



Enepro Grow
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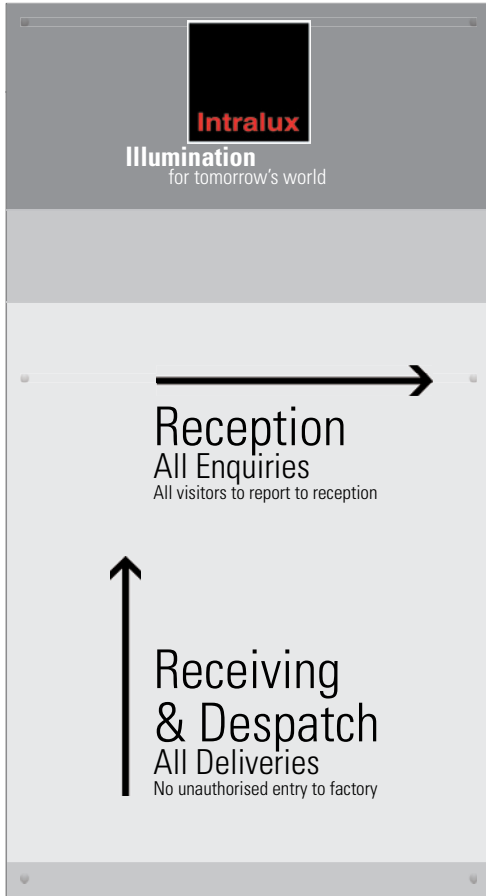
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Enepro Grow

- **Enepro Grow** has infiltrated the Green Wall market sector, offering a specialist luminaire that distributes an architecturally pleasing lighting outcome whilst providing indoor plants the lighting requirements they need to survive, flourish and photosynthesize.
- There are two fixture footprints offering varied performances. Those two fixture footprints are **Enepro Grow Cuboid** and **Enepro Grow Spot**.
- **Enepro Grow** is an architecturally designed luminaire intended to facilitate plant growth within an indoor environment that is void of sunlight.
- **Various beam options** available including Narrow (26°), Medium (37°), Wide (58°) and two Oval Beams (58° x 28°) for ultimate lighting design control. This flexibility enables the correct beam for the correct application therefore potentially limiting the quantity of luminaires required and ensuring the plants are getting the lighting required.
- The **Enepro Grow** range houses integral gear (where required) for simplified installation and are available in **DALI** and **Fixed Output** control options.
- Both **Surface Mount** and **3C Lighting Track** mounting are available for ease of installation into existing green wall tracks using a known method for installation.
- A **Colour Rendering Index (CRI) exceeding 90** offering true and natural colour rendition.
- **Australian** designed and manufactured in **Brisbane, Queensland, Australia**.
- **Intralux Australia** offers a **5 Year Limited Warranty** on **Enepro Grow**.

Intralux Australia

Illumination for tomorrow's world



A specialist category luminaire product development company, commenced operation more than 30 years ago in 1986, headquartered in Brisbane, Australia. **David Tilbury**, our Founder and industry identity has led the company across the globe with exceptional levels of market penetration in Europe, Asia, the Middle East and North America. Our leading edge product development delivers true world class, award winning products for use by professional lighting, architectural and building services designers. Total commitment to ISO 9001 Quality Systems ensures every aspect from product design to distribution are seamlessly and systematically managed.





Biophilic Lighting

What is it? How is it achieved? Making Plants Grow

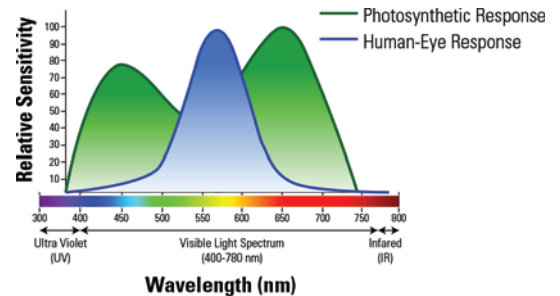
Biophilic Lighting is centred around the idea of Biophilia which is “The deep seated affiliation that humans seek to connect with nature and other life forms.” Using this yearning for nature, the lighting design of a space becomes centred around satisfying this need.

