

PHILIPS

Horticulture LED

Medicinal cannabis



HORTICOOP
SCANDINAVIA A/S



Grow the best cannabis **with the right LED grow light**

Produce premium flowers packed with the right active compounds



“

Every time I use the LEDs, I've noticed that the plants are not only healthier, but they also finish a lot faster than under metal halide, ceramic metal halide or any HPS type light.”

Chad Zaki, Chief Cannabis Officer - Michigan Pure Med

How do you design your cannabis facility for success and what impact does light have on your crop? Based on our long experience in horticulture lighting, Signify can help you choose the right lighting to produce consistent and high quality cannabis flowers, with the right amount of active compounds.

Growing medicinal grade plants

To grow cannabis for medicinal applications, your crop has to meet GACP (Good Agricultural Collecting Practices) ensuring consistent growth with the same consistent level of quality on THC and CBD to meet GMP standards. So it's crucial to understand and being able to control all cultivation aspects, including lighting, irrigation and temperature.

Light plays a key role in cultivation

Whether you have a greenhouse or indoor facility, light is essential for stimulating plant growth. But not all light is equal. Natural light levels can vary greatly at any given time, resulting in unpredictable yields and quality. High pressure sodium (HPS) lamps are traditionally used as a supplemental light source for growing cannabis, however, the heat they produce limits the usage of the lights. Supplemental LED lighting, on the other hand, emits very little heat, giving you the flexibility and control to grow the perfect crop all year round. Philips GreenPower LED toplighting takes this to the next level, using a custom light recipe for your cannabis crop that describes the intensity, spectrum, duration and timing of the lighting applied to help you increase quality and yield.



Your path to greater profitability

- Intro
- Why LED?**
- Did you know
- Grow with the pros
- Philips products

As a grower, you are always aiming for the best recipe for growth – working to optimize results, minimize risks, and increase yield in a sustainable way. Putting you in a position to have maximum control over your investment and operational costs, and take full advantage of LEDs to improve your business results. A successful LED-based growth strategy provides three key benefits for indoor growing in a greenhouse or without daylight.



High sustainable production

Growing cannabis with LED will generate:

- higher yield per square meter
- optimal photosynthesis and flower production
- lowest possible energy usage with maximum production per watt
- less water and nutrients needed

- Lighting can improve canopy strength and steer characteristics of plant morphology, resulting in a more uniform crop that requires less labor and pruning
- Enables more light to reach the plant compared to HPS lighting to promote more uniform budding and consistent flower quality



Improve the quality of your cannabis crop

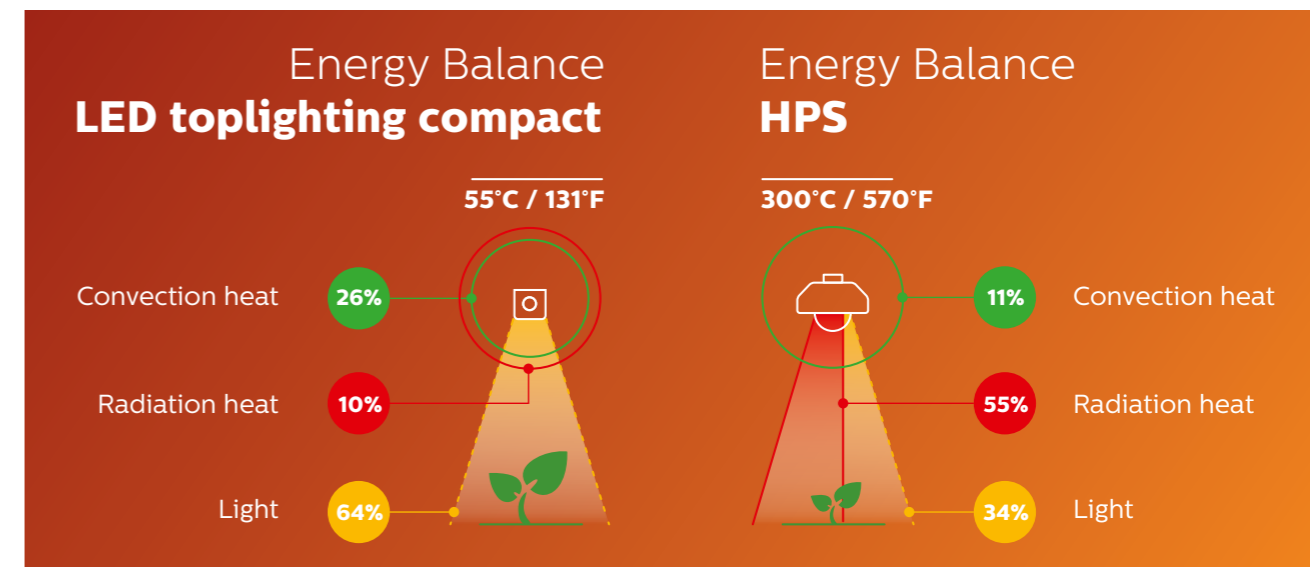
- A dedicated light recipe improves both the quality of the plant and the possibility to steer its cannabinoid, terpenes and flavonoid content. As proven in trials Signify has conducted with growing partners



