



## Light is the source of well-being

### Efficient HCL solutions

Today, modern lighting offers more than just optimum visibility. With innovative concepts for Tunable White and Human Centric Lighting, OSRAM uses the many positive effects of light in order to create more pleasant working environments. Improve the quality of life with light quality by using efficient lighting systems from OSRAM.

**Light is OSRAM**

**OSRAM**

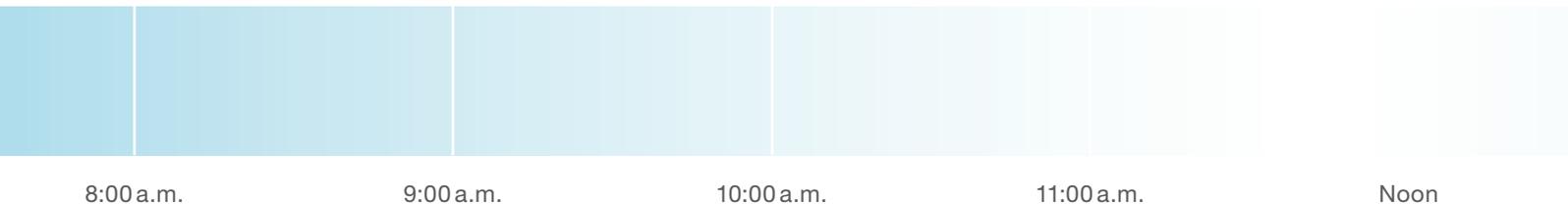


# Biologically effective light for balance and well-being

In the modern working world, human beings and their concerns have become increasingly important. Lighting supports this trend with groundbreaking concepts for Human Centric Lighting (HCL), which focus on humans and the optimal light for their needs. For example, they bring the natural course of daylight and its biological effects into indoor areas. This is achieved by using artificial light with the right brightness and color temperature to supplement the daylight. The interplay of light and room climate creates an atmosphere that has a positive impact on the well-being of humans as well as on their productivity and health.

## The right light at the right time

Referring to the artificial light of an HCL solution, the timeline shows the change in color temperature over the day. Biologically effective light with a high blue content activates us from morning to lunchtime and also when we hit a performance “low” in the afternoon. Towards evening, the color temperature gets warmer.



## A balanced internal clock

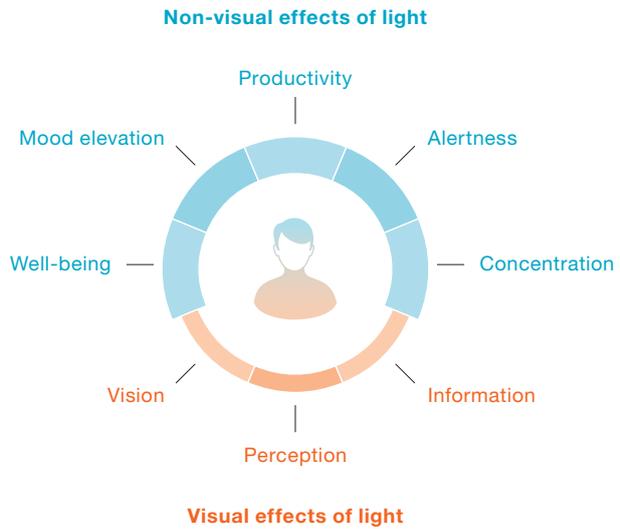
The sunlight synchronizes the day/night rhythm, our internal clock, which regulates our body in a 24-hour rhythm. By simulating the impact of natural daylight, biologically effective artificial light synchronizes humans with the outside world. As light color and brightness of the lighting are adjusted according to the changes in daylight by means of intelligent lighting control and sensor technology, the internal clock of humans is stabilized. They feel more alert, can concentrate better and are more vital.

## More alert, active and productive

While the color and intensity of the light is manually controlled in applications for Tunable White, HCL solutions dynamically adjust the brightness and color temperature of the lighting to the natural course of daylight – from activating cold white to relaxing warm white. In order to make use of the biological impact of light, suitable luminaires have to be chosen for the HCL concept. In addition, parameters such as daylight level, room structure and user profile have to be considered. Studies have shown that dynamic lighting solutions simulating the natural course of daylight significantly improve concentration and productivity as well as alertness and quality of sleep.

