



HORTILED

THE FUTURE OF GROW LIGHTING



P.L. LIGHT SYSTEMS
THE LIGHTING KNOWLEDGE COMPANY

HARNESSING THE FULL POTENTIAL OF LED TECHNOLOGY.

With the introduction of PL Light Systems' HortiLED products, growers no longer have to compromise on lighting quality. They can achieve the same lighting performance as traditional sources—with all the benefits of LEDs.

The LED optics have been engineered to deliver unrivalled lighting performance—offering the best possible combination of performance and efficacy. Robustly constructed from aluminum and only the highest quality LEDs, the HortiLED products offer the industry-leading quality you've come to expect from PL Light Systems.



HortiLED TOP



HortiLED INTER



HortiLED MULTI

A SOLUTION FOR ANY APPLICATION

Each of the HortiLED product offerings features unique LED optics—custom engineered to deliver optimum lighting performance for specific indoor horticultural applications.



HortiLED TOP

A highly versatile LED top-lighting solution that offers unrivalled lighting performance and energy efficiencies.



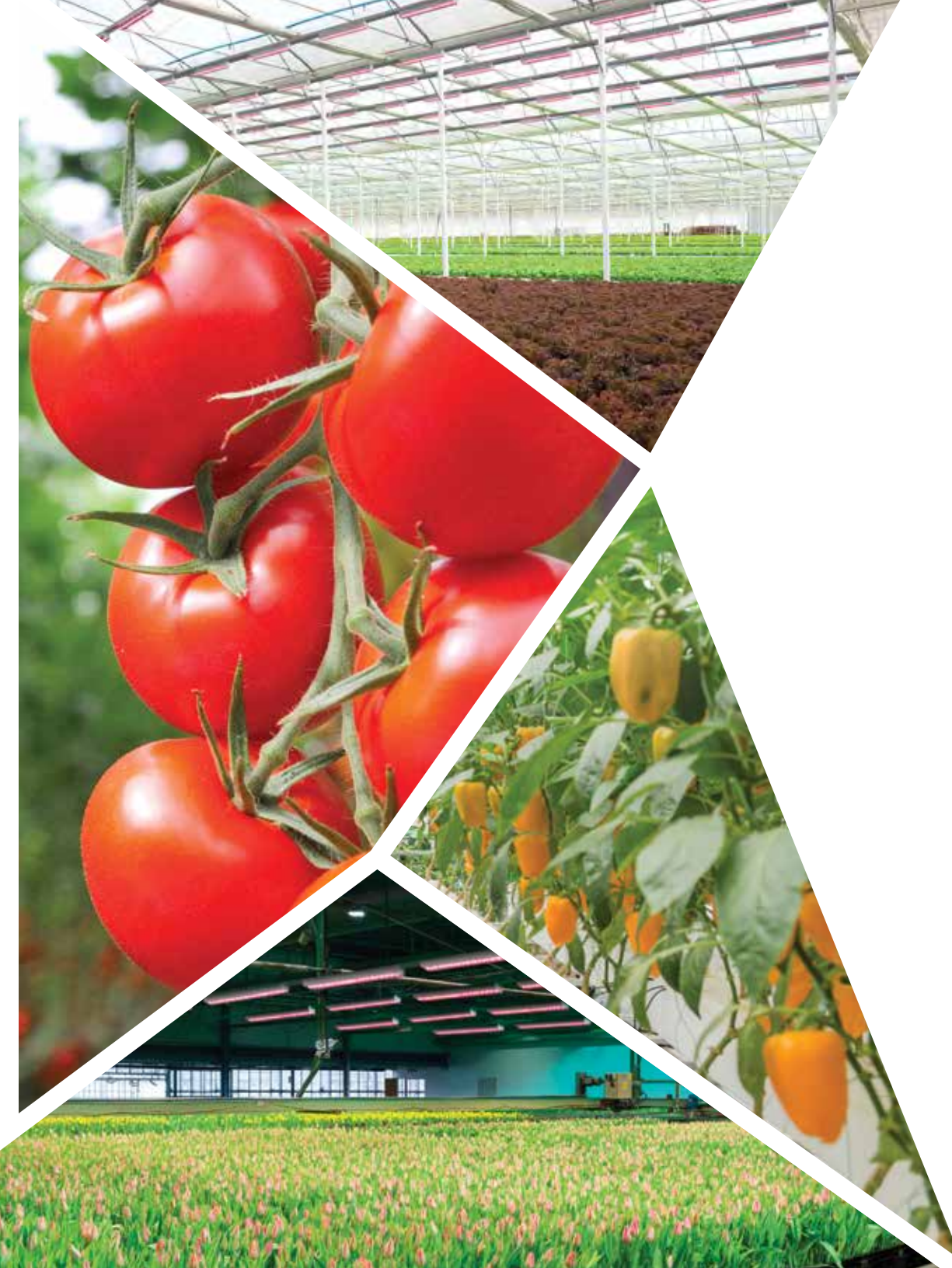
HortiLED INTER

An LED inter-lighting solution that features a highly unique optical design that delivers optimum performance in high-wire applications.



HortiLED MULTI

An LED solution that enables highly controlled plant growth in multi-layer applications with limited daylight, and industry-leading efficiencies.



OPTICAL DESIGN FREEDOM

Designed for maximum flexibility, the HortiLED products deliver optimum optical performance in any type of indoor growing application. All products are designed to produce the ideal light level and distribution for a particular crop—either as a full LED solution, or to supplement an existing lighting system.

SPECTRAL TUNING

