HUBBELL Industrial Lighting

cultivaire™
LED HORTICULTURE LIGHT

# FAQ

## 1. What is the Hubbell Lighting Cultivaire™ Grow System?

- The Cultivaire™ Grow System (CGS) is a new NutriLED™ series LED grow light. Compared to the NutriLED™ Grow System (NGS), which utilizes Red, Blue and Far Red narrowband LEDs, the CGS provides full-spectrum white light, which includes wavelengths from 400nm to 800nm. Additionally, the CGS is available with three light recipes (vegetative, flowering and general). Unlike partial spectrum grow lights, the CGS' full spectrum white light color enables growers to inspect plants without supplemental inspection lighting.
- The CGS is designed to provide high photosynthetic photon flux output (700+ µmol/s). This enables a one-for-one replacement of 600W to 1000W HID light sources and is capable of being mounted closer to plants due to the reduction in heat radiated by the grow light.

| Product | Fixture Watts | PPF[1] Output (µmol/s) | Distance to Plant Canopy | Avg. PPFD[2] (µmol/m²/s) | Max. PPFD (µmol/m²/s) | Min. PPFD (µmol/m²/s) | Avg./Min. | Max./Min. |
|---|---|---|---|---|---|---|---|---|
| Cultivaire™ | 368 | 751 | 1.2' | 507 | 794 | 319 | 1.59 | 2.49 |
| 600W HPS | 682 | 716 | 1.5' | 510 | 986 | 265 | 1.93 | 3.72 |

[1] PPF (Photosynthetic Photon Flux): Metric used to identify how much Photosynthetically Active Radiation is emitted from a source or fixture for plant growth
[2] PPFD (Photosynthetic Photon Flux Density): Measurement of Photosynthetically Active Radiation taken at a given point on a work surface for plant growth; in this case, taken at a 4'x4' surface

## 2. How is a full-spectrum white light source useful for horticultural lighting applications?

While Red (600-700 nm) and blue (400-500 nm) wavelengths are still considered the most efficient for photosynthesis, all wavelengths between 400-700 nm can be used by plants for photosynthesis. This range of wavelengths is called Photosynthetic Active Radiation (PAR). Additional Far Red light (700 – 800 nm) also influences growth and development (morphology). For example, far red light promotes larger leaves, taller stems and early flowering in some species, which therefore improves productivity. The inclusion of green wavelengths in full spectrum white light sources, "can better penetrate a plant canopy and thus reach lower leaves." [1]

Depending on the application, some growers still prefer to use partial spectrum lighting technology (mostly red and blue light), such as the NutriLED Grow System (NGS), while others prefer full-spectrum grow lighting.

3. Does the Cultivaire™ (CGS) horticultural light cost less than NutriLED™ grow light?

Cultivaire horticultural light (CGS) provides full spectrum white light with high PAR output suited to indoor farming using a light-weight housing that is easily adapted to common growing strategies.

4. What is the difference between CGS's three Full-Spectrum white light options?

There are three options.

a. Full Spectrum Vegetative (FSV): FSV provides a 1.3:1 ratio between red and blue µmol/s.
    i. Full Spectrum Vegetative (FSV) provides the strongest blue wavelength, promoting leaf growth and pigmentation beneficial to the vegetative stage of plant growth.
b. Full Spectrum Flowering (FSF): Provides a 4.1:1 ratio between red and blue µmol/s.
    i. Full Spectrum Flowering (FSF) provides a higher red and far red content to promote plant reproduction and flowering.
c. Full Spectrum General (FSG): Provides a 2.1:1 ratio between red and blue µmol/s.
    i. Full Spectrum General (FSG) provides the most evenly distributed wavelength range, while still emphasizing blue and providing red contribution; the general source supports seed-to-flowering or seed-to-fruit growth stages.
d. See also our Horticulture Spectrum Reference Guide.

5. Why is the CGS more beneficial than traditional HID growing systems?

a. Energy
    i. Typical HID grow lights use 650W to over 1,000W of energy compared to the CGS at only 368W. Energy savings go directly to the bottom line and typically provide sufficient return on investment to justify re-fitting an existing growth operation, even without considering all the added benefits of the CGS.
b. Lamp Life and Light Output
    i. HID lamps only last 10,000 to 20,000 hours and quickly lose 40% of light output, continuing to decline as they age. The most conservative estimate of CGS LED life is 60,000 hours of operation at 90% lumen maintenance (TM21 reported) with over 200,000 hours projected over life (TM21 calculated) with only 30% light loss over the 200,000 hour period.
c. Maintenance
    i. The long life and high maintained light output of the CSG translates into significant maintenance reduction, which can result in higher operational efficiency and profit for the growing operation.

d. Heat.
    i. The operation of HVAC is systems can be a significant cost for indoor farming. CGS uses state-of-the-art LED solid state technology, which runs cool rather than hot, allowing for reduced HVAC costs, lower water evaporation, and the ability to place lights closer to the plants themselves, if desired.
    ii. Conversely, HID sources reradiate a significant amount of heat, driving up HVAC costs, causing higher water evaporation rates, and preventing growers from placing HID lights close to plants.

e. Dimming and Control Options.
    i. CSG comes standard with 0-10V dimming and is compatible with a number of Hubbell and general market control systems. This allows growers to tailor the light levels within a growing space to the specific needs of the plant. HID does not dim well and, at best, may offer a limited and costly 'step down' option when light level reduction is beneficial.

f. Re-start.
    i. CGS offers instant on/off cycles after power outages or at any time when lights may need to be turned on or off. HID lamps require a 15-minute 'cool down' time before they can be restarted.

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[1] Erik Runkle (professor in Michigan State University's department of horticulture).
Light Wavebands and Their Effects on Plants. http://gpnmag.com/wp-content/uploads/15_TechnicallySpeaking_GPN0315%20FINAL.pdf



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**Phone: 1-864-678-1000**

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