### Effects of a circadian lighting solution

Influence of dynamic lighting on the merely visual and non-visual effects of light



#### Supports the sleep/wake rhythm

Increased vitality  
Better sleep



#### Supports economic effects

Fewer mistakes and less absenteeism  
Higher productivity

(Source: CBRE case study OSRAM)

1:00 p.m.

2:00 p.m.

3:00 p.m.

4:00 p.m.

5:00 p.m.



#### Dynamic adjustment over the day

Daylight with a higher blue content has the most influence on our internal clock as blue light has an activating impact. Therefore, a great amount of light with at least 5,300K and a higher blue content is used to increase performance during the day, whereas warm light with color temperatures below 3,000K is suitable for the evening.

**Improve the quality of life with light quality – profit from innovative HCL concepts!**

Learn more at:

[www.osram.com/human-centric-lighting-systems](http://www.osram.com/human-centric-lighting-systems)

#### HCL and melanopic effects

When designing an HCL-ready luminaire, the spectral evaluation of the optical radiation in the visible range has to be carried out in order to evaluate the melanopic effects of light. This evaluation depends on various parameters, which has led to the use of “HCL” in place of the term “biologically effective light”. These parameters include:

- Brightness compared to glare
- Color temperature and spectral deviations due to the application of reflector/optics material and constant-current amplitude dimming
- Filter effect of applied covers/diffusers, e.g. made of glass
- Transmission, reflection and absorption of walls
- Possible impact of daylight (glare)
- Different characteristics of the user (pupil diameter, age etc.)

Detailed information can, for example, be found in the standards DIN SPEC 5031-100 and DIN SPEC 67600.

HCL approaches have to be considered as an interdisciplinary interaction of various factors, which go beyond the mere lighting solution. In addition to the ergonomics at hand, architectural structure and interior design also have an impact on the individual.

“HCL solutions generally make sense for all types of companies.”

Andreas Wojtysiak | OSRAM Innovation



## Dynamic daylight supports humans in all areas

An interview with Andreas Wojtysiak, OSRAM Innovation, and the OSRAM product managers Nicolai Heber and Peter Bach

**OSRAM: In Human Centric Lighting, the biological impact of lighting on humans is the main focus. Can you briefly explain these phenomena?**

**Andreas Wojtysiak:** A biological impact is primarily achieved by utilizing the control phenomena of light that coordinate our bodily functions. These include day/night control or activating effects on the central nervous system. Due to evolution, our biological functions and processes are mainly based on our roots in Central Africa – meaning a rhythm with 12 hours of day and 12 hours of night. Our biological system, our internal clock, so to speak, has only partially adapted to life in our corner of the world, where the length of a day changes between summer and winter.

**OSRAM: This means that our rhythm is based on the difference between day and night.**

**Andreas Wojtysiak:** That's correct. Our body is made to be active during the day and to regenerate during the night when the repair processes take place. For our well-being, both phases are important. The difference between activity and recovery has to be as clear as possible.

**OSRAM: In case of HCL solutions, how is lighting controlled over the day?**

**Nicolai Heber:** During the day, the brightness levels are increased and light with a higher blue content is used. It is this blue content in the spectrum of visible light that addresses the cells in the retina that regulate our internal clock and thus our bodily functions. A wide-area light distribution across the ceiling or the walls is important to create a sky of light. In the evening, spot illumination with a low blue content and low intensity makes more sense. In this case, the light only fulfills the actual visual tasks.

**OSRAM: How do the color temperatures reflect this?**

**Andreas Wojtysiak:** In the morning, color temperatures of at least 5,300 K or 6,000 K help achieve the activating impact of light. During the day, it also makes sense to use high kelvin numbers over long periods of time. Towards evening, the values are reduced to below 3,000 K.

**OSRAM: Many studies have proven the positive effects of the new concepts. Is OSRAM also doing research in this area?**

**Andreas Wojtysiak:** In the past, we mainly did basic research. In the meantime, we are also part of research projects that analyze real applications to show which benefits can be achieved for the individual.

**OSRAM: What specifically are those benefits?**

**Andreas Wojtysiak:** Standard long-term tests in schools, for example, have demonstrated that the rate of errors is reduced and that concentration and sustained attention are significantly improved. These factors are, of course, also important for office work. In addition, health effects can also be noticed, but these are difficult to quantify.

**Nicolai Heber:** The individual feels more at ease, can concentrate better and is more alert. Of course, companies also profit from this because their office staff is more productive, makes fewer mistakes and is less often sick.

