

# EXCAL<sup>3</sup>

Environmental test chamber

Climats Essentials



Climats

Environmental test pilot

# EXCAL<sup>3</sup>

## All-Weather Climate Chamber

Since 1974, Climats designs and manufactures high-precision, Made-in-France environmental test chambers. With 200 models and 8 volume configurations options, we combine the power of standardized production with the flexibility of custom solutions, delivering efficient, tailored answers for every client.



### Applicable Standards

#### Cold

- NF EN 60068-2-1
- GAM EG 13 Fasc 01
- MIL STD 810/502-2
- ISO 16750-4, low temperature
- JESD 22-A119

#### Dry heat

- NF EN 60068-2-2
- GAM EG 13 Fasc 02
- MIL STD 810/502-2
- ISO 16750-4, HighTemperature test
- MIL STD-202 G/108A
- MIL STD-883 D/1008.2
- JESD22-A103D

#### Environmental Stress Sceneing

- NF EN 60068-2-14
- GAM EG 13
- RTCA DO160 SEC5
- ISO 16750-4, temp. steps
- ISO 16750-4, temp. cycling
- MIL-STD-331C, Test C6
- JESD22-A105C

#### Damp heat

- IEC 60068-2-30
- IEC EN 60068-2-38
- IEC EN 60068-2-78
- GAM EG 13 fasc 03
- MIL STD 810/507
- RTCA DO160 SEC6
- NF C 20-703
- ISO 16750-4, Damp heat steady
- MIL STD-2026/103B
- JESD 22-A 101C

#### Climatic cycle

- GAM EG13 fasc 08
- IEC 60068-2-30
- IEC 60068-2-38
- ISO 16750-4, Damp heat cyclic
- ISO 16750-4, Temp/Humid cyclic
- MIL STD-202 G/106D
- MIL STD-331 C/C1
- MIL STD-750-1/change 3
- MIL STD-810 G/507.5
- MIL STD-883 J/1004.7
- JESD22-A100D
- NORME JJF 1101



### Reduce your carbon footprint

Stay compliant and cut service costs without sacrificing performance. **Ultra-low climate impact** thanks to natural Refrigerant R-744 (CO<sub>2</sub>) with a **Global Warming Potential of just 1**. **Full compliance with EU Regulation No. 573/2024 'F-Gas III'**, securing your operations for the future. **Non-toxic and non-flammable refrigerant**, ensuring safety for your teams. **Lower maintenance costs**, no mandatory annual leak detection checks required anymore. **Push the limits**, achieve unprecedented cooling down to -50°C.

### Custom Volume Configurations

EXCAL<sup>3</sup> offers **8 standard** cabinet sizes, **from 150 to over 1900 liters**, ensuring the perfect fit for your products. For specific requirements, custom solutions are available on request.



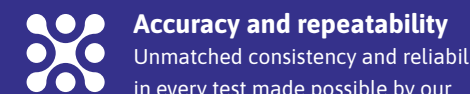
Boost your competitiveness with higher speed and lower energy consumption with our **ENERGY SAVING** design and smart regulation.



Save time and simplify your workflow with our advanced, all-in-one control software, designed for precise, intuitive management of every climatic test.



Upgrade your EXCAL<sup>3</sup> to boost safety, expand temperature capabilities, and improve accessibility and connectivity, customized it to fit your exact requirements.



**Accuracy and repeatability**  
Unmatched consistency and reliability in every test made possible by our partnerships with leading suppliers and domain experts.



**Complete compatibility**  
Get direct remote control or connect it to your supervision systems or test benches.



# Where simplicity meets performance,

## Climats Excellence

### A test chamber adapted to all your requirements

- **Easy access** : Ø100 mm porthole on each side and 180° door opening, can be operated with one hand.
- **Moveable** : Integrated wheels to relocate your chamber and stabilizing feet to adapt to any floor.
- **See every detail** : Observe your products in the illuminated cabinet **via a reinforced glass window** or remotely through **Spirale's optional camera integration**.
- **Customized instrumentation** : various connectors available on the **User Interface Panel** (analog measurements, logic outputs, etc.).
- **Optimized regulation** : improve control reliability with the mobile **PT100 sensor**, which can be positioned as close as possible to the products.
- **Monitoring and traceability** : Spirale Vision allows you to **control, record, and store** each test
- **Enhanced safety** : adjustable safety thermostat + thermal fuse, with the option to set **temperature limit** directly via Spirale.



