Grow Lights, Racks & Benches

LaboSys®
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Controlled Environment Agriculture (CEA)

Applications

- Commercial farms.
- Research institutes and labs.
- Growing leafy greens and herbs.
- Medicinal plants.
- Supplementary lighting in Greenhouse.
- Vegetative of tomatoes, cucumbers, and other vine crops.
- Light-intensive crops such as rice and tobacco.
- Research and testing facilities.
- High value-added medicinal plants.
- Vegetative and flowing stages of plants.
- Commercial scale indoor facility.

CUSTOMIZABLE SPECTRUM

Optimized Spectral Design

- Optimum light recipe designed by plant scientists.
- Efficient light environment, enhance crop yield and quality.

Proven Quality & Reliability

- 25,000h life time and 2-year standard warranty.
- Additional warranty available upon request.
- IP 21 rated Tested for wet locations.

More Savings Less Trouble

- Energy saving up to 75%.
- Efficient management.
- Quick-connector for easy installation and replacement

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Artificial lighting is essential for growing plants indoors. This guide will walk you through the basics of understanding commercial horticultural lighting and things to take into consideration when shopping for fixtures.

What is PPFD and PPF Efficacy?

PPFD stands for Photosynthetic Photon Flux Density, which is the amount of light energy available per square meter of leaf surface area. The higher the PPFD, the more light energy available to your plants. Plants use that light energy during photosynthesis to convert carbon dioxide into carbohydrates, which they then use to grow and reproduce.

Multi-Tier Vertical Farming Racks

Conserve horizontal square footage by going vertical. Grow cannabis plants, vegetables, and other crops on two-tiers or more. Multi-tier racks (or archive shelves) come in a variety of options. These vertical grow racks can be stationary, mobile, or even stackable. Special designs are available, including multi-tiered Ebb and Flow benches, cloning racks, and drying racks.
This water temperature alarm is most likely caused by no water or insufficient cooling, which causes the laser alarm.
Pls check the chiller before installing this machine.

MULTI-TIER RACKS

Multi-tier racks help you maximize precious square footage by stacking plants vertically. These grow racks take the concept of traditional archive racking and apply it to indoor ag. High quality, rust resistant materials make these racks durable and reliable. LED lights can be mounted to each level so your plants can photosynthesize unimpeded. And a direct chain driven system ensures ease of mobility.

Single-Tier Growing Benches

Ebb and Flow benches are available in a variety of configurations. Bench top trays feature sturdy polystyrene with UV inhibitors for decades of worry-free use. They come in 9 standard sizes, but other widths may be special ordered. All lengths are customized to meet your exact needs. Options include stationary benches, rolling benches, track benches, expanded metal benches, and custom designs.

STATIONARY BENCHES

Grow benches are a must-have for greenhouses and sealed indoor farms. All bench sizes can be furnished with expanded metal or Ebb and Flow trays. Ebb and Flow trays play a crucial part in hydroponic irrigation.
This system allows you to periodically flood and drain nutrient solutions.

ROLLING BENCHES AND TRACK BENCHES

Increase your yield without adding square footage! These grow tables give you the ability to maneuver your benches. This eliminates the need for empty aisleways and helps maximize canopy space.

