

SP CLIMATIC CABINETS

THE FIRLABO SOLUTION TO ENVIRONMENTAL CONTROL



LABORATORY EQUIPMENT MANUFACTURER



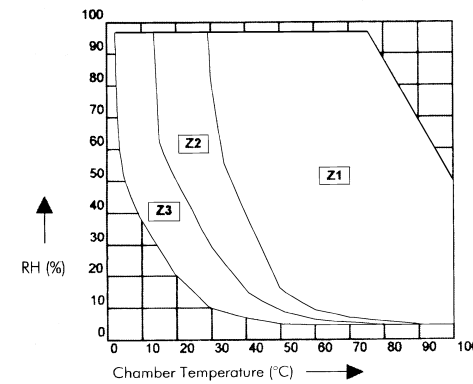
CHOOSE FIRLABO :
A RANGE DESIGNED FOR MANY APPLICATIONS

Humidity is a variable condition, whose influence is important in a number of physico-chemical and biological processes. Therefore the need to control humidity, becomes an important factor in many industrial and laboratory situations.

A CABINET FOR YOUR PARTICULAR APPLICATION

Faced with these requirements, SP climatic cabinets allow you to carry out almost all types of thermo-hygrometric tests : drying, ageing, stability, ...

OPTIONS :
- DAY / NIGHT SIMULATION USING LIGHTS
- 4 OR 16 SEGMENTS PROGRAMMER FOR COMPLEX CLIMATIC VARIATIONS



Z1 BVEH model
Z1+Z2 BVEHF model
Z1+Z2+Z3 BVEHF model + humidity trap

ENVIRONMENTAL CONDITIONS :
Atmosphere at 23°C +/- 3°C
Humidity 85% max

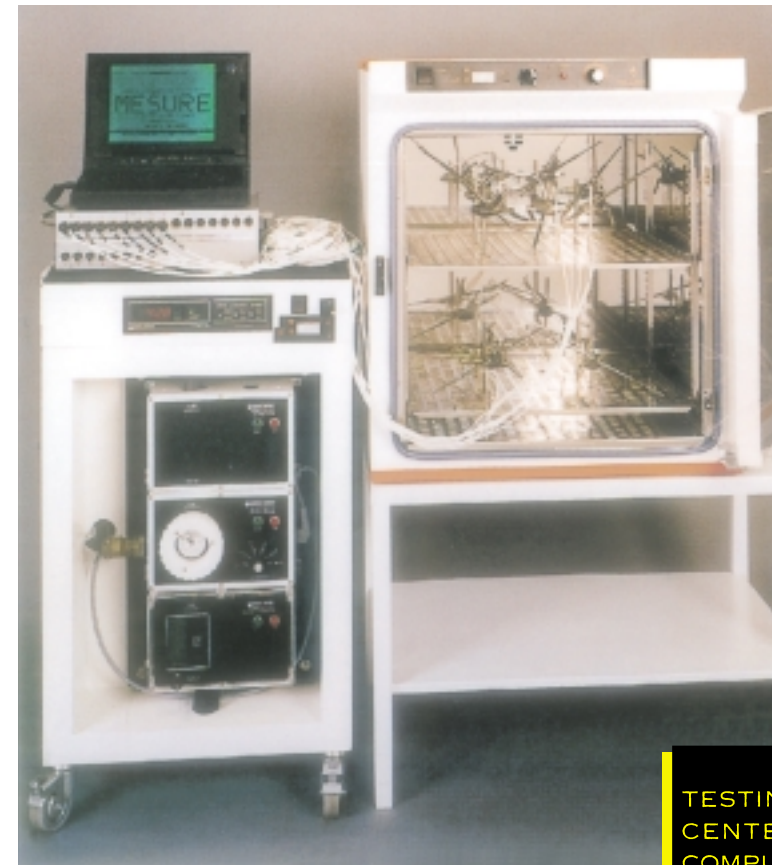
DESIGN ADAPTATIONS

The SP range is divided into :
- **WARM-HUMID** models - SP BVEH which give temperatures from + 5°C above ambient, to 60°C
- **WARM-COLD-HUMID** - SP BVEHF - for temperatures from 0°C to 60°C (eg. tests done at + 20°C)

OPTION :
TEMPERATURES UP TO 140°C

The temperature chosen allows us to define the useable climatic range : relative humidity can be varied between 5 % and 98 % depending upon the temperature required.

