

EnviroCube

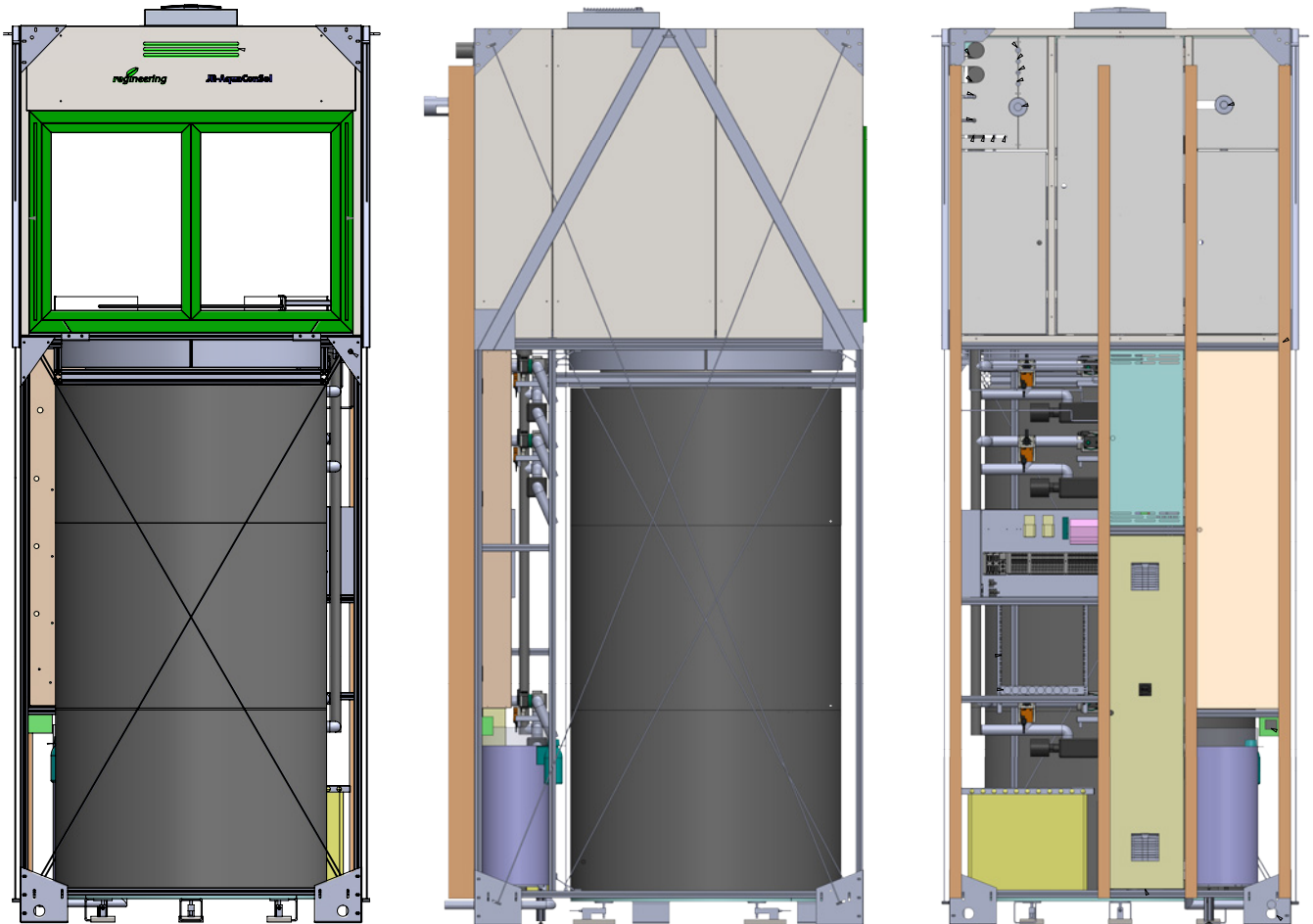


Version: 3008/2024


regineering

EnviroCube

Biotope in a Box



It integrates lysimeter, vegetation room, light, and climate chamber into a compact stand-alone solution. It is easily controlled with a tablet or remotely from your desk. Inputs are made via an intuitive user interface. Assemble your biotope of soil, plants, and fauna according to your needs and control the environmental parameters according to your research questions.