Achieve more predictable production

- Low-temp LED lighting makes it easier to control the climate in the greenhouse or sole source facility
- Harvest consistent yields year-round with the right composition of compounds to simplify logistical planning and guarantee reliable manufacturing

Why choose LED over HPS?



Control heat and light separately

High levels of radiant heat can stress or even burn the plants. LED lighting helps you manage your temperature and humidity (vapor pressure deficit) to achieve greater cannabis plant performance. You can apply higher levels of light to plants with 67% less radiant heat than HPS lighting. A lower crop temperature means you will have to raise the ambient temperature in your greenhouse and manage the related change in humidity.

More light, less radiant heat

One important aspect is understanding how to grow your crops with LED lighting. When comparing the energy balance of LED lighting versus HPS lighting, the conversion of electricity into light and heat is different. Using the same amount of energy, LED-modules deliver more light and less radiant heat. This does call for new growth strategies.

Signify plant specialists share the answers to the most common questions about LED lighting and medicinal cannabis based on the numerous projects they have carried out with research partners.

Did you know...

You can achieve a 40% higher yield* and faster growth cycles for medicinal cannabis crops grown in a greenhouse under LED lighting. The vegetative phase can be shortened by 5 to 9 days increasing crop cycles.

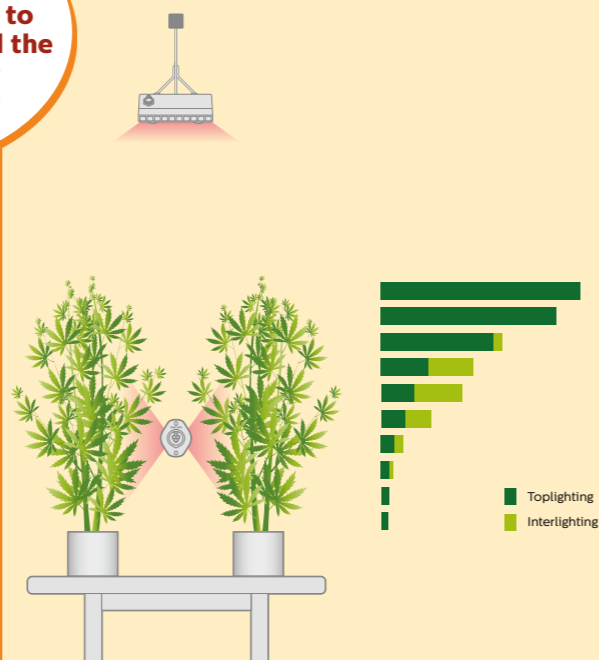
...LED lighting provides new opportunities to boost yield and growth speed?