**OSRAM: Employees working with more focus are naturally also in the best interest of the companies.**

**Andreas Wojtysiak:** There are market studies that show an increase in the performance of employees, which can be translated into amortization times.

**Peter Bach:** The daylight simulation generally improves the living conditions of humans. This can be in the office, in production plants or in the health sector, for example, in retirement homes or hospitals. It also supports professional athletes by improving their concentration and power.

**OSRAM: Does this mean that HCL concepts have a positive benefit-cost ratio?**

**Andreas Wojtysiak:** In terms of applied energy, the cost of HCL solutions is perhaps higher. The most important factors in a company, however, are not the energy costs but the employees. When employees are more productive and more efficient, you can gain much more in the long run. HCL concepts generally make sense for all types of companies.

**OSRAM: Does HCL pay off for companies of all sizes?**

**Nicolai Heber:** The size doesn't matter. Several studies show that HCL pays off in the end. The initial investment is higher, but absenteeism is reduced and productivity is increased. Most of all, because the concepts can be implemented much easier thanks to modern control technology.

**OSRAM: What's the difference between HCL and Tunable White?**

**Peter Bach:** While Tunable White is about the personal comfort of the individual, HCL focuses on the biological impact. Tunable White provides the technological opportunity to plan HCL solutions in the best possible way.

**“We want to make HCL easy.”**

Peter Bach and Nicolai Heber | OSRAM product managers

**OSRAM: So where is the trend headed?**

**Nicolai Heber:** It depends on the application. Generally, however, the trend is headed towards HCL as these concepts are now easier to implement thanks to LED technology. Tunable White, on the other hand, is ideally suited for applications in the hospitality sector, for example in hotels or restaurants, where changing light moods are crucial.

**OSRAM: What's the difference between OSRAM and its competitors?**

**Nicolai Heber:** Uncomplicated system use and comprehensibility are the essential characteristics of our HCL concepts and Tunable White solutions. The systems can be commissioned and operated in a convenient way. Moreover, you can adapt them to the application at hand. It's all about good lighting quality at a reasonable price, with scalable systems for the respective application. We want to make HCL easy.

**OSRAM: How do you see the future?**

**Nicolai Heber:** The idea behind HCL has been around for a long time. Until now, however, complexity and costs had often been the limiting factors. Right now, people's thinking is changing. Job satisfaction is becoming more and more important for the employer. The image of the company is also an important aspect when it comes to groundbreaking lighting concepts. Moreover, a market study of ZVEI and LightingEurope shows that high growth rates can be expected from Human Centric Lighting. Therefore, I see great future potential for OSRAM in this area. More information can be found at [www.zvei.org](http://www.zvei.org) and [www.lightingeuropa.org](http://www.lightingeuropa.org).



# Optimized lighting for the modern working environments of tomorrow

When it comes to the well-being, motivation and productivity of employees, the whole working environment plays a crucial role. In addition to an appealing, pleasant room design, the lighting also supports the physical and mental balance. For individually adjusted lighting systems, OSRAM provides cost-efficient HCL components. An installation in an open-plan office shows the possibilities these concepts have to offer.

## Optimizing the lighting conditions

In order to achieve the desired positive effects, a time-controlled lighting system, which simulates the character and quality of daylight over the day, was installed for the entire office. During the design of the lighting system, the experts from OSRAM in Wipperfurth provide layout support on the basis of specific framework conditions. For the calculation of light ceilings, the OSRAM LED deSIGNer as well as our checklists for the correct combination of suitable components can be consulted. More information can be found at [www.osram.com/led-designer](http://www.osram.com/led-designer).

Prior to refurbishment, the main focus had been on the illumination of working surfaces and particularly the places in the back of the room had obtained only little daylight. All in all, the open-plan office had been characterized by single islands of light, resulting in an inconsistent and dark overall impression.

## Taking advantage of the activating effects of light

Thanks to the new HCL concept, the basic lighting creates a wide-area sky of light, giving the entire room a pleasantly bright atmosphere. By means of daylight and presence sensors, the light coming through the window front is also used efficiently. In the morning hours and in the early afternoon, the cold white light with high brightness levels and a high proportion of indirect light activates the employees. In the late afternoon, the light changes to a warmer dimmed level. This process supports the natural biorhythm and improves concentration, alertness and consequently productivity.

