

SYLVANIA



Lighting solutions for plant growth

Sylvania Horticulture Range

Light your world

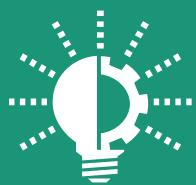
About us: Sylvania's Horticulture expertise

The world's first light sources for plant growth were invented in 1959 by Sylvania Lighting. Over the past 6 decades our passion for excellence in product design and performance have successfully enabled new possibilities for modern horticulture.

Gro-Lux® SHP lamps have achieved among the highest sustained photosynthetic efficacies in the world and that same technical leadership has now been applied to LED technology.

Innovation:

We've been bringing lighting products to market since 1901



Specialist expertise:

Horticulture R&D centre of excellence in Europe



Collaboration:

Working with you closely to provide the correct product for your business



Quality:

Premium lighting solutions which maximise your crop quality and yield





Providing the right lighting products to enable your business to grow



We understand the importance of being agile, adapting and growing to match the challenges of global markets. Sylvania works in partnership with you to provide innovative horticulture lighting solutions which enable your business to change gears and grow.

- Your global lighting partner
- Active in 25+ countries
- 12 manufacturing facilities
- Business operations in: Europe, Latin America, Asia, Middle East and Africa



Specialised R&D team

Tienen (Belgium) is Sylvania's competence centre for special lighting applications with a deep history in R&D specifically for Horticulture. A team of specialists used to finding solutions for all those industrial and technology challenges that allow brilliant ideas to become effective and valuable outcomes for your business.

The well known Gro-Lux® spectrum to enhance plant growth was developed by Sylvania's R&D team in the early nineties. In more recent years the team developed the gas cooled linear LED Helios with customised spectra.

Stimulating growth since 1959

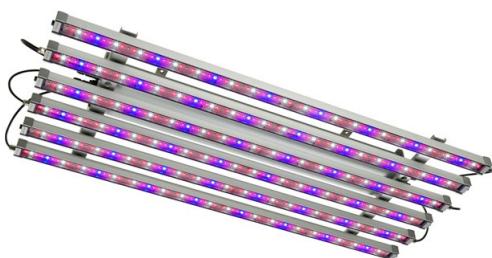
Sylvania Horticulture solutions



A SYLVANIA brochure on Gro-Lux® special lamps in 1964



**GroXpress
LED 340W
FullSpectrum+**



**Gro-Lux® LED Linear
Modular System**

**Gro-Lux® LED
E27 Far-Red**



2018

2019

2020

2021

Gro-Lux® LED E27



**Gro-Lux®
Helios LED**





The exponential growth of horticultural indoor farming

Importance of light

The demand for horticulture products has never been higher with growing populations, rising food prices and the desire for fresh, organic all year-round crops.

The rapidly exponential growth of horticultural indoor farming is due to increased modern requirements and demands. It gives growers control of year-round crops that are not affected by pests, weather conditions and changing, and at times, extreme temperatures.

Food crops are just one of the many applications as the demand for out-of-season flowers and medicinal plants rises.

Temperature, light and carbon dioxide levels affect the rate of photosynthesis and therefore have an impact on crop yield. It is important for the grower to find the optimum growing conditions within an indoor farming environment via temperature & humidity control, lighting, addition of CO₂ into the air, regular watering and soil enrichment.

The best way to maximise photosynthesis is to supply as much PAR light as possible and to support the plant in keeping its energy and water balances in equilibrium. One way to do this is through the use of plant growth lighting solutions, such as those produced by Sylvania.

The global greenhouse horticulture market is currently valued at approximately 30 billion USD and is expected to grow by a further 9% by 2026.

(Market data forecast: Greenhouse Horticulture market Feb 2020).

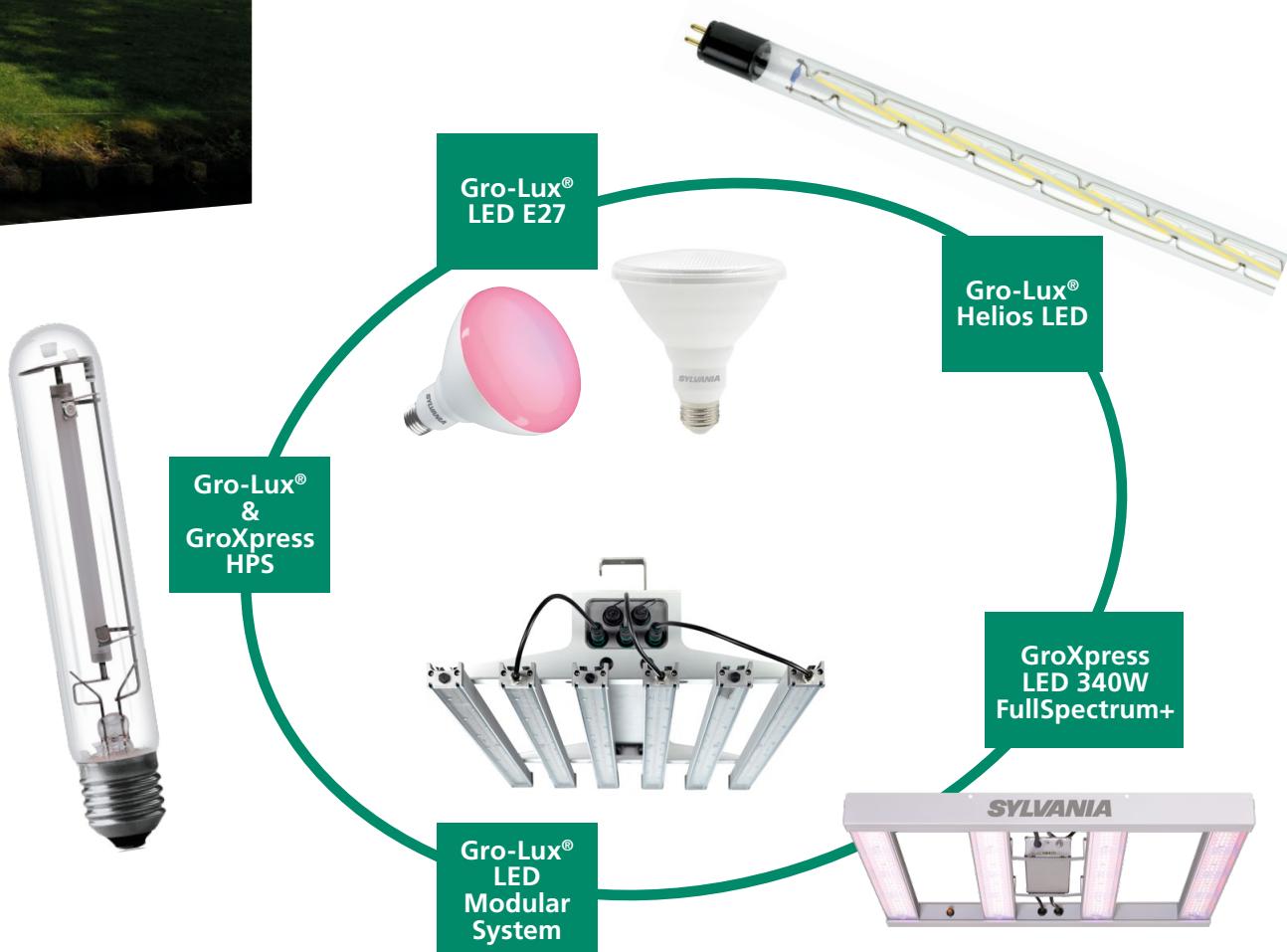


Sylvania's Plant growth Lamp and Fixture range

A plant growth lamp is a light source that produces the proper balance of energy needed for plant growth. It is designed to provide this energy for plants, and for no other purpose.

Sylvania's Gro-Lux® SHP range is one of the most popular and highest performing plant growth lamps on the market due to its high efficiency in converting electrical energy into Photosynthetically Active Radiation (PAR). It is suitable for a plethora of applications related to plant cultivation.

In recent years there has been a move towards LED technology and Sylvania has applied its technical leadership in plant growth lamps to range of LED lamps and fixtures to suit all types of horticultural applications.



Indoor farmers need flexibility from their horticulture lighting systems to meet plant growth needs and maximise yield. Sylvania has an extensive range of products which can be customised to meet your specific needs.