*These results are based on the specific characteristics of trials at Wageningen University and others. We can estimate yields of 50-100 grams per plant, depending on the variety, planted at a density of 9-10 plants per square meter. The LED light intensity used was a medium intensity of 800 $\mu\text{mol}/\text{m}^2/\text{s}$.

... intercanopy lighting is proven to increase yields and the quality of your cannabis crop?

The use of intercanopy LED lighting will result in light reaching the lower positioned buds, more uniform flowers from top to bottom, more potent flowers, higher yields, and a larger amount of top shelf flowers. Crops grown in this way had healthier leaves, a higher dry flower weight and fewer dead leaves which significantly reduced labor.



...rooting of cannabis stem cuttings can be improved with LED lighting?



An accurately designed light plan and light recipe that incorporates growth-stimulating LED lighting can enhance the rooting of stem cuttings.

...you can improve the uniformity of your cannabis young plants with LED lighting?

Growing uniform plants is at the very heart of achieving medicinal cannabis quality flowers. With LED lighting you can steer the quality and uniformity of the young plants by tuning the spectrum and intensity of the light. This helps initiate rooting followed by stem development.

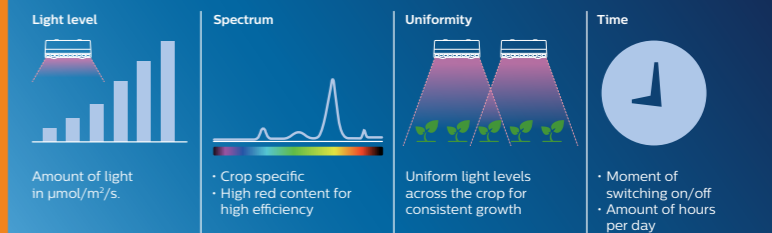


... you plants are triggered to flower according to their photoperiod?

A light recipe describes the intensity, spectrum, duration and timing of the lighting applied to help you increase the quality and yield of your crops. Your plants need to go through a dark period of at least 12 hours every day to flower. They are triggered according to their photoperiod or numbers of hours of light/dark they receive.

What is a light recipe?

The four characteristics that define the optimal growth of your crop



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Grow with the pros

You want to make sure you get a rapid return on your investment and have all aspects of your project carried out professionally and with minimal risk. Now is the time to shift to Philips LED technology. With Signify, you are growing with the pros. With cutting-edge Philips LED innovations at our command, we can customize a science-based lighting solution for you.

Signify is the global leader in lighting and LED plant expertise and has repeatedly demonstrated the value and benefit of LEDs with more than 1000 horticulture projects in more than 30 countries. Since 1995, our dedicated experience in developing tailor-made, LED-based light recipes has helped growers speed up growth, increase yield, and improve the quality of their crops, while delivering profit to their bottom line.