Biophilic Lighting addresses the affects of physical and mental health and wellbeing of building occupants. The inclusion of plants in an indoor environment improves air quality. Cleaner air enhances employee wellness and productivity, provides internal noise reduction as well as heat absorption within a space which can also lead to energy savings.

On the global stage there are three major green building rating/certification systems that now include ‘Biophilic Design’ as a key component of building design. These include the Building Research Establishment Environmental Assessment Method (BREEAM), The U.S Green Building Council and the WELL Building Standard. The WELL Building standard is the first performance based standard and certification to focus solely on the building occupants health and wellbeing.

Both humans and plants require certain types of light to function but the requirements are not mutual with both life forms requiring different wavelengths for different purposes. Some examples of similarities and differences are below:

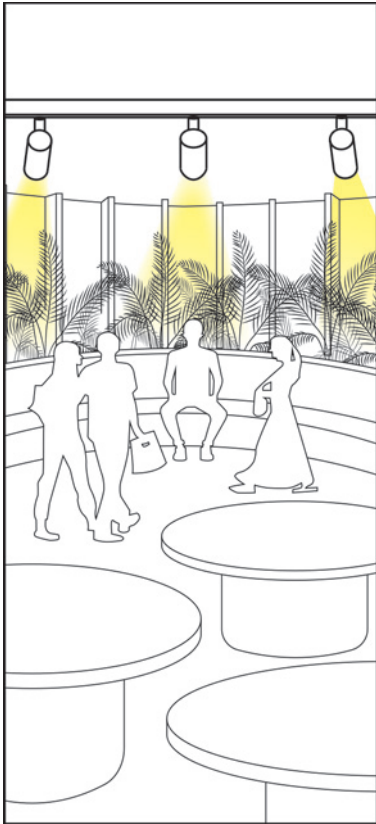
| | |
|-----------------------------|---|
| UV-A | Plants require this exposure, but it causes skin cancer in humans. |
| UV-B | Both plants and humans require this (humans require for Vitamin D Synthesis). |
| Full Spectrum Visible Light | Plants require for photosynthesis, humans require this for vision and overall health and wellbeing (including setting of the circadian rhythm). |
| Blue Light | Plants require but humans avoid at night for melatonin suppression. |
| NIR/Infrared | Plants require but humans should only have limited exposure. |



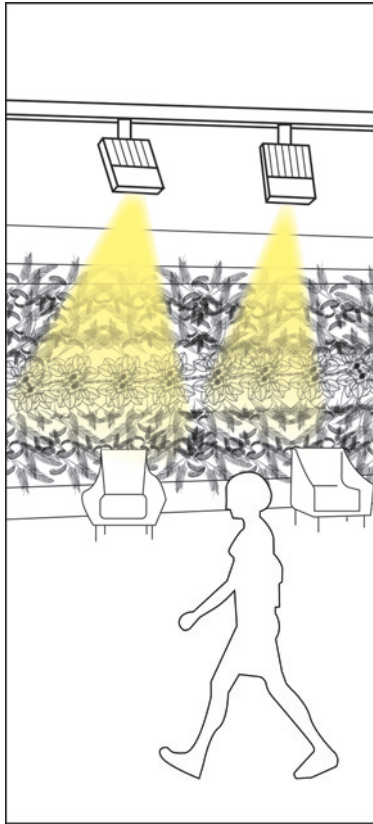
Other things to consider are the requirements/dosage of a particular light source (Intensity of light, timing of light, period of exposure)