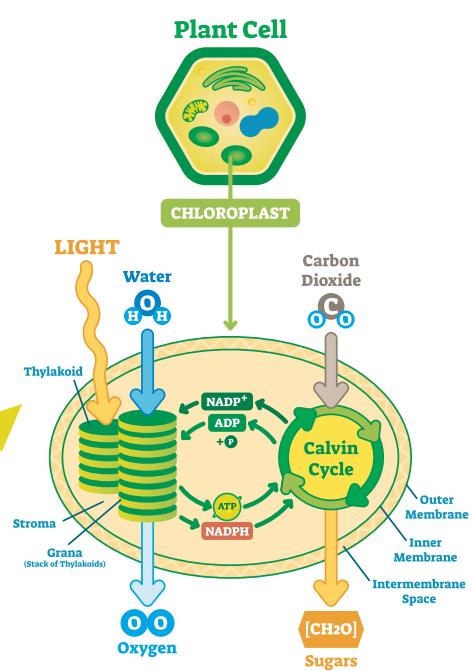
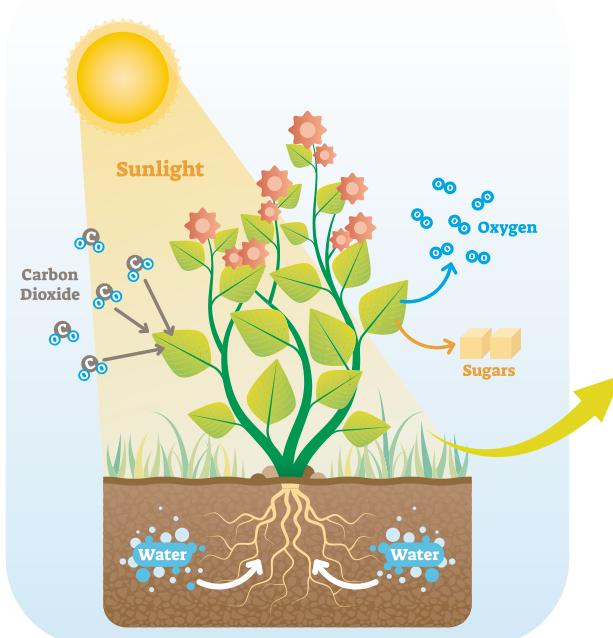
We turn light into food

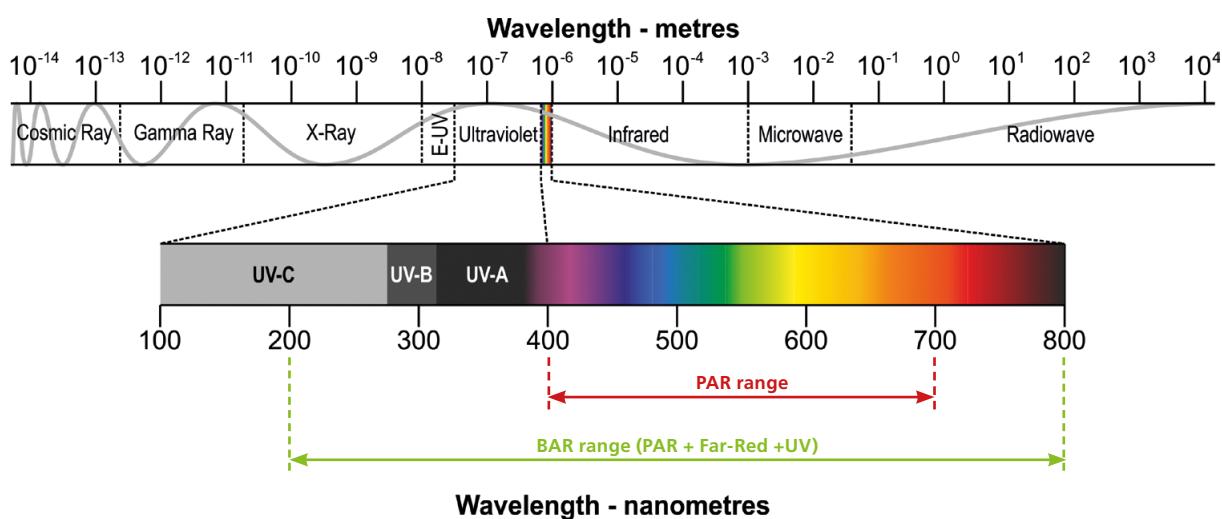
Importance of light



Light plays three major roles in the world of plants; it gives the plant information about the surroundings it is growing in, delivers energy to the plant to enable it to grow and develop and it influences the long-term health of the plant.

The process by which plants transform light energy into chemical energy is called photosynthesis. During photosynthesis, light energy is captured and used to convert water, carbon dioxide, and minerals into oxygen and energy-rich sugars.





Quality and intensity of light

The designated spectral range (wave band) that is usable for photosynthesis is defined in the "photosynthetically active radiation" or PAR range. This is defined from a light wavelength of 400nm up to 700nm.

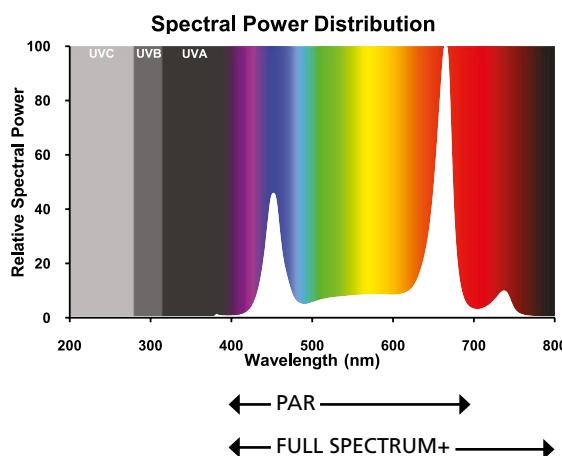
However, all wavelengths deliver information about the plant's surroundings, for example: being shaded by another plant, full sunlight etc. This information influences its shape, size of leaves, stem and root development and more. Therefore, it is important for the plant to be exposed to a wider range of wavelength than just PAR.

To take this into account the range of PAR was extended to the "biologically active radiation" (BAR) range, 200nm to 800nm. By exposing the plant to this larger range, we can trigger the plant's development mechanisms (Photomorphogenesis) on purpose to control it's growth to our liking. This can, for example, lead to a greater harvest or influence the time of flowering.

Growth beyond the boundaries of PAR

Full Spectrum+

Sylvania has developed an LED plant-specific spectrum which delivers not only light over the whole PAR spectrum, but also beyond the boundaries of PAR lighting.



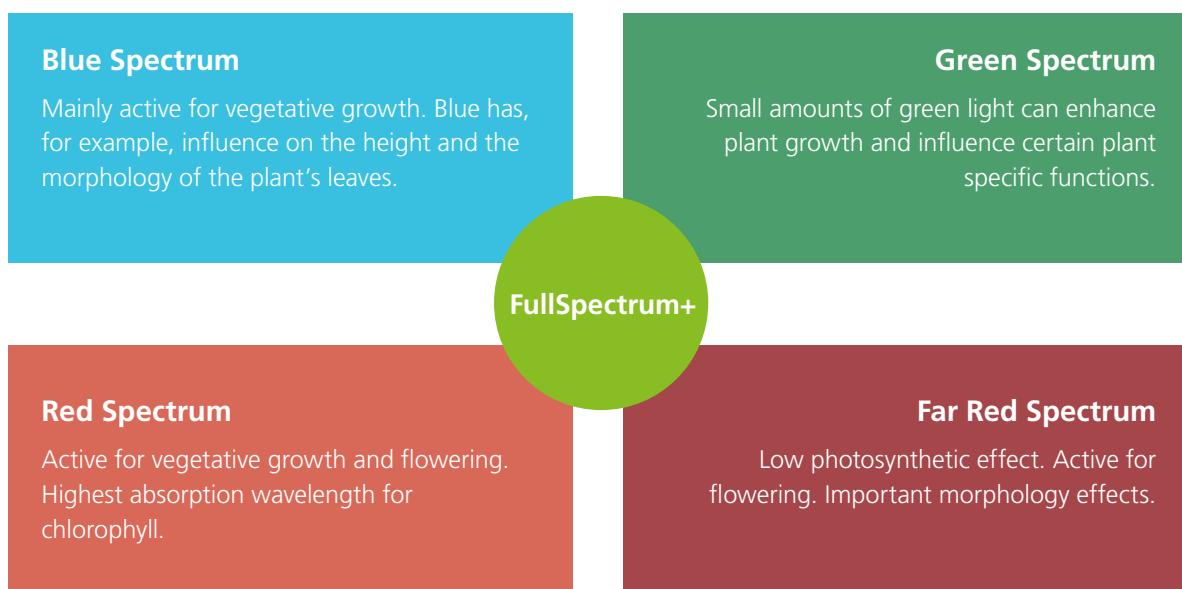
Numerous tests proved that not only the existence of certain wavelength is crucial for plant growth and flowering - but also the ratio between the given wavelength.

FullSpectrum+ LED has the right proportion of needed wavelengths including correct portions of Far-Red radiation. This brings the grower into the situation to only use one spectrum during the whole growing process.

We specifically designed FullSpectrum+ LED to be the most efficient spectrum on the market - backed by recent scientific standards such as DIN 5031-10:2018.

FullSpectrum+ LED is one of the most plant efficient spectra available today.

FullSpectrum+ LED is a tailor made plant specific spectrum, designed for the highest plant specific efficiency and highest possible yields.



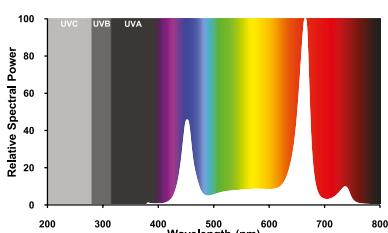
We believe that a plant light should be 100% usable for the plant - this is why we do not waste energy in providing too high amounts of white light. This gives the light a more red appearance to the human eye.

Studies found out that not just the availability of these spectra are important but also the ratios to each other.

The Gro-Lux® FullSpectrum+ combines all the needed spectra together and is the ideal solution for all indoor lighting applications.

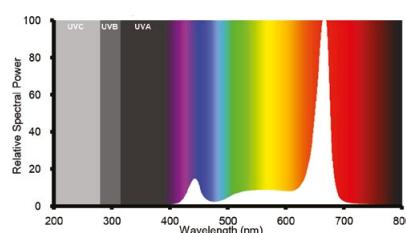
Choice of Horticulture Spectra

Plants can require different spectral needs at specific phases in their growth. Therefore, Sylvania offers 3 spectra types in addition to FullSpectrum+. We welcome enquiries for other customer or application-specific spectra.