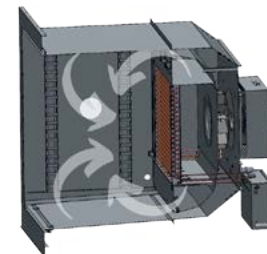
# Robustness and durability

for controlled climate testing



### Humidity regulation that recreates nature's perfect balance

EXCAL<sup>3</sup> stands out for its ability to reproduce natural humidity conditions accurately, thanks to the uniformity of the test chamber and the precision of Spirale Vision's control actuators. Its high-performance humidity sensor enables Spirale to ensure an optimal balance between the steam generator and the humid trap. This innovative solution offers a wide range of uses, high reactivity, and low maintenance requirements.



### Double airflow system

The cabinet's double air flow system enhances air velocity and ensures uniform circulation inside the test chamber. This design achieves natural homogeneity and consistent air distribution, providing stable and controlled conditions across all zones.

### Technical performance to ensure compliance with your validation protocols

Cabinet size	8 volumes from 150L to 1900L
Minimum temperature	Down to -50°C with R-744 (CO <sub>2</sub> ) refrigerant Down to -70°C with R-449 A + R-469A refrigerents (low GWP) R-449A + R-23 refrigerents (faster in cooling) Down to -90°C with R449A + R23 refrigerents
Maximum Temperature	Up to +180°C, with an optional upgrade to +250°C
Temperature variation speed	Up to 25 °C/min
Humidity range	Stable and reproducible between 5% and 98% for a temperature between +10°C and +95°C
Temperature homogeneity in space	Up to +180°C excluding measurement uncertainty : ±0.4°C to ±1.5°C
Heat compensation	From 1000 W to over 10 kW

### A chamber that truly connects with you

The LED lights around the window show you the status of the machine.

- Green : Cycle in progress
- White : Powered on
- Red : Alarm

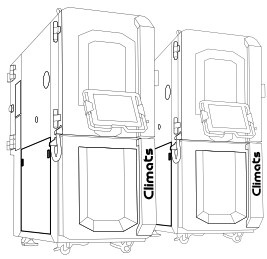
### Choose your cooling mode

Two cooling modes available :

- **Air-cooled condenser** for minimal connections and utility requirements.
- **Water-cooled condenser** for quiet operation and superior cooling performance.

### Metrology : dynamic compensation of temperature and humidity

Each calibration point is compared to a certified reference standard to build a precise calibration table, **ensuring accurate, repeatable measurements**. All values are recorded for full traceability, **guaranteeing compliance and confidence in your test campaigns**.



# EXCAL<sup>3</sup> RANGE

## LEGEND

Minimum temperature in °C  
 Rate of cooling according to IEC 60068-3-5 in K/min  
 Rates given from +180°C to the value indicated in this column and vice-versa  
 Rate of Heating according to IEC 60068-3-5 in K/min  
 Condenser type A (air) / W (water)  
 Maximum power consumed in kW  
 Net weight in kg  
 Sound pressure level dB(A)  
 Fast change rate (ESS)  
 -50 R-744 (CO<sub>2</sub>)

## EXCAL<sup>3</sup> 140

151 LITERS

**Mobile !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 1451-T/H	-50	7	-40	6,5	A/W	5	421	60
EXCAL 1452-T/H	-50	11	-40	15	A/W	8	464	61
EXCAL 1421-T/H	-70	5	-70	5	A/W	7,9	475	64
EXCAL 1423-T/H*	-80	12	-70	15	A/W	12,6	529	65

## EXCAL<sup>3</sup> 220

227 LITERS

**Compact !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 2251-T/H	-50	4,2	-40	4,5	A/W	5	459	60
EXCAL 2252-T/H	-50	10	-40	14	A/W	8	497	61
EXCAL 2221-T/H	-70	5	-70	5	A/W	7,9	508	64
EXCAL 2223-T/H	-80	10	-70	14	A/W	12,6	562	65
EXCAL 2224-T/H*	-80	15	-70	15	A/W	17,1	659	66