The HortiLED luminaires offer multiple color spectral variations—each specifically designed to elicit the desired plant response—including leaf size and stem elongation, chlorophyll concentration, pigment concentration, branching and early / late flowering. Plant response times are also often faster with LEDs.

HEAT MANAGEMENT

LED luminaires produce significantly less heat than traditional sources, so LED luminaires can be placed closer to plants—enabling higher light intensities without excessive heat. Reduced heat also translates into reduced water consumption.

LONG LIFE, LOW MAINTENANCE

LEDs offer a long operating life which, when combined with their robust construction and reduced maintenance requirements, makes them ideal for the harsh conditions of an indoor growing facility.

ENERGY SAVINGS

LED lighting delivers exceptional energy efficacies, using up to 40% less energy than traditional HPS systems to deliver the same light levels.

HOW PLANTS PERCEIVE LIGHT

Plants and humans perceive light very differently.

The human eye responds most strongly to light in the green/yellow part of the spectrum. Plants, however, respond most strongly to the PAR region (blue and red wavelengths) for photoperiodic growth responses and germination control. Photosynthesis, flowering, climate response and photomorphogenesis are all affected by the intensity, duration, distribution and spectral quality of light.

Blue Light (400-499 nm)

- Inhibits stem elongation
- Important for chlorophyll synthesis
- Promotes greening of germinating seedlings

Green Light (500-599 nm)

- Most visually comfortable for human eye
- Best for visual assessment of plant health

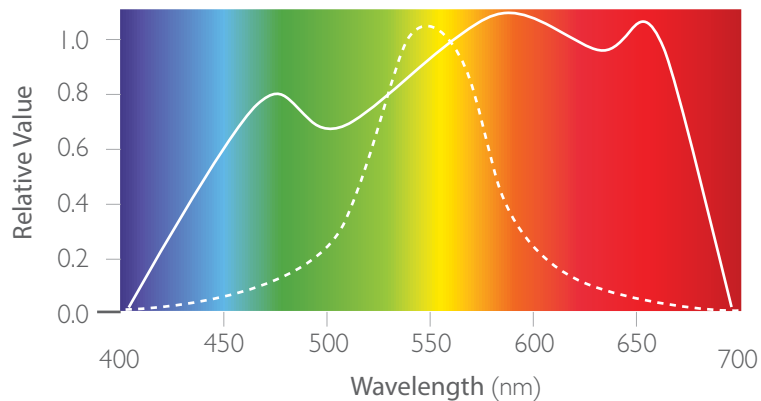
Red Light (600-700 nm)

- Speeds up seed germination
- Encourages stem growth
- Essential for flowering and fruit production

Far Red Light (701-750 nm)

