FitoClima / FitoTerm SOL chambers

Climatic & Temperature chambers for Solar Photovoltaic Panels testing

IEC 61215 / 61646 / 62108 and EN 12975-1 / 12975-2 compliant

aralab

YOUR OWN CLIMATE

Aralab

ARALAB is a company specialized in designing, developing, manufacturing and servicing of high quality Climatic Chambers.

Since 1985 we have been perfecting ways to create and control temperature, humidity and many other environmental conditions that respond to the needs of customers all around the world.

Only the highest quality components are used to manufacture our chambers so customers can have the best equipment for their research and testing purposes.

Aralab chambers. Your own climate.


BUREAU VERITAS
Certification

Certification

ARALAB - Equipamento de Laboratório e Electomecânica Geral, Lda.

NP EN ISO 9001: 2008

Design, Development, Manufacture, Selling, Installation and Servicing of Climatic Test Equipment.

Key Temperature Features (FitoTerm chambers)

FitoTerm SOL chambers	Temperature Range	Humidity Range
FitoTerm E 45	-45ºC to +150ºC	*N/A*
FitoTerm E 60	-60ºC to +150ºC	*N/A*

Key Climatic Features (FitoClima chambers)

FitoClima SOL chambers	Temperature Range	Humidity Range
FitoClima ECP 45	-45ºC to +150ºC	10% to 98% RH
FitoClima ECP 60	-60ºC to +150ºC	10% to 98% RH

Highlights

- The most advanced technology in climate control
- Internal aerodynamic optimization to ensure uniformity of climatic conditions
- Nonpolluting construction and cooling system
- Equipped with touch-screen controller CLIMAPLUS
- Reduced investment, low maintenance, reliable and accurate performance
- Compliant with international standards and requirements EN, IEC, DIN, ISO, NP and UNE

Fitoclima 4.500 SOL (optional window)

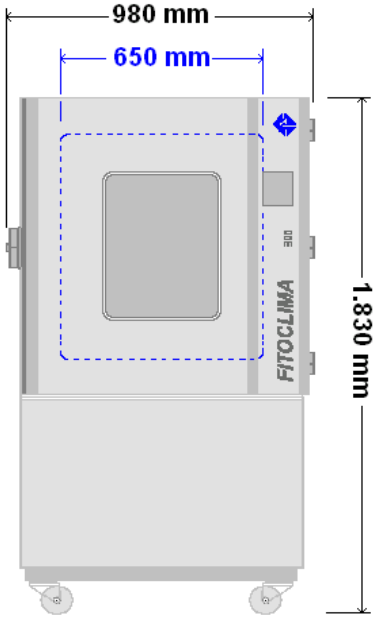
Technical Highlights ***FitoClima / FitoTerm SOL chambers***	
Temperature range E45 & ECP45 models E60 & ECP60 models	 -45ºC to +150ºC -60ºC to +150ºC
Precision	± 0,5 ºC
Fluctuation	± 1,0 ºC
Uniformity	± 1,0 ºC
Humidity Range (FitoClima models only)	10% to 98% RH
Precision	± 1 % RH
Fluctuation	± 2 % RH
Uniformity	± 2 % RH
Heating and Cooling speeds *	Adjusted according to customer requirements

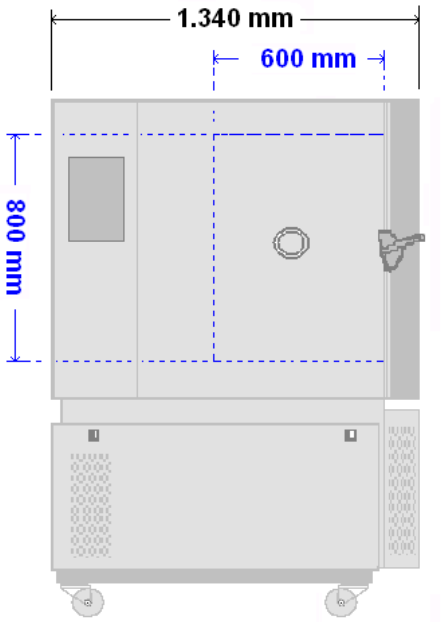
* Please inform Aralab about specific cooling / heating requirements so we can provide with the most adequate solution. Standards systems can be upgraded to comply with more demanding cooling / heating speed requirements.