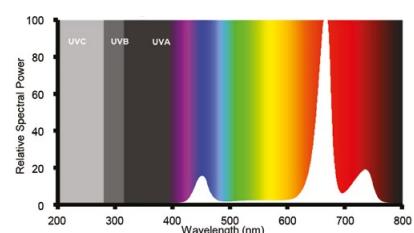
Far-Red spectrum

Used to simulate sunrise/sunset or to increase far-red radiation of an existing lighting solution in applications when no natural daylight is available



Vegetative spectrum

Provides perfect lighting for small plants, photoperiodic lighting or supporting the growth phase only in applications where natural sunlight is present.



Flowering spectrum

Offers great supplemental light for all flowering plants



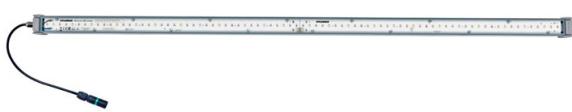


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Gro-Lux® LED Linear Modular System

Gro-Lux® LED Linear luminaire, offers a well thought-out solution for all phases of plant growth for each type of lighting in commercial horticulture.



Gro-Lux® LED Linear Modular System



Gro-Lux® LED Linear is the most advanced plant light solution available on the market today and has been built with the professional grower in mind. The modularity of the Gro-Lux® LED linear gives plant growers' flexibility from their horticulture lighting systems to meet plant growth needs and to maximise yields. It is the right solution for any type of installation, from small greenhouse facilities to large scale installations or for indoor farming projects.

There are two different types of Gro-Lux® LED Linear modules available which can be used on their own or fixed to the Gro-Lux® LED Linear frames for a maximum output on top lighting installations. To increase the output further up to 6 of these IP66 rated luminaires can be connected in a series.

To ensure optimum growing conditions Sylvania offers two types of LED Gro-Lux® Modules:

- Vegetative spectrum to support growth of plants and to enhance natural spectrum of light in greenhouse environments.
- FullSpectrum+ delivers a plant-specific full spectrum usable as sole source light source.

Features

- Anti-Reflex coating gives one of the highest transmission rates on the market
- Waterproof: IP66 protection against liquid water ingress
- Humidity-proof: Integration of osmotic membrane vents to eliminate humidity ingress
- Passive-cooling minimises heat build-up
- Easy installation: push-and-click system
- Modular system allowing different modules to be easily clipped in and out
- Through-wiring allows for the connection of up to 6 fixtures in a series
- Highly durable and rubber-insulated cables that won't degrade under solar radiation
- Smart fixture enabling wireless dimming by Casambi system
- 100% UV-Stable cables and plugs
- L90 Lifetime at 25°C: 60,000hrs
- Made in Britain

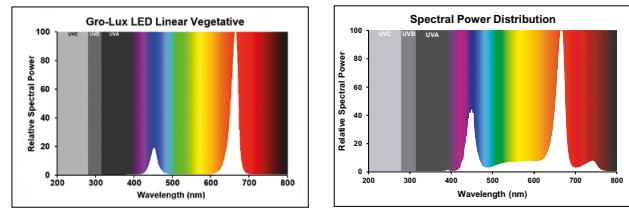
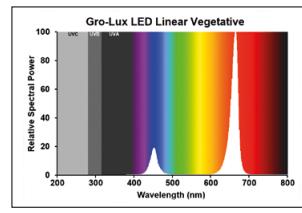
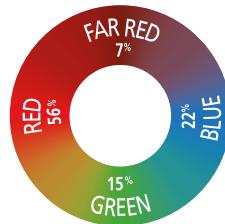
Product information

Code	Item description	Spectrum	Wattage (W)	Voltage (V)	Beam Angle (°)	Photosynthetic Flux - PF (Phytolumen)	Photosynthetic Photon Flux Inc. Far-Red (μmol/s)	Photosynthetic Photon Efficacy incl. Far-Red (μmol/J)	Packaging Quantity (pcs)
Gro-Lux® LED Linear Complete									
0020912	Gro-Lux® LED linear Full Spectrum+ Complete (6 modules)	FullSpectrum+	398	220-240	120	183,000	1128	2.83*	1
Gro-Lux® LED Linear Modules									
0020913	Gro-Lux® LED linear Vegetative Module	Red/Blue (85%/15%)	59	42	120	34,000	180	3.06	1
0020914	Gro-Lux® LED linear Full Spectrum+ Module	FullSpectrum+	63	45	120	30,500	188	3.00	1
Gro-Lux® LED Linear Frame and Gearbox									
0020909	Gro-Lux® LED linear frame 4x	-	-	-	-	-	-	-	1
0020910	Gro-Lux® LED linear frame 6x	-	-	-	-	-	-	-	1
Code	Item description	*system efficacy							
Gro-Lux® LED Linear Accessories									
0020920	Dim Controller Gro-Lux® LED								

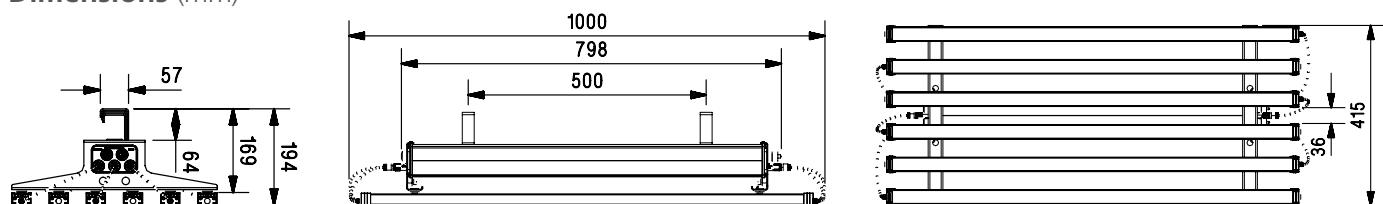


Dim Controller

Photometric Data

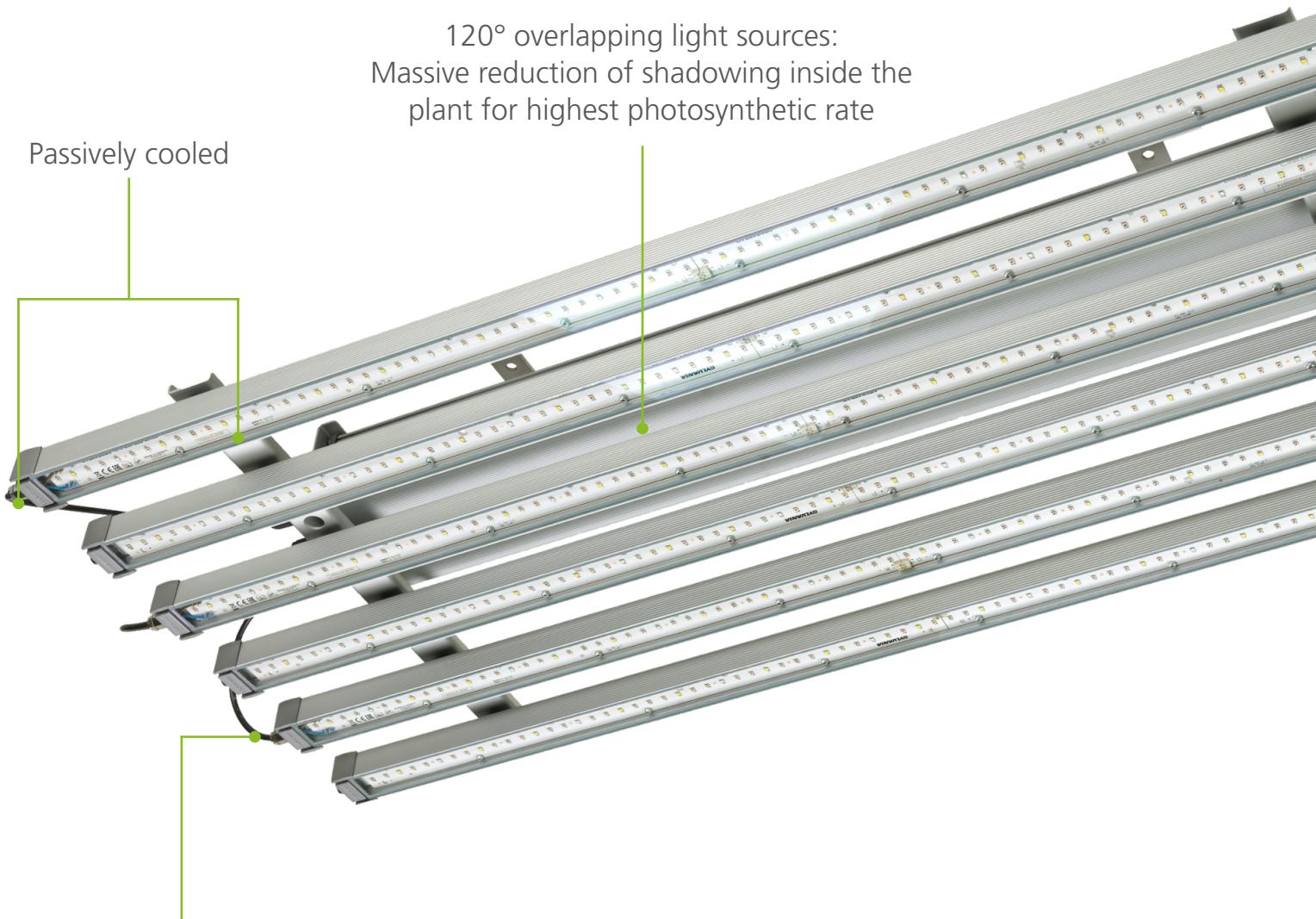


Dimensions (mm)



120° overlapping light sources:
Massive reduction of shadowing inside the
plant for highest photosynthetic rate

Passively cooled



Heat and UV
stable cables

Easy installation



Gro-Lux® LED Linear

The Gro-Lux® LED Linear is
manufactured in our UK
factory and uses only the
highest quality components to
ensure advanced product
performance, even in the most
challenging of conditions.