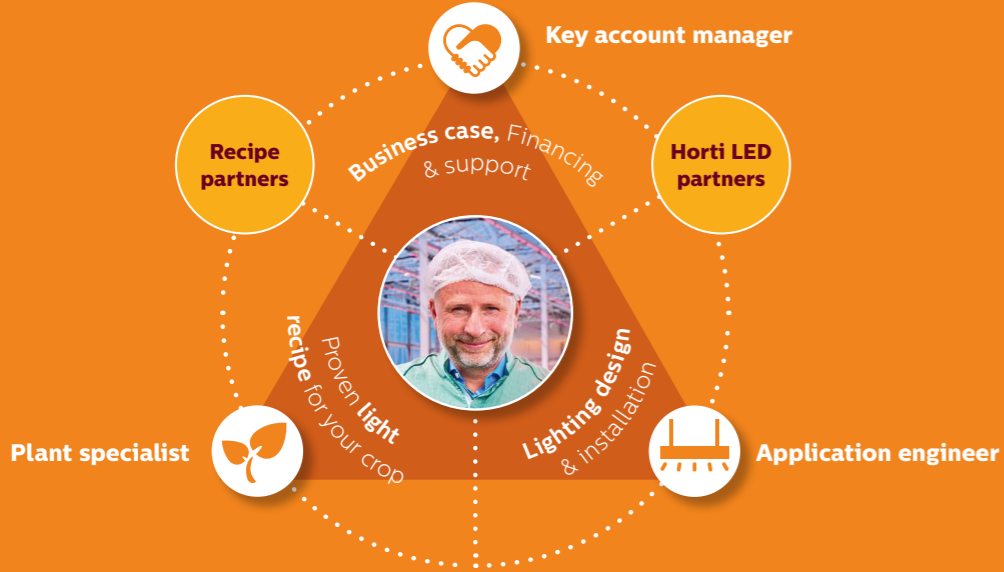
Make the best choices for your business to succeed
 With our extensive lighting know-how and plant expertise, Signify can offer growers the best choices to help their business succeed with Philips LEDs. We supply the most reliable techniques and LED products for growing indoors, in both greenhouses and multilayer cultivation.

Get the best advice to grow your crops with LED
 You can rely on our plant specialists for advice about the range of possibilities with supplemental lighting based on the specific needs of your crop. Our plant specialists are continuously involved in research trials with universities, agricultural research institutes and individual growers to stay up to date on the latest results with Philips LED lighting. They can help you adapt the climate and other aspects of your greenhouse or vertical farm to take full advantage of Philips LED lighting.



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“We see faster bloom cycles and an increase in density and overall quality of the flowers”
 Mads Pedersen, CEO Aurora Nordic - Denmark




 Extensive lighting knowledge and plant expertise


 Understand the growers business thanks to our Horti experience and global network


 Most reliable LED solutions suited for horticulture

Realistic business case and financial assistance
 The payback period for your Philips LED investment depends heavily on your growth strategy, marketing approach, financial situation, etc. Factors that affect the payback include the price you get for your crop, the energy costs in your region, your geographic location and your local climate. To help you make a realistic decision about a new lighting installation and guide you in making the best business decision, our key account manager provides you with a business case calculation based on your goals, crop and growing situation. The calculation can show your return on investment, as well as your savings and additional potential earnings over time. This business case can be used to support your financial planning and help you in the process of financing your LED investment.

Local support every step of the way
 We work with a global network of certified Philips Horti LED partners and one of our local partners is always involved in your project. Based on the detailed lighting design prepared together with our application engineer, the local partner is responsible for installing your Philips LED solution. Beyond that, we offer grower training courses to help you expand your knowledge, as well as specialist support after installation

Reliable Philips GreenPower LED products **for growth like never before**

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Due to its large global network, Signify has the resources to provide high quality and cost-efficient product offerings for both small and large projects worldwide. Every grower has different needs, so we offer a variety of Philips GreenPower LED products that support you in making the most of your crop and growing situation.

Philips GreenPower LED products combined with our dedicated light recipes open new opportunities for growers to increase yields and move to predictable year-round production. Our dedicated horticultural LED lighting with an extensive lifetime of up to 36,000 hours and a proven track record across the globe will increase the quality of your crop and guarantee more predictable growth. Our LED lighting products deliver excellent lighting uniformity and ultimately consistent growth results. Thanks to passive cooling, our products require less maintenance compared to water- and

fan-cooled units. The streamlined product design ensures that light gets to where it is needed for your crops.

The design of a LED module has a significant impact on its overall performance and lifetime. At Signify we take all the necessary steps to make sure your LED products are reliable and provide longlasting performance. We put each component through a battery of stringent technical and mechanical tests. Each Philips LED module is backed by our guarantee of quality to meet your requirements.