Aralab turnkey installation of climatic and temperature testing chambers of 'walk-in' and 'reach-in' sizes at an international accredited laboratory offering complete verification of IEC standards for the PV industry

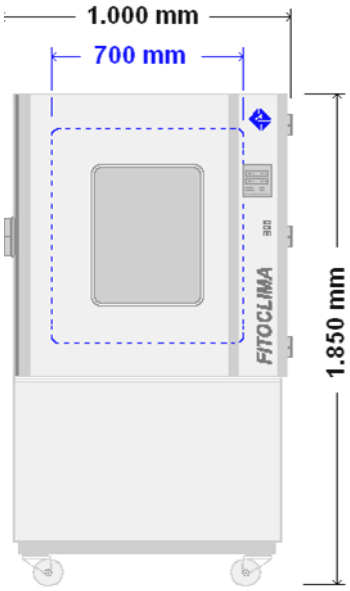
FitoTerm / FitoClima reach-chambers dimensions

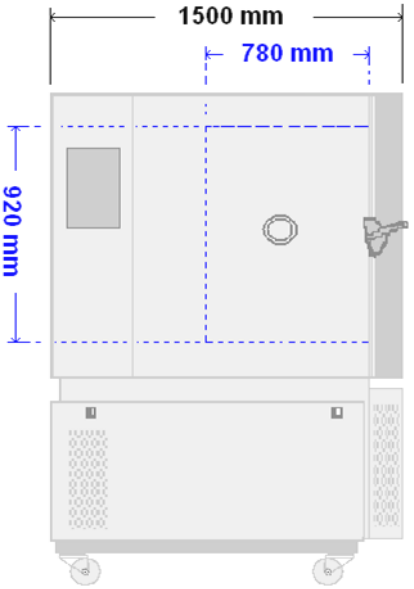
Internal volume	Dimensions	Height	Width	Depth
300 liters	**Interior**	800 mm	650 mm	600 mm
	Exterior	1.830 mm	980 mm	1.340 mm



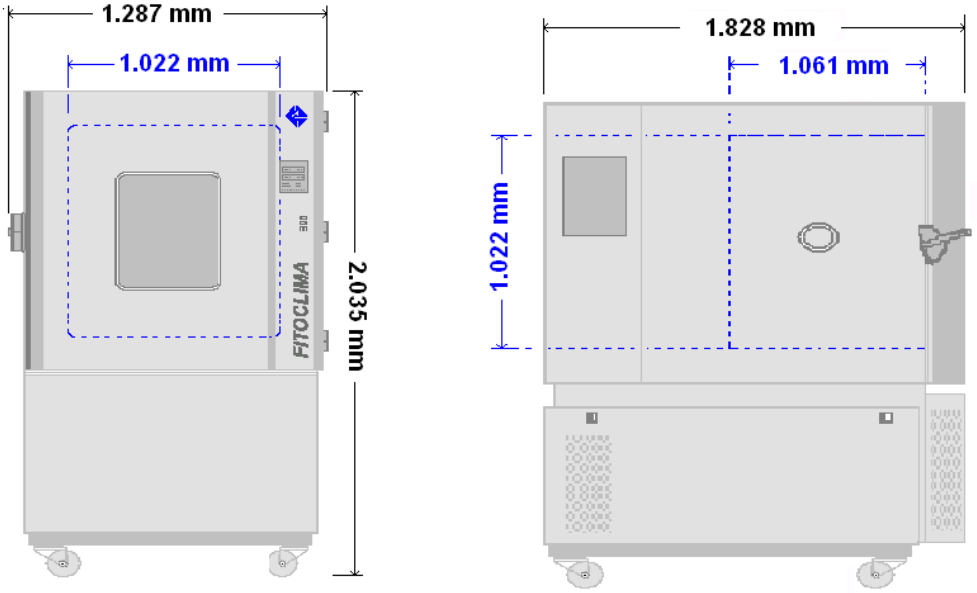


Internal volume	Dimensions	Height	Width	Depth
500 liters	**Interior**	920 mm	700 mm	780 mm
	Exterior	1.850 mm	1.000 mm	1.500 mm