Membrane plugs



LED Emitters

End caps made from painted aluminium

Anti-reflective glass: Superior optical efficiency

Waterproof self locking
plugs, and stainless steel
cable glands for superior
sealing quality

Through wiring:
Allows connection of up to
6 fixtures in series possible

Flexibility



Flexibility at your fingertips

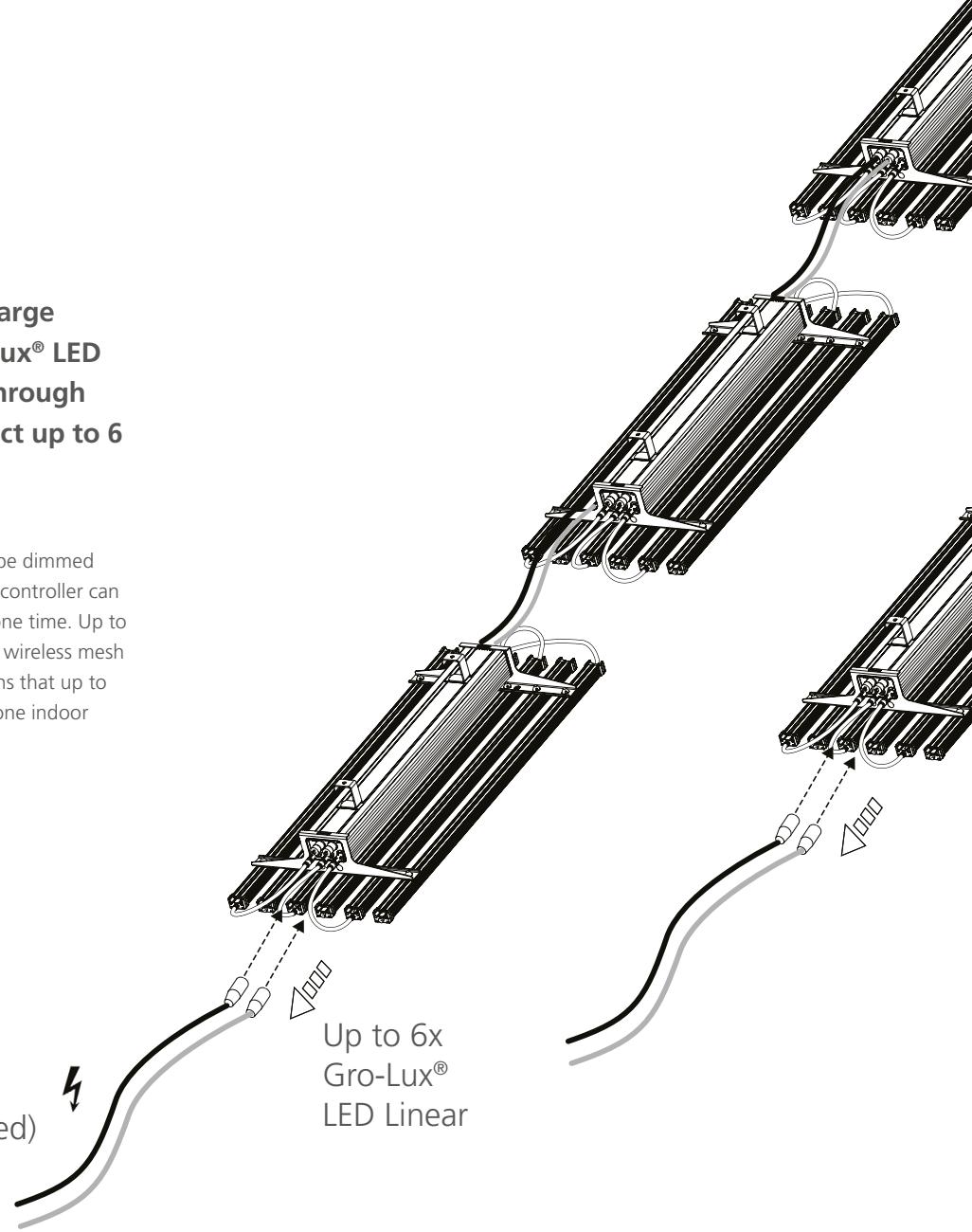
Through Wiring

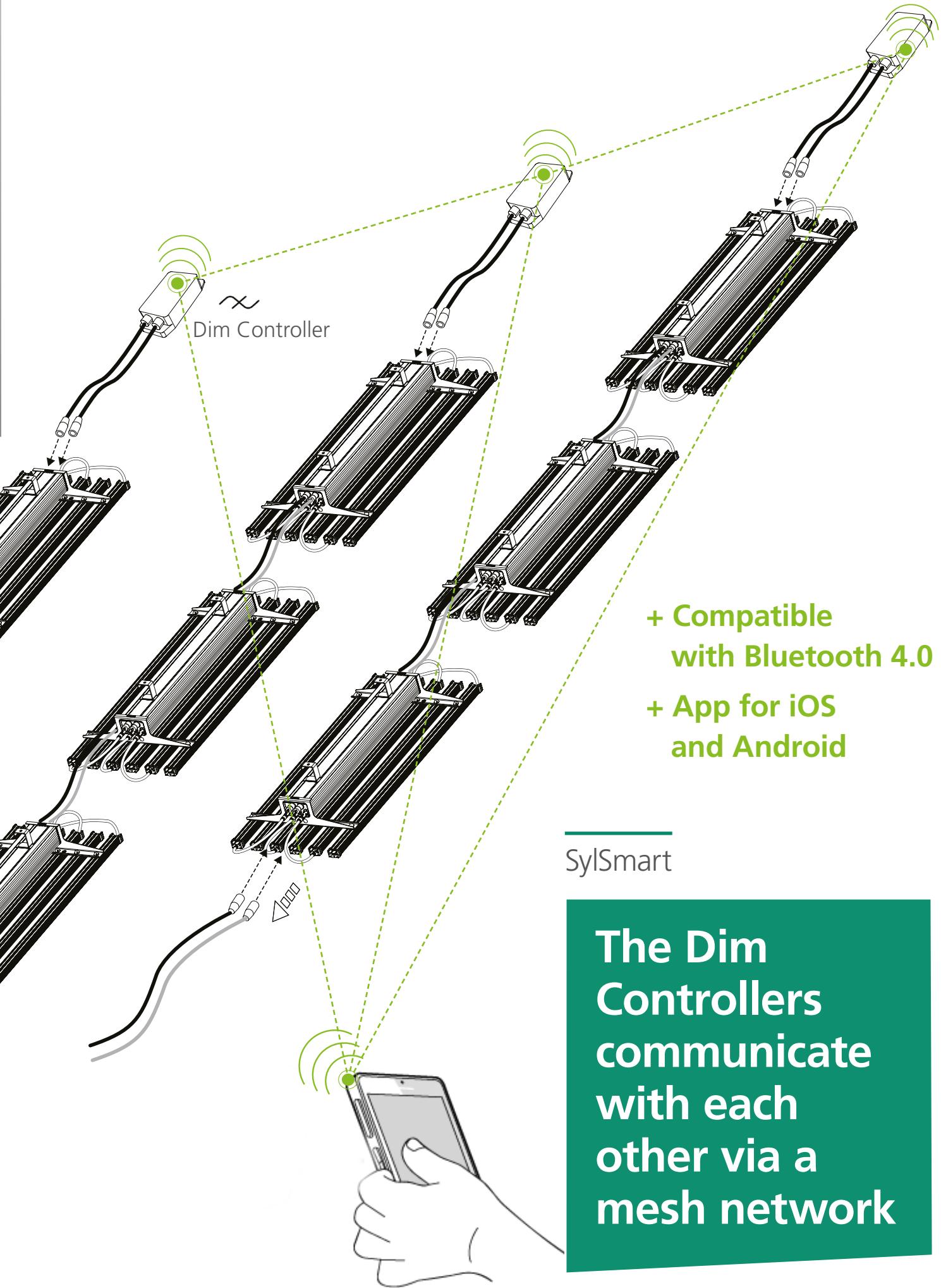
From small greenhouses to large industrial installations Gro-Lux® LED Linear offers the solution. Through wiring enables you to connect up to 6 luminaires to one power socket.

Gro-Lux® LED Linear modular system can be dimmed using a Casambi wireless controller. Each controller can adjust the light output of 6 luminaires at one time. Up to 127 controllers can be used together via a wireless mesh network on a bluetooth device. This means that up to 762 Gro-lux® LED fixtures can be used in one indoor farming facility.

Mains Cable
(plus Dimming
Cable if required)

Up to 6x
Gro-Lux®
LED Linear







GroXpress LED 340W FullSpectrum+

GroXpress LED 340W FullSpectrum+ is a dimmable, low-profile luminaire. This LED toplight has been carefully engineered so that the light penetrates deeper into the plant, leading to increased growth rates of indoor grown flowers, vegetables and crops.

