
BioUp
Melanopic Lighting
Brighter Days Darker Nights
COOPER
Lighting Solutions
a signify business

Why melanopic light

We've become the indoor generation. On average, we spend more than 90% of our time indoors, with 36% of that spent in the workplace. And if we spend too much time indoors, we don't receive enough exposure to melanopic light and we miss out on the beneficial effects it has on our wellbeing to help us:

See well **Feel well** **Function well**

What is melanopic light?

Melanopic light refers to specific wavelengths of light that affect melanopsin photoreceptors in the eyes. These particular photoreceptors are responsible for regulating non-visual responses to light – including circadian rhythm, a natural internal process that repeats every 24 hours and regulates the sleep/wake cycle.

As a result, melanopic light influences our sleep patterns, alertness, and mood. When emitted at the right intensity, spectrum, and time, light feeds our internal flywheel.

Light lets us do more than see the world around us.

Melanopic light is often referred to as biological light.

Indoor lighting was historically driven mainly by vision requirements. Now that we know light can also stimulate other biological functions, we're designing lighting that creates melanopic (or biological) light.

New metrics have been developed to measure the intensity of melanopic light and its potential for stimulating non-visual responses such as the creation of melatonin and cortisol (hormones that drive our internal circadian rhythms and help us to function better). The most common metrics are the melanopic daylight efficiency ratio or melanopic DER and melanopic equivalent daylight illuminance.

Light intensity **Light-dark cycle (circadian rhythm)** **Light spectrum**

DID YOU KNOW?

Researchers have been studying melanopic lighting and its impact on circadian rhythm for over 40 years.

4 ways to increase melanopic light levels

DID YOU KNOW?

Melanopic lighting is designed to stimulate the production of melanopsin, a photopigment found in the eye that is responsible for regulating circadian rhythms.

1

Use more daylight

Daylight is a great source of melanopic light, but it often leads to expensive building design. Mitigating glare is a challenge. And depending on location, daylight may not always be optimum.

2

Use more light

Increasing average light levels using luminaires with higher lumen output or adding more luminaires are options, but they'll increase your energy costs. And you'll have more glare to deal with.

3

Use cooler CCTs

You could try tunable white lighting that follows natural daylight temperature cycles, creating cooler light at specific times of day. But not everyone likes light that's cool enough to have a biological impact.

4

Use increased melanopic spectrum

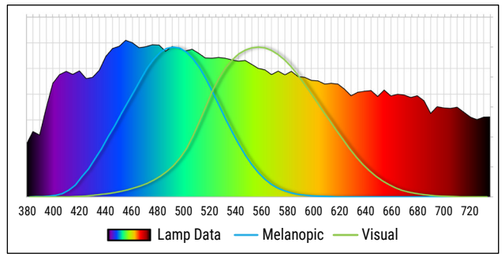
BioUp

Indoor melanopic lighting such as BioUp from Cooper Lighting Solutions includes a peak (the cyan part of the spectrum) that enhances our circadian rhythm without additional lights, higher lumen levels, and associated energy costs.

Melanopic Lighting

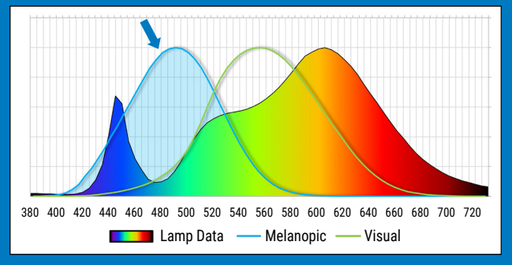
Melanopic lighting (also known as cyan lighting) is designed to mimic natural daylight and bring its benefits to people indoors, ie., visual comfort, wellbeing, and performance.

Spectral Power Distribution of Daylight

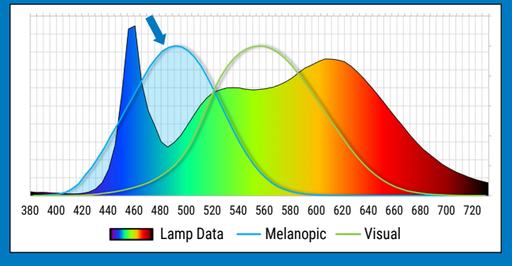


With melanopic lighting, the melanopic DER is 42% higher compared to the standard LED spectrum. There's no change in visual color impression or visual light output between melanopic and LED lighting. This graph shows the peak in the cyan wavelength, aligned with biological active light.