## EXCAL<sup>3</sup> 400

409 LITERS

**Optimal !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 4051-T/H	-50	4,6	-40	10	A/W	8,5	529	60
EXCAL 4052-T/H	-50	6,4	-40	10	A/W	8,7	572	61
EXCAL 4053-T/H	-50	19	-40	19	W	17,4	724	64
EXCAL 4021-T/H	-70	3,5	-70	8	A/W	11,1	578	64
EXCAL 4023-T/H	-75	7	-70	8	A/W	13,4	637	65
EXCAL 4024-T/H	-80	10	-70	10	A/W	16,9	734	66
EXCAL 4025-T/H*	-85	15	-70	17	W	22	886	66

## EXCAL<sup>3</sup> 540

535 LITERS

**Versatile !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 5451-T/H	-50	4	-40	9	A/W	8,5	586	60
EXCAL 5452-T/H	-50	6,5	-40	9	A/W	8,7	616	61
EXCAL 5453-T/H	-50	16,5	-40	19	W	17,4	767	64
EXCAL 5421-T/H	-65	2,5	-65	8	A/W	11,1	621	64
EXCAL 5423-T/H	-75	5,5	-70	8	A/W	13,4	675	65
EXCAL 5424-T/H	-80	8	-70	10	A/W	16,9	772	66
EXCAL 5425-T/H	-85	15	-70	16	W	22	912	66
EXCAL 5427-T/H	-85	20	-70	15	W	24,7	943	67
EXCAL 5428-T/H	-90	25	-70	20	W	35,5	975	68

## EXCAL<sup>3</sup> 770

769 LITERS

**High-Performance !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 7752-T/H	-50	5	-40	6,3	A/W	9,8	702	61
EXCAL 7753-T/H	-50	15	-40	16	W	18,5	848	67
EXCAL 7723-T/H	-70	4	-70	5	A/W	13,2	761	65
EXCAL 7724-T/H	-75	7	-70	7	A/W	18,2	851	66
EXCAL 7725-T/H	-80	10	-70	13	W	23,1	996	66
EXCAL 7727-T/H	-85	14	-70	13,5	W	23,7	1028	67
EXCAL 7728-T/H	-90	18	-70	18	W	33,3	1060	68

## EXCAL<sup>3</sup> 1000

1000 LITERS

**Universal !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 10052-T/H	-50	4	-40	3,8	A/W	9,8	875	61
EXCAL 10053-T/H	-50	13,5	-40	12	W	18,5	1007	65
EXCAL 10023-T/H	-70	2	-70	4,5	A/W	13,2	940	65
EXCAL 10024-T/H	-75	4,5	-70	6,5	A/W	18,2	1018	66
EXCAL 10025-T/H	-75	7	-70	10,5	W	23,1	1160	66
EXCAL 10027-T/H	-85	8	-70	11	W	23,6	1192	67
EXCAL 10028-T/H	-85	12	-70	15	W	33,3	1223	68
EXCAL 10029-T/H**	-85	18	-70	20	W	44,9	1286	70

## EXCAL<sup>3</sup> 1400

1416 LITERS

**Powerful !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 14052-T/H	-50	4	-40	5	A/W	9,8	965	61
EXCAL 14053-T/H	-50	8	-40	8	W	18,5	1113	64
EXCAL 14023-T/H	-70	2	-70	3	A/W	13,2	1028	65
EXCAL 14024-T/H	-75	4	-70	5	A/W	18,2	1124	66
EXCAL 14025-T/H	-75	6	-70	6	W	23,1	1265	66
EXCAL 14027-T/H	-85	7	-70	7	W	23,6	1309	67
EXCAL 14028-T/H	-85	10	-70	10	W	33,3	1341	68
EXCAL 14029-T/H	-85	12,5	-70	17	W	44,9	1362	70