Enepro Grow Design Applications

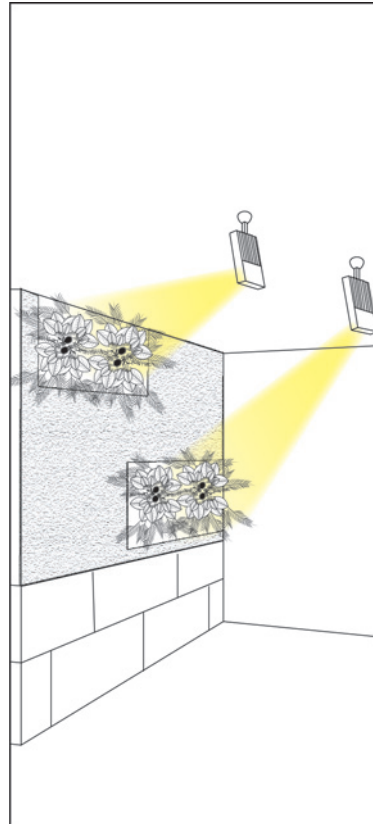
04-05



Indoor Garden Features



Vertical Gardens



Office Interiors



Public Spaces

Why Enepro Grow

Enepro Grow has been designed with both lighting design and ambience of space coupled with the lighting requirements of plants to bring a pleasing illumination for both plants and humans.

Traditionally Green Walls have been soaked with a 'pinkish' tinge (CCT of approximately 6500K) of light that has created undesirable locations within built environments. Respectively, Green Wall designers resort to using visually pleasing lighting for the client however the plants die soon after, **Enepro Grow** has changed the Green Wall illumination world.

Green Walls are an architectural trend right now, appearing in the latest restaurants, shopping centres, clothing retailers and more.

The Enepro Grow family offers:

- ✓ Architecturally pleasing white light.
- ✓ High Colour Rendering Index (CRI) for true colour representation of Green Wall plants.
- ✓ Integration of both plant light wavelength requirements and that of humans.
- ✓ Various luminaire types available to suit most applications.
- ✓ The ability to design, envision and implement a beautiful indoor space using plants and **Enepro Grow** in a symbiotic relationship.
- ✓ The installation of Green Walls can earn LEED/building sustainability program credits.
- ✓ Delivers even lighting distribution eliminating unsightly and harmful hotspots.
- ✓ Aesthetically pleasing luminaire unlike most Green Wall/Plant-based luminaries.



Light Quality

a higher CRI produces more natural colours

What is the Colour Rendering Index (CRI)

There are two main colour standards relating to methods of measuring the degree of colour shift a lit object undergoes when illuminated by a light source (i.e. an LED light source) compared with the colour of that object when illuminated by a reference source (i.e. sunlight) using comparable colour temperatures. The most commonly used method, is the CIE 1995 method which breaks the spectrum into 15 reference colours and are measured on a scale of 1-100, the higher the number the better the light sources ability to render that colour. This is generally what one is referencing when speaking about CRI. Whereas Testing Method 30 - 2015 (TM-30-15) is widely considered a more comprehensive method of evaluating colour rendering than the traditional CIE 1995 method.

TM-30 testing uses two distinct values - Colour Fidelity (Rf): The closeness to the reference sample colour, similar to CIE 1995 method but with 99 colours. Colour Gamut (Rg): The saturation of a colour sample. Outputs from testing is in the form two images, a colour vector graphic and a colour distortion graphic. These images are able to portray the affects of any given light source on an environment.

Colour Rendering Quality is one of the most important aspects of professional lighting design. Obtaining great colour rendition is extremely important in producing a high quality visual experience for the end user.

The 'R9' Value is a common comparison point when discussing high quality LED luminaires. The 'R9' Value relates to red tones and a light sources ability to reproduce these tones. This tone in particular is such a crucial point in the index as red tones surround us everyday! From skin tones, clothing, and even at the supermarket.

TM-30-15: What is it?