Dynamic light recipes for precision steering

For growers and researchers looking for more flexibility and precision in steering the growth of their crops, Philips GreenPower LED production module Dynamic is the perfect choice. It allows you to create light recipes that can be dynamically adjusted with the GrowWise Control System, creating the optimal light intensity and color spectrum during the day or growing cycle.

Products



Toplighting compact

The easy 1-to-1 HPS replacement. Switch to LED lighting as a way to improve crop results or reduce energy costs.

Specifications	
Voltage	200-400V
Power consumption	590-630 W
Light output	Up to 2200 $\mu\text{mol/s}$
Efficacy	Up to 3,6 $\mu\text{mol/J}$
Ingress Protection	IP66 ¹
Lifetime	36,000 hrs L90
Warranty	3 years



Toplighting linear

The proven optimal lighting solution with regards to uniformity.

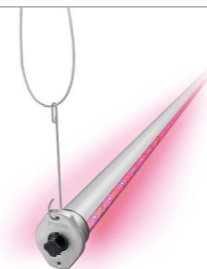
Specifications	Regular output		High output	
	Voltage	200-400 V	277-400 V	
Power consumption	175-215 W	265-285 W		
Light output	410-550 $\mu\text{mol/s}$	800 $\mu\text{mol/s}$		
Efficacy	2.3-2.6 $\mu\text{mol/J}$	2.8-3.0 $\mu\text{mol/J}$		
Ingress Protection	IP66 ¹	IP66 ¹		
Lifetime	36,000 hrs L90	36,000 hrs L90		
Warranty	3 years	3 years		



Production module

Cost-effective way to improve climate and crop control for sole source cultivation. Adding GrowWise control system gives you full flexibility to create and control your own time-based light recipes.

Specifications	
Voltage	120-277 V
Power consumption	56-79 W
Light output	168-210 $\mu\text{mol/s}$
Efficacy	2.7-3.0 $\mu\text{mol/J}$
Ingress Protection	IP66 ¹
Lifetime	36,000 hrs
Warranty	3 years



Interlighting

Growth-stimulating light on the most vital part of the crop. With the sideways light distribution pattern, the leaves can optimally transform the light into growing more yield.

Specifications	2.5 m/98"		2.03 m/80"	
	Regular output	High output	Regular output	High output
Voltage	200-400 V	200-400 V	200-400 V	200-400 V
Power consumption	79 W	92 W	64 W	72 W
Light output	220 $\mu\text{mol/s}$	300 $\mu\text{mol/s}$	175 $\mu\text{mol/s}$	240 $\mu\text{mol/s}$
Efficacy	2.8 $\mu\text{mol/J}$	3.3 $\mu\text{mol/J}$	2.7 $\mu\text{mol/J}$	3.2 $\mu\text{mol/J}$
Ingress Protection	IP66 ¹	IP66 ¹	IP66 ¹	IP66 ¹
Lifetime	25,000 hrs	25,000 hrs	25,000 hrs	25,000 hrs
Warranty	3 years	3 years	3 years	3 years



Flowering lamp

Flowering lamps are used to lengthen the day to prevent flowering.

Specifications	Deep red/White		Deep red/White/Far red	
	Voltage	120-230 V	120-230 V	
Power consumption	13 W	11 W		
Light output	25 $\mu\text{mol/s}$	20 $\mu\text{mol/s}$		
Efficacy	1.9 $\mu\text{mol/J}$	1.8 $\mu\text{mol/J}$		
Ingress Protection	IP44 ¹	IP44 ¹		
Lifetime	25,000 hrs	25,000 hrs		
Warranty	3 year	3 year		

¹ UL/CSA for damp & wet locations

Head for sustainable growth with Philips LED technologies

Take control of quality, yield, and costs for your medicinal cannabis or hemp crops. Philips LED technologies supply the recipe for growth that helps you succeed. Get predictable, high quality, high production crops in a sustainable way and build preference for your brand. Gain maximum control over your investment and operational costs.



More questions?

Visit our website or send us an email:
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