GroXpress 340W FullSpectrum+



GroXpress LED 340W FullSpectrum+ has been developed for smaller spaces and growing racks with low ceilings. It consists of four LED modules which create a large lighted area enabling light to penetrate deeper into the plant, thus increasing growth rates and yield. Sylvania's plant specific and proven FullSpectrum+ has been incorporated into this luminaire, therefore ensuring superior results in all stages of growth and bloom.

Features

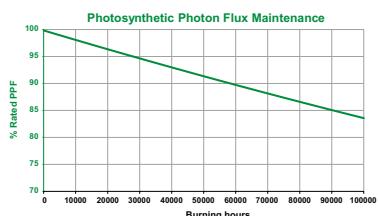
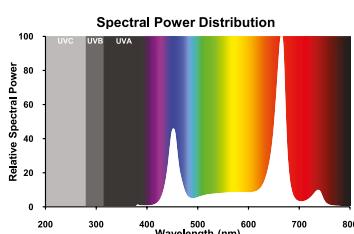
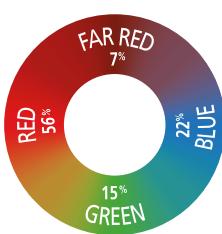
- Consists of four LED modules which create a large lighted area (for maximum uniformity) enabling light to penetrate deeper into the plant - "3D plant lighting"
- Uses Gro-Lux® FullSpectrum+ ; a plant specific spectrum for all stages of plant growth, optimised for applications without natural sunlight
- Suitable for plant production in 80x80cm or 100x100cm areas with first-class photosynthetic and morphologic spectrum
- Max. Output of ~800 μ mol/s/m² in 50cm distance
- Suitable for low ceilings or growing racks – just 53mm in height
- Dimming switch located on the luminaire for easy operation- no accessory required
- Passively cooled – increased LED board surface area leading to increased cooling for maximum performance and lifetime
- Plug in and grow – includes power cable and two different hanging solutions (hook or cable suspension)
- Made of anodised aluminium, to protect against rust and extend the life of the product
- Engineered in Belgium
- 3 year warranty

Product information

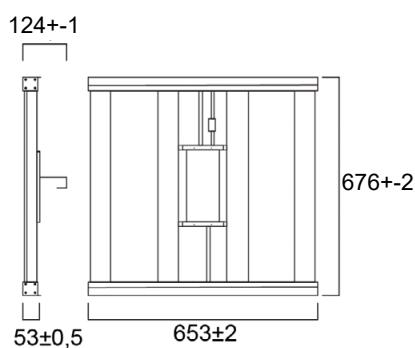
Code	Description	Spectrum	Plug	Wattage (W)	Voltage (V)	Beam Angle (°)	Photosynthetic Flux - PF (Phytolumen)	Photosynthetic Photon Flux Inc. Far-Red (μ mol/s)	Photosynthetic Photon Efficacy incl. Far-Red (μ mol/J)	Packaging Quantity (pcs)
Gro-Xpress LED										
0020930	Gro-Xpress LED Toplight Fullspectrum+ EUR	FullSpectrum+	2-pin	340	220-240	120	12,500	780	2.3	1
0020931	GroXress LED 340W FullSpectrum+ UK***	FullSpectrum+	3-pin	340	220-240	120	12,500	780	2.3	1

*** Available on request. Minimum MOQ applies

Photometric Data



Dimensions (mm)





Gro-Lux® & GroXpress SHP

Sylvania's most popular plant growth lamps, they can be used as a stand-alone source of indoor lighting or as a supplement to natural daylight in greenhouse lighting and full-spectrum lighting.

Gro-Lux® & GroXpress SHP

High Pressure Sodium technology has been used as standard in plant lighting in professional horticulture for over 25 years. It is a cost-effective solution for plant cultivation due to the low initial costs per square meter of area.

Sylvania's Gro-Lux® SHP range was developed in 1995 by Rudy Geens, who is Technology Manager within our special applications competence centre, Tienen. It was the 1st product of it's kind on the market and remains one of Sylvania's highest selling horticultural lighting products.

This was followed in 2005 by the development of the Gro-Lux® SHP-TS 400V lamp. A revolutionary product which was the first of it's kind to work on both magnetic and electronic ballasts. It's performance is outstanding on both ballast types and continues to be a popular product within the Gro-Lux® SHP range.

Why does Sylvania's Gro-Lux® SHP range continue to be successful within the Horticulture market?

- It is one of the world's most powerful plant growth lamps
- Delivers high photosynthetic efficacy
- Sylvania's Gro-Lux® spectrum has been specially developed to be suitable for all stages of plant growth.

The arc tube is optimised to effectively convert electrical energy into photosynthetically active radiation (PAR)



Gro-Lux® SHP-TS



Sylvania Gro-Lux® lamps are among the world's most powerful plant growth lamps with the best photosynthetic efficacy. The patented burner enables SHP Gro-Lux® lamps to efficiently convert electrical energy into photosynthetically active radiation. Due to the specially developed Gro-Lux® spectrum, the lamps are particularly suitable for all stages of plant growth.

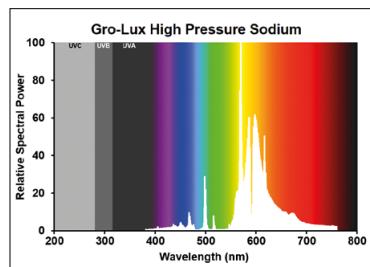
Features

- Sylvania's arc tube delivers one of the highest photosynthetic efficiency in the world
- Performance maintained at an exceptional level due to structure of the outer bulb
- Optimised for the highest Phytolmens (up to 215,000) or PAR output (up to 1180umol/s)
- Gro-Lux® light spectrum maximises red output essential for plant growth

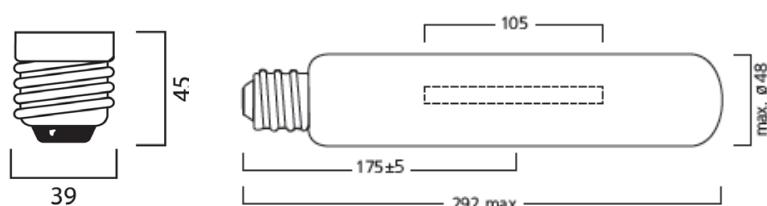
Product Information

Code	Item description	Socket	Watt (W)	Volt (V)	Amp (A)	Mains Voltage (V)	Beam angle (°)	PAR (μmol/s)	Visible lumens (lm)	Phyto-lumens	Efficiency (PAR/W)	Lifetime at Ta 25 C (hrs)	Packaging Quantity
0020819	SHP-TS Gro-Lux® E40 250W	E40	265	115	2.6	230	360	425	34,000	75,500	1.7	26,000	12
0020807	SHP-TS Gro-Lux® E40 400W	E40	425	120	4.0	230	360	713	58,000	128,000	1.7	26,000	12
0020808	SHP-TS Gro-Lux® E40 600W	E40	615	125	5.5	230	360	1,100	90,000	200,000	1.8	26,000	12
0020809	SHP-TS Gro-Lux® E40 600W 400V	E40	620	200	3.5	400	360	1,180	88,000	215,000	1.9	26,000	12

Photometric Data



Dimensions (mm)



GroXpress SHP-T



Sylvania's GroXpress is an ideal solution for small and medium scale greenhouses and domestic plant growth facilities for flowering plants and vegetables. It also provides an opportunity for out of season crops. SHP-T GroXpress is optimized for high Phytolumens and its light spectrum maximises red output which is essential for plant growth.

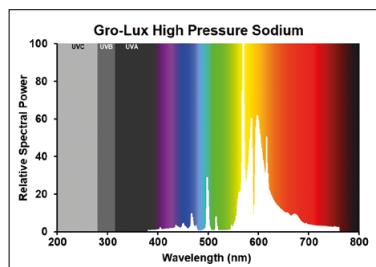
Features

- Delivers high photosynthetic efficiency
- GroXpress light spectrum maximises red output essential for plant growth
- Optimised for the highest Phytolumens (up to 165,000) or PAR output (up to 960umol/s)
- Suitable for a plethora of applications related to plant growth

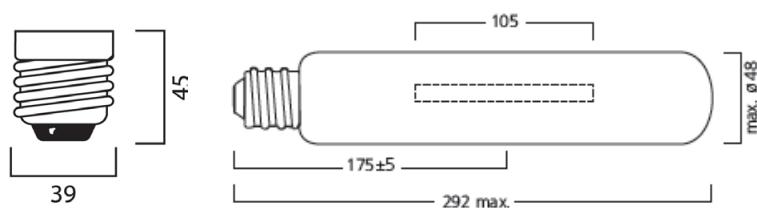
Product Information

Code	Item description	Socket	Watt (W)	Volt (V)	Beam angle (°)	Colour Temp. (K)	PAR (μmol/s)	Light Output (lm)	Phyto-lumens	Efficiency (PAR/W)	Lifetime at Ta 25 C (hrs)	Packaging Quantity
0020816	SHP-T GroXpress E40 250W	E40	250	100	360	2,000	370	33,000	66,000	1.5	24,000	12
0020817	SHP-T GroXpress E40 400W	E40	400	100	360	2,000	640	55,000	115,000	1.6	24,000	12
0020818	SHP-T GroXpress E40 600W	E40	600	115	360	2,050	950	90,000	165,000	1.6	24,000	12

Photometric Data



Dimensions (mm)





Gro-Lux® LED PAR

The Gro-Lux® LED E27 series offers a complete range of lamps for horticulture, offering three spectra to meet all your needs: Far-Red, Vegetative and Flowering. Sylvania horticulture LED lamps have one of the highest PPF values on the market, with up to 39 μ mol/s.