- Promotes stem elongation
- Inhibits branching

PEOPLE vs. PLANTS

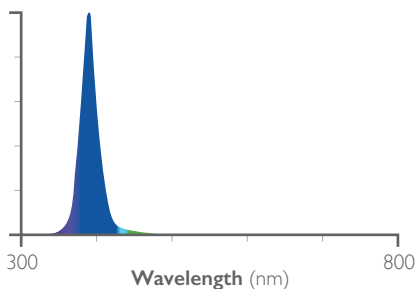


Light Sensitivity

- Plants
- People

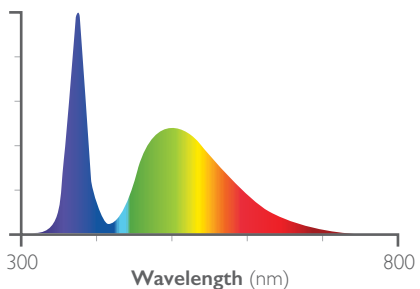


BLUE

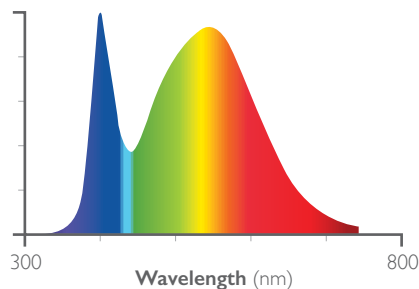


460 nm deep blue
Efficiency: 2.4 $\mu\text{mol}/\text{j}$

WHITE

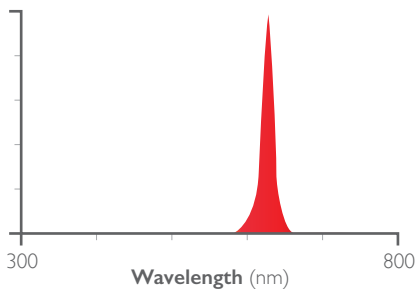


6500K cold white
Efficiency: 2.3 $\mu\text{mol}/\text{j}$

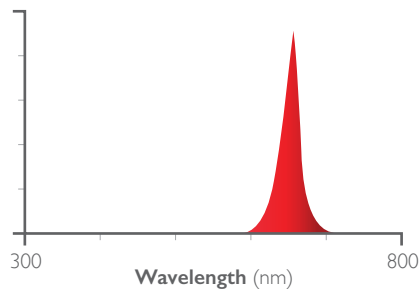


4000K neutral white
Efficiency: 2.2 $\mu\text{mol}/\text{j}$

RED



660 nm hyper red
Efficiency: 3.0 $\mu\text{mol}/\text{j}$



730 nm far red
Efficiency: 2.0 $\mu\text{mol}/\text{j}$

OPTIMIZED COLOR RECIPES

Designed to deliver optimum color efficiencies, the HortiLED products offer multiple standard, as well as custom, color recipes to ensure growers are able to tune their lighting to the optimal wavelengths for each stage of growth.

STANDARD LIGHT RECIPES

| | HortiLED TOP | HortiLED INTER | HortiLED MULTI |
|-------------------|--------------|----------------|----------------|
| Red/Blue | LB/MB/HB | 95%/5% | MB/HB |
| Red/Blue/Far Red | - | - | MB/HBFR |
| Red/White | LB/MB | - | MB |
| Red/White/Far Red | - | - | MB |
| Red/White /Blue | - | - | MB/HW |
| Full Spectrum | - | - | - |
| Red (660 nm) | - | - | - |
| Blue (460 nm) | - | - | - |
| White (6500 nm) | - | - | - |
| Far Red (730 nm) | - | - | - |
| Custom | - | - | - |



Designed for optimum performance and exceptional efficacy, the HortiLED TOP is a versatile top-lighting system that can be used for all types of crops.

HortiLED TOP

PERFORMANCE MEETS EFFICIENCY

With a light output of 860 $\mu\text{mol/s}$ and a system efficacy of 2.7 $\mu\text{mol/J}$, the HortiLED TOP delivers optimum performance and energy savings.