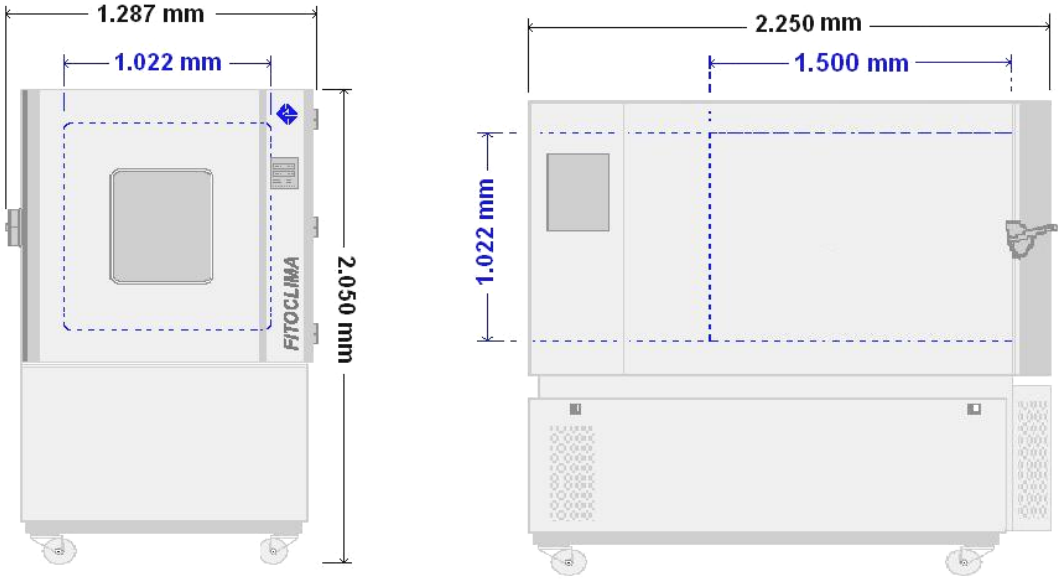




Internal volume	Dimensions	Height	Width	Depth
1.000 liters	**Interior**	1.022 mm	1.022 mm	1.061 mm
	Exterior	2.035 mm	1.287 mm	1.828 mm

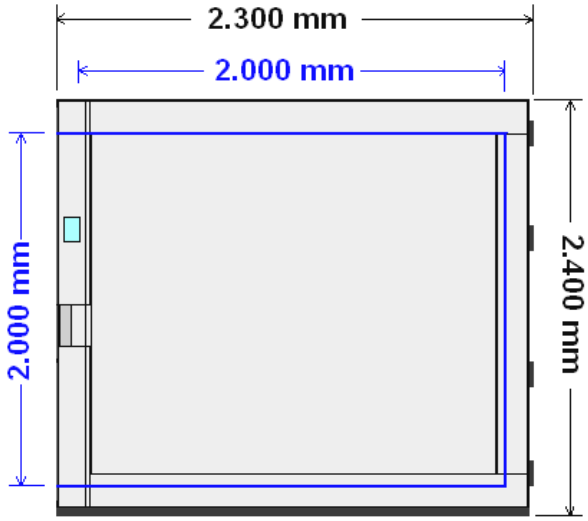


Internal volume	Dimensions	Height	Width	Depth
1.500 liters	**Interior**	1.022 mm	1.022 mm	1.500 mm
	Exterior	2.050 mm	1.287 mm	2.250 mm

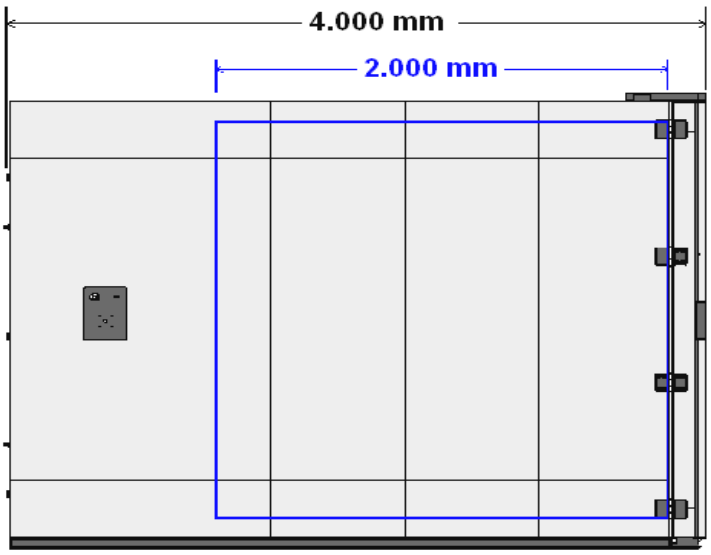


FitoTerm / FitoClima walk-in chambers dimensions

Internal volume	Dimensions	Height	Width	Depth
8.000 liters	**Interior**	2.000 mm	2.000 mm	2.000 mm
	Exterior	2.400 mm	2.300 mm	4.000 mm