OPTION :
HUMIDITY TRAP ALLOWS YOU TO INCREASE THE FUNCTIONAL RANGE OF YOUR CABINET



In order to validate the performance and operating characteristics of the cabinets during manufacture, Firlabo uses high performance metrological instruments :

- **Multi-channel recorder** and high quality platinum probes for the temperature.
- **Condensation hygrometer** "General Eastern high temperature" model, indispensable for any precise measurement of humidity.

These instruments, calibrated to national standards, are similar to those used by test laboratories and allow us to check our cabinets following the standards defined by the Aeronautical Industry norm RE Aero 681 01.

OPTION :
TESTING OF YOUR CABINET BY AN OFFICIAL TEST CENTER IN ORDER TO GUARANTEE AND CERTIFY COMPLIANCE WITH YOUR STANDARDS



PRINCIPLES OF REGULATION : PRECISION AND REPRODUCIBILITY OF TEST CONDITIONS

Firlabo climatic cabinets have been carefully designed to cope with the most severe test conditions and to limit, as far as possible, variations in temperature and humidity.

CONTROLS

Sensors :
- PT 100 Ohms temperature probe conforming to IEC 751 Class A.
- Capacitance type for humidity. It gives a direct reading of the Relative Humidity inside the cabinet.

Self-adjusting PID controller for temperature and humidity.

- It makes fine adjustments by referring to the set points, and then
- raises or lowers the temperature
- increases or condenses the water vapour

Ultrasonic vapour generator which can produce very small quantities of vapour and thus give exceptional relative humidity control, particularly during small changes in the mixture*
Demineralised or distilled water for the generator is provided by a manually-filled 10 litre reservoir. Refilling varies between 1 week and 1 month depending upon the conditions being used.

* $R = M_v/M_a$ (Mass of water vapour / Mass of dry air)

OPTION :
AUTOMATIC WATER REFILLING

Vertical air convection produced by 1, 2 or 4 (depending on the model) 450 m³/hr tangential fans. Air circulation inside the chamber produces excellent uniformity.

ADEQUATE WORKING SPACE

Four different sizes of cabinet allow you to choose the optimum working capacity. Sizes available : 90, 260, 540 and 1000 litres (see the chart for precise dimensions).



Firlabo also manufactures a range of cabinets with a temperature range of -40°C to +140°C. Please ask for details.

DUAL CIRCUIT TEMPERATURE PROTECTION

The cabinets are provided with dual safety circuits :

- The first is integrated into the controller, and can be programmed for high or low values in relation to the set point.
- The second is an independant alarm thermostat which is built-in and cannot be altered. It is set at the maximum temperature for the cabinet. If they operate, a visible alarm is activated;

OPTIONS :
- THE CONTROLLER CAN BE LINKED (VIA AN RS485 INTERFACE) TO A COMPUTER FOR DATA STORAGE
- 1 OR 2 PEN CHART RECORDER - DOOR LOCK
- DRY CONTACT FOR AN EXTERNAL ALARM

