



COOLGROW® VF

Indoor Grow Lighting Redefined

From LED Bars to Indirect Diffused Light

Instead of a traditional vertical farming system where LED bars directly illuminate onto the plants, the CoolGrow® VF utilizes indirect and diffused lighting.

The entire growing area is coated with a highly reflective material, turning both the ceiling and side walls into sources of light for the plants. This ensures that light photons are utilized optimally, minimizing any potential light loss.

The major breakthrough was the realization of 100% diffuse light, which resulted in a net increase in photosynthesis and fresh weight of 30%-55% depending on the crop, and allowing a significant increase in plant density.

With just one line of daisy-chained lamps in the center a wide canopy area is totally homogeneously lit. Two optical systems have been brought to market – optics for a canopy width of 3.2 meters and optics for a canopy width of 4.8 meters. The system support a setup up to a length of 40 meters.

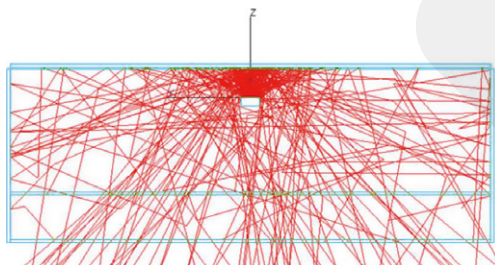
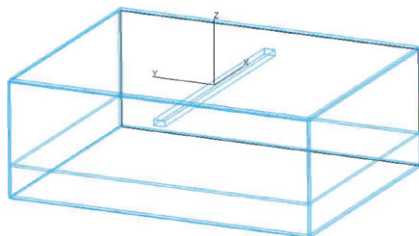
- increase in fresh weight -



Sample		Reflective enclosure
17,2 ± 1,2 cm	↔ +55% ↔	18,0 ± 1,7 cm
28,0 ± 3,2 g		43,4 ± 4,3 g
shorter roots		longer roots



- simulation of the light rays -



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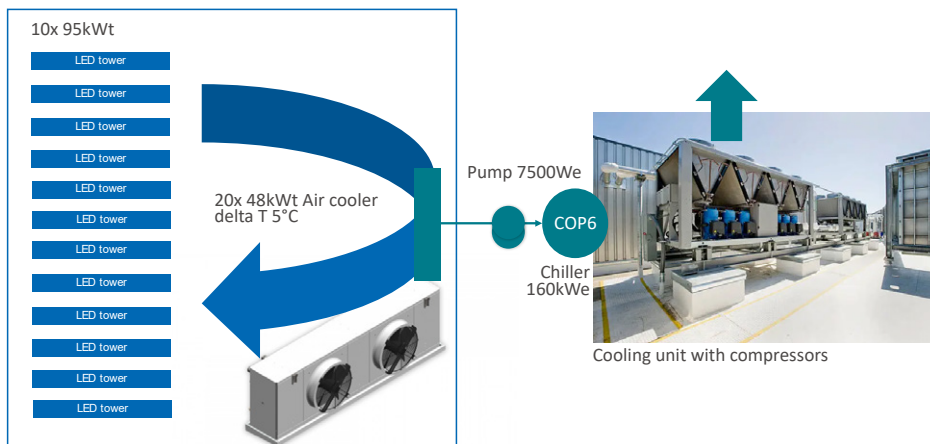
From Convection-Cooled Bars to Water Cooling

Traditional vertical farm grow lights have about 30% direct heat loss, which remains in the grow canopy through free air convection and thus impacts the cooling requirements for the growing area.

The CoolGrow VF features a unique water cooling technology which transports the full heat loss of the lamps out of the farm and enables setups of up to 200 m² per growing line. And thus this reduces both CAPEX and OPEX for cooling by 15%.

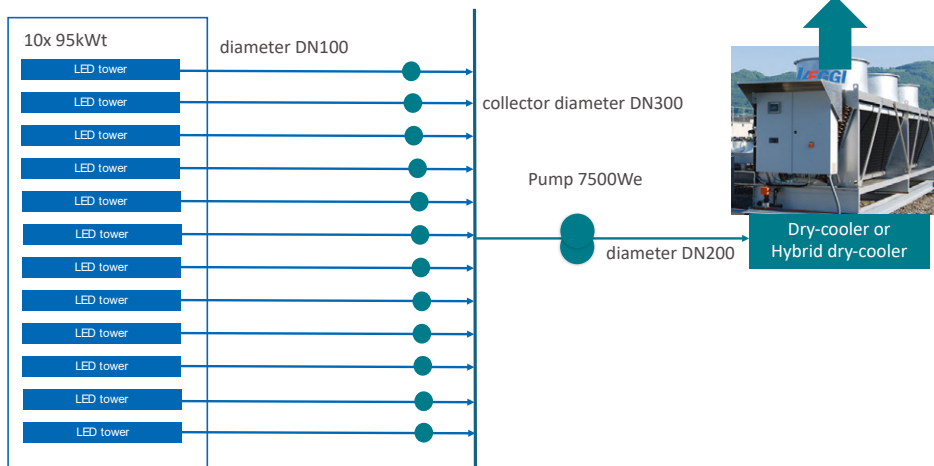
► Standard herbs farm 7128m²: convection cooled LED + chiller