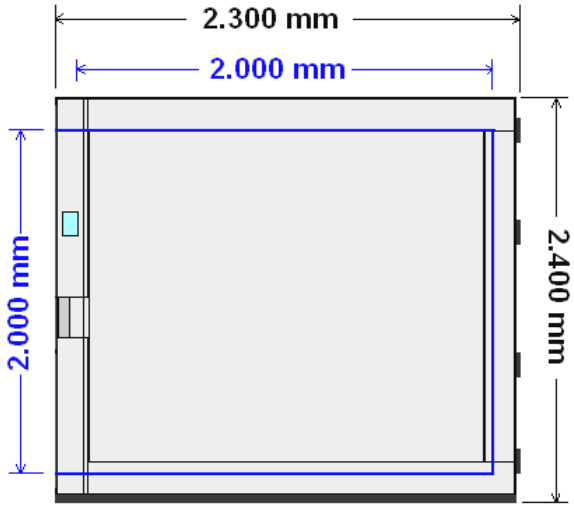


Front View

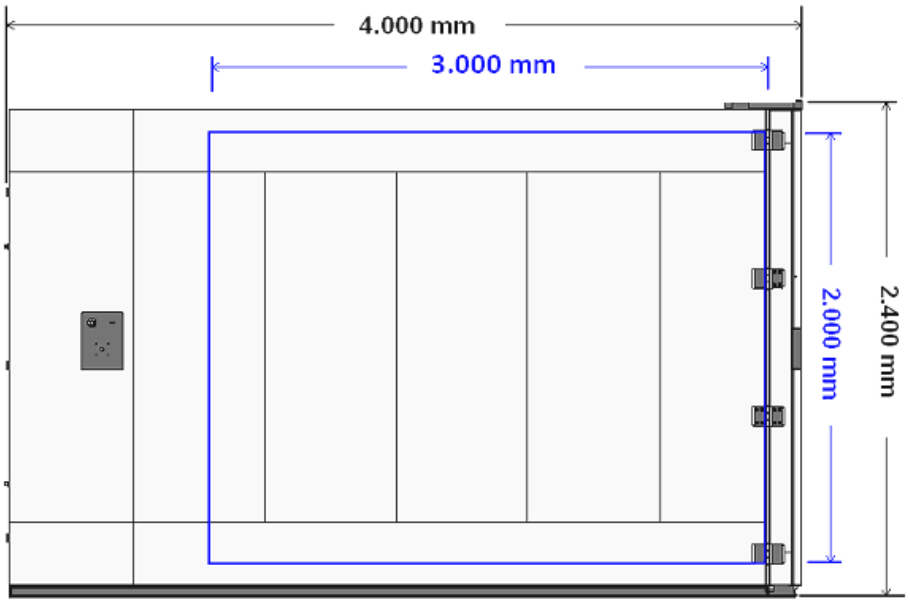


Side View

Internal volume	Dimensions	Height	Width	Depth
12.000 liters	**Interior**	2.000 mm	2.000 mm	3.000 mm
	Exterior	2.400 mm	2.300 mm	4.000 mm