## EXCAL<sup>3</sup> 1800

1932 LITERS

**Industrial !**

Model	Min Temp (°C)	Internal dimensions (mm)			Condenser	External dimensions (mm)		
		W	D	H		W	D	H
EXCAL 18052-T/H	-50	3	-40	3,6	A/W	9,8	1197	61
EXCAL 18053-T/H	-50	6	-40	6	W	18,5	1407	65
EXCAL 18023-T/H	-70	1,5	-70	1,5	W	13,2	1323	65
EXCAL 18024-T/H	-75	3	-70	3	W	18,2	1404	66
EXCAL 18025-T/H	-75	4	-70	4	W	23,1	1555	66
EXCAL 18027-T/H	-85	5	-70	5	W	23,6	1586	67
EXCAL 18028-T/H	-85	8	-70	8	W	33,3	1617	68
EXCAL 18029-T/H	-85	10	-70	10	W	44,9	1680	70

Nominal test conditions: Empty chamber without option. Water condensing type, clean water supply at +18°C with a flow and pressure rate (3 bar mini; 6 bar max) matching the technical specifications of the chamber.

400 V three-phase 50 Hz/60 Hz mains power supply.

Internal dimensions do not include the thickness of the rack for the shelves (25 mm on each side).

\* Cabinet depth reduced by 10 mm

\*\* Cabinet depth reduced by 20 mm

Measurement accuracy ensures a regulation stability between +/- 0.1 °C and +/- 0.3 °C.

Workspace homogeneity, according to the standard IEC EN 60068-3-5, is between +/- 0.4 °C and +/- 1.5 °C.

Hygrometry : Reliability, accuracy and regulation stability between +/- 1% and +/- 2%.

Relative humidity range between 5% and 98% and temperature range between +10 °C and +90 °C.

# Modular

technical devices

Over  
**200 options**

featuring standardized accessories  
and measuring devices

## Keep your tests secure and your teams safe

- **Integrated alarms for door access, temperature control, and system safety**
- **Door lock for customer process**
- **Thermal safety** via independent PT100 sensor (MINI/MAXI housing)
- **Variable speed control on ventilation** to adapt to your products
- **Air dryer** or preventing the formation of humidity by sweeping with dry air or nitrogen
- **Secure 10/16 A socket** for your power connections
- **Emergency stop to be interfaced with your test benches**
- **Active monitoring of water flow** (depending on power : 1.5 to 45 hp)
- **Integrated thermal fuses in critical circuits**

## Develop your tests

- Temperature extension to **+200°C and/or +250°C**
- **Camera to record shots** of your product inside the cabinet during the tests
- **Relative humidity sensor** for measuring or regulating
- PT100 or thermocouple **data acquisition system**
- **Module** with 6 relay outputs/ 6 logical inputs
- **Bar code reader** for tracking
- Remote Panel PC for **controlling your chamber remotely**
- **Specific operating mode development** : regulation on the average of several sensors, incoming regulation information on dry contact, START & STOP for regulation and ventilation when taking measurements
- **Specific digital communication** such as IEEE 488, and 0/10v analogue control

## Set up your chamber your way

- **Additional portholes** on the sides, ceiling, door and even in the window (diameters between 80 and 200 mm)
- **Specific customer windows, connectors or sensors adapted to your requirements**
- **Notched cabinet portholes** for connecting products before inserting them into the cabinet
- **Reinforced shelves** and floor for heavy loads
- **Reversible door opening**
- **Integration of inserts** for precise mechanical assemblies
- **316L stainless steel cabinet** and nickel-plated evaporator
- **Air extractor** for renewing the air inside the test volume
- **A fully customizable chamber, even in its finishing color**

## Strengthen your chamber environment

- **Demineralized water generator or tank** for humid tests
- **Clean water filter cartridges**
- **Additional chilled water unit** to ensure cooling of the system
- **Option to integrate a remote air-cooled condenser**
- Audible alarm and 3-colour LED for **visual alerts**
- **Enhanced soundproofing** for optimal acoustic comfort
- **Boiler filtration** to limit fouling
- **Frost control to guard against the risks of icing** on products