Traditional LED Lighting Spectrum

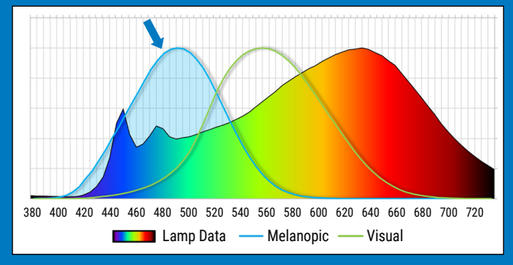


3000K LED M/P = 0.50 MDER = 0.45

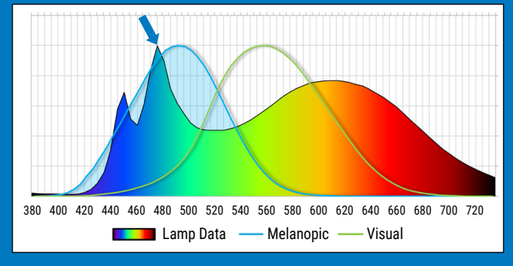


4000K LED M/P = 0.76 MDER = 0.69

BioUp Melanopic Lighting



3000K LED M/P = 0.63 MDER = 0.57



4000K LED M/P = 0.92 MDER = 0.84

DID YOU KNOW?

Absence of cyan light helps one fall asleep because it does not inhibit natural production of melatonin.

BioUp Solutions

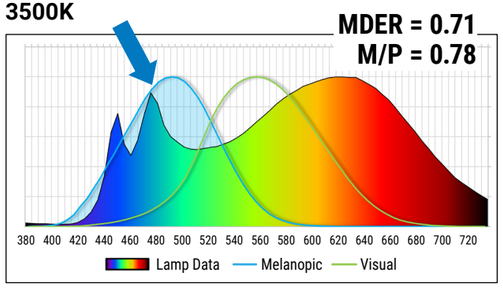
BioUp technology from Cooper Lighting Solutions enhances LED spectrum with cyan light to increase the biological impact of the light to enhance our circadian rhythm which regulates our sleep/wake cycle, daytime engagement, and mood – all without distorting visual color impression.

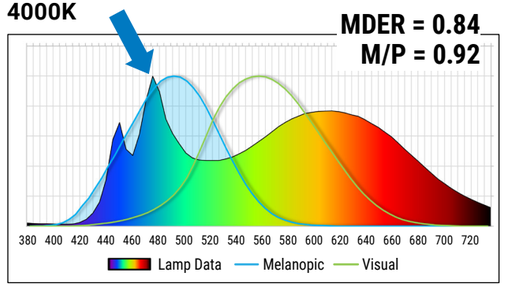
DID YOU KNOW?

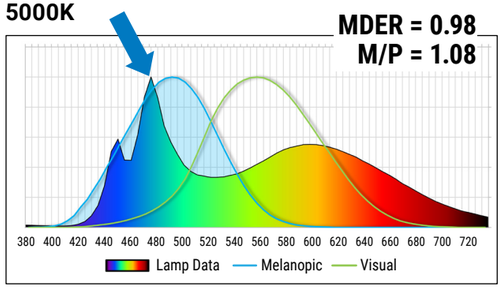
IES published RP-46 and TM18 in March 2024 defining the metrics (MDER, M-EDI and EML) and thresholds that help to regulate the circadian cycle for day active indoor applications.

Static Spectrally Enhanced LED

The static option, which provides enhanced biological lighting performance, is ideal for applications with mostly daytime usage by workers and/or visitors, such as offices, institutional, and public buildings. It's a cost-efficient and simple way to enjoy the benefits melanopic lighting.



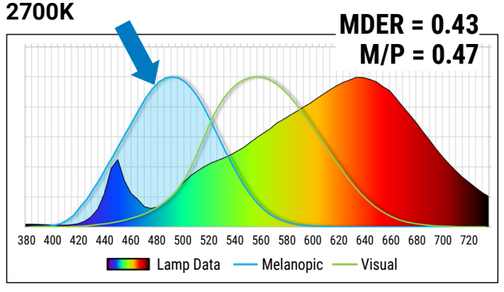


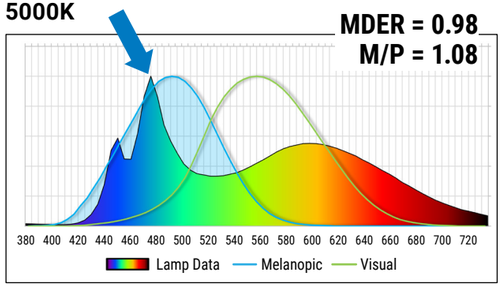


Optional control with WaveLinx

Dynamic Tunable White + Spectrally Enhanced LED

The dynamic option is an advanced solution adapted to spaces with daytime and nighttime usage, such as hospitals, schools, and airports. Combined with our WaveLinx intelligent digital lighting solution, the melanopic portion of the light is adjusted throughout the day.