99 Colour Swatch used in TM-30 Colour Analysis





Specification

| | | |
|--------------------------------------|---|------------------------------|
| Product Code | Enepro Grow Cuboid (ENLEDG-C) | Enepro Grow Spot (ENLEDG-XL) |
| Typical Colour Rendering Index (CRI) | 93+ | |
| LED Colour Options (K) | 3500K | |
| Fixture Lumens | 3,511 | 2,978 |
| Fixture Wattage (W) | 29.2 | 24.2 |
| Beam Optics | 26° (N) / 37° (M) / 58° (F) / 58° x 28° Oval Horizontal Spread (OHS) / 28° x 58° Oval Vertical Spread (OVS) | |
| Fixture Finish | Black Texture Powdercoat (BT) / White Texture Powder coat (WT) | |
| Mounting Options | Surface Mount Ceiling Rose (SM) / Track Mount via Track Adapter (TM) | |
| Controls | DALI Integrated PSU (DALI) / Fixed Output Integrated PSU (F) | |

| | |
|-----------------------|------------------------|
| Input Voltage | 220-240 Vac - 50/60Hz |
| Colour Consistency | 2 Step MacAdam |
| TM30 Colour Specifics | Rf = 94, Rg = 103 |
| LED Module Life | L90 B10 > 60,500 hours |
| Housing Material | Aluminium Housing |

#1 - Average calculations across all beam angles
 #2 - Data values based on manufacturers specifications

Plant Specific Characteristics

| | |
|--------------------------------------|--------|
| PPF Range (μmol / s) | 20-255 |
| Average Photon Efficiency (μmol / J) | 2.2 |

Compliance



Product code

ENLEDG-XL-TM-24-935-M-WT-DALI

Product Family

Mounting Options

Wattage

CRI/ Colour Temp

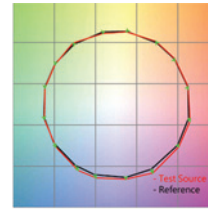
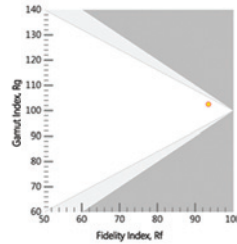
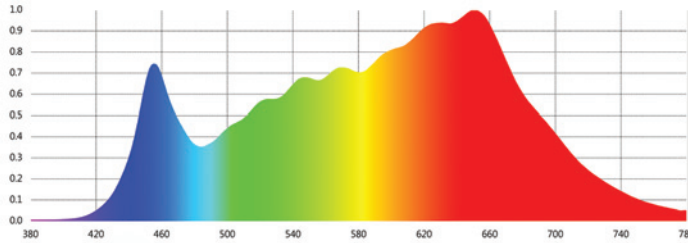
Beam Optics

Fixture Finish

Control

Colour Metrics

Relative Intensity - wavelength (nm)



TM-30-15
Rf = 94
Rg = 103

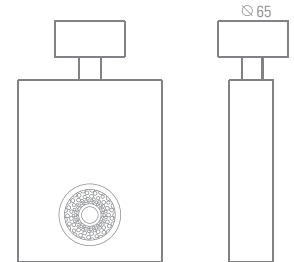
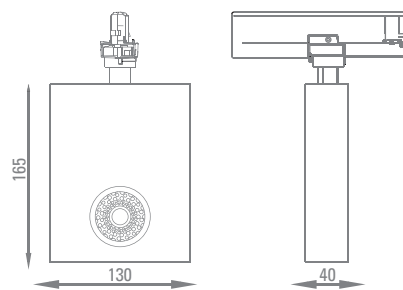
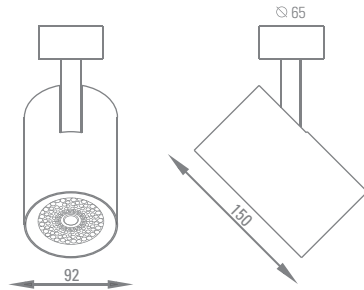
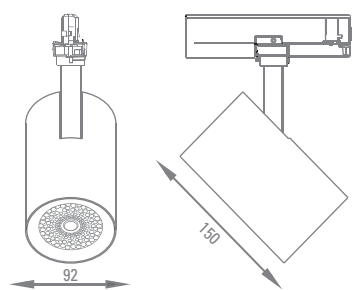
Dimensions in mm

