories that adhere to **FDA standards**.

The equipment has been designed to **improve qualification and validation processes**, which encompass:

- **QI / QO / QP**
- **Climate maps**
- **Regulatory validation efforts**

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### *A customized project strategy for each application.*

Each laboratory and testing program has its own distinct limitations.

At Caelis, we do not simply provide standard equipment; we create customized **solutions that correspond to the unique context of each client**, particularly taking into account:

- **Test volumes**
- **Fundamental climatic conditions**
- **Installation constraints**
- **Regulatory requirements.**

This methodology **ensures that each climatic chamber is optimally aligned with its intended application.**

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### *A partner throughout the entire duration of the equipment's lifecycle.*

In addition to providing the equipment, Caelis offers support to its customers throughout **the entire life cycle of their climatic chambers**:

- **Installation and initial configuration**
- **Qualification and validation.**
- **Preventive and corrective maintenance.**
- **Assistance technique.**

This methodology **ensures continuous testing and the sustained reliability** of the facilities.

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**“Sleep peacefully, your stability studies are safe.”**



## Our modular components

In keeping with CAELIS' core principles, our engineers have concentrated their efforts on what is most important to you: **stability and homogeneity.**

Adjustable volume: **Ranging from 5m<sup>3</sup> to several hundred m<sup>3</sup>,** tailored to your requirements.

Extended ranges: Temperatures ranging from **-15°C to +55°C** and humidity levels between **10% and 95% RH.**

Extreme precision: Exceptional homogeneity that can reach **+/-2°C** and **+/-5%RH** depending on the designs and conditions.

Given that our equipment is seamlessly integrated into the **daily** operations of your laboratories and production areas, we have meticulously considered every detail with your users in focus:

**User-friendly interface:** A touchscreen positioned at an ergonomic height for swift and effortless configuration.

**Connectivity:** Direct data transmission to your Building Management System (BMS).

**Total security:** A comprehensive audible and visual alarm system designed for prompt response when necessary.





## Our modular components

Our modular climatic chamber can accommodate a variety of **additional options**. Our specialists are on hand to assess your specifications and provide **tailored solutions**, technical guidance, and pertinent option recommendations.

This monitoring enables us to develop a customized solution that is precisely aligned with your challenges and adheres to the highest environmental testing standards.



[caelis-solution.com](http://caelis-solution.com) [acamus@caelis-](mailto:acamus@caelis-solutions.com)



[solutions.com](mailto:solutions.com) [sebastien@caelis-](mailto:sebastien@caelis-solutions.com)



[solutions.com](mailto:solutions.com)



# In which scenarios would it be pertinent to utilize a Modular Climatic Chamber system?

## Case n°1: Extensive storage for stability studies

When a laboratory seeks to validate the preservation of a drug on a global scale, it does not test a few boxes but rather entire batches.

### Concrete illustration:

The installation of a 50 m<sup>3</sup> climatic chamber equipped with optimized shelving. Its modular design allows for doubling the surface area if production increases, while guaranteeing perfect air homogeneity despite the volume and maintaining a temperature of 25°C (±2°C) and 60% RH (±5%) for several years for thousands of samples. We can refer to this as the 30°C/65% RH condition.

## Case n°2: Validation of aseptic processes (Media Fill Test)

In the pharmaceutical industry, the validation of aseptic processes is essential to guarantee the sterility of injectable products.

### Concrete illustration:

The Media Fill Test simulates a manufacturing process under aseptic conditions by replacing the product with a microbiological culture medium. The produced units are then incubated under controlled conditions to detect any microbiological contamination. Climatic chambers ensure perfectly controlled incubation conditions, generally between 20°C and 25°C or 30°C and 35°C, depending on the protocol. Temperature stability and homogeneity within the usable volume are essential to guarantee reliable results and contamination detection. These tests are carried out in accordance with the requirements of standards such as EU GMP Annex 1.