CCT	M-DER	CRI
2700K	0.47	93
3000K	0.59	91
3500K	0.73	87
4000K	0.83	85
4500K	0.91	83
5000K	0.98	81

MDER = 0.43
M/P = 0.47
2700K
>90 CRI

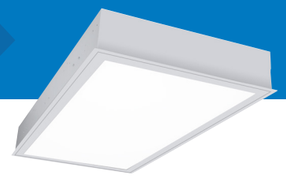
MDER = 0.98
M/P = 1.08
5000K
>80 CRI

Control with Wavelinx 2ch 0-10V, or DALI

Application Example:
Healthcare Patient Room

Click on products to learn more

Fail-Safe 2x4 APR
ArcMED Patient Room



Portfolio 4" & 6"
LED Recessed Downlights

DID YOU KNOW?

A study found that tunable LED lighting systems with a specific light schedule has reduced falls by 43% in long-term care facilities.*

Morning

Morning lighting should reflect the sunrise lighting spectrum, with primary light colors in the red at a moderate intensity.

Daytime

Daytime lighting should be primary in the cooler colors, including a peak in the range, to maximize melanopic lighting at a relatively high intensity.

Nighttime

Nightlight should reflect the sunset lighting spectrum, with primarily light colors in the red, at a low intensity. Once people are sleeping, the light shouldn't be higher than 1 lux, which is equivalent to the light of a candle.

Application Example:
Office

Click on products to learn more

Metalux Cruze ST 2x2 Office

Corelite Continua SQ4 LED linear slot Office

DID YOU KNOW?

Our bodies have a natural internal clock, called the circadian rhythm, that regulates important functions on a roughly 24-hour cycle. This rhythm is crucial for our health and well-being.

Daytime

In office applications, to maximize melanopic lighting at a relatively high intensity, daytime lighting is used with a mix of colors including a peak in the range of 450-530nm. The melanopic lighting is adapted to office occupants mainly during mornings and afternoons.

DID YOU KNOW?

One of the most exciting discoveries in science during the past decade was the identification of new type of photoreceptor, called intrinsically photosensitive retinal ganglion cells (ipRGCs). The activation of these cells @475nm wavelength is directly linked to our circadian rhythm.

What is melanopic-EDI?

Melanopic equivalent daylight illuminance (melanopic-EDI), unit lux, is the circadian metric adopted by the International Commission on Illumination (CIE). It describes the response of the non-visual photo-receptors, intrinsically photosensitive retinal ganglion cells (ipRGCs) in our eyes. This response indicatives how the body will respond and is a combination of the spectrum of the light and the intensity.

These new metrics allow artificial lighting to have circadian-supportive lighting, i.e., melanopic lighting, without the need for dimming and brightening the lights to adjust color temperatures between warm and cool; melanopic lighting supports circadian rhythm while maintaining a pleasant "visible" light.

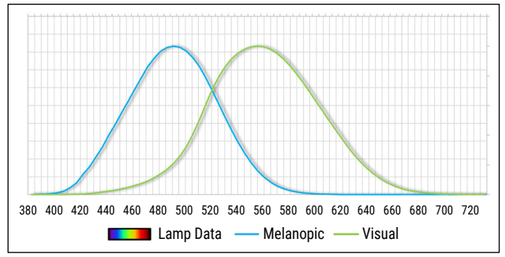
White Paper

(Learn more)

What is melanopic-DER?

The melanopic daylight efficacy ratio is a spectral metric of the biological effect of an artificial light source compared to daylight (6500K). The melanopic-DER of a reference daylight spectrum is 1. Typically, artificial lighting has a lower biological effect than daylight, the melanopic-DER being below 1.

Visual and Non-visual Spectral Eye Sensitivity



Melanopic-DER and M/P ratio are both metrics used to quantify the effects of light on the human circadian system. However, they measure different things and are calculated in different ways.