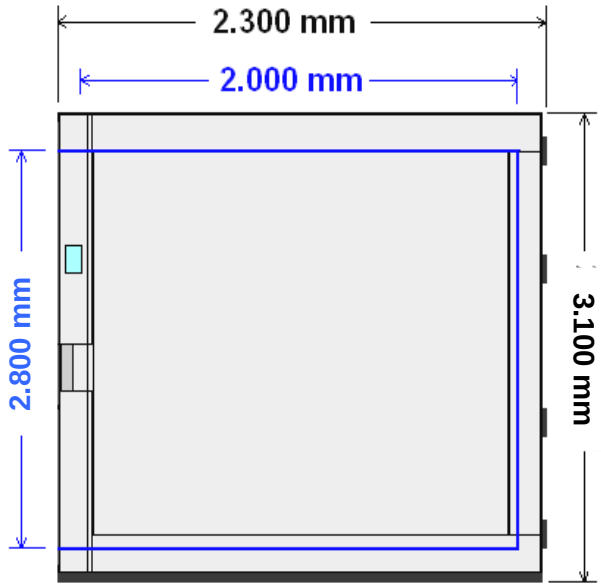


Front View

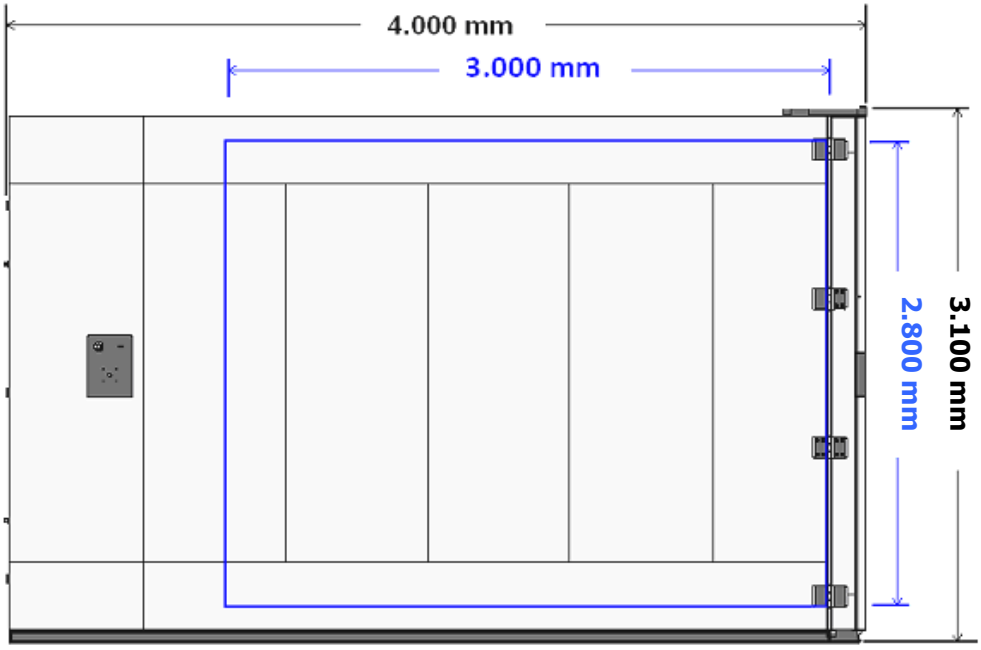


Side View

Internal volume	Dimensions	Height	Width	Depth
18.000 liters	**Interior**	2.800 mm	2.000 mm	3.000 mm
	Exterior	3.100 mm	2.300 mm	4.000 mm



Front View



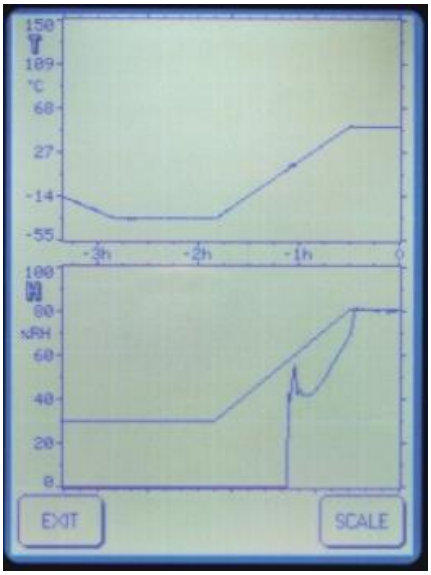
For quality and performance purposes the range FitoClima walk-in SOL chambers (8.000, 12.000 and 18.000 liters internal volume) require an additional external compressor group with approximately 2000mm (H) x 2500mm (W) x 1000mm (D).

Controller ClimaPlus V

- Programmable PLC exclusively developed for ARALAB chambers
- Programmable easy to use controller with Touch Screen Display (168 x 112mm)
- Resolution of 0.1ºC for Temperature and 0.1% for Relative Humidity
- High performance temperature and humidity control with value correction possibility in all ranges
- Capability for creating 50 programs of 50 segments each
- Non-volatile memory
- Automatic restart of tests due to power failure, without losing data and restarting test where it was interrupted

- Real-time monitoring of all functions and control of equipment.
- Send all control settings and system software via RS232 to plant.
- Possibility of programming a delay of the beginning of test
- Monitoring and recording of all alarms

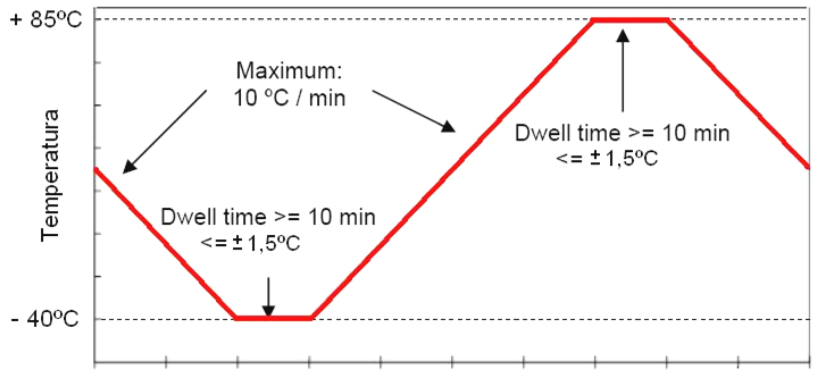
- Possibility of performing events by external commands
- RS232 output for computer connecting
- Alarms management
- Graphic representation of the tests ran
- Graphical visualization of the test in the controller.
- Possibility of running computer test programs and export them to the controller



