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EnvironmentalLights.com

EnvironmentalLights.com LEDs for Algae and Plant Growth

Environmental Lights is pleased to offer red and blue lighting solutions that will increase the effectiveness of bioreactors while reducing power consumption. The strongest absorption peaks for chlorophyll are at 660 nanometers (deep red) and 455 (blue.) These are the wavelengths people requested we make, and that is what we offer.

We made the red and blue bars separate to allow you to choose the ratio of red and blue you use for your process, and to allow you to experiment with changing the ratio.

These bars are laboratory grade, and were designed for the scientific community. If you have a lot riding on your project, choose our excellent red and blue bars, designed for the purpose.

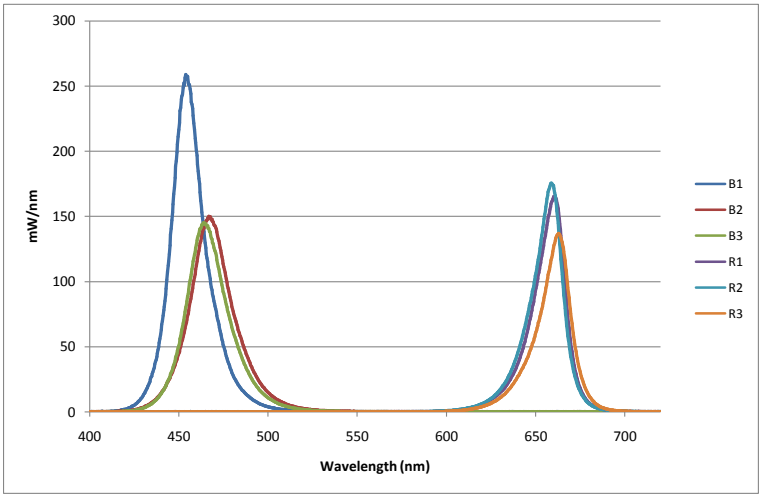
Features

- Very high flux. We made prototypes of several different high flux LED nodes and assembled them in a variety of ways. Then we chose the best, not the cheapest.
- 455 nm blue and 660 nm red for algae and other plants. Humans prefer 470 nm blue and 620 nm red. These are specifically designed to be grow lights, not decoration.
- Easily dimmable, using either pulse width modulation or current reduction (i.e. constant voltage reduction) dimming. We offer excellent options for either to allow you to vary the intensity of the light for experimental purposes or biological reasons.
- Energy efficient. Power is a major expense for a bio reactor. These bars have very high efficacy, defined as watts of radiant output per watt of power consumed. This will help you get the most red and blue radiation for the lowest power bill.
- Long lived. We estimate 40,000 hours before radiant output falls to 70% of initial. Actual lifetime may vary, because we expect people to use these in challenging conditions; however, we believe they may last 7 years or longer if driven properly with well-regulated drivers.
- UV resistant, to stand up to the sun.
- IP66 waterproof (dust-tight, protected against powerful water jets.) You can use these outdoors and clean your bio reactor or other grow apparatus with a typical power washer.
- Each bar is 2 feet long (60 cm) and comes with 2 clips and screws.
- RoHS (Reduction of Hazardous Substances) compliant. Lead was not used to make these products.

We tested three pairs of prototypes at an independent laboratory (Lighting Sciences Canada) and selected the "R1, B1" pair as superior. Then, we optimized the circuit board for red to further improve efficacy without reducing light output. Based on customer feedback, we reduced the length to 60 cm (2 feet.) The results are shown in bold below. The full report is at the end of this note.

	Independent Lab Results on Prototypes		**Production Models**	
				
	R1	B1	**HBRed660-24**	**HBBlue455-24**
LED nodes used per bar	66	66	**27**	**24**
Length (m)	1.644	1.644	**0.6**	**0.6**
Peak Wavelength (nm)	660.4	454.1	**660**	**455**
Voltage (V_{DC})	23.82	23.78	**24**	**24**
Current (A_{DC})	1.127	1.126	**0.42**	**0.42**
Wattage	26.85	26.78	**10**	**10**
Total Radiant Output (Watts)	3.763	6.237	**1.539**	**2.268**
Efficacy (Radiant Output/Power Consumed) (mW/W)	140	233	**154**	**227**

Peaks for red and blue are shown below. Our production models correspond to R1 and B1.



Power supplies

The bars use 24 volts DC. Use a well-regulated DC source. We offer many. The main considerations are:

- Size. For small scale installations, we recommend choosing a power supply that is 25% larger than the expected load. This margin for error accommodates slight miscalculations and parasitic line resistance. For larger installations, you can justify improving the engineering, installation and *in situ* measurements to ensure you can run the driver closer to its rated power to save money. We only offer the highest quality supplies, and they are engineered to take their full rated load.
- Do you need the power supply to dim the lights for experimental or other reasons? If so, the supplies will be more expensive and less powerful, requiring more installation expense.
- Do you need the power supply to be waterproof? If so, it will be more expensive.

