



PLANT GROWTH RESEARCH CABINETS

- GENERAL PLANT RESEARCH APPLICATIONS
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PLANT GROWTH RESEARCH CABINETS

Hettich Benelux is an ISO 9001, ISO 13485 and ISO 14001 certified manufacturing company. We design and manufacture plant growth chambers and cabinets, biological incubators and special application research chambers. Hettich Benelux offers standard models and custom made applications, designed to meet your specific research requirements, time lines and budget. The models are widely used in universities, seed companies and other research facilities.

The housing

The walls of the cabinets are isolated with environmental friendly CFC free insulation foam with a GWP value less than 0,01 (Global Warming Potential) and an ODP value also less than 0,01 (Ozone Depletion Potential). The technical compartment can be located either on the side or top of the unit, depending on the model. Both versions allow easy service access, which simplifies on-site installation. The inside sides and doors are white coated stainless steel for maximum reflection of the light. At the base of the unit there is a stainless steel floor, equipped with a floor drain and a hose assembly. The way the models are designed gives full and easy access to the growth area. The door closes with a light tight, magnetic door gasket. The connections for power supply, LAN connection, water for water-cooling, softened water to the ultrasonic humidifier unit and CO₂ gas inlet are located at the rear of the cabinet.

Light system

LED light is standard and is located under a stainless steel shelf. 200 µmol, 400 µmol and 1100 µmol modules are available. The LED lighting is arranged to give 99,9% efficiency of the usable work area; no 'dark corners' anymore. The light intensity can be controlled between 10% and 100% on either single shelves or all shelves together, depending on the model. The spectrum of the white LED lighting is 95% equivalent to the sunlight spectrum on a clear cloudless day. In the models with four colour LED shelves (red, blue, white and far-red) each colour can be independently dimmed between 10% and 100%, similar to the white LED system.

Benefits of our LED light system

- 100% homogeneous light at 5 cm below the LED lights; 99,9% light coverage on the work area and no 'dark corners'.
- The LED lights are fully dimmable between 10% and 100%. This function is 100% linear
- 100% PAR light spectrum.
- Multi layer cultivation is possible due to the homogenous light at 5 cm.
- White wide spectrum LED light with independent switchable far-red LED lighting.
- Low energy consumption.
- Minimal heat radiation on the plants.
- Due to low heat generation of the shelves, a better and more stable temperature homogeneity in the cabinets can be achieved.
- Low cooling capacity results in low energy consumption.
- The LED lights produce minimal heat. Therefore only a low airflow in the cabinets is required to reach the programmed temperature with high temperature stability inside the chamber, which leads to less stress on the plants.
- Life time of the LED lights is more than 10.000 hours, reducing annual costs of replacing TL-tubes.
- Light intensity is stable during the lifetime of the LED lights.
- Light intensity does not diminish as temperature decreases. A TL-tube loses 8 μmol per $^{\circ}\text{C}$ decrease; a 10 $^{\circ}\text{C}$ temperature decrease directly results in 80 μmol intensity loss.



Growth space and height

Standard models have one, two or three height adjustable shelves. In each model the usable growth height between the light source and the shelf is between 40 and 50 cm (adjustable). Extra shelves are available on request. (N.B. Technical specifications may vary).

Climate system

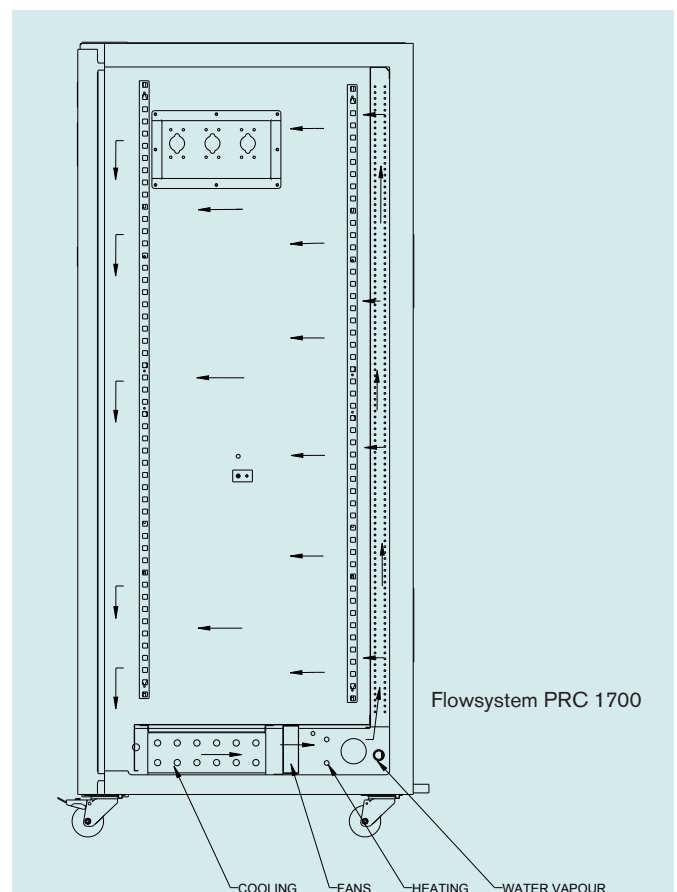
Using state of the art high quality components, the climate system in the PRC cabinets guarantees a steady and homogenized temperature, humidity and/or CO₂ environment in the chamber. The system includes independent cooling, heating, humidification and CO₂ sub systems, all controlled by a state of the art control system, giving maximum flexibility, controlling all environmental parameters, independent of the load of the cabinet.