A visualisation tool makes daily control of the measured values very easy. Alarm functions prevent data gaps and measurement errors.

The data can be stored locally or automatically on a server. The raw data can be individually processed and thus optimally adapted to the user's needs. The EnviroCube is low-maintenance and easy to use—an ideal research platform for all questions about our environment.

General data

Product dimensions	Width:	2.0 m
	Depth:	2.0 m
	Height:	4.95 m
	Weight:	approx. 800 kg (without lysimeter & fluids)
Atmosphere space dimensions	Diameter:	1.35 m
	Height:	1.5 m
	Surface:	1.54 m ²
Lysimeter cylinder dimensions	Diameter:	1.13 m [*]
	Depth:	3.0 m ^{**}
	Surface:	1.0 m ²
	Volume:	3.0 m ³
	Weight:	600 kg (without soil) approx. 6,600 kg (with soil)
	Material:	Stainless steel

* Lysimeter cylinder also available with diameter of 0.8 m.

** Variable depth up to 3.0 m.

Do you need a customised solution?
We're looking forward to collaborate
and design, plan and realise the product
that meets your needs.

Product variations

Atmosphere	EnviroCube Forest Green	EnviroCube Ocean Blue
Air temperature simulation	✓	✓
Air humidity simulation	✓	✓
Lighting	✓	✓
Lighting simulation (dimnable by channel 0-100%)	2-Channel LEDs, 2500 $\mu\text{Mol}/\text{m}^2\text{s}$	5-Channel LEDs, 2500 $\mu\text{Mol}/\text{m}^2\text{s}$
CO ₂ simulation	—	✓
CH ₄ simulation	—	optional
N ₂ O simulation	—	optional
O ₃ simulation	—	optional
Irrigation system and simulation	—	✓
Input parameter control via graphical user interface	✓	✓
Input parameter control via time series input	—	✓
Camera	—	✓
A vegetation ring to avoid island effects	✓	✓

Product variations

Soil	EnviroCube Forest Green	EnviroCube Ocean Blue
Soil temperature simulation (lower boundary)	✓	✓
Matric potential simulation (lower boundary)	–	✓
Control lower boundary condition	Free discharge with tilt counter (resolution: 100 g)	LBC with programmable aliquot sampling
Lysimeter weighing system	✓	✓
Matrix potential sensors	1 x TEROS32	4 x TEROS32
Water content sensors	–	4 x TrimePico32
Root tubes	–	2 x Ø 70 mm
AWAT-filter	–	✓
Control based on Industry standards with PLC and full remote control	✓	✓
Easy data visualisation	✓	✓



Lysimeter is produced by JR-AquaConSol.

Simulation options



Climatisation parameter atmosphere

Air temperature*: +4 °C up to +40 °C

Accuracy air temperature: ±1 K

Gradient air temperature: max. ±5 K/H

Air humidity: 40 %–95 %

Accuracy air humidity: ±5 %

Gradient air humidity: max. ±5 K/h

Dew point: 2° C to 35° C

Cooling brine must be provided on site.

Seperate cooling machine on request.

GasPort to sample gas samples or directly connect a gas analyser.



Lower boundary control (hydraulic)**

Special ceramic cups with 1bar air entry point

Leachate tank: 50 l volume

Resolution leachate balance: 1.0 g

Accuracy leachate balance: 10 g

Soil temperature control system

Temperature at the bottom

of soil column: from +2 °C to +20 °C***

Cooling brine must be provided on site.

