GROW MORE INVEST LESS

leoLED

A GUIDE TO LEOLED GROW LIGHT SERIES | JANUARY 2016 BROCHURE

WWW.LEOLEDGROW.COM

Having our own indoor research lab, we understand the importance of growers to utilize grow lights that give them the performance, flexibility, and precision they need. From the sophisticated heatsink that keeps the high power efficiency LEDs silently cool, to the system that is used to deliver power and control spectral channels independently, leoLED Grow Lights are designed and engineered to give professional as well as home growers a valuable advantage.

HIGH PPFD PERFORMANCE

Carefully selected highest quality components providing highest light output for maximum plant photosynthesis.

FLEXIBLE COVERAGE

The modular design enables uniform light distribution and greater canopy coverage. Suitable for vertical farming applications.

MAXIMUM EFFICIENCY

leoLED Grow Lights provide industry-leading system efficiencies of up to 2.6 PPF/Watt. More light, less heat, increased yield.

PASSIVE COOLING

Superior heat dissipation without ventilation fans, making the fixture silent and waterproof.

FULL SPECTRUM

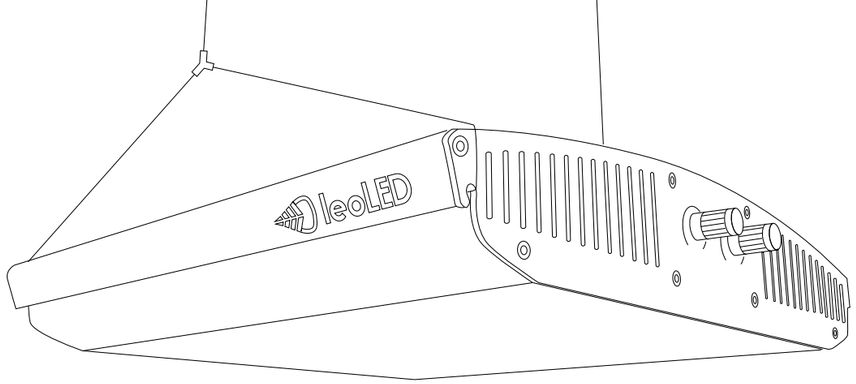
Rely on the full spectrum output with the fSpectrum or tailor the spectrum to the plant needs with the iSpectrum Series.

ZERO MAINTENANCE

Our LED Grow Lights do not need any maintenance or bulb change, reducing time and cost for maintenance to zero.

HIGH RETURN INVESTMENT

High PPF/Watt and modular design combined with maximum efficiency and a long lifespan of up to 60.000 hours.



GROWING PLANTS BETTER

leoLED Horticultural Lights are designed to promote plant growth, improve crop quality as well as yield and reduce growing cycle - all at a significantly lower cost of operation than any other technology on the market.

leoLED Grow Lights are equipped with a selection of the highest-efficiency LEDs on the market, achieving a strong und homogeneous illumination. Only the best quality LED production batches (so called binnings) are used at leoLED: as a result your plants will enjoy maximum photon flux density (PPFD) at the lowest possible power consumption. Crafted from the best aluminum, the sophisticated and aerodynamic design of leoLED lights primarily serve as a passive cooling mechanism. All our electrical and thermal designs are aiming for highest performance at the optimum efficiency. Heat and noise are reduced to zero and the reliability and durability of the components is guaranteed. Even after several 10,000 hours of operation, the brightness remains at more than 90%.

ALL OUR FIXTURES OPERATE WITH PASSIVE COOLING.

NOISELESS, WATERPROOF AND DURABLE.

RESOURCE FRIENDLY

The LED technology of the iSpectrum provides better light while consuming only 50% of the energy of traditional lighting systems. The lifespan is rated at 60.000 hr (8 years, when operating during 16h a day), until the light output decreses by 20%. In addition, LEDs are environmentally friendly due to the fact that they are the only lighting technology that does not contain toxic metals, such as mercury (as found in High Pressure Sodium and Metal Halide grow lamps).

PERFORMANCE COMPONENTS

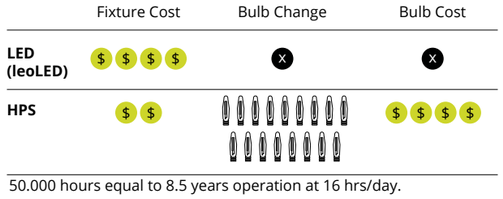
Providing the most efficient holticultural light system on the market, we rely on technology components of the best-in class component manufacturers. leoLEDs provide maximum light output for the least cost of ownership: reducing excess heat and electrical consumption as well as maintenance costs.