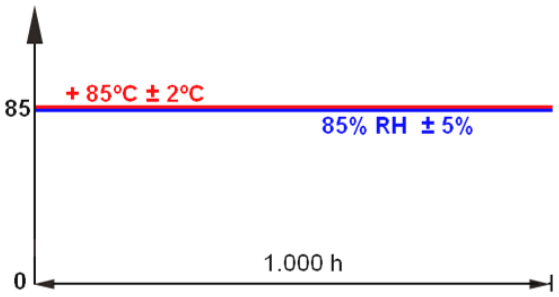
IEC Compliance and Performance

ARALAB range of "SOL" chambers were designed to perform thermal and climatic cycles in compliance with the major international testing standards for photovoltaic panels and solar concentrators - IEC 61215 and IEC 61646. These include the following tests:

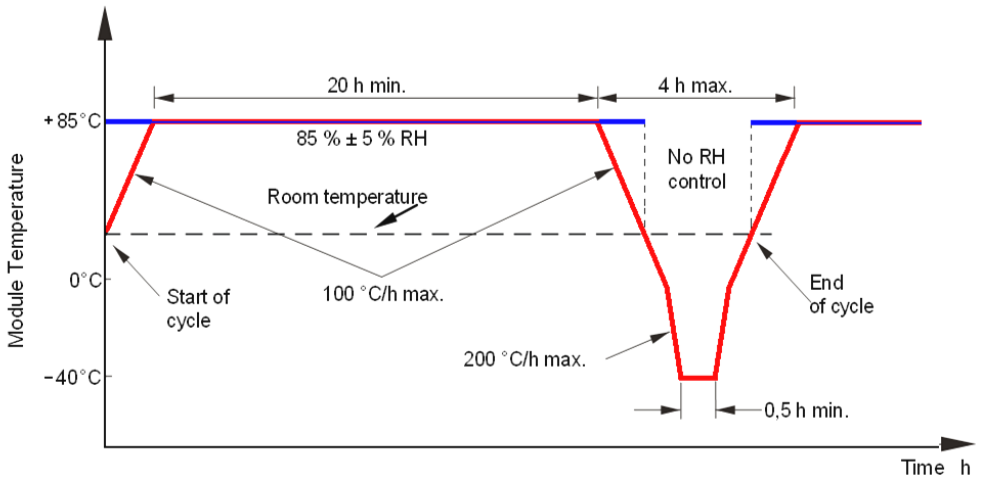
Thermal Cycle test



Damp Heat test

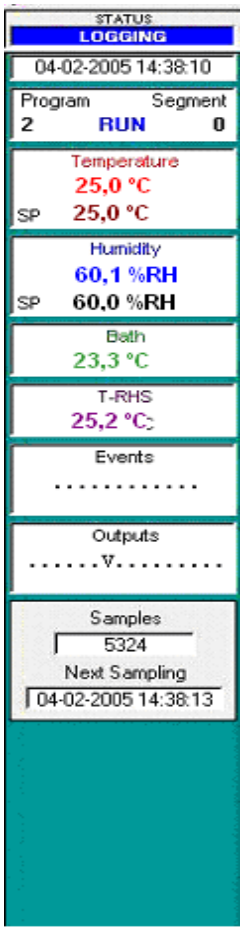


Humidity Freeze test



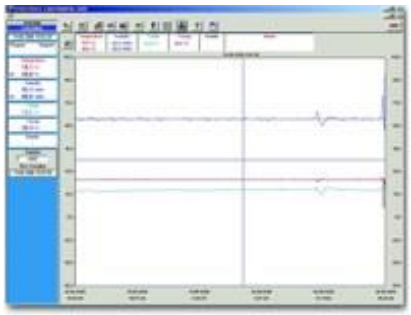
All Aralab chambers are factory calibrated to assure compliance with the international standards required for Solar Panels testing. Calibration by accredited laboratory is also available as an option.

Software

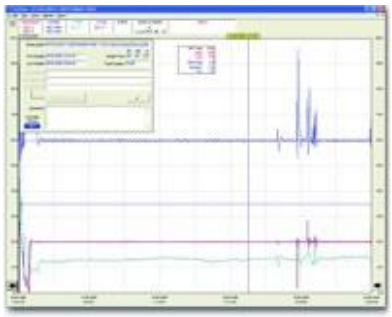


The **FitoLog** software is a set of applications designed to monitor and register data from the chambers processes variables. The software consists of 3 applications: **FitoLog, FitoLogView** and **FitoProgram.**

FitoLog



FitoView



FitoLog: Displays and records in real time all the data and details of the measurements and respective set-points in a file. It also retrieves the data of process variables, errors, alarms and allows external alerts configuration, which may include Email or SMS to report the condition of the equipment or warnings of alarms.