## Homogeneous sky of light for effective working

The entire installation creates various fields of light, which are positioned systematically according to the space utilization concept. The applied luminaires offer a wide spectrum of white light, with light colors between 2,700K and 6,500K, and are therefore ideally suited for the HCL concept. A large sky of light stretches over the meeting area, backlit by BackLED® LED modules in a very uniform way and with high light quality. Thanks to the dynamic control of light colors and the activating effects of the light, meetings now take place in a stimulating atmosphere.





**Bright direct and indirect light**

At the workstations, the direct light of pendant luminaires with PrevaLED® Linear TW provides high visual comfort, while their indirect light brightens the ceiling and the upper third of the wall without any glare. In order to support the pleasant and activating light atmosphere in the entire room, the recessed ceiling luminaires merge together to form a large-area lighting grid.

The integration of the new recessed luminaires into the existing ceiling grid system could be carried out easily with PrevaLED® Linear TW or LINEARlight Flex® Tunable White LED modules. The luminaires can be grouped into individual units and provide a modular system that can be extended by additional elements when the room arrangement is changed.



**Lighting control as backbone of the system**

The light management system from OSRAM is the central element of the lighting installation. The applied control system allows for the dynamic adjustment of light color and brightness level according to the natural course of daylight – with the help of light and presence sensors as well the OPTOTRONIC® OTi DALI TW LED drivers. The changes in light are carried out smoothly and continuously and can therefore not be consciously perceived by the employees. What can be perceived, however, is the stimulating light mood created by the wide-area basic lighting, giving the feeling that the whole room is a brightly lit unit.

In this case, the non-visual effects of light are combined with a high light quality, providing a functional and efficient overall concept that creates a harmonious working atmosphere.

**More information on our light management systems can be found on pages 14/15.**

# Tunable White and HCL.

## Versatile control for any size

### Easy integration of the lighting solutions

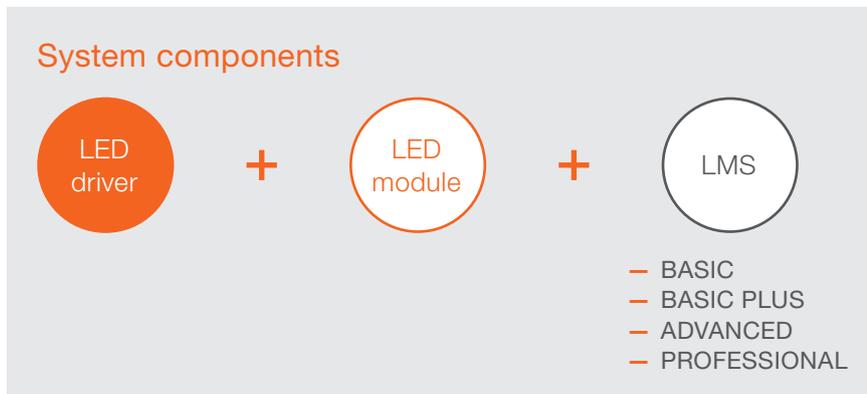
Lighting systems from OSRAM can be scaled easily and flexibly in order to implement installations of any size in office buildings and industrial facilities as well as in the health and education sector.

#### Maximum flexibility of the luminaire system

Thanks to interchangeable components and standardized interfaces, the modular luminaire systems can be easily extended and arranged in a cost-efficient way. With the light management systems from OSRAM, luminaires can be easily grouped and lighting scenes can be set as required.

#### Easy access to Tunable White and HCL

Our range of solutions extends from basic concepts for Tunable White systems to comprehensive HCL installations. The entry level comprises simple Tunable White applications for the manual control of single rooms with the DALI MCU TW. The DALIeco BT for luminaire and ceiling integration as well as the DALI ACU BT, which has been optimized for flush-device boxes, also allow the daylight- and presence-dependent control of single luminaires and luminaire groups as well as convenient control via app. The real-time clock of the DALIeco BT RTC allows for daytime-dependent control. DALI PROFESSIONAL helps you to realize dynamic, daylight-dependent lighting control, also via app, for example in open-plan offices or production halls. With the interface KNX IF 250 it will also be possible to integrate DALI PROFESSIONAL into a building management system.