When combining the technological advantage of LEDs with science, the truth is given by the type and quality of the components used. By selecting the most efficient LEDs available on the market, leoLED grow lights achieve a system efficiency of up to 2.5 PPF/W, outperforming all other conventional lighting technologies on the market (e.g. HPS). Our efficient electrical design allows us to operate our lights completely passive with maximum light output, ensurig lower temperatures and a higher lifetime.

leoLED stands for high performance and best quality - developed and assembled in Switzerland.

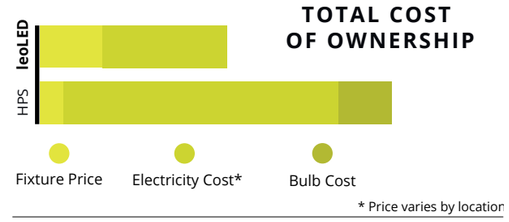
MEAN WELL OSRAM CREE

HOW MUCH WILL THE OPERATION AT 50'000 HOURS COST?



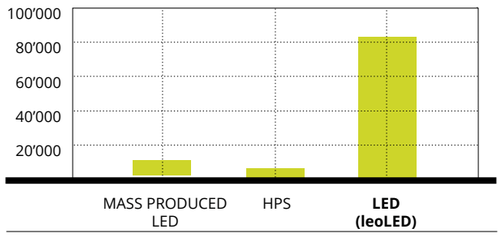
50.000 hours equal to 8.5 years operation at 16 hrs/day.

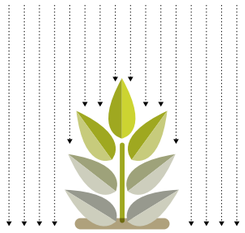
TOTAL COST OF OWNERSHIP



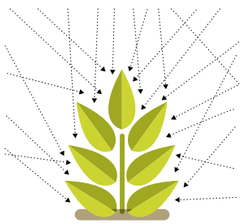
* Price varies by location

HOW LONG DOES THE LIGHT SOURCE MAINTAIN BRIGHTNESS?





DIRECT LIGHT



DIFFUSED LIGHT

WIDE ILLUMINATION

Because even coverage and penetration of the canopy is important when cultivating in closed environments, individual arrangement of lighting modules allow the distribution of the light in a flexible way. By using only one single LED fixture, hot spots are created over the canopy and the light source penetrates only a portion of the growing area, thus not providing sufficient light for photosynthesis of all plants. By using multiple light sources, leaves are illuminated from all sides, minimizing shadows and increasing photosynthesis rate.

leoLED Grow Lights are designed to illuminate your canopy effectively, ensuring that plants receive the right amount of energy at all growth stages. leoLEDs product range is adaptable and extendable to any gardening area: from the small home indoor garden to large growing facilities.

PROVEN SPECTRUM

Plants rely on photosynthesis to produce glucose for their cellular respiration, they achieve this using chlorophyll in photosystems I & II. At leoLED, we understand that the Emerson Enhancement Effect allows for stronger plant growth by combining different wavelengths in our spectrum blend, just like nature intended with sunlight. Moreover, the output spectrum of our lights follow the McCree (1972) curve of photosynthetically active radiation, stimulating photopigments and carotenoids, allowing us to provide the most photosynthetically efficient plant lighting system.

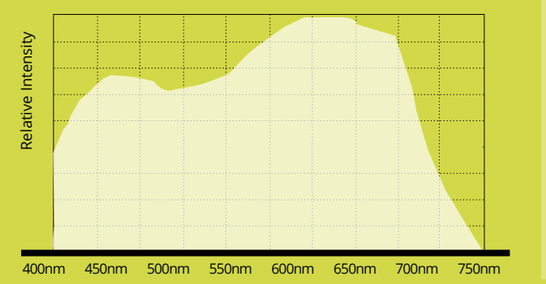
SCIENCE OF THE SPECTRUM

Blue light is experienced in high intensities at midday and would usually be a time of peak intensity and heat, Therefore in many plants high intensities of blue light cause the chlorophylls to migrate to the bottom of the cell for shielding, which causes reduced leaf internodal length and promotes compact and bushy growth. In addition blue light stimulates the production of flavonoids and carotenoids, which also add to the taste and texture of your crops.