Spotlight Track Mount Option

Spotlight Surface Mount Option

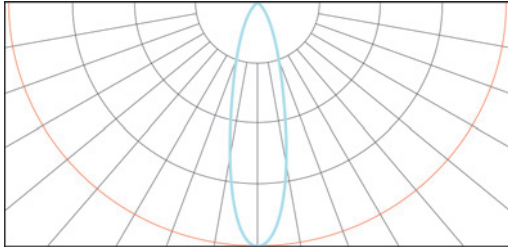
Cuboid Track Mount Option

Cuboid Surface Mount Option

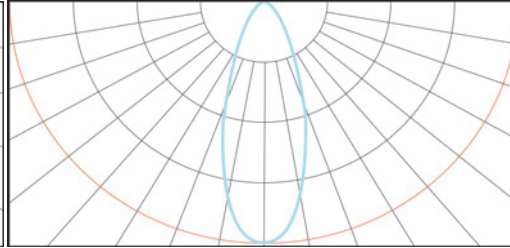


Photometric Data

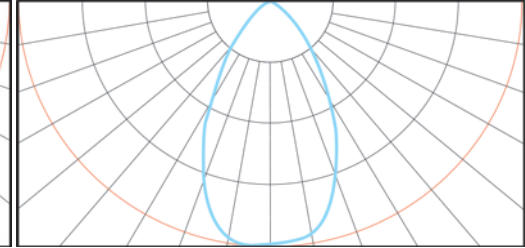
Narrow Beam - 26°



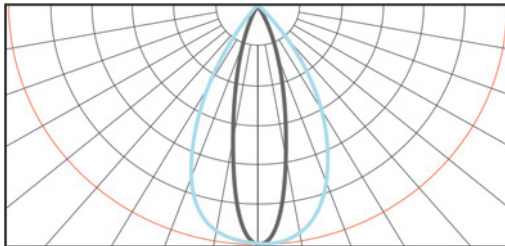
Medium Beam - 37°



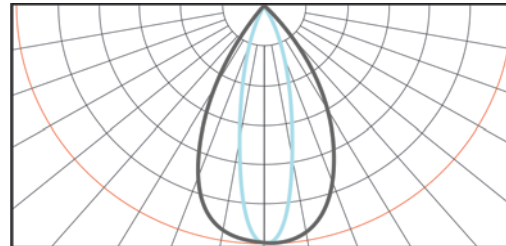
Flood Beam - 58°



Oval Horizontal Beam (OHS) - 58° x 28°



Oval Vertical Beam (OVS) - 28° x 58°



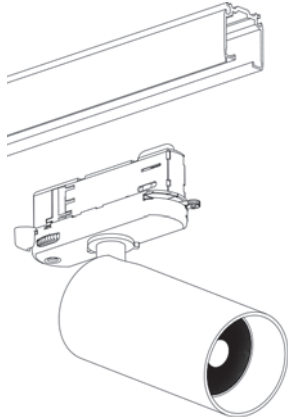


Installation

Electrical Connections / Configurations / Mounting

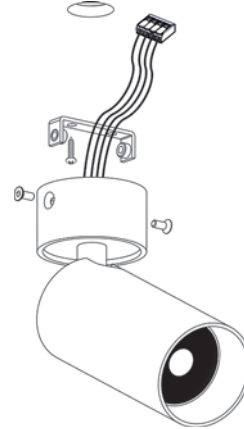
Electrical Connection of 3C / 3CD Pulse Lighting Track Luminaire:

Connect to 230V power supply only



Light must be fitted into a 230V track

Electrical Connection of Surface Mount Luminaire:

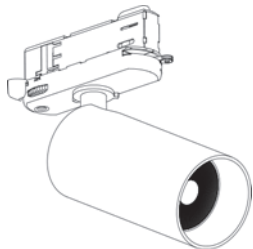


Power Connections (Surface Mount)

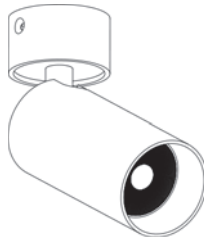
| | |
|--------|--------------|
| DALI+ | Grey |
| DALI- | Purple |
| 230V + | Red |
| 230V - | Black |
| Earth | Green/Yellow |

Mounting options:

Track Mount



Surface Mount



Caution:

*Mount products so that cables will not be exposed to excessive stress.



