

PHILIPS

Horticulture LED

Medicinal cannabis



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



Intro

.....
Why LED?
.....

.....
Did you know
.....

.....
Grow with the pros
.....

.....
Philips products
.....

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 be 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

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



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

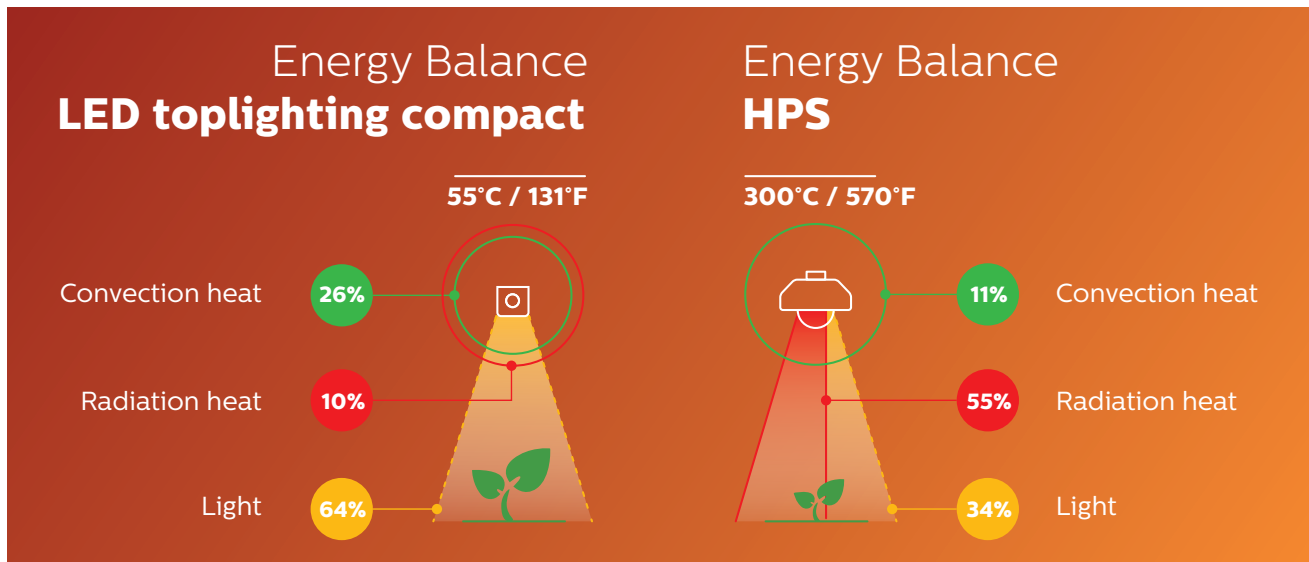
- Lighting can improve canopy strength and steer characteristics of plant morphology, resulting in a more uniform crop that requires less labor and pruning
- Enables more light to reach the plant compared to HPS lighting to promote more uniform budding and consistent flower quality



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 higher yields 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.

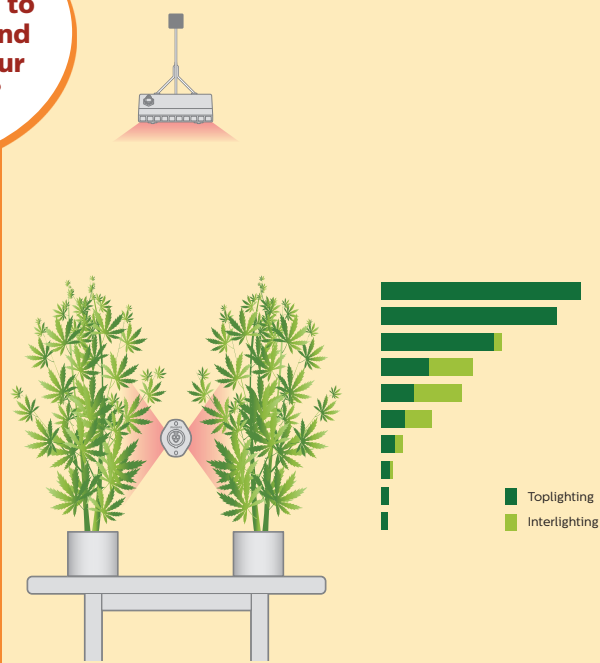
...LED lighting provides new opportunities to boost yield and growth speed?