To size your driver, add up the wattage of the bars. If you use 8 bars, that's 80 watts. For a small project, use an 80 watt/80% = 100 watt power supply. For a larger installation, you can use an 80 watt power supply, but pay careful attention to making sure your cabling is short and heavy gauge, and measure the DC voltage at the light bars at enough bars to make sure you are really delivering 24 volts at the light, not losing it in your wiring. We offer a calculator that allows you to determine voltage drop, depending on distance, wire gauge and load.

Some people who design large scale plants expect to use a large power supply with output in the kilowatt+ range. The problem with that is voltage drop: if you try to distribute 24 volts DC through a large bioreactor with many light bars, the cables would have to be inordinately large and expensive. The simple solution is to distribute the power supplies among the lights, to ensure that you are delivering 24 VDC at the lights. That is a far better design layout. With the HLG-240H-24, for example, you can power up to 24 bars, which is a lot, given the expected lighting density at many bioreactors.

Waterproof Power Supplies (Drivers)

We expect that most people will not need to dim these plant growth lights, but that they will need the supplies to be waterproof. These waterproof power supplies are completely sealed and perfect for outdoor lighting installations. Both of the hardwire waterproof drivers below are universal (100-240 VAC, 50/60 Hz.)

35 W 24 VDC Waterproof Power Supply
(LPV-35-24)

60 W 24 VDC Waterproof Power Supply
(LPV-60-24)

The hardwire waterproof drivers below are universal (90-305 VAC, 50/60 Hz.) This means you can use them on 277 VAC commercial service, as well as 120 VAC, 240 VAC and other commonly-found service voltages.

100 Watt 24 VDC Waterproof
Power Supply with PFC
HLG-100H-24

150 Watt 24 VDC Waterproof
Power Supply with PFC
HLG-150H-24

240 Watt 24 VDC Waterproof
Power Supply with PFC
HLG-240H-24

320 Watt 24 VDC Waterproof
Power Supply with PFC
HLG-320H-24

Features

- 24 volts DC output (constant voltage.)
- Accepts 90-264 volts AC input, 50-60 Hertz, auto-sensing (90-305 AC for HLG series.) Therefore, with the HLG-H, you can use 277 VAC, a common industrial voltage in North America.
- Protection: Short circuit / Overload / Over voltage.
- Super energy-efficient: it consumes almost no power in the no-load state.
- IP67 waterproof rating, fully encapsulated.
- UL class depends on wattage.

Specifications

Part No.	**LPV-35**	**LPV-60**	**HLG-100H**	**HLG-150H**	**HLG-240H**	**HLG-320H**
Rated Output Power (Watts)	30/35/35	40/60/60	100	150/150	192/240	264/320
Output Potential (VDC)	5/12/24	5/12/24	24	12/24	12/24	12/24
Output Current (amps)	6/2.9/1.5	8/5/2.5	4.2	12.5/6.3	16/10	22/13.3
Input Potential (VAC)	90-264	90-264	90-305	90-305	90-305	90-305
Input Potential (VDC)	No	No	127-431	127-431	127-431	127-431
Input Auto-sensing	Yes	Yes	Yes	Yes	Yes	Yes
Power Factor Correction	No	No	Yes	Yes	Yes	Yes
Length (mm)	148	162.5	220	228	244.2	252
Width (mm)	40	42.5	68	68	68	90
Height (mm)	30	32	38.8	38.8	38.8	42
Input Cord (mm)	600	600	300	300	300	300
Output Cord (mm)	600	600	300	300	300	300
Length (in)	5.8	6.4	8.7	9.0	9.6	9.9
Width (in)	1.6	1.7	2.7	2.7	2.7	3.5
Height (in)	1.2	1.3	1.5	1.5	1.5	1.7
Input Cord (in)	23.6	23.6	11.8	11.8	11.8	11.8
Output Cord (in)	23.6	23.6	11.8	11.8	11.8	11.8
Warranty (years)	2	2	5	5	5	5

We also offer the EnvironmentalLights.com dimming driver line. Like the others, it is UL and waterproof. Additional information is available, or call for assistance.

Finally, we offer many 24 volt DC non-waterproof enclosed drivers and adapters.

The hallmarks of EnvironmentalLights.com include engineering prowess and financial expertise. Usually, when we sell plant growth bars to the scientific community, our customers choose to enlist our engineering support, and we encourage you to do so. We can also help you with calculations you may require for capital expenditure justifications typically needed for financing large bioreactor projects. Please call us at 888-880-1880, 001-858-521-0233, outside the U.S.