Red light is another main contributor to photosynthesis, but similarly to blue it produces unique results in plant physiology. Red induces some of the fastest and tallest growth in plants. If you wish to grow plants fast, using a red strong spectrum will give you heavy results, vigorous and bushy. Far-red is also used by plants in photosynthesis and also by phytochromes to control plant circadian rythm and shade avoidance mechanisms.

Green light penetrates deeper into the plant, further than red and blue, and therefore provides additional photosynthesis beyond the red/blue top leaf saturation. As seen in the below McCree curve, all wavelengths from 350nm-750nm promote photosynthesis. As photopigments and carotenoids use green light to push photosynthesis even further, a balanced full spectrum is truly the best light a plant can get.

MCCREE ACTION SPECTRUM



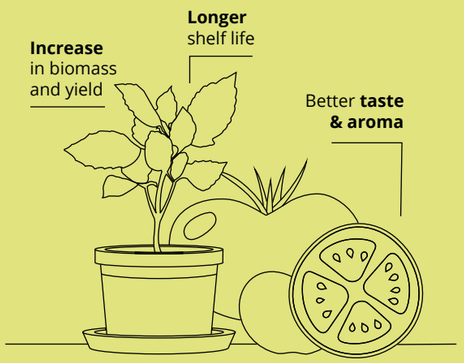
TAKE CONTROL

Many plants use circadian rythm influencers from light such as the photoperiod (length of light in a day), phytochrome status (balance of red to far-red light), cryptochrome (blue light response) and heliochrome (green to far-red ratio), all to help a plant choose how to grow. These systems set the season (in addition to temperature sometimes) for the plant to know how to respond. In essende you can control the plants to a large degree if you have the control over the output spectrum!

Having control over the portions of the emitted color spectrum allows allows to induce fruiting and flowering all year round, grow plants short or tall, all this is possible and configurable with our iSpectrum and iSpectrum Pro (available 2016).

Join the horticultural revolution!

ACCELERATES GROWTH UP TO 40%



Increased revenue, energy savings and efficient use of resources (water, nutritions).

leoLED iSPECTRUM

Modular LED horticultural light with a dual-channel customizable output spectrum. Designed for highest efficiency and tailored to the optimal needs of the hobby and professional grower to adjust the light to optimal needs for all plant species.

FEATURES:

195W highest efficiency CREE & Osram SMD LEDs
Adjustable output spectrum (GROW & BLOOM)
Modular & flexible design
Silent operation

APPLICATIONS:

Vertical Farms
Greenhouses
Growth Chambers
Grow Rooms
IP55-rated waterproof design

FACTS

5 Modules (420W) outperform 600W HPS on one meter square (3x3 ft) by quality and yield

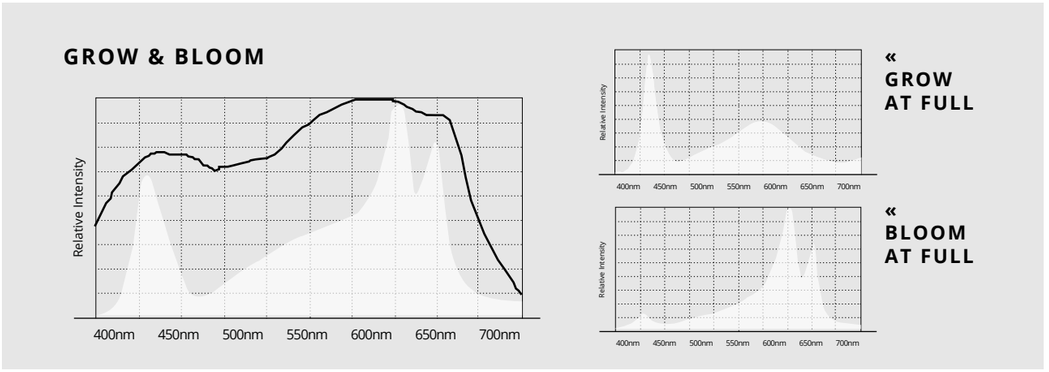
Electricity reduction by up to 70% using GROW & BLOOM