*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 can maintain their lower leaf load, increase flowers viability, and reduce labour costs as lower branched flowers achieve similar chemical content and flower maturity speed as top flowers.



...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.

Intro

Why LED?

Did you know

Grow with the pros

Philips products

...you can improve the uniformity of your young cannabis 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.



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

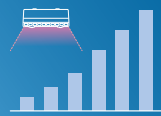
A light recipe describes the intensity, spectrum, duration and timing of the lighting applied to help you increase the quality and yield of your crops. Your plants need to go through a dark period of at least 12 hours every day to flower. They are triggered according to their photoperiod or numbers of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

What is a light recipe?

The four characteristics that define the optimal growth of your crop

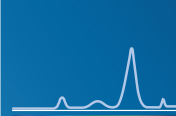


Light level



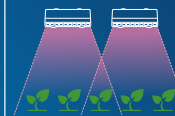
Amount of light in $\mu\text{mol}/\text{m}^2/\text{s}$.

Spectrum



- Crop specific
- High red content for high efficiency

Uniformity



Uniform light levels across the crop for consistent growth

Time



- Moment of switching on/off
- Amount of hours per day

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.

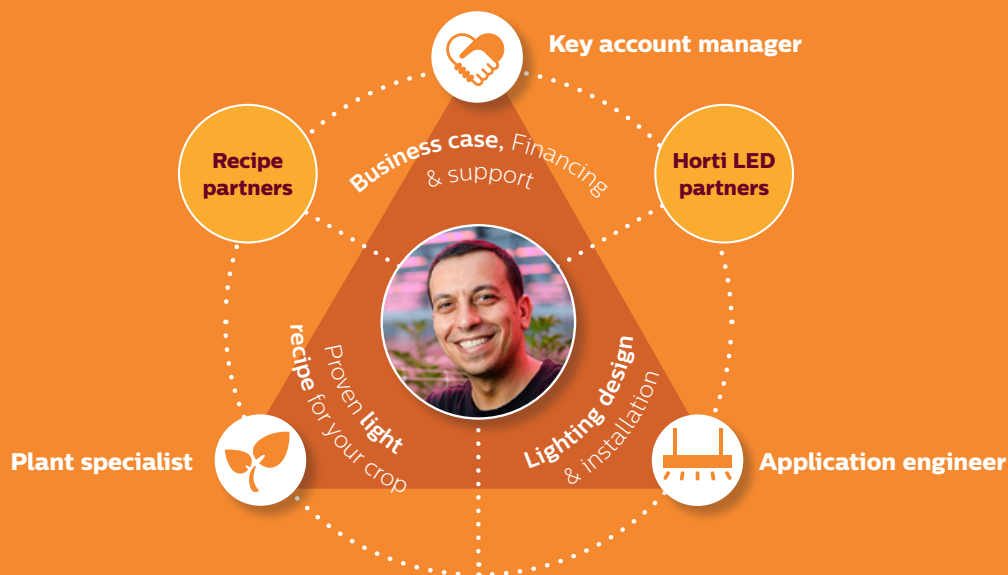
Signify is the global leader in lighting and LED plant expertise and has repeatedly demonstrated the value and benefit of LEDs with more than 1000 horticulture projects in more than 30 countries. Since 1995, our dedicated experience in developing tailor-made, LED-based light recipes has helped growers 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.



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



Intro

Why LED?