Engineered to deliver lighting performance on par with that of traditional light sources, the HortiLED TOP is ideal for use in many different top lighting applications.

Available in multiple distribution and spectral options—HortiLED TOP offers unparalleled lighting design flexibility. Optional 0-10V dimming allows for seamless integration with compatible control systems.

Light output can be dimmed on a relative scale, based on varying levels of natural daylight within the facility—enabling exceptional control of light levels and energy consumption.

A simple plug-and-play platform, intuitive mounting and multiple voltage options, allows for quick and easy installation or retrofitting from traditional light sources.



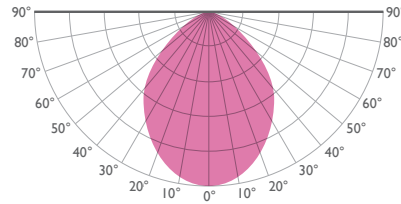
860
 $\mu\text{mol/s}$

IDEAL BALANCE

The HortiLED TOP is available in two distribution options to deliver optimum light intensity to the surface of the crop.

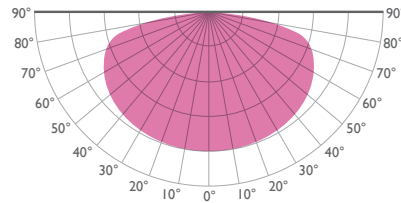
80° DISTRIBUTION

With a highly-focused beam pattern, this distribution option delivers exceptional depth penetration into the plants.



150° DISTRIBUTION

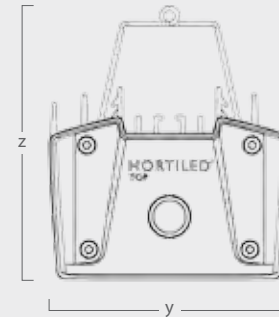
Offers exceptional uniformity—enabling wider spacing so growers can achieve desired light levels evenly across the surface of the crop, with fewer modules.



The integrated fins on the top of each module are thermally and mechanically engineered to dissipate heat through conduction and convection paths—minimizing LED junction temperature and maximizing light output, lifetime and reliability.

TECHNICAL SPECIFICATIONS

| | |
|------------------------|--|
| System Efficacy (R-LB) | 2.7 $\mu\text{mol/l}$ |
| Flux (R-LB) | 860 $\mu\text{mol/s}$ |
| Rated Main Voltage | 120-480 V |
| Input Frequency | 50-60 Hz |
| Power factor | >0.98 |
| Actual Input Power | 320W |
| Dimming (optional) | 0-10V |
| Lifetime | 50,000 hr Photon flux maintenance of 85% @ max. ambient operating temp of 30°C |
| Warranty | 5 years |



Dimensions

| | |
|------------|-----------------------|
| x = length | 38.039 in. (966.2 mm) |
| y = width | 4.681 in. (118.9 mm) |
| z = height | 3.740 in. (95 mm) |



A highly-unique optical design provides exceptional energy efficiencies and ideal distribution of light onto the plant canopy in high-wire applications.

HortiLED INTER

PRECISELY CONTROLLED DISTRIBUTION

A highly unique optical design allows for the best possible combination of light intensity and distribution along the vertical plane of high-wire crops like tomatoes or cucumbers.

The HortiLED INTER delivers up to 125 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ uniformly to the top surface of the leaves, even at the lowest levels of the canopy—while delivering system efficacies as high as 2.63 $\mu\text{mol}/\text{J}$. The narrow-profile modules are also designed to provide optimal heat management—enabling close-to-canopy mounting without any burning.

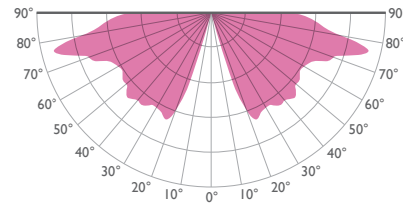
The HortiLED INTER can be used as standalone system or in combination with one of PL Light System's top lighting solutions—providing unparalleled flexibility and optimum lighting control throughout the growing season.