Gro-Lux® LED PAR



Sylvania's Gro-Lux® LED PAR range supports the growth of the plants at specific phases in their growth.

Far-Red spectrum – used to introduce or boost the flowering of a given plant, simulate sunrise/sunset or to increase Far-Red radiation of a given lighting solution

Vegetative spectrum – provides perfect lighting for small plants, photoperiodic lighting or supporting the growth phase

Flowering spectrum – offers great supplemental light for all flowering plants

Features

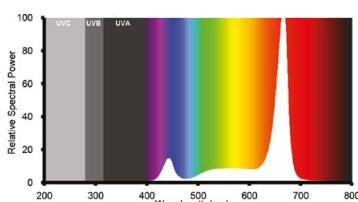
- Fits in every standard E27 base (120-240V for Vegetative and Flowering, 220-240V for Far-Red)
- IP44 rated/IP40 (Far-Red)
- Low power consumption
- Highest output for an E27 plant specific lamp
- Three different spectra available: Vegetative, Flowering and Far-Red
- Photosynthetic Photon Efficacy up to $2.3\mu\text{mol}/\text{J}$
- 25,000 hrs $L^{70}B^{50}$ flux maintenance
- Far-Red lamp has a narrow beam angle to enable replacement of incandescent/halogen spotlights used in photoperiodic lighting
- Suitable for applications such as Photoperiodic lighting, Propagation, night-interruption

Product Information

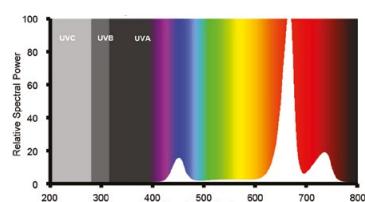
Code	Description	Spectrum	Base	Power (W)	Current	Voltage (V)	Beam angle	Photosynthetic Flux - PF (Phytolumen)	Photosynthetic Photon Flux (umol/s)	Photosynthetic Photon Efficacy (umol/J)	Photosynthetic Photon Flux incl. Far-Red (umol/s)	Photosynthetic Photon Efficacy incl. Far-Red (umol/J)	IP rating	Lifetime at Ta 25 C (hrs)	Packaging Quantity
Gro-Lux® LED PAR															
0020965	Gro-Lux® LED E27 Vegetative	White and Red	E27	17	150mA	120-240	115	125	39	2.3	39	2.3	IP44	25,000	1
0020966	Gro-Lux® LED E27 Flowering	White, Red and Far-Red	E27	17	150mA	120-240	115	125	31	1.8	38	2.2	IP44	25,000	1
0020970	Gro-Lux® LED E27 Far-Red***	White and Far-Red	E27	10	85mA	220-240	36	121	7	0.7	20	2	IP40	25,000	1

*** Available on request. Minimum MOQ applies

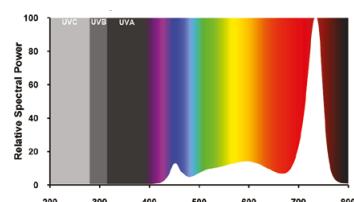
Photometric Data



0020965 Gro-Lux® LED E27 Vegetative

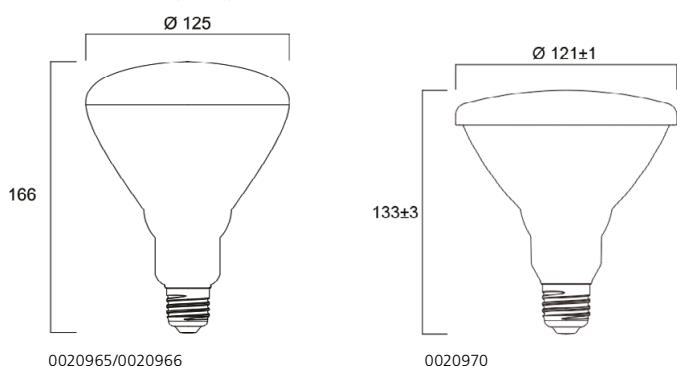


0020966 Gro-Lux® LED E27 Flowering



0020970 Gro-Lux® LED E27 Far-Red

Dimensions (mm)





Gro-Lux® T5 & T8



Gro-Lux® Fluorescent range are the original plant growth lamps. Used for stimulating various plant growth, including aquatic plants.

Gro-Lux® T5 & T8



Gro-Lux® T8 Lamps were the 1st plant growth lamps developed by Sylvania in 1959, and although the technology is traditional, it is still used in many plant growth applications. The lamps are electrically and physically the same as standard fluorescent lamps and can be used in any standard fluorescent circuit.

Gro-Lux® Fluorescent tubes are the ultimate solution to keep upfront costs very low and profit from a very well proven plant specific light spectrum

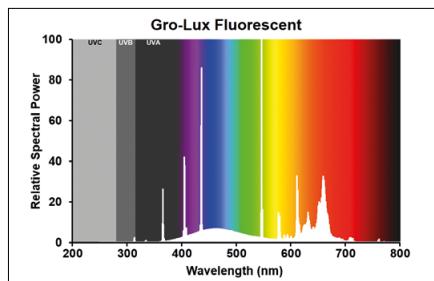
Features

- High level of blue and red radiation helps promote healthy plant growth as in bright sunlight
- Promotes the process of photosynthesis in plants
- T5 - FHO high output and lumen per watt in comparison to T8 versions
- Cost effective option for vertical farming

Product information

Code	Description	Length (mm) L	Diameter (mm) D	Power (W)	Voltage (V)	Lamp Current (mA)	Beam angle (°)	Base	Ballast Type	Light Colour	PAR (μmol/m ² s)	Life (h) (Electronic/Magnetic)	Packing quantity
Grolux T5													
0000728	FHO24W/GRO-Retail	549	16	24	77	295	360	G5	electronic	Gro-Lux®	1633	15,000	10
0000729	FHO39W/GRO-Retail	849	16	39	118	325	360	G5	electronic	Gro-Lux®	3283	15,000	10
0000730	FHO54W/GRO-Retail	1149	16	54	120	455	360	G5	electronic	Gro-Lux®	3800	15,000	10
Grolux T8													
0000069	F15W/T8/GRO	437	26	15	55	50		G13	electronic/magnetic	Gro-Lux®	10,098	14,000/10,000	25
0000150	F30W/T8/GRO	895	26	30	96	365		G13	electronic/magnetic	Gro-Lux®	23,444	14,000/10,000	25
0001523	F18W/GRO	590	26	18	57	370		G13	electronic/magnetic	Gro-Lux®	13,301	14,000/10,000	25
0001524	F36W/GRO	1200	26	36	103	50		G13	electronic/magnetic	Gro-Lux®	28,929	14,000/10,000	25
0001525	F58W/GRO	1500	26	58	110	670		G13	electronic/magnetic	Gro-Lux®	36,000	14,000/10,000	25
0000708	F15W/T8/GRO - Retail	437	26	15	55	50		G13	electronic/magnetic	Gro-Lux®	10,098	14,000/10,000	10
0000709	F18W/T8/GRO - Retail	590	26	18	57	370		G13	electronic/magnetic	Gro-Lux®	13,301	14,000/10,000	10
0000710	F25W/T8/30"/GRO - Retail	742	26	25	84	360		G13	electronic/magnetic	Gro-Lux®	18,756	14,000/10,000	10
0000711	F30W/T8/GRO - Retail	895	26	30	96	365		G13	electronic/magnetic	Gro-Lux®	23,444	14,000/10,000	10
0000712	F36W/T8/GRO - Retail	1200	26	36	103	50		G13	electronic/magnetic	Gro-Lux®	28,929	14,000/10,000	10

Photometric Data



Dimensions (mm)