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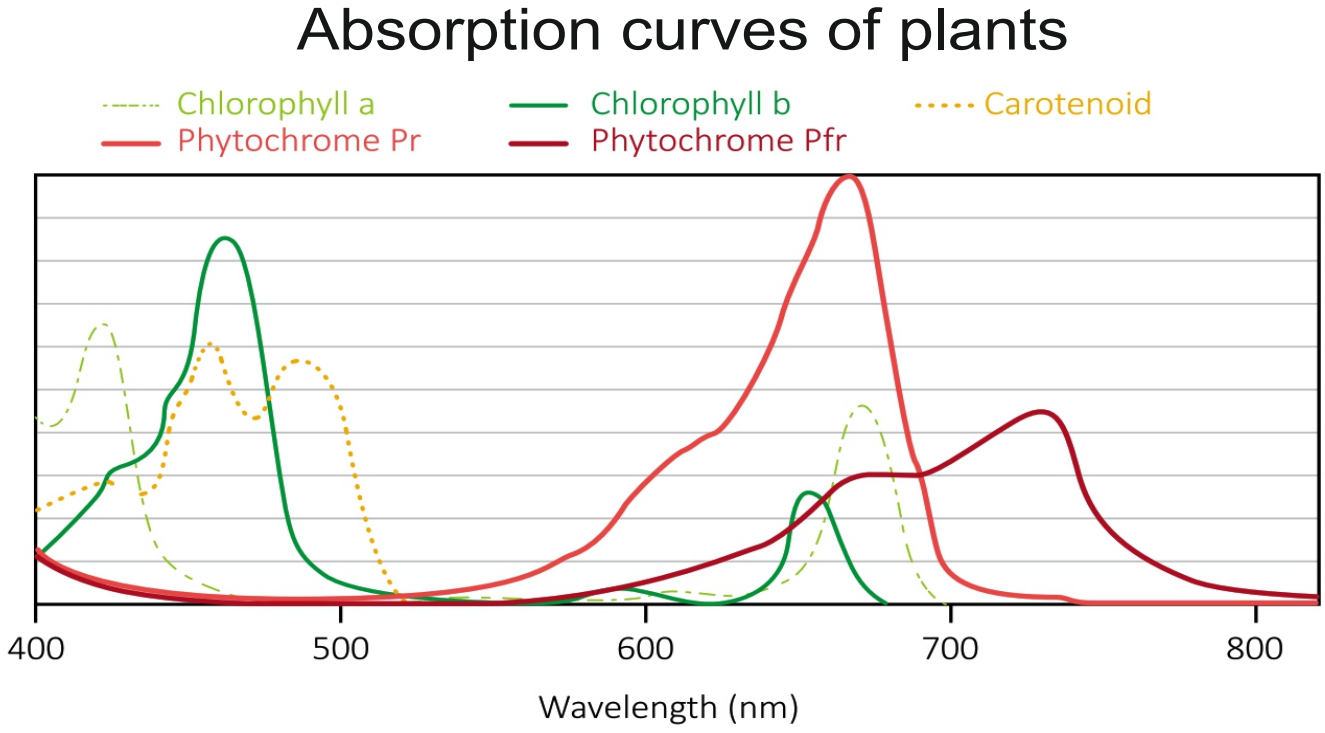
Technology – More PPF output for reduced installation costs

While the easiest way to compare grow lights is probably the price per µmol, there are many variables which make comparisons between various systems somewhat difficult.
One of the biggest influences on total project cost comes as a result of the output of the grow light expressed in PPF or Photosynthetic Photon Flux.
Since each luminaire needs to be cabled and preferably with not only the mains power but also smart controls wiring, the output of the grow light and required PPFD on the plant canopy immediately implements an extra cost on installation.
We see even in many cases that the foreseen construction bars tend not to deliver enough fixation points for some grow lights leading to extra construction profiles in the project and related extra costs.
The grow light delivers a stunning PPF up to 1.950µmol/s out of a single LED grow light.
And that's all full passive cooled thanks to the advanced heat pipe technology we use.
In this way the cost of cabling, smart controls costs and expensive circuit breakers can be strongly reduced.
Never the less a perfect light distribution over the plant canopy is achieved through the TIR lens technology.

Technology – Growth Spectra for Yield and advanced Morphology

To understand how your crops are going to react on different wavelengths and colors, you have to keep in mind that every crop and every growth stage requires an individual approach.
The amount of light affects the photosynthesis process in the plant.
This process is a photochemical reaction within the chloroplasts of the plant cells in which CO2 is converted into carbohydrate under the influence of the light energy.
The spectral composition of the different wavelength regions (blue, green, yellow, red, far red or invisible e.g. UV or IR) is important for the growth, shape, development and flowering (photomorphogenesis) of the plant. For the photosynthesis, the blue and red regions are most important. The timing / light duration which is also called photoperiod is mainly affecting the flowering of the plants. The flowering time can be