### TW/HCL segmentation and definition

Manual control (Tunable White)		Automatic control (Human Centric Lighting)				
Rotary dimmer	Two-button switch	Multi-button switch (pre-set)	Sequencer, e.g. one (pre-set) scene per hour	Daylight simulation (circadian white)	Any free format profile (from scratch)	Adjustment of a pre-defined profile
<b>Classic control (examples)</b>						
DALI MCU TW	Touch DIM TW	Buttons	DALIeco BT RTC	Possibility of manual override and return to automated cycle Example: DALI PROFESSIONAL and DALI Pro Control app		
<b>Control via app (examples) – daily time profile</b>						
OSRAM BT CONTROL app	OSRAM BT CONTROL app	OSRAM BT CONTROL app*				

\* Only in combination with DALIeco BT RTC

BASIC

BASIC PLUS

ADVANCED

PROFESSIONAL



Touch DIM TW



DALI MCU TW (rotary dimmer with Tunable White)



DALIeco BT/DALI ACU BT (convenient control via app)



DALIeco BT RTC



DALI PROFESSIONAL (integrated real-time clock, control via pushbutton and app)



Single offices, conference rooms

## Tunable White

### Single luminaires

Floor-standing luminaires, pendant luminaires

### Single offices/conference rooms

Recessed and surface-mounted luminaires, pendant luminaires

### Functions BASIC

- DIM to warm
- Setting of color temperature in combination with DT8 driver
- Storage of a memory value

Up to 2 DALI LED drivers

### Functions BASIC PLUS

- Dimming and switching
- Setting of color temperature in combination with DT8 driver
- Storage of a memory value

Up to 25/100\* DALI LED drivers



Single to open-plan offices, shops and hospitality

## Tunable White

### Single luminaires, single and open-plan offices

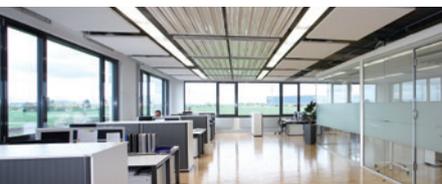
Floor-standing luminaires, pendant luminaires, recessed and surface-mounted luminaires, cove lighting

### Functions ADVANCED

- Dimming and switching
- Setting of color temperature
- Storage and recall of lighting scenes
- Daylight- and presence-dependent brightness control
- Convenient control via app

Up to 32 DALI LED drivers

## HCL



### Smaller facilities

Floor-standing luminaires, pendant luminaires, recessed and surface-mounted luminaires, cove lighting

Single- or multi-room solutions, e.g. in production halls, school buildings, retirement homes and hospitals



### Medium-sized and large facilities

Pendant luminaires, recessed and surface-mounted luminaires, cove lighting, trunking systems, batten luminaires

### Functions PROFESSIONAL

- DALI DT8
- Dimming/DIM to warm, color changing and setting of lighting scenes by remote control via app
- Daylight simulation
- Daylight-dependent regulation
- Real-time clock for daytime-dependent control

Up to 1,024 DALI LED drivers

\* max. 25 DALI LED drivers per DALI MCU TW/up to 100 DALI LED drivers with 4 active DALI MCU TW, connected in parallel

# HCL concepts pave the way to the future of light

With the systems from OSRAM, the implementation of functional HCL concepts can be carried out more easily and more cost-efficiently than ever before, both in existing and new installations. It requires the application of luminaires that allow for melanopically effective lighting in terms of the spectral evaluation of the optical radiation in the visible range. As a system provider, OSRAM offers you a comprehensive portfolio of LED drivers and modules as well as light management systems, allowing you to find the best combination for your individual needs.

### Benefits for luminaire manufacturers

- **Flexibility** thanks to the interchangeability of the components
- **Cost efficiency** through demand-based solutions
- **Innovation** with DALI DT8 LED drivers for Tunable White or HCL luminaires
- **Reduced amount of components** thanks to the use of DT8 LED drivers as 2-channel devices for direct and indirect lighting
- **State-of-the-art LED driver technology** allowing the choice between amplitude dimming and pulse width modulation (only with OTi DALI NFC TW L)
- **LED drivers suitable for emergency lighting** with DC detection and EL approval mark for AC and DC operation

### Benefits for end customers

- **Scalable system** with individual solutions for small to large applications
- **Light similar to natural daylight** with color temperatures from 2,700 to 6,500 K
- **Individualization** of personal workplace lighting
- **High light quality** with pleasant flicker-free light
- **Wide operating range** even in mixed installations via DALI standard