## Case n°3: Refrigerated storage and flow management

In many sectors (pharmaceutical, logistics, food processing), the storage of sensitive products requires controlled temperature conditions, typically around +5°C ± 3°C.

### Concrete illustration:

A modular climatic chamber is used as a cold room for the storage of temperature-sensitive products, with direct access from a logistics area. Frequent door openings, due to the flow of incoming and outgoing goods, cause significant disturbances to the internal climatic conditions.

The chamber must therefore be designed to:

- maintain a uniform temperature throughout the usable volume;
- ensure rapid temperature recovery after door openings;
- limit the ingress of warm and humid air;
- prevent condensation phenomena.

The system design (air circulation, refrigeration capacity, and control strategy) is essential to ensure compliance with storage conditions despite operational constraints.

## Case n°4: Qualification of construction materials (concrete / cement)

To guarantee the mechanical performance of construction materials, concrete test specimens are kept in controlled climatic conditions before testing.

### Concrete illustration:

Concrete specimens (cores or cubes) are placed in a climatic chamber to replicate standardized curing conditions, typically at 20°C and with relative humidity above 95%. These conditions ensure optimal cement hydration and guarantee the reproducibility of mechanical tests. After a defined period (7, 14, or 28 days), the specimens are tested in compression to verify their compliance with requirements. These tests are carried out in accordance with standards such as EN 12390-2 and EN 12390-3.



# Monoblock climatic chambers

A **monoblock climatic chamber** is utilized when:

- The volumes designated for testing are either limited or singular.
- The products are compact or can be manipulated manually.
- The laboratory's available space is constrained.
- A swift "Plug & Play" configuration is necessary.

**Concrete instance:**

A research and development laboratory must evaluate the thermal resistance of a new smartphone prototype prior to its commercialization.

In this instance, a monobloc climatic chamber is employed. The equipment is affixed to casters to facilitate effortless relocation between workstations.



What is the difference between monobloc and modular?		
Pregnant	Monoblock	Modular
Volume	600 to 2,000 liters	10 to 100 m <sup>3</sup> and beyond
Installation	extremely straightforward	industrial facility
Utility	Research and Development or stability assessment	Ample storage

## Which solution should I select?

A **monoblock climatic chamber** is typically the optimal choice when:

- The volume of trials is limited.
- The examinations are conducted in the laboratory.
- The studies pertain to research and development or batch stability.

A **modular climatic chamber** system is advantageous when:

- The sample volumes are substantial.
- The products are required to be stored on pallets.
- The stability programs pertain to industrial production.





## Our affiliated services

### Manufacturing

**Manufactured in France:** All our climatic chambers are carefully designed and crafted in France, ensuring quality and expertise.

**Customized solutions:** each proposal is designed to address your unique needs.

**Sustainable performance:** outstanding stability and reduced energy consumption for maximum efficiency.

### Multi-brand maintenance

**Preventive:** comprehensive inspection (refrigeration, electrical, mechanical, hydraulic, safety) • replacement of deteriorated components • replacement of consumables (according to client agreement) • significant work within the budget.

**Curative:** Customer service callback within eight hours • Intervention within 24 to 72 hours in France • Remote troubleshooting option available.

**Contract:** prioritized intervention • document reductions • lowered rates.

### Metrology

**Metrology:** stable and precise instruments that ensure reliable measurements over a broad temperature range (from -80 °C to +400 °C).

### Location / Event

**Equipment:** a reliable climate control system, carefully maintained and customized to meet your testing needs.

**Climatic chamber rental:** economical, pre-purchase assessment, maintenance included.

**Sale of refurbished units:** economical, readily accessible, 3-month warranty, expert assistance.

# Contacts



1 Impasse de la Gravette  
31150 Gratentour  
France



+ 33 (0) 5 34 44 65 33



[contact@caelis-solutions.com](mailto:contact@caelis-solutions.com)



[www.caelis-solutions.com](http://www.caelis-solutions.com)