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Photosynthetic efficiency is mainly driven by chlorophyll a and b.
Chlorophyll a and b are mainly responsible for the photosynthesis and responsible for the definition of the area for the photosynthetically active radiation PAR.
The Photosynthetically Active Radiation (PAR) shows further photosynthetic pigments also known as antenna pigments like carotenoids - carotene, zeaxanthin, lycopene and lutein etc.
The Phytochromes Pr (red) and Pfr (far red) are mainly influencing the germination, plant growth, leave building and flowering.
The phytomorphogenic effects are controlled by applying a spectrum with a certain mix of 660nm

Different regions of the wavelength in the illuminaton

Wavelength range [nm]	Photosyntesis	Further Effects	Further Effects	Further Effects
200 – 280		Harmful		
280 – 315		Harmful		
315 – 380				
380 – 400	Yes			
400 – 520	Yes	Vegetative growth		
520 – 610	Some	Vegetative growth		
610 – 720	Yes	Vegetative growth	Flowering	Budding
720 – 1000		Germination	Leaf building and growth	Flowering
> 1000		Converted to heat		

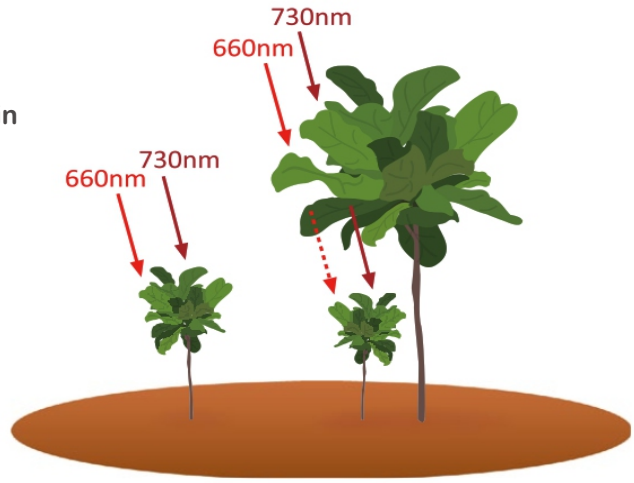
A typical application example for the use of 730nm:

One of the most obvious influence of far red light on a plant is the shade escape reaction.

Illumination with 660nm:

If the plant is illuminated mainly with 660nm it feels like illuminated in the direct sun and grows normally.

If the plant is illuminated mainly with 730nm it feels like growing in the shadow of another plant that shades the sun light.
Therefore the plant is reacting with an increased length growth to escape the shadow. This leads to taller plants



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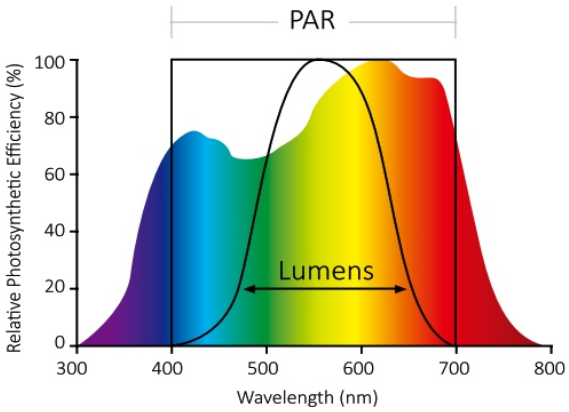
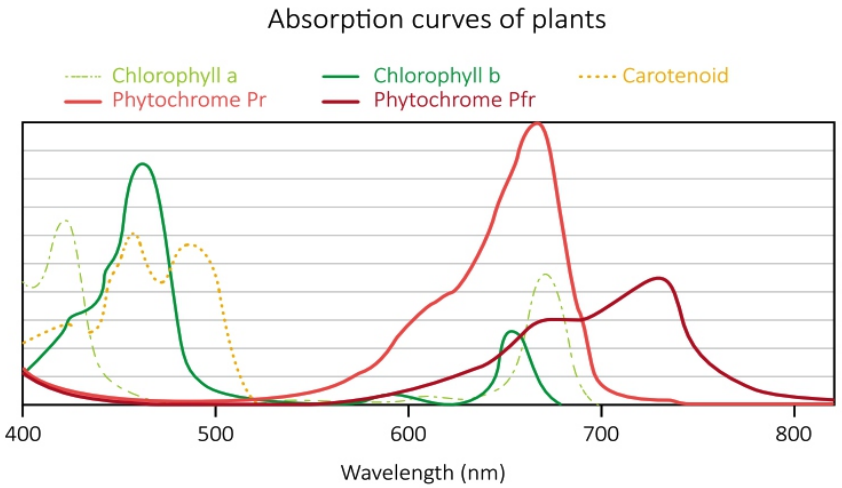
PAR, PPF, PPFD and DLI