Choose from many possible combinations to find the best solution for your project:

LED driver	LED module	LMS
<b>Constant-current LED driver</b> OTi DALI 35/220...240/400 D NFC TW L OTi DALI 75/220...240/700 D NFC TW L	<b>LED module</b> PrevaLED® Linear Tunable White	<b>LMS</b> Touch DIM TW DALI MCU TW DALI ACU BT DALIeco BT DALIeco BT RTC DALI PROFESSIONAL
<b>Constant-voltage LED driver</b> OTi DALI 50/220...240/24 TW OTi DALI 80/220...240/24 TW OTi DALI 160/220...240/24 TW	<b>LED module</b> LINEARlight Flex® Tunable White BackLED® TW Plus	<b>LMS</b> DALI MCU TW DALI ACU BT DALIeco BT DALIeco BT RTC DALI PROFESSIONAL

# Perfect light at any time of the day

The OPTOTRONIC® OTi DALI LED drivers perform well in Tunable White as well as HCL applications. In addition to models for 2-channel applications, 4-channel versions for RGBW lighting are also available.

LED  
driver



## OTi DALI NFC TW L

- 2 constant-current LED drivers (non-isolated): 35 W and 75 W
- 2 settings: DT6 (two separately controlled channels) or DT8 (version for Tunable White)
- Fully programmable via DALI and NFC
- Simple TW function integrated via the pushbutton without the need for additional control components (available end of 2018)
- Very high efficiency: up to 92 %
- Wide operating and temperature range
- 1...100 % DALI-2-dimmable, PWM or amplitude dimming can be selected
- Low ripple below 1 % for high light quality
- Lifetime of up to 50,000 h at  $T_c$  max

## OTi DALI NFC TW L

Product reference Product portfolio excerpt	Product code	Output power	Output voltage	Rated output current	LED driver efficiency (max.)	Dimensions (L x W x H)	Ambient temperature range
OTi DALI 35/220...240/ 400 D NFC TW L	4052899990302	4...38 W	54...240 V	75...400 mA	up to 91 %	360 x 30 x 21 mm	-25...+50 °C
OTi DALI 75/220...240/ 700 D NFC TW L	4052899990326	8.1...75 W	54...240 V	125...700 mA	up to 92 %	360 x 30 x 21 mm	-25...+50 °C



## OTi DALI 24 V LED driver Tunable White (DALI DT8)

- Constant-voltage LED driver
- Intelligent power matching thanks to Smart Power Supply
- Small cross-section for installation in coves or linear luminaires
- Minimized flickering effect thanks to high PWM frequency
- Dimming range 0.1...100 % (PWM)
- Wide range of applications thanks to many output levels
- Suitable for 24 V LED modules
- Lifetime of up to 70,000 h at  $T_c = 70$  °C

## OTi DALI 24 V LED driver Tunable White (DALI DT8)

Product reference Product portfolio excerpt	Product code	Output power	Output voltage	Rated output current	LED driver efficiency (max.)	Dimensions (L x W x H)	Ambient temperature range
OTi DALI 50/220...240/24 TW	4052899490772	50 W	24 V	2100 mA	90	346 x 32 x 22 mm	-20...+45 °C
OTi DALI 80/220...240/24 TW	4052899490758	80 W	24 V	3300 mA	90	346 x 32 x 22 mm	-20...+45 °C
OTi DALI 160/220...240/24 TW	4052899986312	160 W	24 V	6660 mA	93	300 x 50 x 35 mm	-20...+45 °C

# High light quality, high performance

LED modules from OSRAM are suitable for a wide range of luminaires in Tunable White and HCL concepts. BackLED® TW Plus provide a particularly uniform light distribution in light ceilings. PrevaLED® Linear Tunable White, LINEARlight Flex® Tunable White and BackLED® TW Plus deliver great results in recessed ceiling luminaires, pendant luminaires and cove lighting – with a high light quality and a wide spectrum of light colors from 2,700 to 6,500 K.