Airflow system

The chamber provides a uniform airflow and climate. The internal growth area has a horizontal airflow pattern, discharged from a perforated special designed rear wall plenum. The air flows along the entire rear wall, over the shelves and returns via the door back downwards. The airflow speed is low, preventing dehydration of the plants and soil, as well as preventing stress for the plants due to high airflows. The airspeed has been optimized to provide a stable and homogeneous climate in the chamber. The use of special ventilators results in a low noise cabinet. On the back of the cabinet an adjustable fresh air intake port has been mounted to allow fresh air to enter the cabinet interior.

Humidification system (optional)

The adiabatic ultrasonic humidifier produces cold mist from demineralised water. Fine droplets of water vapor with a size of 0,01 mm are absorbed by the air immediately. The air is cooled at the same time. The unit works without time delay and requires up to 93% less electricity compared to conventional steam humidifiers. A dehumidification system can be installed on request after factory consultation. The settings of such a system depend on the type of test and have to be calculated per application and model.





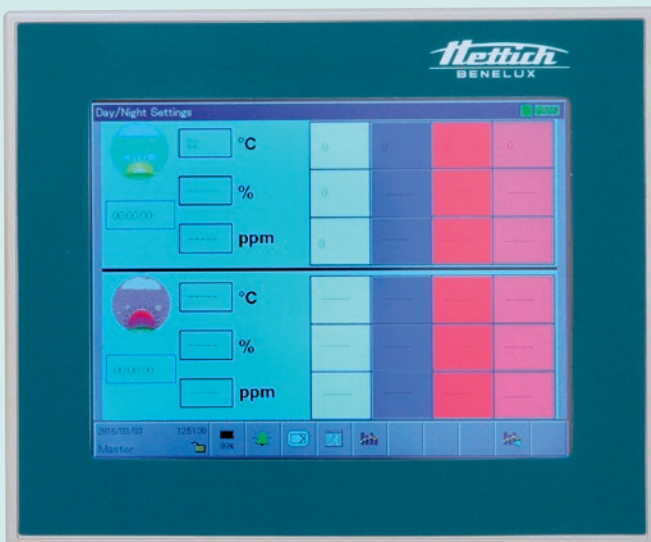
CO₂ supply system (optional)

A CO₂ supply system can be built into all models and can control up to 10.000 ppm CO₂ gas in the chamber. The connection for the CO₂ gas (bottle or house supply) is at the rear of the cabinets. The CO₂ level is programmable along with the day-night cycle.

Control systems

A state of the art control system with a touch screen interface is provided for programming and climate control in the PRC models. Solid state components and industrial based actuators give the user the guarantee of long lasting, problem free use of the cabinet. Clever control loops and algorithms are used to save as much energy as possible.

Via the LAN connection on the back of the cabinet, the controller is connected to the internet and is accessible via its unique IP-address, accessible to any standard browser. From behind a desk the user can monitor the operation and all parameters of the cabinet and all parameters during the test periods. Day-night control, ramping up and down, timescales, light dimming per tier, data logging (optional) and temperature, humidification and CO₂ settings are very easy to program whether via LAN or direct in front of the cabinet with a single laptop, making the total control system a simple, application oriented and users friendly configuration concept.



Touch screen control panel



Key product attributes

- Small footprint and low overall heights
- High growth area / footprint ratio
- Easy and fully accessible climate chamber
- Large and adjustable growth heights between light source and shelves
- Easy adjustable height of shelves
- Interchangeable LED light shelves with 200, 400 or 1100 μmol light intensities in the WL models (TL-tubes available as an option)
- Dimmable lights per tier from 10% to 100% (depending on the model)
- Easy to clean stainless steel shelves and white coated stainless steel interior
- Low noise level
- Units delivered on castors
- Stainless steel floor equipped with a floor drain and a hose assembly
- Touch screen based control system, web interface with LAN connection



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