SPECIFICATIONS

Dimensions	280 × 250 × 60 mm (11.0” × 9.8” × 2.4”)
Weight	2.2 KG (4.9 LBS)
Operating Temperature	0 - 38 °C (32 - 100 °F)
Cooling	Passive, free-air convection
LED Components	CREE & Osram SMD LEDs
Certifications	CE, RoHS, IP55

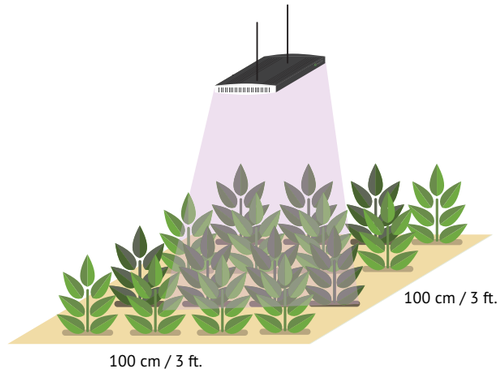
Power Consumption	84 Watt
Power Factor Input	91%
Voltage Range	85 ~ 264V, AC 47-63 Hz
Wavelength Range	400-730 nm
PPF	178 µmol/s
System efficiency	2.1 PPF/W

SPECTRUM OUTPUT



Make use of GROW & BLOOM channels in order to take control of the growth characteristics of your plants. Use GROW for seedlings and small plants and accelerate growth by providing the BLOOM spectrum as your plants mature.

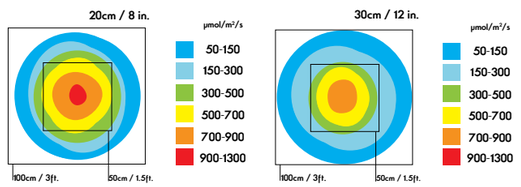
PERFORMANCE METRICS

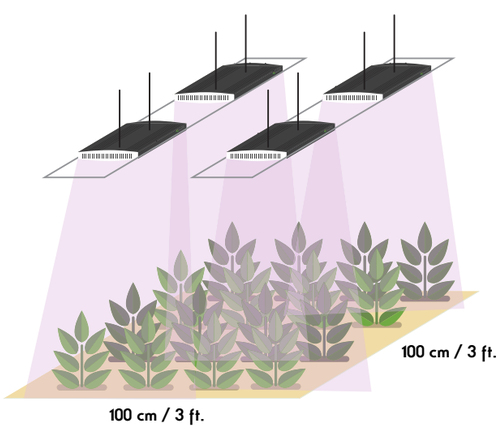


PERFORMANCE:

PPF: 178 µmol/s (2.1 PPF/W)
PPFD: 159 µmol/m²/s (1.9 PPFD/W)

PPFD MAP:

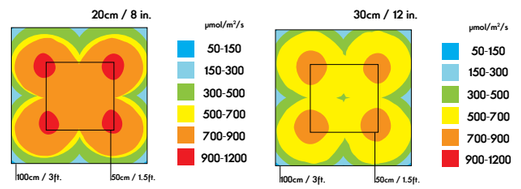




PERFORMANCE:

PPF: 710 µmol/s (2.1 PPF/W)
PPFD: 636 µmol/m²/s (1.9 PPFD/W)

PPFD MAP:



leoLED fSPECTRUM C

Packed in an oustanding product design, the fSpectrum C outperforms all commercial grade lighting systems available on the market reaching a system efficiency of 2.5 µmol/Watt. The high intensity is aimed for high light plants, with the spectrum being perfect for all growth.

FEATURES:

468W highest efficiency CREE COB LEDs
Fixed output spectrum
Modular & flexible design
Silent operation
IP55-rated waterproof design

APPLICATIONS:

Vertical Farms
Greenhouses
Growth Chambers
Grow Rooms
Hobbies

FACTS

4 fSpectrum C 125W modules on one meter square serve as a superior replacement to a double-ended 1.000W HPS, providing full penetration of the canopy without any heat.

10% higher yield while reducing electricity by more than 50%.

The fSpectrum C outperforms any other lighting source on the market by means of performance and efficiency.