Seperate cooling machine on request.

* For a room temperature of 4 °C, a brine of –2 °C is required on site.

** Only with EnviroCubes with LBC-pump.

*** For a floor temperature of 2 °C, a brine of –2 °C is required on site.

Simulation options

Gas simulation

Special full space ventilation system with 360° distribution to guarantee homogeneous conditions for air temperature, air humidity and optional with simulation of various gases:

Carbon dioxide (CO ₂):	ambient up to 5,000 ppm
Ozone (O ₃):	ambient up to 1,000 ppb
Methane (CH ₄):	ambient up to 10,000 ppb
Nitrous oxide (N ₂ O):	ambient up to 3,000 ppb



Irrigation simulation

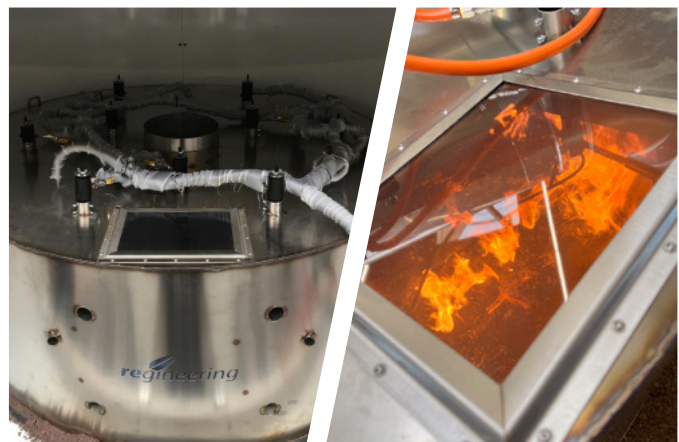
With the help of a watering ring or a spray nozzle it is possible to simulate different types of rain showers.



Fire simulation

Simulation of wildfires within the atmosphere chamber using a fire hood with a heat-resistant viewing window. Inflow of propane gas for controlled flaming of the plants.

The exhaust pipe is equipped with a "spark shield" to catch sparks and light ash. These can be removed from a collection container after cooling.



Equipment options in detail



Sensor equipment

Lysimeter:

TEROS32 tensiometer for matric potential and temperature (10 cm, 30 cm, 50 cm, 90 cm)

TrimePico32 for volumetric water content, electrical conductivity and temperature

(10 cm, 30 cm, 50 cm, 90 cm)

Additional sensors and other depth on request.

Atmosphere:

Air temperature, air humidity and PAR sensor

Root cam:

Root cam tubes \varnothing 70 mm

at depths of 20 cm, 40 cm, 60 cm



Weighing system lysimeter

0.5 m² lysimeter surface

3 pcs. load cell á 500 kg

Resolution lysimeter balance: 5 g / 0.01 mm

Accuracy lysimeter balance: 50 g / 0.1 mm

1 m² lysimeter surface

3 pcs. load cell á 750 kg

Resolution lysimeter scale: 10 g / 0.01 mm

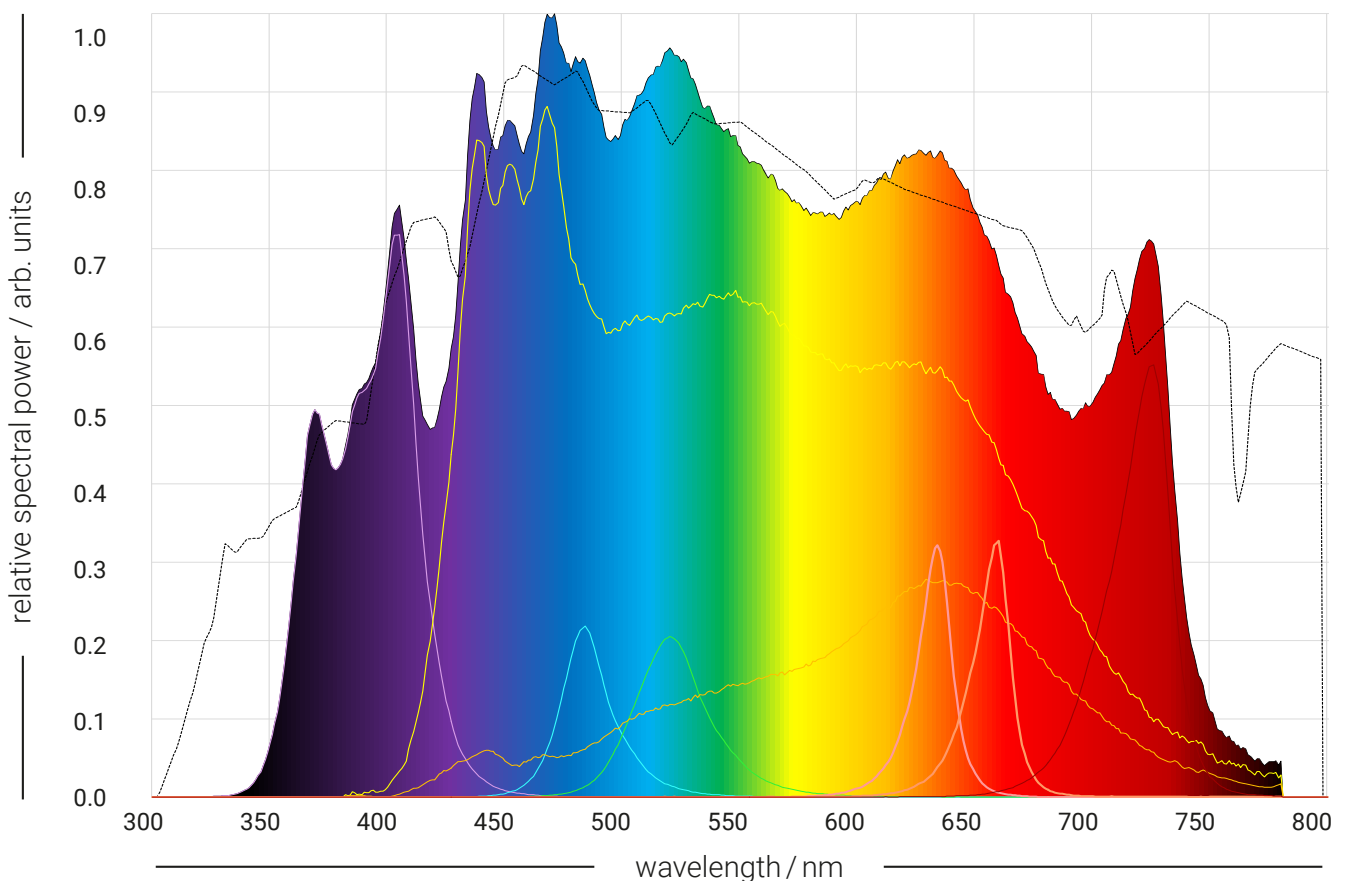
Accuracy lysimeter scale: 100 g / 0.1 mm

Functions and equipment

5-Channel Light Management System (LIMAS)

CW 6500K	Each channel is separately flicker-free dimmable (0–100%)
WW 2700K	Light intensity 2500 $\mu\text{Mol}/\text{m}^2\text{s}$ in 1.5 m distance to soil surface
UV 365 + 385 + 405 nm	with extra channel especially for improved plant growth
Red 630 + 660 nm	Higher intensity with >2500 $\mu\text{Mol}/\text{m}^2\text{s}$ on request
Farred 730 nm	Programmable day/night cycles

Example of sun-like spectral power distribution with 5-channel spectrum:



Due to the in-house production of the lighting system, custom designs for special requirements are possible at any time. Please contact us if required.

Interested in our product?

Get in touch:



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