# Spirale

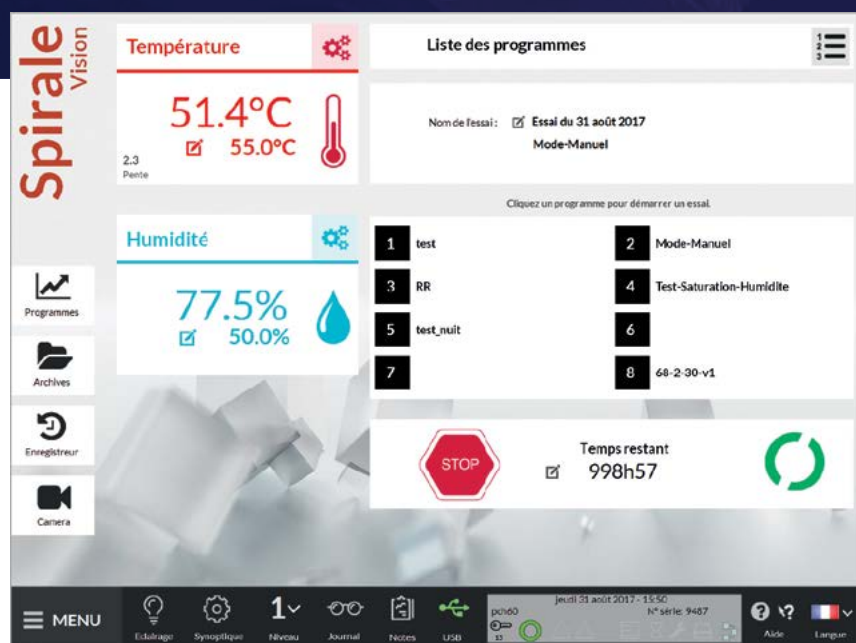
Start your journey as an environmental test pilot



The Spirale reference software is developed internally by our engineers. With its user-friendly interface and advanced features, it allows you to maintain control over every phase of your tests, wherever you are.

## The Human-Machine Interface designed for all your tests

EXCAL<sup>3</sup>'s perpetual license software **SPIRALE** transforms your testing into a smooth, reliable and progressive experience. Controlled from a multi-touch capacitive panel PC measuring over 15 inches (depending on the model) running on Windows, it offers an ergonomic and intuitive interface. Its advanced features give you complete control over your tests, whether locally or remotely. With **two USB ports**, you can easily download test data or use programming and operating utilities such as **Progwin** and **Visuwin**.



### Remote connection and supervision

Thanks to its **built-in web server**, EXCAL<sup>3</sup> can be controlled from any connected workstation via a simple browser. No installation required: you create a shortcut on your desktop. In the event of an alarm or the end of a test, an **automatic notification** is sent to you by e-mail. The Supervision option allows you to group all your Climats equipment, even the oldest, on a single workstation to **manage test campaigns in a unified manner**.

### Advanced functions at your fingertips

The user-friendly graphical interface allows you to **easily build complex test scenarios** (loops, conditions, wait-for, etc.). A user script is also integrated: customized automation, specific triggers, combined controls, etc.

### Integrated tracking and cybersecurity

Each operator has their own rights, **ensuring secure test management and complete traceability of interventions**. Different levels of accessibility can be set for secure test and data management. EXCAL<sup>3</sup> can be equipped with an **NFC badge reader** allowing you to identify yourself via a company badge, telephone, specific card, etc.



### UIP Centralised connections

User Interface Panel (UIP): gathers all client control connections in a centralised connection space.

You have access to:

- a safety socket (option)
- clear status indicators
- 8 analog input for PT100 probe (4-wire) including 1 dedicated to control in product-probe mode.
- 2 analog input (current-measurement)
- 6 configurable analog input (0-10V or 0-20mA)
- 6 configurable analog output (0-10V or 0-20mA)
- 8 logical inputs (dry contacts)
- 6 logical outputs, including 4 controllable relay (230V - 5A) and 2 status feedback RUN and FAULT contacts

Worldwide environmental testing:  
A global network  
of agents all around **30 countries**

Discover  
all our environmental  
testing solutions



Technopole Bordeaux Montesquieu  
2-4 Allée Jacques Latrille - CS 50067  
33650 MARTILLAC - France  
Tél. +33 (0)5 56 20 25 25  
sales@climats-tec.com  
[www.climats-tec.com](http://www.climats-tec.com)

**Climats**

Environmental  
test pilot