

# Circadian lighting

How the right light at the right time affects performance and well-being

# Why circadian lighting?

Sunlight-inspired indoor light gives you the energy you need to live a good, comfortable life every day.



Circadian lighting from Signify brings the experience and benefits of natural sunlight indoors, **supporting performance, comfort, and well-being** in classrooms, workspaces, and healthcare facilities.



Light is essential for vision, and for experiencing and responding to the world around us. But did you know that light plays an important role in regulating sleep, moods, behavior, and performance, and mental health?



This is the circadian, or biological, function of light. Whether we're aware of it or not, the light we take in throughout the day **plays a key role in determining our physical and mental well-being**.

## What is circadian lighting?



Light produces obvious and profound visual effects in us. It also produces non-obvious but equally profound non-visual effects. There are receptors in the eyes, alongside the famous rods and cones, with a direct line to the region of the brain—the suprachiasmatic nucleus of the hypothalamus—that regulates the human circadian rhythm.



This third kind of receptor contains a photopigment known as melanopsin. Melanopsin has a lot to do with the functioning of “sleep hormones” like melatonin and tryptophan, as well as with cognitive and affective processes in general. Melanopsin is most sensitive to short wavelengths of visible light—that is to say, blue light. Not surprisingly, the amount and timing of the blue light we get during each 24-hour period has a lot to do with our circadian health,



Curiously, the eyes' melanopsin receptors don't work in tandem with the human visual system, but entirely independently. We know this because experiments have demonstrated the melanopic effects of light even on people who are completely blind.

## Circadian lighting and payback time

Circadian lighting creates a comfortable working environment that fosters well-being and productivity. The benefits to your employees and business afford an attractive payback time on the additional investment.

Category	Assumptions & sources of assumptions made	BaseLine: DALI	Additional investment Circadian lighting
Hardware luminaires	DALI: 100 luminaires DALI Circadian: Adding additional cost for 100 luminaires DALI in Tunable White	15.000 €	5.500 €
Hardware controls	DALI: 2 master controllers, 8 room sensors, 4 touch panels for manual override. Circadian: Adding DALI extenders and SC200 sensors	2.000 €	4.000 €
<b>Total hardware</b>		<b>17.000 €</b>	<b>9.500 €</b>
Installation	DALI: DALI wiring to fixtures, wiring master controllers Circadian: Adding commissioning time & SAAS fee	2.000 €	1.700 €
<b>Total investment</b>		<b>19.000 €</b>	<b>11.200 €</b>

Financial benefits circadian lighting			
Improved Output of employees	250 mLux/4h, improves sleep 26 min 5 min of extra work done <sup>1</sup> > 1% productivity gain		50.000 €
Less absenteeism	Reduced by 0.5% <sup>2</sup> . Typical absence 5%, → 4.5%		25.000 €
Less employees switching jobs	People turnover reduction by 0.5% <sup>3</sup> . Typical 14% of annual salary to recruit/train		3.500 €
<b>Total annual benefits</b>			<b>78.500 €</b>
<b>Payback time</b>			<b>&lt; 0,2 years</b>

100 luminaires = 50 workers  
Salary 100,000 Euro / year

<sup>1</sup> [Human phase response curve to a 1 h pulse of bright white light, Insufficient sleep causes annual economic loss](#)

<sup>2</sup> [Working in our sleep: Sleep and self-regulation in organizations](#)

<sup>3</sup> [Absenteeism Rate Explained | Formula & Meaning of Absence Rate](#)

## Circadian calculation example

Category	Standard DALI solution	Investment
Hardware luminaires	50 x Downlight TC TT210 30S/840 PSD-E OC WH 50 x Linear suspended TrueLine DALI	5.000 € 10.000 €
Hardware: DALI controls	2 master controllers, 8 room sensors, 4 touch panels for manual override.	2.000 €
<b>Total materials</b>	<b>Downlights &amp; Controls</b>	<b>17.000 €</b>
Installation	15 minutes per fixture at a labor rate of 80 EUR/h to: • Pull a DALI wire to the fixtures • Power 2 master controllers • Power 8 room sensors • Power 4 touch panels	2.000 €
<b>Total</b>		<b>19.000 €</b>

Category	Circadian lighting: tunable white solution	Additional Investment
Hardware: 100 luminaires	50 x Downlight TC TT210 27S/TW9 PSD-E OC WH (+30 Euro for Tunable White) 50 x Linear suspended TrueLine (+80 Euro for Tunable White)	1.500 € 4.000 €
Hardware: Interact controls	Dali extenders and PRE running on SC200	4.000 €
<b>Total materials</b>		<b>9.500 €</b>
Additional programming	PRE licence fee of 7 Euro 6 minutes / 10 Euro commissioning per fixture	1.700 €
<b>Total</b>		<b>11.200 €</b>

## Our circadian lighting solutions

Circadian lighting from Signify uses a combination of dynamic LED luminaires, flexible controls, and science-based lighting recipes or experiences to deliver the right kind and quality of light for the optimum biological impact throughout the day.



### [Signify NatureConnect >](#)

Signify NatureConnect brings natural daylight indoors. The blue-sky effect mimics daylight, boosts energy, and improves workspaces.



### [Philips BioUp >](#)

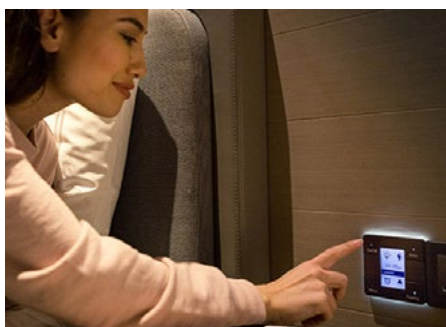
By enhancing the LED spectrum with cyan light, Philips BioUp supports biological health without changing the visual color or intensity of light.



### [Signify MyCreation >](#)

Customize your lighting solutions to reflect your style and brand identity. Offering adjustments in light color and intensity throughout the day.

Discover [GreenSpace >](#)



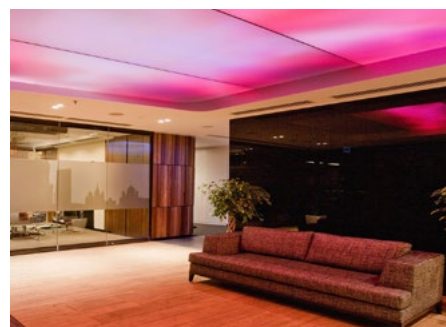
### [Signify Interact >](#)

Interact connected systems use tunable LED luminaires and evidence-based lighting recipes to support mood, performance, and overall well-being.



### [Philips Dynalite >](#)

Dynalite lighting controls can adjust lighting levels dynamically depending on task, time of day, and other factors.



### [Color Kinetics >](#)

OneSpace LED lights with textiles create a ceiling surface that delivers high-quality, uniform white light for an enhanced daylight experience.

Find out how Signify can transform your business  
[www.signify.com](http://www.signify.com)