Melanopic-DER is a measure of the amount of light that is stimulating to the melanopsin receptors in the eye and is *calculated by measuring the amount of light in the blue and green spectrum,* which includes the wavelengths of light that are most stimulating to melanopsin.

M/P ratio stands for melanopic to photopic ratio and measures of the ratio of light that's stimulating the melanopsin receptors to the light that's stimulating the image photoreceptors in the eye. *The M/P ratio is calculated* by dividing the melanopic-DER by the photopic-DER.

Lighting and the **WELL Building standard**™

A WELL certificate offers an opportunity to increase the value of real estate through the technical requirements that indicate to what extent a building is designed for health and wellbeing of staff.

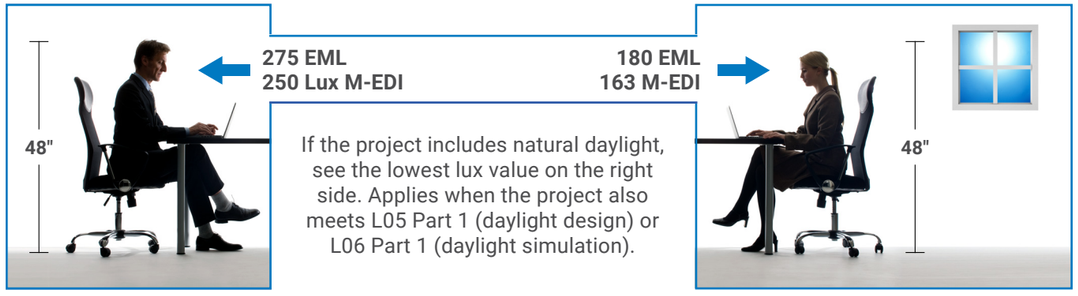
Functional environments are giving way to spaces that:

- Engage and inspire
- Improve mood, supports a sound rest and performance
- Attract talent and retain high-value employees.

In the WELL Building Standard, the Light concept includes nine features, one of which is Circadian Lighting Design (L03). This section provides guidelines on ways to minimize disruption to the circadian system, enhance productivity, support relaxation and provide appropriate visual acuity.

BioUp solutions will help you maximize the WELL points for Circadian Lighting Design (L03):

Tier	Threshold		Threshold for Projects with Enhanced Daylight	Points
1	At least 150 EML [136 M-EDI (D65)]	**OR**	The project achieves at least 120 EML [109 M-EDI(D65)] and L05 Part 1 or L06 Part 1	1
2	At least 275 EML [250 lux M-EDI (D65)]	**OR**	The project achieves at least 180 EML [163 M-EDI(D65)] and L05 Part 1 or L06 Part 1	3



Looking for more points?

Combine the project with lighting control!
Add control with individually controlled zones and lighting systems have at least three lighting levels or scenes with the ability to change at least one of the following: color temperature or distribution of light.

L09 Occupant Lighting Control

This WELL feature requires projects to implement innovative lighting strategies that take into account personal preferences of users as well as their interaction with the physical space.

WELL Building reference table (click here)

BioUp Lighting

BioUp from Cooper Lighting Solutions is offered as an option with these products.

All products are available with BioUp Static or Dynamic

Metalux **Cruze ST**

LED Recessed Ambient

The Cruze LED combines contemporary styling and optimal illumination design with the technology of Cooper Lighting Solutions linear LED platform for unprecedented energy savings, comfort, and aesthetics, all at an affordable price.

- Up to 7000 lumens with BioUp.
- High efficacy up to 140 LPW.
- Multiple lens options including square and a perforated "basket" appearance.

Click on products to learn more

Corelite **Class RX/ZX**

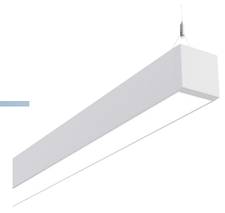
LED Recessed Ambient

Experience architectural performance at a great value. The completely re-designed Corelite RX LED comes with everything you need for a longterm sustainable lighting system.

- Up to 7500 lumens with BioUp.
- Architectural quality - powder coat painted with refined lens options.
- Standard and high-performance lumen packages up to 145 lumens per watt.

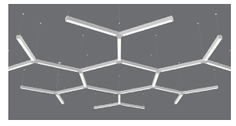
Corelite **Continua SQ4**

LED Linear Slot



Continua SQ4 linear features a minimalistic square profile and seamless illumination along the entire row length using a single-piece, roll in lens.