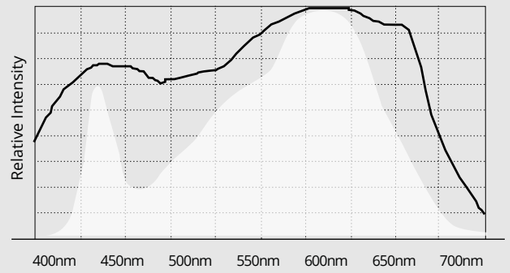
SPECIFICATIONS

Dimensions	280 × 250 × 60 mm (11.0” × 9.8” × 2.4”)
Weight	2.2 KG (4.9 LBS)
Operating Temperature	0 - 38 °C (32 - 100 °F)
Cooling	Passive, free-air convection
LED Components	CREE CXB Chip-on-Board
Certifications	CE, RoHS, IP55

Power Consumption	125 Watt
Power Factor Input	94%
Voltage Range	85 ~ 264V, AC 47-63 Hz
Wavelength Range	400-730 nm
PPF	309 µmol/s
System efficiency	2.5 PPF/W

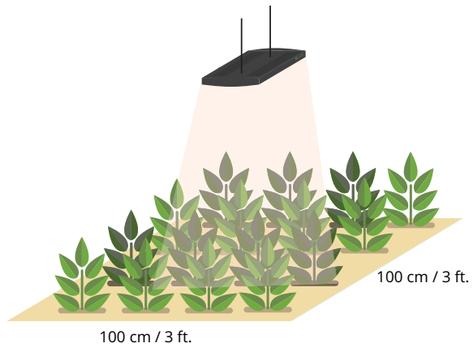
SPECTRUM OUTPUT

FIXED OUTPUT SPECTRUM



The spectrum is tailored to be used by all plants from seed to harvest. The pure white´s unmatched intensity provides a balanced mix of all spectral colors for vigorous growth.

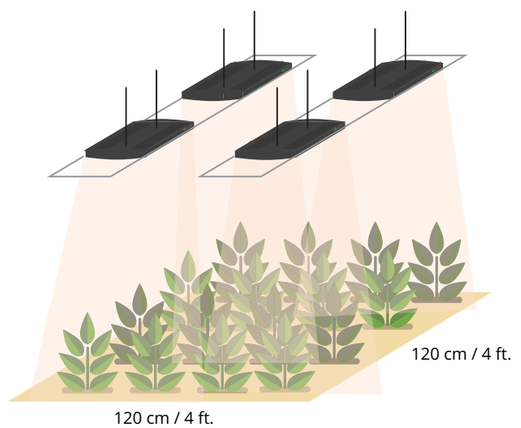
PERFORMANCE METRICS



PERFORMANCE:

PPF: 309 µmol/s (2.5 PPF/W)
PPFD: 290 µmol/m²/s (2.3 PPFD/W)

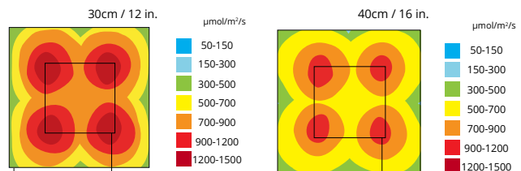
PPFD MAP:



PERFORMANCE:

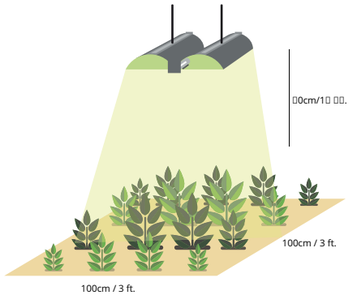
PPF: 1.236 µmol/s (2.5 PPF/W)
PPFD: 1.180 µmol/m²/s (2.3 PPFD/W)

PPFD MAP:

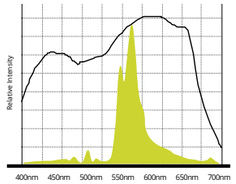


LIGHTING SYSTEM COMPARISON

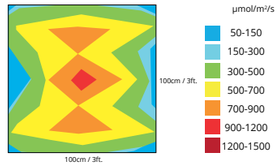
600W HIGH-PRESSURE SODIUM (HPS)



SPECTRUM:

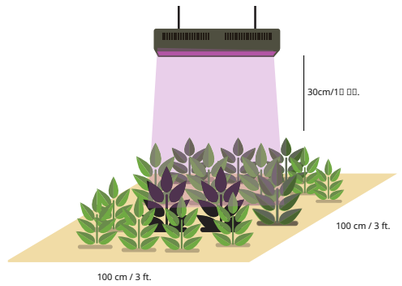


PPFD MAP:

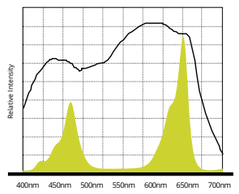


PPF: 792 µmol/s (1.2 PPF/W)
PPFD: 660 µmol/m²/s (1.0 PPFD/W)

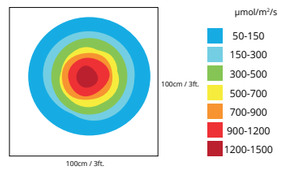
500W ORDINARY LED GROW LIGHT



SPECTRUM:

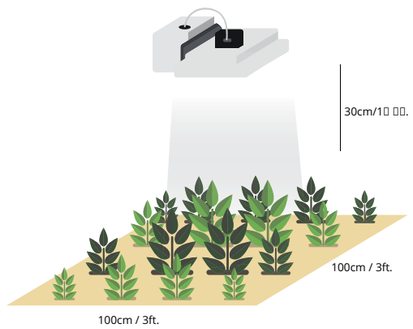


PPFD MAP:

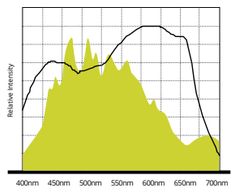


PPF: 380 µmol/s (0.76 PPF/W)
PPFD: 300 µmol/m²/s (0.6 PPFD/W)

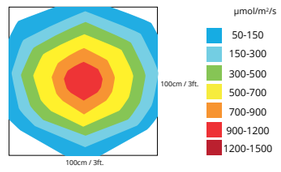
300W PLASMA GROW LIGHT



SPECTRUM:



PPFD MAP:



PPF: 480 µmol/s (1.6 PPF/W)
PPFD: 450 µmol/m²/s (1.5 PPFD/W)

HORTICULTURAL GUIDE

PAR

Photosynthetically active radiation (PAR) is a biological term and describes the part of the electromagnetic radiation spectrum (light) that is useful for plants to photosynthesize. PAR defines the spectral wavelength range between 400-700 nanometers (nm), whereas the actual measurements of the light are represented in PPF and PPFD.

PPF/WATT

The PPF/Watt ratio provides a clear picture of the overall electrical efficiency of a plant lighting system. How much of plant-beneficial light is converted by the system per Watt? Superior LED lighting system reach a PPF/Watt efficiency of up to 2.8 PPF (µmol/s)/Watt, while in comparison 1000W High Pressure Sodium (HPS) can reach only up to 1.7 PPF/Watt.

PPF

Photosynthetic Photon Flux (PPF) measures the total light output (photons) emitted by a plant lighting system. PPF provides the amount of photosynthetically active radiation (PAR) emitted per second and is therefore measured in µmol/s (micromoles per second). PPF however does not provide the amount that is arriving at the plant.

PPFD/WATT

The PPFD/Watt ratio is the the most important term in evaluating the effectiveness of a lighting system on the canopy besides the PPF/Watt efficiency. This is the most important ratio to know as the delivered PPF (PPFD) is finally important in horticulture and is measured at least at several points over the plant canopy. leoLED measurements are taken at 180 spots on the canopy.

PPFD

Photosynthetic Photon Flux Density (PPFD) expresses the amount of light that reach the plants per second. PPFD is measured in micromoles per square meter per second (µmol/m²/s). Because PPFD is a measurement of a specific location on the plant canopy, it is crucial to know the average PPFD on a given surface.

LUMENS & LUX

Lumens and Lux (lumens/m²) are standard units for the luminous flux of a light source and are used by general lighting designers. The luminous flux is the part of the power which is perceived as light by the human eye, and is based upon our eye sensitivity at 555 nm. Therefore Lumens and Lux do not provide a comprehensive picture for horticultural applications.

ABOUT leoLED

Combining Science with technology

leoLED is a Zurich-based electronics manufacturing company. The professionals comprising leoLED's expert team have combined their years of experience in the LED lighting and horticultural industry with vision, creativity and passion to bring LED horticultural lighting to the vanguard of modernity. The Leo is a symbol of power and leadership and symbolizes leoLED's commitment to empowering the horticultural industry in exceeding current standards of quality, pricing, and plant growth results.

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