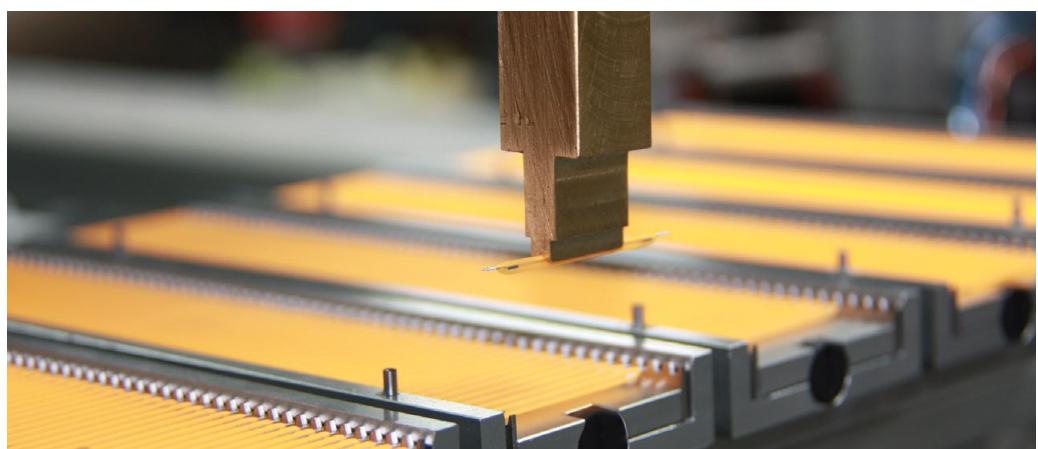


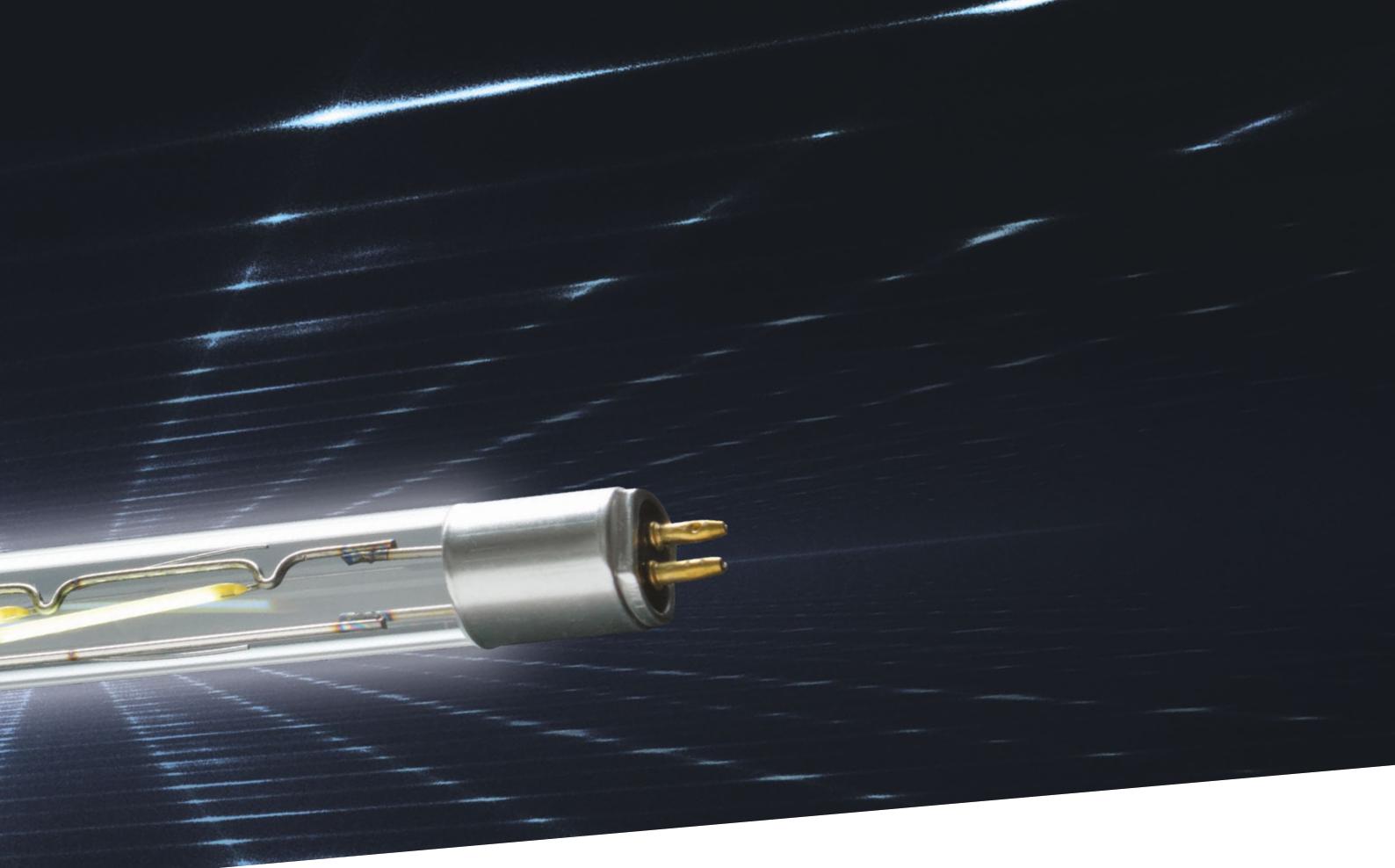
Helios

Customised gas-cooled
linear LED light source

Helios is an entirely new class of linear LED light source with exceptionally high system performance.

This includes an outstanding operating efficacy of up to 200 lumens per watt, which is twice the efficacy of the best-in class Fluorescent T5 systems. The unique design of Helios allows full 360° radiation and excellent optical control due to its very slim onmidirectional light source.



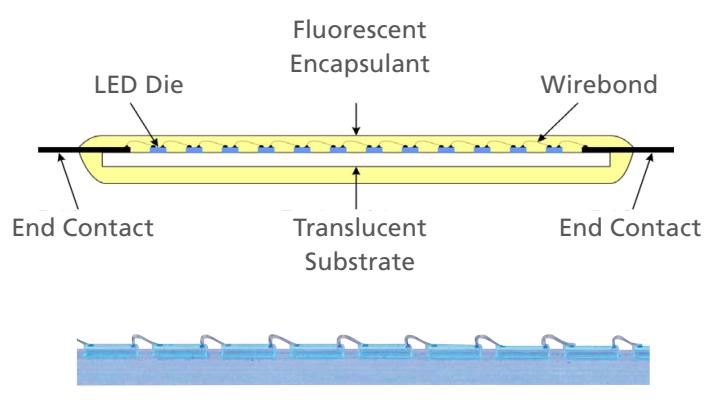


What is Helios?

Sylvania has fundamentally changed the construction of a linear lamp with the development of Helios. This has seen a shift from surface-mounted LED emitters to gas-cooled LED filaments.



The key reason for such a change is that LED Filaments allow Helios to offer a full 360 degree light emission – a world first for a linear LED product. Filaments can achieve higher efficacy than traditional surface-mounted LEDs (200 lm/W). They also facilitate the achievement of an improved uniformity of tube surface luminance without hot spots.



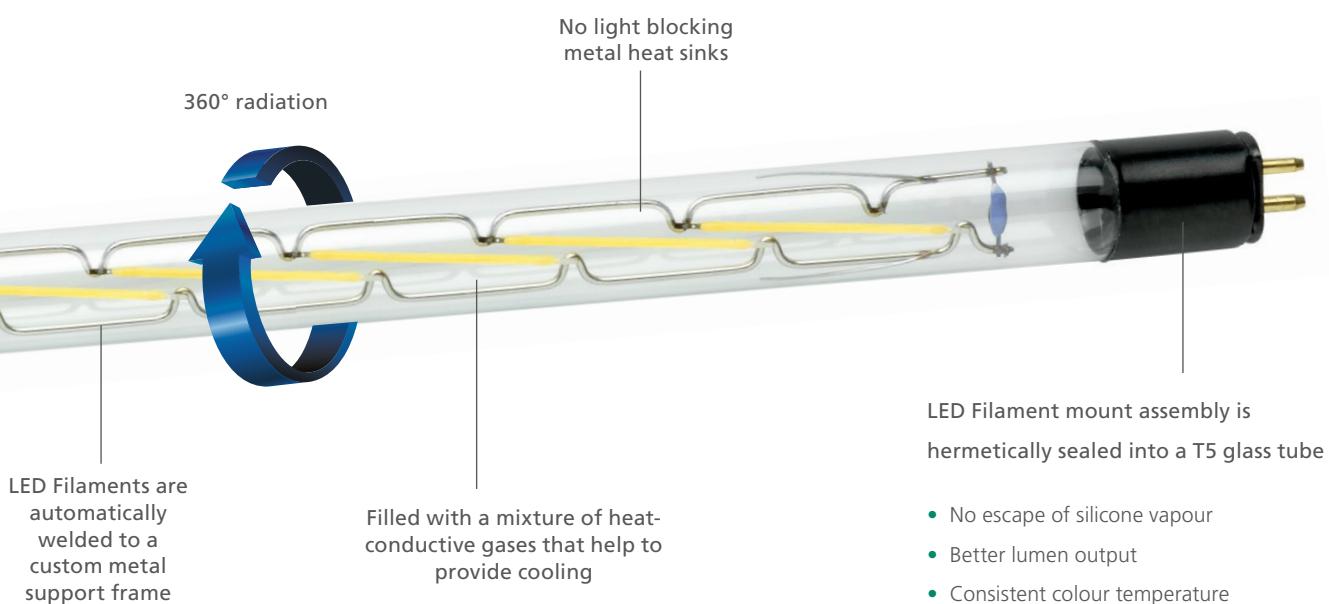
Microscope photograph of an individual LED filament

Benefits of Helios

Helios Compatibility

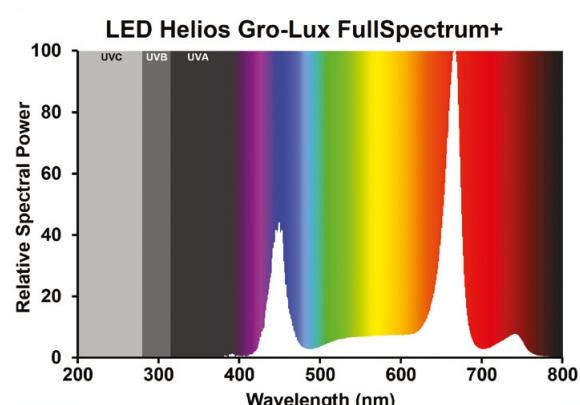
- Helios lamps are a non-retrofit concept. They are intended for modified fluorescent or completely new luminaires.
- Mechanical - Identical dimensions and caps as linear fluorescent lamps – however in common with other LED tubes, the power is supplied from only one end.