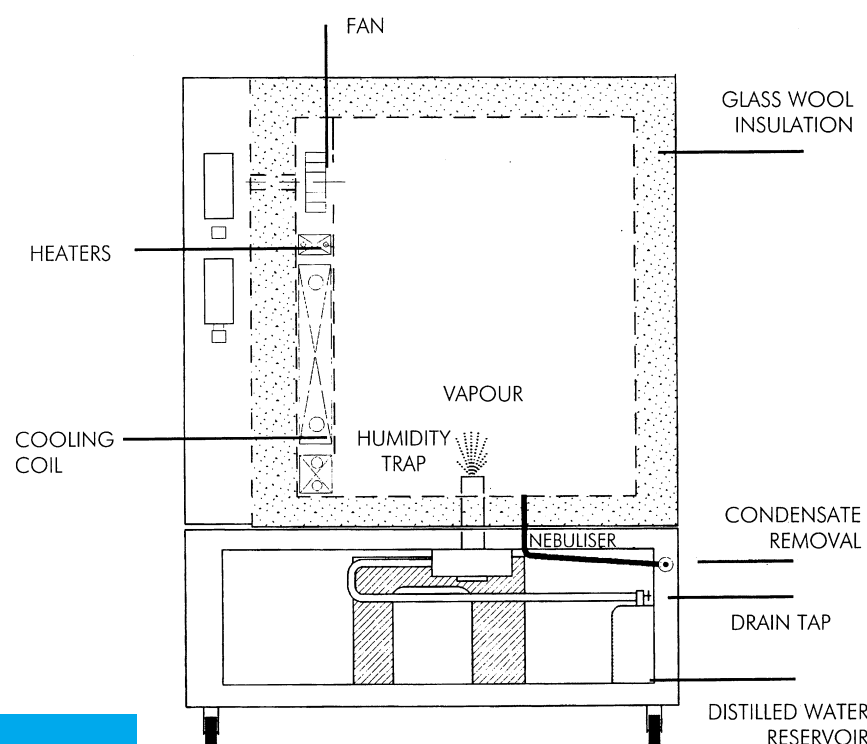
THERMAL CONTROL

Warming :

By finned, electric heating elements made from stainless steel.

Refrigeration (BVEHF models) :

- Comprising an hermetically sealed refrigeration unit
- Water or air condenser depending on the model
- Refrigerant gas, type HFCR 134a (CFC-free)



CONSTRUCTION DETAILS

Interior chamber : 304 grade stainless steel to Z2CN 1809.
Welded seams ensure a watertight enclosure.

External cabinet : zinc plated steel with an epoxy enamel paint finish to RAL 9016.

Insulation :

- Heat-retaining glass wool 60mm thick.
 - A double silicone gasket ensures a perfect heat seal between the door and the interior chamber.
- The climatic cabinets all have an interior glass door as well as a heated external door which prevents condensation (double external doors on SP1000).

Weight : our cabinets are carefully designed to avoid possible weight problems. They never exceed 300 kg/m² (the usual maximum upper floor weight) when unloaded.

Because of the materials used and the construction methods defined here, our climatic cabinets are guaranteed for 18 months.

VOLUMES	MODEL	INTERNAL DIMENSIONS W x H x D	EXTERNAL DIMENSIONS L x H x P	HEATER RATING	SHELVES (MAX)	WEIGHT (KG)	PACKED WEIGHT
90 L	SP 90 BVEH	460 x 470 x 400	830 x 1190 x 520	600	5	115	135
	SP 90 BVEHF			900		132	155
260 L	SP 260 BVEH	600 x 1000 x 550	960 x 1770 x 670	1100	10	167	190
	SP 260 BVEHF			1600		185	208
540 L	SP 540 BVEH	700 x 1100 x 700	1080 x 1870 x 820	1600	10	229	260
	SP 540 BVEHF			2200		255	286
1000 L	SP 1000 BVEH	1000 x 1250 x 800	1250 x 2140 x 920	2600	12	295	335
	SP 1000 BVEHF			3500		332	360

THERMAL AND HYGROMETRIC PERFORMANCE

	TEMPERATURE	RELATIVE HUMIDITY
Precision of the probe	IEC 751 CLASS A	+/- 2%
Variation	+/-1.0°C	+/- 2%
Fluctuation at a point	+/-0.5°C	+/- 0.5%

Mean speed of temperature change :

Cooling : 1°C/min Heating : 1°C/min
This performance is obtained at an ambient temperature of 25°C
Please let us know if you need faster speeds (from 2°C/min to 10°C/min)

FITTINGS

Castors are fitted.

Cable entry port (right side) 32 mm diameter.

Interior fittings : The cabinet is provided with a rack to hold moveable shelves. It is provided with 2 shelves each of which can support 40 kg.

N.B. : The maximum weight per cabinet 300 kg for SP1000

Power supply : 230 V / 50 Hz Single phase.

OPTIONS :
- CABLE ENTRY PORTS OF A DIFFERENT DIAMETER
- 380 V / 50 HZ THREE PHASE + NEUTRAL FOR SP1000 OR 380V/3 PHASE WITHOUT NEUTRAL
- ADDITIONAL SHELVES
IF YOU NEED ANY ADDITIONAL OPTION (WEIGHTS, INTERIOR FITTINGS,...)
PLEASE DON'T HESITATE TO ASK

This documents is not binding.

We reserve the right to introduce any modifications which we feel are necessary, at any time.

CAREFULLY PLANNED PROGRESS

FIRLABO ALSO MAKES :

- OVENS AND INCUBATORS
- CENTRIFUGES
- WATERBATHS
- SHAKERS

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