Plants absorb radiation mostly in the 400-700 nm visible range and convert Co2 uptake and water into oxygen and glucose.

The amount of absorption in each wavelength depends on the cellular structure of the plant and may differ from species to species somewhat.





Another important parameter is Daily Light Integral which is defined as the total number of photons impringing per square meter in one day.

DLI is measured in units of mol/m2.d and each plant has a specific requirement of DLI for its growth. There is a relationship between PPFD and DLI which is given by:
DLI=PPFD x light hours per day x (3600/1000,000).

You can see from this formula that there is a trade-off between PPFD and number of light hours required to achieve a certain DLI value.

If there is a certain amount of natural lighting available for a green-house, it has to be subtracted from the original DLI value for proper artificial lighting fixture calculations.

Taking into account the DLI, PPFD and number of light hours per day, you can calculate the total number of fixtures required in a green-house to illuminate the crops.

Calculation from DLI to PPFD and needed number of grow lights

12 moles / 16 hr photoperiod / 60 minutes / 60 seconds = 0.000208 moles

(This gives us the amount of moles delivered per second per square meter)

0.000208 moles x 1,000,000 = 208 µmols per second per meter squared (µmol/sm²)

So in this case with a CoolStack® producing a PPF of 1.800µmol/s you can roughly cover 9 square meter of canopy.

With the height of the luminaire in mind the beam angle can be calculated leading to the ideal TIR lens for

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What are typical µmol/s.m² values for horticulture lighting?

What light level for what type of crop?

Plant	Min (µmol/s.m²)	Max (µmol/s.m²)	Typical (µmol/s.m²)
Tomato	170	250	185
Pepper	100	200	100
Cucumber	100	200	150
Cannabis Vegetative growth	280	450	350
Cannabis Flowering	650	1,000	850

What light level for what potted plant?

Plant	Min (µmol/s.m²)	Max (µmol/s.m²)	Typical (µmol/s.m²)
Orchid / Phalaenopsis	80	130	105
Dendrobium	130	260	195
Bromelia	40	90	50
Anthurium	60	130	70
Kalanchoë	60	105	82.5
Potted chrysanthemum	40	80	50
Potted rose	40	60	50
Geranium	40	60	50

What light level for what cut flower?

Plant	Min (µmol/s.m²)	Max (µmol/s.m²)	Typical (µmol/s.m²)
Chrysanthemum	105	160	117.5
Rose	170	300	182
Lily	80	100	90
Lisianthus	170	200	185
Alstroemeria	60	105	82.5
Anthurium / Orchid - cut	80	105	92.5
Freesia	70	105	87.5
Gerbera	80	105	92.5
Tulip	25	40	32.5

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SPECIFICATIONS	
Light Source	MultiwaveCool LED
Input Power	300W - 400W spectrum depending
Input Voltage	90 - 305 Vac or 249 - 528 Vac
Fixture Dimensions	W180x L980 x H110 (mm)
Weight	12Kg
Thermal Management	Active air flow
Dimming	0 - 10V, PWM, DALI, BLE Bluetooth,
Light Distribution	Advanced TIR - 45°, 60°, 80°, 90°, 105°,
Lifetime	75.000 hrs - L90
Power Factor	> 95%
Warranty	2 years standard
Material	Aluminum / Polycarbonate
PAR Output (Center)	
6 inches	1000 µmol/m2/s
12 inches	500 µmol/m2/s
18 inches	300 µmol/m2/s
24 inches	150 µmol/m2/s
36 inches	75 µmol/m2/s
48 inches	25 µmol/m2/s
60 inches	10 µmol/m2/s

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