### PrevaLED® Linear Tunable White

- Module efficacy: up to 152 lm/W at 2,700 K
- Module efficacy: up to 162 lm/W at 6,500 K
- Very broad spectrum of light colors: 2,700 K to 6,500 K
- Luminous flux: approx. 2,200 lm per light color
- Color rendering index CRI > 80
- Initial color consistency: ≤ 3 SDCM (threshold value unit)
- Average lifetime (L70B50): 50,000 h at T<sub>c</sub> = 55 °C
- Geometry according to Zhaga Book 7 L56W2

### PrevaLED® Linear Tunable White

Product reference	Product code	Rated power	Color temperature	Usable total luminous flux	Luminous efficacy	Rated current	Construction length
PL-LIN-Z1 2200-TW 560X20	4052899989351	14.2 W	2700...6500 K	2152... 2287 lm	152...162 lm/W	275 mA	560 mm



### LINEARlight Flex® Tunable White

- Flexible and cuttable LED strip
- Seamless light without shadowing
- Fine White Binning (3 SDCM)
- Dimmable (PWM)
- Very broad spectrum of light colors: 2,700 K to 6,500 K and 2,200 K to 3,500 K as well as 2,400 K to 3,500 K
- Perfectly matched with OPTOTRONIC® OTi DALI 50/220...240/24 TW, OTi DALI 80/220...240/24 TW, OTi DALI 160/220...240/24 TW
- Luminous flux: up to 4,000 lm/m, depending on the applied LED driver and control
- Self-adhesive back for easy mounting
- Flexessories® – dedicated accessories for Flex® strips – for quick installation and homogeneous light distribution: mounting tracks, covers, mounting brackets and end caps
- Quick installation with optional SLIM TRACK System
- 5-year guarantee\*

### LINEARlight Flex® Tunable White

Product reference	Product code	Watts per meter	Color temperature	Rated voltage	Length
<b>Tunable White (LFxxxx-TW) R<sub>a</sub> ≥ 80</b>					
LF4000TW-G3-827/865-02	4052899953260	36.8 W	Dynamic (2700–6500 K)	24 V	2100 mm
LF3000TW-G3-827/865-03	4052899953277	30 W	Dynamic (2700–6500 K)	24 V	3000 mm
LF2000TW-G3-827/865-04	4052899953284	18.5 W	Dynamic (2700–6500 K)	24 V	4500 mm
LF1200TW-G3-827/865-09	4052899953161	10.5 W	Dynamic (2700–6500 K)	24 V	9000 mm
LF2X1600TWW-G1-822.835-02	4052899563339	38.7 W	Tunable White	24 V	2100 mm
LF2X1600TWW-G1-824.835-02	4052899563353	37.7 W	Tunable White	24 V	2100 mm

\* For conditions and detailed information, see [www.osram.com/guarantee](http://www.osram.com/guarantee)



#### BackLED® TW Plus

- High color rendering index (CRI > 80)
- Very broad spectrum of light colors: 2.700 K to 6.500 K
- Fine White Binning (3 SDCM)
- Flexible programmable lighting moods in connection with light management systems
- Uniform backlighting of large surfaces thanks to extremely wide angle optics
- Simple fixing with M3 screws
- 5-year guarantee\*

#### BackLED® TW Plus G15

Product reference	Product code	Color temperature	Rated power	Luminous flux per module	Number of modules/chains (L x W x H)	Module dimensions (L x W x H)
BA-TW-PL 827-865	4052899452954	2700–6500 K	96 (4.8) W	460 lm	20	130 x 35 x 13 mm



#### BackLED® RGBW Plus

- Broad color mixing palette including pastel colors (in connection with light management systems)
- Uniform backlighting of large surfaces thanks to extremely wide angle optics
- Consistent white light (Standard Deviation of Color Matching SDCM: < 5)
- Simple fixing with M3 screws
- Simple connection with open cable ends
- 5-year guarantee\*

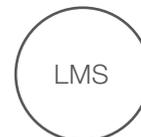
#### BackLED® RGBW Plus G2

Product reference	Product code	Color temperature	Rated power	Luminous flux per module	Number of modules/chains (L x W x H)	Module dimensions (L x W x H)
BA-RGBW-PL G2	4052899452930	RGBW, 6500 K	55.2 (3.7) W	154 lm	15	129 x 35 x 12.8 mm

\* For conditions and detailed information, see [www.osram.com/guarantee](http://www.osram.com/guarantee)

# Compatible light management systems for HCL and Tunable White

Lighting concepts from OSRAM allow for easy installation and convenient configuration. Covering the entire range of application, the light management systems are suitable for any project size and any requirement profile, from Basic to Advanced to Professional. This offers easy access to cost-efficient Tunable White and HCL applications and provides the opportunity to extend the scope and add functionalities if required.