- Available lumens/ft: 500, 750, 1000 and 1250. Lumens/ft may be custom within this range.
- Available in 4', 6', 8' and 12' lengths.
- Available in suspended, surface and connection patterns.
- Black and white glare-reducing, louvered baffle options.
- Multiple lens options including black/white glare-reducing, baffle options and Perceive roll in options.



Neo-Ray **Define**

LED Slot

The Define is the ultimate in minimalist simplicity. It provides clean, uniform lines of illumination in any architectural environment.

- Deliver BioUp in continuous rows starting at 4' long and in 1' increments.
- Available lumens/ft may be customized and range from 500 to 1250.

Fail-Safe **FCZ**

LED Sealed Recessed Ambient

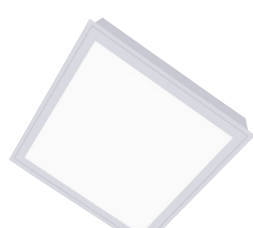
The FCZ is a sealed, IP65-rated center basket troffer with high-performance, visual comfort, and aesthetics. Offered in three different sizes, multiple lumen packages, and optional polycarbonate and acrylic lenses. The FCZ is an excellent choice for a wide range of applications including vandal-resistant, behavioral health, medical, cleanroom, and hose down.

- Sealed center basket luminaire for use in high abuse, medical, wet location, and sterile applications. IP65 rated and NSF listed.
- Up to 7000 lumens with BioUp.
- High efficacy up to 125 LPW.

Click on products to learn more

Fail-Safe **APR**

ArcMED Patient Room



The APR ArcMED Patient Recessed is an architectural medical recessed light specifically designed for use in healthcare facilities where exam and ambient illumination is required. The APR is available in 2' x 2' and 2' x 4' sizes.

- Fully luminous frosted bottom lens with illumination above enables functional illumination – ambient, exam, reading, nightlight – to suit the needs of the patient, medical professionals, and others in the space. BioUp available in ambient function up to 8500 lumens.
- Easy and quick access to LEDs and electrical from room side using an aesthetically pleasing, fastener-free door frame and lens.
- Fully luminous frosted bottom lens for easy wipe down and cleaning. Anti-microbial matte white paint standard.

Fail-Safe **APN**

ArcMED Patient Narrow Recessed

The APN ArcMED Patient Narrow is an architectural medical recessed light specifically designed for use in healthcare facilities where exam and ambient illumination is required. The APN is available in 4', 5' and 6' lengths with 5" aperture to fit in 6" grid spacing.

- Fully luminous frosted bottom lens with illumination above - enables functional illumination - ambient, exam, reading, nightlight to suit the needs of the patient, medical professionals, and others in the space. BioUp available in ambient function up to 4000 lumens.
- Easy and quick access to LEDs and electrical from room side, using aesthetically pleasing, fastener-free door frame and lens.
- Fully luminous frosted bottom lens for easy wipe down and cleaning. Anti-microbial matte white finish standard.

Portfolio **4" & 6"**

LED Recessed Downlights

Portfolio LED balances design and engineering to create a quality product that delivers features, efficacy, superior optical control, and color. Count on comfort and efficiency.

- Offered with 4- and 6-inch downlights and cylinders.
- Lumens range from 800 up to 4000 with BioUp.
- <1% dimming.

Fail-Safe **FLD4B, FLD6B**

LED Vandal Resistant & Sealed/Medical Downlights

4 and 6-inch LED recessed downlight designed for vandal-resistant or sealed/medical applications.

- Bottom lens, bottom trim ring, or open styles.
- Bottom lens thickness up to 0.375" in polycarbonate, acrylic or glass.
- Lumens from 800 to 4000 and 1% dimming standard.

Lighting Brands
Ametrix
AtLite
Corelite
Ephesus
Fail-Safe
HALO
HALO Commercial
Invue
iO
Iris
Lumark
LumarkAP
Lumière
McGraw-Edison
Metalux
MWS
NeoRay
Portfolio
PrentaLux - 3D Printed Lighting
RSA
Shaper
Streetworks
Sure-Lites

Controls Brands
Greengate
Fifth Light
Intelligent Lighting Controls

Connected Lighting Systems and Smart Spaces Platform
WaveLinx
Trellix Infrastructure

COOPER Lighting Solutions
a signify business

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