2.63
 $\mu\text{mol}/\text{J}$

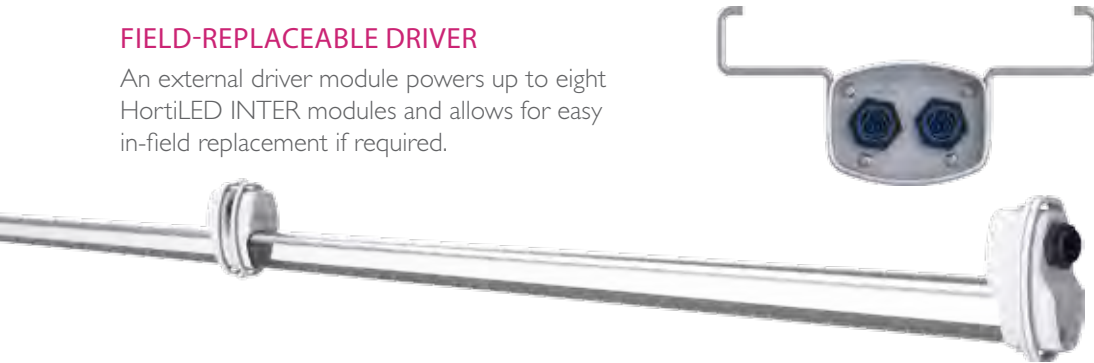
IDEAL BALANCE

The HortiLED INTER provides perfectly symmetrical light distribution to deliver ideal uniformity across the top surface of the leaves—throughout the canopy.



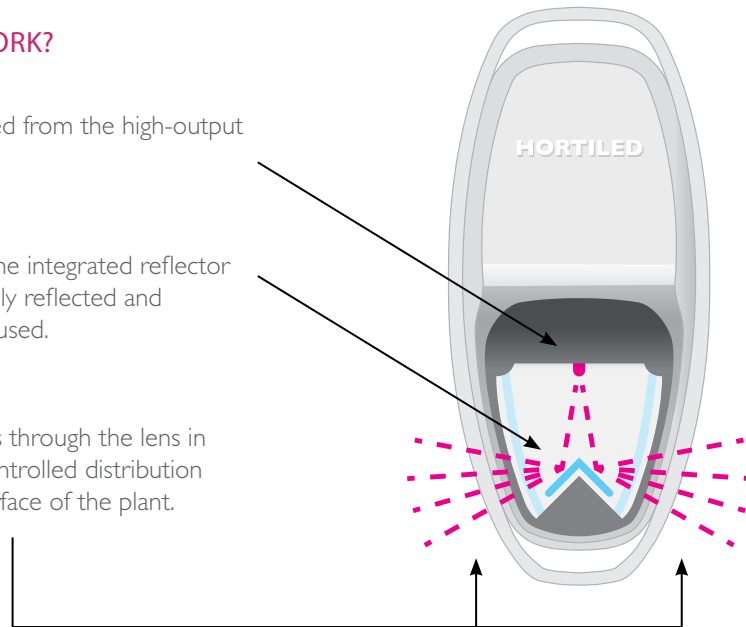
FIELD-REPLACEABLE DRIVER

An external driver module powers up to eight HortiLED INTER modules and allows for easy in-field replacement if required.



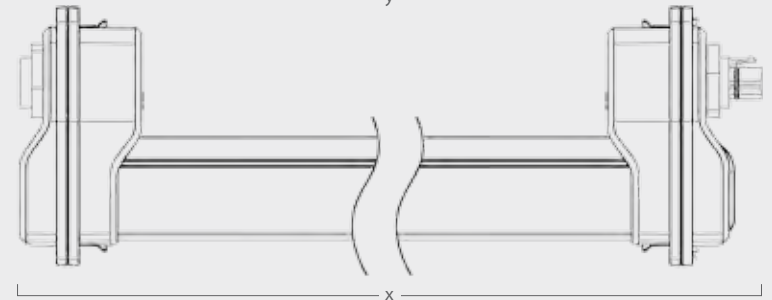
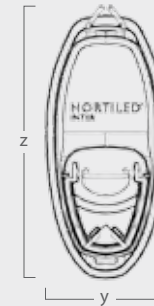
HOW DOES IT WORK?