Installed power for LED-heat extraction 167,5kWe



► Efficient herbs farm 7128m²: water-cooling LED + free-cooling

Installed power for LED-heat extraction 15kWe



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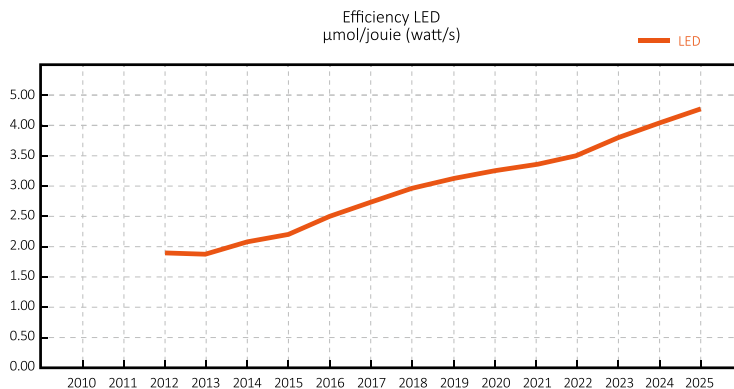
Efficiency and dynamic spectrum controls

With an extremely high system efficiency of $> 4\mu\text{mol}$ per Joule and a full dynamic spectrum, crops are optimally controlled.

While the efficacy improvements over time mainly result from developments in LED technology, the water cooling adds another substantial impact to the overall energy consumption.

Direct heat losses from the lamp are transported out of the growth environment resulting a lower needed cooling capacity.

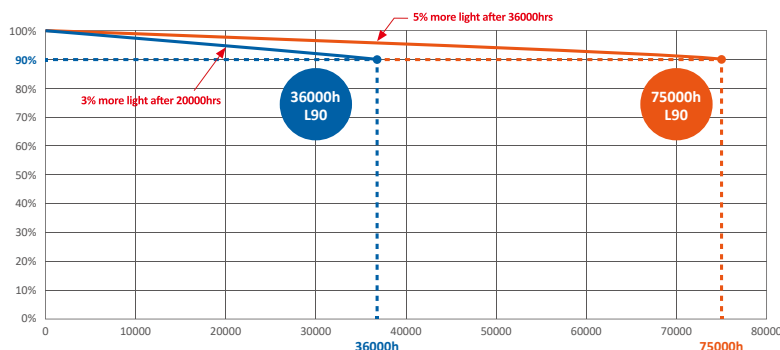
Full spectrum controls guarantee a perfect balance between energy efficiency, plant morphology and yield.



Longest lifetime and lowest light decay over time

The CoolGrow VF® is a true masterpiece of technology.

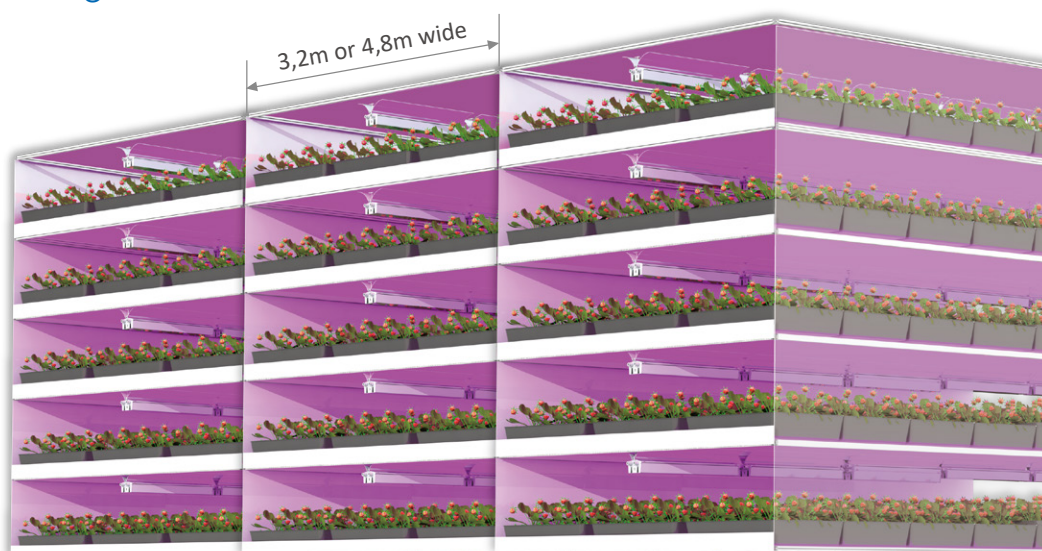
While most LED grow lights for indoor farming use simple cooling like passive aluminium, the heart of the CoolGrow® VF is a sophisticated double-loop water cooling system. This guarantees you the best thermal management of the LEDs on the market. The light efficiency, the lifetime and the light decay (how fast or slow the light reduces over time) are all directly related to the LED temperature of the grow light. With a lifetime of 75.000 hours L90B10 and a warranty of 10 years, the CoolGrow VF offers double the life-time compared to most grow lights for vertical farming.



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- Total Internal Reflection
- Higher light use efficiency (LUE)
- Diffuse Light



The combination of all these technologies together gives a new perspective on the future of vertical farming and opens up completely new possibilities.

Together with Colruyt Group, MechaTronix succeeded in making vertical farming commercially feasible on both levels, Capex and Opex.

The technology, as well as the optics, are globally patented.

For more information, get in touch with MechaTronix!

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