- Electrical - No internal driver. Helios uses standard external LED drivers for maximum reliability and control.
- Lifetime - Similar or better than other LED lamps, double the lifetime of a fluorescent tube.



Helios has many USP's for Horticulture

- Very high efficacy = lowest heat generation
- Totally sealed waterproof construction > IP68
- 360 degree light distribution = uniform plant growth across large areas
- More cost efficient to produce than conventional watertight LED modules
- Special Gro-Lux® spectrum or even colour tuneable red:blue ratio possible
- Helios operates cooler than traditional LED and other lighting solutions, thereby minimising impact on air conditioning loads for cold storage areas
- Helios allows for vertical hanging lighting
- The lamps can be positioned closer to the foliage of plants and vegetables than other older and hotter grow-lights, as the low surface temperature ensures leaves cannot be scorched



Application possibilities for Horticulture

Potato Chitting (Sprouting) Store

A key advantage of Helios is also to produce stronger sprouts that are better attached to the potato surface. Thereby reducing any damage during mechanised handling, and producing more consistent crop yields.



Shelf Lighting

Commercial propagation requires specialised lights that have been designed to provide seedlings, cuttings and young plants with the right spectrum of light they need to grow.



Microalgae Cultivation

Photobioreactors are used for the large-scale production of microalgae for use by the food, pharmaceutical, cosmetic and nutraceutical industries. These provide a controlled environment for growth and utilise light sources to assist with photosynthesis.



Helios is a versatile and high-performing product that can be developed for use in a multitude of different applications. Please contact Sylvania to discuss how Helios can be developed for your specific needs.

The way to your horticulture solution by **SYLVANIA**

1

Start Up Meeting

We start with a discussion of your requirements to find the best solution to your challenge and the best way to bring you to your goal.



4

Economic Aspect

You have to be successful. Not only has the setup fulfill your needs, it has to make sense - economically. This is when Sylvania Logic comes into account. Logic answers your financial and business needs: no upfront capital needed, guaranteed return on investment and performance and saving tracking.





2

Product Test

We setup a field trial, an usual time for the test is up to 6 months. This gives you enough time to truly test the setup on your application.

3

Audit

We are at your side to assist with the new setup. Not only from the lighting standpoint, but also with a look on all factors involved in growing.



5

Final Phase

Finish the setup. If you are satisfied with the implementation, when the economical value is clear and everything is running, then we call it a success.



Symbols and definitions



Horticultural product.



The product contains LED technology.



Not suitable for household illumination.



Ingress protection rating (IP). The first number indicates the measure of protection against the ingress of solids. The second number indicates the measure of protection against the ingress of liquids.



This product is mains dimmable.



3 Year Warranty.



Product conforms to all requirements from European directives.



Chlorophyll

It is a green pigment which is the most abundant in plants. Chlorophyll captures mostly red and blue light for the photosynthesis process allowing plants to absorb energy from light.

Colour Temperature / Correlated Colour Temperature (CCT)

Correlated Colour Temperature (CCT) is a measure of light source colour appearance defined by the position of the light source's chromaticity coordinates along the Planckian locus or blackbody locus.

Colour Rendering Index (CRI)

The colour rendering of a light source is an indicator of its ability to realistically reproduce the colour of an object. The higher the colour rendering index (on a scale up to a maximum of 100) of the source, the better our ability to perceive differences in colour.

Daily light integral (DLI)

Describes the number of photosynthetically active photons (individual particles of light in the 400-700 nm range) that are delivered to a specific area over a 24-hour period. This variable is particularly useful to describe the light environment of plants.

Luminous flux

Luminous flux is the total light output of a light source. It is measured in lumens (lm).

Lumen (lm)

Unit of luminous flux used to describe a quantity of light emitted by a source.

Luminous efficacy (lm/W)

Indicates how efficiently a light source converts electrical energy to light. It is the ratio of luminous flux to power.

Mole (mol)

It is a unit of measurement which indicate the amount of a substance. It is used in horticulture to quantify the amount of active light generated by a lighting system or which reach a target area.

Photosynthesis

This is the process used by plants to convert light into energy. Chlorophyll plays an important role in this process.

Photosynthetic Active Radiation (PAR)

PAR light is the wavelengths of light within the visible range of 400 to 700 nanometers (nm) which is used by plants in the photosynthesis process.

Photosynthetic Photon Flux (PPF)

This is a measurement that determines the total amount of photosynthetic active radiation (PAR) produced by a lighting system. PPF is expressed in $\mu\text{mol}/\text{second}$.

Photosynthetic Photon Flux Density (PPFD)

This is a measurement of the amount of photosynthetic active light that reach a target area. PPFD is expressed in $\mu\text{mol}/\text{second}/\text{m}^2$.

Photosynthetic Efficiency ($\mu\text{mol}/\text{W}$ or $\mu\text{mol}/\text{J}$)

It shows the luminous efficacy of a lighting system to convert electrical energy into active light.

McCree curve

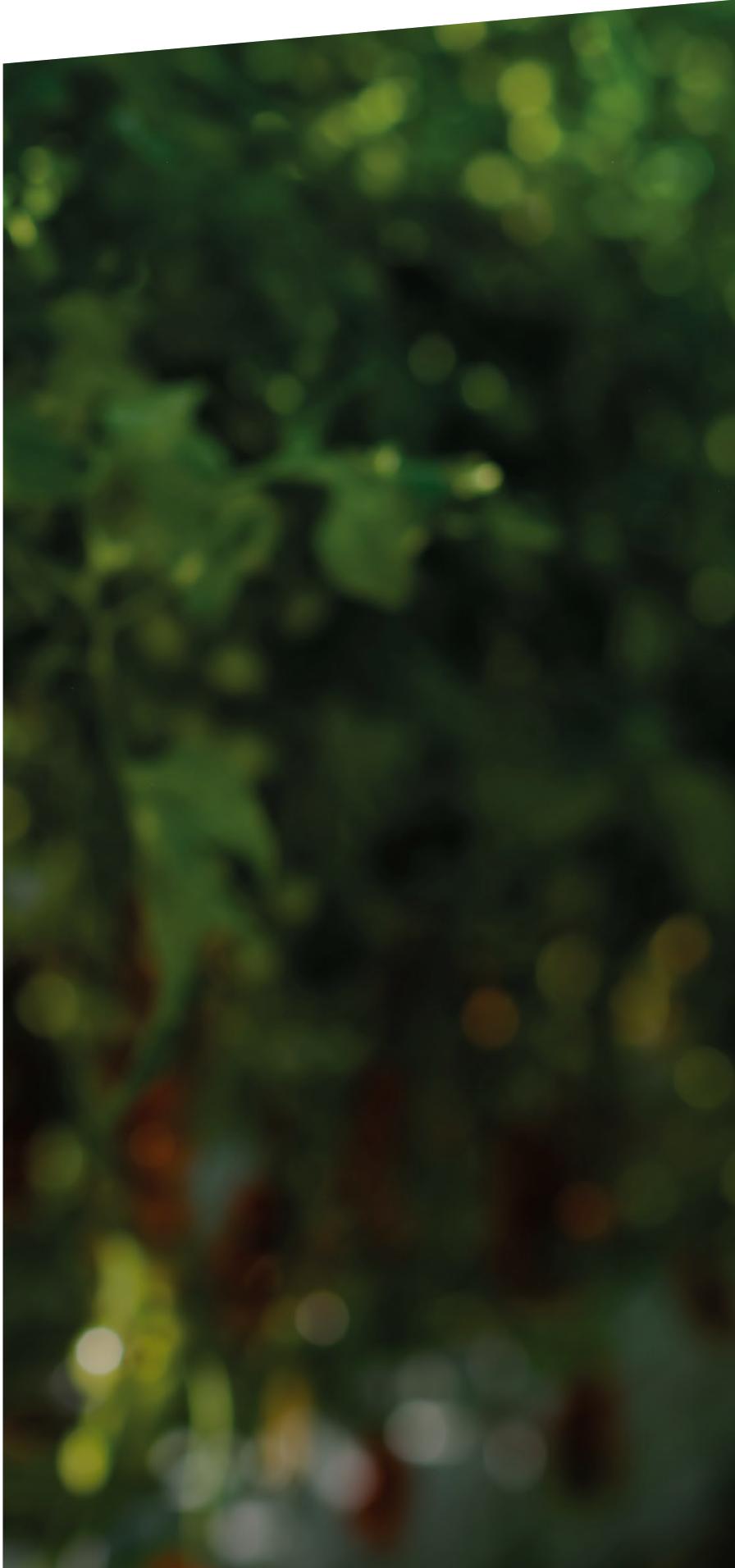
Dr. K J McCree was a scientist who performed several studies in the 1970s to determine the influence of light spectra on photosynthesis. In his work "The action spectrum, absorptance and quantum yield of photosynthesis in crop plants"-1972, Dr. Keith McCree created a relation in between photosynthetic efficiency and the light spectrum which is known as the McCree curve.

Spectral Power Distribution (SPD)

The Spectral Power Distribution curves gives a visual profile of the colour characteristics of a light source. It describes the power per unit area per unit wavelength of an illumination.

Notes

Notes



Although every effort has been made to ensure accuracy in the compilation of the technical detail within this publication, specifications and performance data are constantly changing. Current details should therefore be checked with Feilo Sylvania International Group.

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