Did you know

Grow with the pros

Philips products

“

We see faster bloom cycles and an increase in density and overall quality of the flowers”

Mads Pedersen, CEO Aurora Nordic – Denmark

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

From **propagation to flowering**, Philips GreenPower LED grow lights deliver growth like never before

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 around the world 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.

Products



Toplighting compact

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

Specifications	Static	Dimmable*
Voltage	200–400V	200–400 V
Power consumption	520–645 W	49–645 W
Light output	Up to 2200 $\mu\text{mol/s}$	Up to 2200 $\mu\text{mol/s}$
Efficacy	Up to 3,6 $\mu\text{mol/J}$	Up to 3,6 $\mu\text{mol/J}$
Ingress Protection	IP66	IP66
Lifetime	36,000 hrs L90	36,000 hrs L90
Warranty	5 year limited	5 year limited



Toplighting linear

Manage light and heat separately with the toplighting linear grow light. LEDs deliver highest light levels in a spectrum that supports optimal plant growth.

Specifications	Regular output	High output*
Voltage	200–400 V	277–400 V
Power consumption	170–190 W	25–285 W
Light output	500–550 $\mu\text{mol/s}$	80–800 $\mu\text{mol/s}$
Efficacy	2,6–3,1 $\mu\text{mol/J}$	2,4–3,0 $\mu\text{mol/J}$
Ingress Protection	IP66	IP66 ¹
Lifetime	36,000 hrs L90	36,000 hrs L90
Warranty	5 year limited	5 year limited

*Dimmable with Philips GrowWise Control Systems (GWCS)



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

Our light spectrum is optimized to deliver growth-stimulating light for every stage. The same light recipe can be used successfully for your propagation, vegetative, and flowering cycles.

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

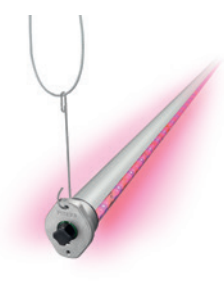
For growers and researchers looking for more flexibility and precision in steering the growth of their crops, Philips GreenPower LED production module Dynamic is the perfect choice. It allows you to create light recipes that can be dynamically adjusted with the GrowWise Control System, creating the optimal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



Production module

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

Specifications	
Voltage	120–277 V
Power consumption	59–88 W
Light output	0–210 $\mu\text{mol/s}$
Efficacy	2.7–3.0 $\mu\text{mol/J}$
Ingress Protection	IP66
Lifetime	36,000 hrs
Warranty	5 year limited



Interlighting

Growth-stimulating light on the most vital part of the crop. With the bi-directional light distribution pattern, the leaves can optimally transform the light into growing more yield. Available in two lengths: 2.0 m and 2.5 m.

Specifications		
	Regular Output	High Output
Voltage	200–400 V	200–400 V
Power consumption	64–79 W	74–92 W
Light output	175–220 $\mu\text{mol/s}$	240–300 $\mu\text{mol/s}$
Efficacy	2.7–2.8 $\mu\text{mol/J}$	3.2–3.3 $\mu\text{mol/J}$
Ingress Protection	IP66	IP66
Lifetime	36,000 L90	36,000 L90
Warranty	5 year limited	5 year limited



More questions?

Visit our website or send us an email:

www.philips.com/horti

horti.info@signify.com

Or follow us:

 Philips Horticulture LED Solutions

 @philipshorticulture

 PhilipsHorticulture

 @PhilipsHorti



© 2021 Signify Holding. All rights reserved. The information provided herein is subject to change, without notice. Signify does not give any representation or warranty as to the accuracy or completeness of the information included herein and shall not be liable for any action in reliance thereon. The information presented in this document is not intended as any commercial offer and does not form part of any quotation or contract, unless otherwise agreed by Signify.

Philips and the Philips Shield Emblem are registered trademarks of Koninklijke Philips N.V.
All other trademarks are owned by Signify Holding or their respective owners.

Document order number: 4422.952.00317 B NAM

04/2021

Data subject to change