Glossary

of terms

Ambient Temperature (Ta): The temperature surrounding the fixture during time of operation.

Ampere (Amp): The unit for measuring the rate of flow in an electrical current.

Biophilia: The human attraction and connection to nature.

Candela: the unit of measure indicating the luminous intensity (candlepower) of a light source in a specific direction; any given light source will have many different intensities, depending upon the direction considered.

Colour Fidelity (Rf): The closeness to the reference sample colour measured by a number between 1 to 100. An element of TM-30 reporting.

Colour Gamut (Rg): The saturation of a colour sample. While the value is represented by a number between 1 to 100, this number is also accompanied by two images depicting finer details. These images are a colour vector graphic and a colour distortion graphic.

Colour Rendering Index (CRI): An international system used to rate a lamp (LED or Fluorescent or other) ability to render object colours. The higher the CRI (based on a scale of 1 to 100), the richer the colours generally appear. CRI differences among lamps are not usually visible to the eye unless the difference is more than 3-5 points.

DALI: A digital communications protocol for controlling and dimming lighting fixtures, originally developed in Europe by an industry organisation.

Illuminance: the 'density' of the light (lumens/area) incident on a surface, ie. The light level on a surface. Illuminance is measured in Lux (lx).

Kelvin (K): A measurement of lamp colour. Generally, 3000K resembles the colour of a halogen lamp, 4000K resembles a crisp white light

LED Module Wattage: The wattage of the LED only, this does not include the wattage of the LED driver.

Lumens: A measure of luminous flux or quantity of light emitted by a source. For example, a dinner candle provides approximately 12 lumens. A 60-watt soft-white incandescent lamp provides approximately 840 lumens.

Luminaire: A complete lighting unit consisting of a lamp (or lamps), and driver (or ballast) together with the parts designed to distribute the light, position and protect the lamps, and connect them to a power supply. A luminaire is often referred to as a fixture.

Lux (lx): A unit of illuminance or light falling onto a surface. One lux is equal to one lumen per square meter. Ten lux approximately equals one foot-candle(fc).

MacAdam Ellipse: is the region on a chromaticity diagram which contains all colors which are indistinguishable, to the average human eye, from the color at the center of the ellipse.

Photometry: The measurement of light and related qualities

Polar Curve: A graph of distribution of light intensity of luminaire and other light sources. System: A term referring to the lamp and ballast combination, and sometimes the entire lighting delivery system including the fixture, the optics, the particular layout and the lighting controls. Many luminaires linked together could form a system.

PAR (Photosynthetic Active Radiation): Defines the wavelength spectrum plants require to perform photosynthesis. The wavelength range is between 400nm-700nm

Photon Efficiency: The efficiency of a light source to produce light photons within the PAR range. Measured in $\mu\text{mol/W}$.

Planckian locus: The locus of points on a chromaticity diagram that represents blackbody radiators at various temperatures.

PPF (Photosynthetic Photon Flux): A light sources total emitted photons per second in the PAR region.

PPFD (Photosynthetic Photon Flux Density): The amount of light falling onto a plants surface area. Similar to that of illuminance for human illumination measurement. Measured in micromoles per square meter per second.

TM-30: A method of measuring the degree of colour shift a lit object undergoes when illuminated by a light source (ie an LED light source) compared with the colour of that object when illuminated by a reference source (ie sunlight). This method is widely considered as a more comprehensive method of evaluation.

$\mu\text{Mol/S}$: micromoles/second

Enepro Grow notes



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Intralux products are designed and built to comply with appropriate International Standards. The Intralux 5 year warranty subject to terms and conditions available at www.intralux.com
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