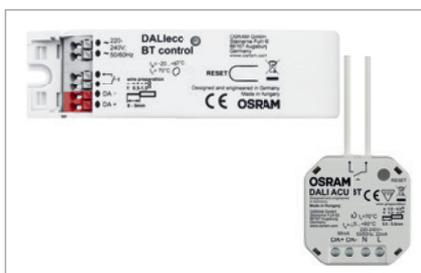


### DALI MCU TW

- Individual manual dimming, switching and changing of color temperature from 2,000 to 10,000 K
- Individual setting of minimal brightness level
- Up to 4 DALI MCU TW can be connected in parallel to set up multiple control points
- Automatic synchronization between the control points
- Suitable for up to 25 LED drivers

### DALI MCU TW

Product reference Product portfolio excerpt	Product code	Voltage	Type of mounting	Ingress protection	Dimensions (L x W x H)	Ambient temperature range
DALI MCU TW	4052899465916	230 V	Integrated into flush-device box	IP20	80 x 80 x 50 mm	0...+50 °C

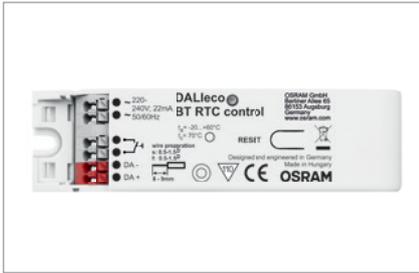


### DALIeco BT control/DALI ACU BT

- Control via app
- Dimming and switching via standard pushbutton
- Configuration via app (DALIeco BT only)
- DALI light and presence sensors can be connected
- Up to 32 LED drivers can be connected (White as standard or Tunable White)

### DALIeco BT control/DALI ACU BT

Product reference Product portfolio excerpt	Product code	Voltage	Type of mounting	Ingress protection	Dimensions (L x W x H)	Ambient temperature range
DALIeco BT control	4052899988781	230 V	Luminaire/ceiling integration	IP20	108 x 30 x 21 mm	-20...+60 °C
DALI ACU BT	4052899544819	230 V	Integration into flush-device box/ceiling	IP20	48 x 49 x 22 mm	-20...+60 °C



**DALIeco BT RTC**

- Real-time clock for daytime-dependent control
- Timer function for time control of up to 4 time periods incl. weekdays
- Configuration and control via app
- Connection of OSRAM DALI light and presence sensors
- Connection of up to 32 DALI ECGs (DALI DT8 (Tunable White))

**DALIeco BT RTC**

Product reference Product portfolio excerpt	Product code	Voltage	Type of mounting	Ingress protection	Dimensions (L x W x H)	Ambient temperature range
DALIeco BT RTC control	4062172016537	230 V	Luminaire/ceiling integration	IP20	108 x 30 x 21 mm	-20...+60 °C

**DALI Pro Control app**

The functions of the DALI PROFESSIONAL system can be adjusted with the DALI Pro Control app. Multiple users can connect to the control in parallel.

**The app features at a glance:**

- Comfortable switching and dimming with status display
- Clearly arranged through grouping of rooms
- Access limitation with individual clearance of each control element per user
- Activate/override daylight controls
- Selection of scenes and sequences
- Control element for colored light (RGB)
- Control element for color temperature adjustment (TW)



More information and links for downloading the app can be found at:

[www.osram.com/dalipro](http://www.osram.com/dalipro)



**DALI PROFESSIONAL**

- Easy and intuitive control via app or standard pushbutton
- Interconnection of up to 4 DALI PROFESSIONAL control units via Ethernet
- Daylight simulation with real-time control
- Control of up to 256 standard DALI or TW LED drivers
- DALI light and presence sensors can be connected
- 4 integrated relay contacts
- Simplest HCL solution for KNX in combination with KNX IF 250 possible

**DALI PROFESSIONAL**

Product reference Product portfolio excerpt	Product code	Voltage	Type of mounting	Ingress protection	Dimensions (L x W x H)	Ambient temperature range
DALI PRO Cont-4 RTC	4008321710871	100...240 V	DIN rail mounting	IP20	90 x 160 x 62 mm	0...+40 °C
KNX IF 250	4062172020008	KNX bus	DIN rail mounting	IP20	1 TE (18 mm)	-5...+45 °C

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