- 1 Light is emitted from the high-output LED array.
- 2 Light strikes the integrated reflector and is internally reflected and laterally refocused.
- 3 Light emerges through the lens in a precisely controlled distribution across the surface of the plant.



TECHNICAL SPECIFICATIONS

| | |
|--------------------|--|
| System Efficacy | 2.63 $\mu\text{mol}/\text{J}$ |
| Flux | 125 $\mu\text{mol}/\text{s}$ |
| Rated Main Voltage | 120-277V |
| Power factor | >0.95 |
| Actual Input Power | 47.5W |
| Lifetime | 50,000 hr Photon flux maintenance of 85% @ max. ambient operating temp of 30°C |
| Warranty | 5 years |



| Dimensions | | |
|------------|----------------------|-----------------------|
| | Fixture | Driver |
| x = length | 48.189 in. (1224 mm) | 33.606 in. (853.6 mm) |
| y = width | 2.201 in. (55.9 mm) | 4.362 in. (110.8 mm) |
| z = height | 4.803 in. (122.9 mm) | 3.268 in. (83.0 mm) |



A high-output LED lighting solution that delivers industry-leading energy efficiencies and optimal lighting quality in limited-daylight multilayer applications.

HortiLED MULTI

SMALL SCALE, BIG PERFORMANCE

HortiLED MULTI is a small fixture that offers big energy savings, allowing for maximum space utilization and system efficacies as high as 2.5 $\mu\text{mol}/\text{J}$.

The HortiLED MULTI is available in two module lengths and distribution options. Each option is designed to deliver optimum light levels and uniformity across the length and width of shelf—while minimizing light loss off the sides of the shelf.

Designed to deliver exceptional uniformity, the HortiLED MULTI ensures even illumination to each individual plant—regardless of its position in the layer.

Multiple spectral options allow growers to tune the lighting according to the desired plant responses.



2.50
 $\mu\text{mol}/\text{J}$

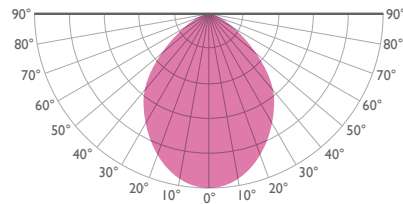
HortiLED MULTI shown here at actual size.

IDEAL BALANCE

The HortiLED MULTI is available in two distribution options to deliver optimum light intensity to the surface of the crop.

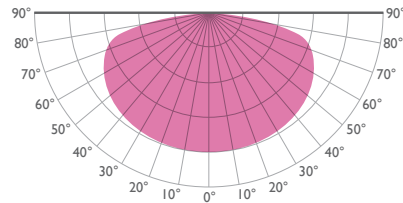
80° DISTRIBUTION

With a highly-focused beam pattern, this distribution option delivers exceptional depth penetration into the plants.



150° DISTRIBUTION

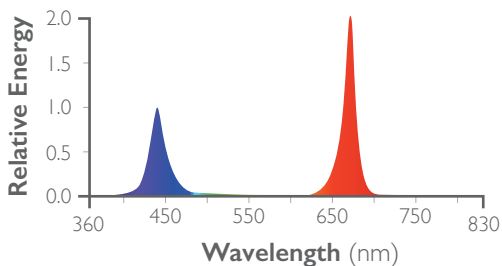
Offers exceptional uniformity—enabling wider spacing so growers can achieve desired light levels evenly across the surface of the crop, with fewer modules.



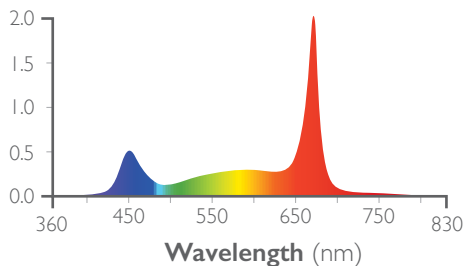
OPTIMIZED SPECTRAL DISTRIBUTION

The HortiLED MULTI is available in multiple spectral distributions to ensure growers are able to apply the optimal spectral recipe for each stage of growth. To achieve a more robust plant structure and smaller, thicker leaves, growers can tune into the blue wavebands to stimulate the synthesis of chlorophyll B. When propagating seedlings, tuning into a full spectrum distribution elicits the best response.