FitoLogView: It is a working tool to process the data acquired by **FitoLog**. You can view, print and export to other file types, and analyze the data in other programs (Excel, Access or others).

FitoProgram: This application allows the designing of test programs and its integration on the chamber controller.

With **FitoLog** it is possible to gather data from each of the chambers subsystems, which makes it a very useful tool to diagnose any necessary maintenance. This tool is the "Black Box" of the Chamber, giving our technicians the necessary data to remotely carry out a fast and efficient diagnostic. All that is needed is a log file with the occurrence, which can be analyzed by Aralab technicians in less than an hour.

Temperature

Control of temperature is done by the PLC Touch Screen ClimaPlus V, high tech PID / FUZZY temperature and humidity control, developed by Aralab.

Temperature Precision (in the interior of the chamber, at 5 cm from walls, floor and top)

In Time ≤ ± 0,5º C
In Space ≤ ± 1,0º C

Temperature Sensors

One (1) PT 100 Class A, located in air treatment tunnel
Two (2) PT 100 Class A, movable sensors for flexible placing inside chamber

Heating

By tubular stainless steel electric heaters located in the air treatment tunnel

Cooling

By airtight mechanical compressor group Copeland Scroll (low noise, high efficiency) with enforced ventilation and without use of CFC's.
As an option the system can be cooled by an air / water condenser. Air is used by default and only in need of greater power is water used, thus increasing efficiency. For -60ºC models this option is required.

Thermal security

Safety thermostat with High / Low temperature configuration, with automatic stop of all thermic systems.
High / Low temperature alarms programmed in the controller, with mute function. This function won't stop the chamber and it's only used to record the occurrence and to call the attention of the users with an audible alarm.

Humidity (only for ECP chambers)

Control of humidity levels is done by the PLC Touch Screen ClimaPlus V, high tech PID / FUZZY temperature and humidity control, and developed by Aralab.

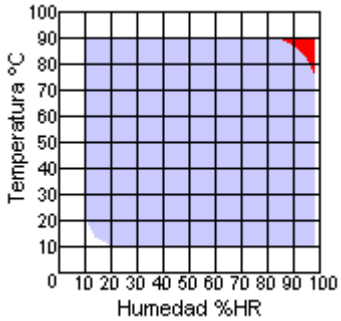
Humidity Precision (in the interior of the chamber, at 5 cm from walls, floor and top)

In Time ≤ ± 1,0% RH
In Space ≤ ± 2,0% RH

Humidity Sensors

To measure and control humidity, Aralab has different probing technologies: Psychometric, Capacitive, or both simultaneously. Consult Aralab for technical support on the appropriate selection.

Humidity Vs. Temperature ranges graphic



For climatic tests that require humidity and temperature ranges highlighted in red, a Psychometric sensor is recommended (ECP chambers).

Humidity / Drying

Humidity: Through thermostatic bath with dew point control.

Drying: Through thermostatic bath with dew point control and additional dry coil

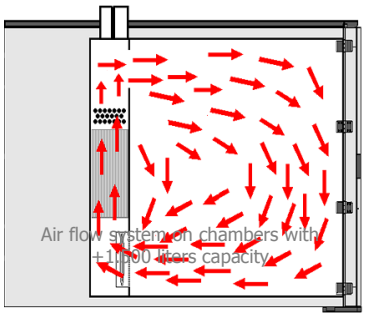
Security

Automatic stop function in case of water failure, with indication on the controller; High / Low Temperature alarms; High / Low humidity alarms;

Air Flow / Ventilation

Air Flow: Forced through 2 ventilators mounted at the top of the chamber.

Air Renovation: By lateral port, also for compensating pressure.



Construction

Interior: AISI 304 hermetical welded, vapor tight, stainless steel

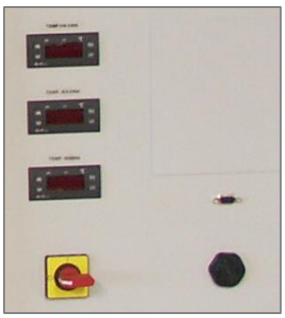
Exterior: Zinc mild steel with epoxy coating finish (color RAL 7035)

Insulation: Rock Wool

Interior illumination: Halogen lamp 12V (only available with optional window)

Door: Double silicone joints and anti-condensation heating frames. Automatic electric locks with emergency opening from the inside

Cut-off panel, Security and Communications



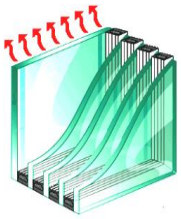
Mounted on left lateral panel of the chamber and equipped with:

- High / Low safety thermostat
- Main Power switch
- Audible alarms
- RS232 Output

Optional Accessories

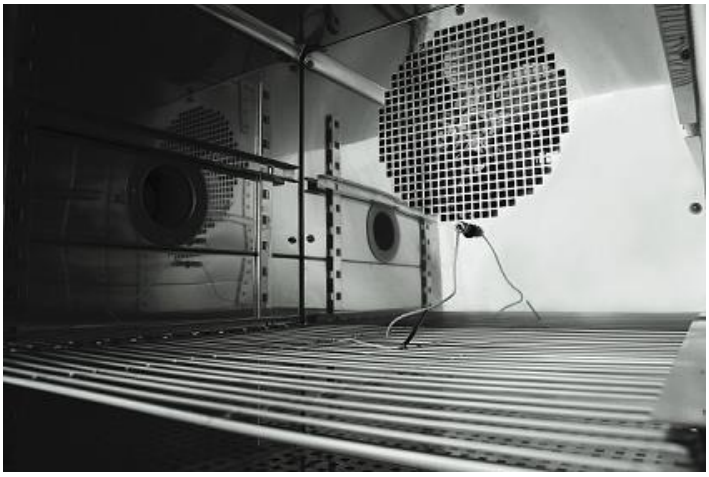
- Software FitoLog and FitoView
- Observational anti condensation windows in multi layered glass
- Water demineralizer (for FitoClima Chambers)
- Water conductivity monitor (for FitoClima Chambers)
- Additional entry ports with different diameters
- Calibration certificate from accredited laboratory
- Casters with adjustable height
- Rack system for solar panel support inside the chamber

Window option

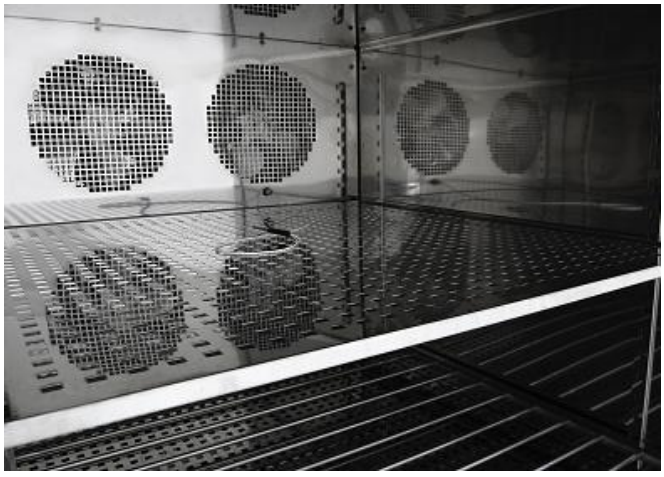


The observation window is composed of a multilayered glass with optimum levels of thermal insulation. The interior and exterior glasses have a heating system that is activated in cold cycles and damp heat to prevent condensation at the surface.

Interior details



Interior view of FitoClima 300 Testing chamber



Interior view of FitoClima 1.500 Testing chamber

Interior view of FitoClima 12.000 Testing chamber

Installation Requirements

To assure a correct functioning of the equipment, the following installation conditions are required:

Installation site

The place should be easily accessible, according to equipment dimensions and weight. It should have good air circulation and a room temperature between 10º and 26ºC. The floor should be leveled and a minimum distance of 50cm from the walls of other equipment must be kept.

Electrical supply

All FitoTerm and FitoClima Testing chambers are: 3/N/PE AC 400 V ± 10% 50Hz.
Nominal current will vary from 16 Amp up to 150 Amp per phase, depending on model and required performance.

Humidification circuit and demineralized water (for FitoClima models)

The humidification circuit works exclusively with distilled or demineralized water. For this circuit, a water admission pressure of 1 to 6 bares and conductivity of ≤ 5µ Siemens is required.

Water circuit for cooling condenser (optional for -45ºC and standard for -60ºC)

A cold water circuit is required for the cold system condenser. Technical characteristics:

- Water flow: 0 to 2000 liters/hour maximum
- Intake pressure: 3 to 6 bares
- Water entry and exit pipe: 1”
- Differential pressure between entry and exit: > 2,5 bares
- Maximum temperature of water entry: 26ºC
- Adequate temperature of water entry: 18ºC.

Drain

At floor level and near the equipment. The draining of the humidification and cooling systems water is done by gravity. For a correct draining there should be a minimum inclination of 10º in a descending trajectory from the chambers draining pipe until the sewage system.

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