Red / Blue (HB) Spectrum Distribution - optimized for chlorophyll absorption



Full Spectrum Distribution - optimized for seed propagation



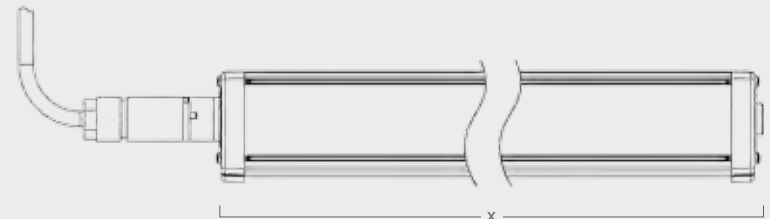
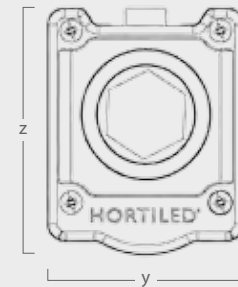
Spectral Options

- Red/Blue (MB/HB)
- Red/Blue/Far Red
- Red/White (MB/HBFR)
- Red/White/Far Red (MB)
- Red/White /Blue (MB/HW)
- Full Spectrum
- Red
- Blue
- White
- Far Red
- Custom

TECHNICAL SPECIFICATIONS

(Values for the 120 cm and 150 cm modules are identical except where indicated)

| | |
|-----------------------------|---|
| System Efficacy | 2.0-2.5 $\mu\text{mol/l}$ |
| Flux (120 cm) | 80-180 $\mu\text{mol/s}$ |
| Flux (150 cm) | 112-225 $\mu\text{mol/s}$ |
| Rated Main Voltage | 120-277V |
| Power factor | >0.95 |
| Actual Input Power (120 cm) | 40W (LO) / 64W (HO) |
| Actual Input Power (150 cm) | 50W (LO) / 85W (HO) |
| Dimming (optional) | 0-10V |
| Lifetime | 50,000 hr Photon flux maintenance of 85% @ max. ambient operating temp of 30°C |
| Warranty | 5 years |



| Dimensions | 120 cm Module | 150 cm Module |
|-------------|----------------------|----------------------|
| x = length† | 46.496 in. (1181 mm) | 57.913 in. (1471 mm) |
| y = width | 1.902 in. (48.3 mm) | 1.902 in. (48.3 mm) |
| z = height | 2.386 in. (60.6 mm) | 2.386 in. (60.6 mm) |

* Photon flux maintenance of 90% @ max. ambient operating temp of 40°C

† Length measurement excludes connector (2.953in. / 75mm)



APPLICATIONS

HortiLED TOP

| | | | |
|----------------------------|---|------------------------|------------------------------------|
| Growing Environment | Greenhouse; Natural Light | System Efficacy | 2.2 - 2.7 $\mu\text{mol}/\text{J}$ |
| Typical Crops | Lettuce, Leafy and Micro Greens | Spectra Used | RB RBFR RW RWFR |
| Light Levels | Low - Mid 75-150 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ | | |



HortiLED MULTI

| | | | |
|----------------------------|---|------------------------|---|
| Growing Environment | Multi-Layer; Limited Natural Light | System Efficacy | 2.0-2.5 $\mu\text{mol}/\text{J}$ |
| Typical Crops | Leafy and Micro Greens | Spectra Used | RB RBFR RW White/ Full Spectrum |
| Light Levels | Medium 100-250 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ | | |

HortiLED INTER

(in combination with top lighting)

| | | | |
|----------------------------|--|------------------------|-------------------------------|
| Growing Environment | Greenhouse; Natural Light | System Efficacy | 2.63 $\mu\text{mol}/\text{J}$ |
| Typical Crops | High-Wire Crops | Spectra Used | RB |
| Light Levels | High Inter-lighting 62.5-125 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ Top-light 100-200 $\mu\text{mol}/\text{m}^2\cdot\text{s}$ | | |



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