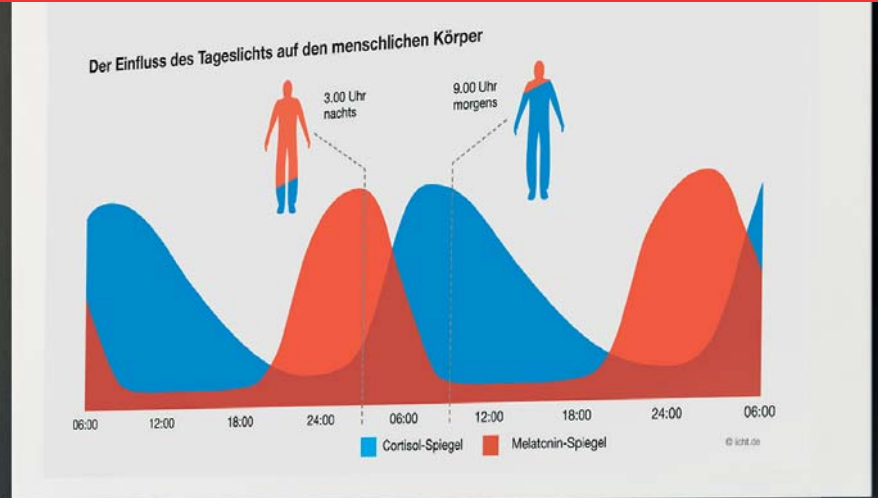


**B.E.G.**

The lighting control professionals



Energy-efficient and biologically effective lighting (HCL) with B.E.G.





## Modern light management with B.E.G.

Presence and occupancy detectors are an important feature in the planning of buildings. The intelligent lighting control favours the building users' convenience. In Germany the Energy Saving Ordinance incorporates light management since 2014, and with 40 years' experience B.E.G. is one of the leading companies in this sector.

For a long time, motion and presence detectors had an eye-catching shape on ceilings. Fortunately, the technology is fast-developing and so B.E.G. designed detectors which are also pleasing to the eye.

And the icing on the cake is that customers must not be concerned that the detectors are less capable: even with an almost invisible occupancy detector on the ceiling it still reliably detects movements and can cover a large area.

**Get excited!**

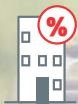




HCL lighting, or “Human Centric Lighting”, is lighting with humans as its focus. Therefore, lighting must take account of the latest discoveries and not only provide good static light, but also consider biodynamics, in other words the right light for the right time of day.



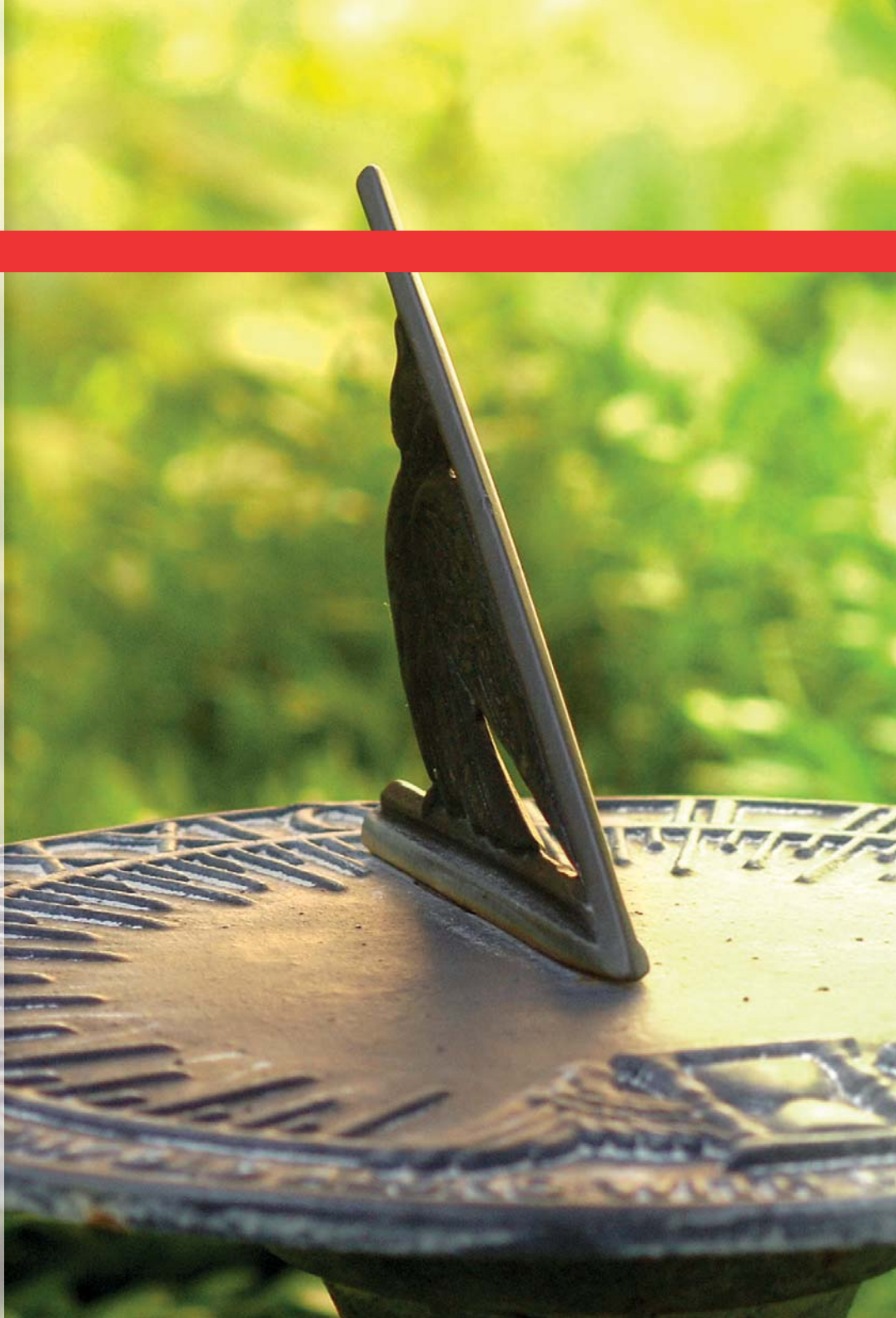
**Modular complete solutions**



**Low investment costs**



**Up to 71% energy savings**





## The light controls our body clock

### New findings from research:

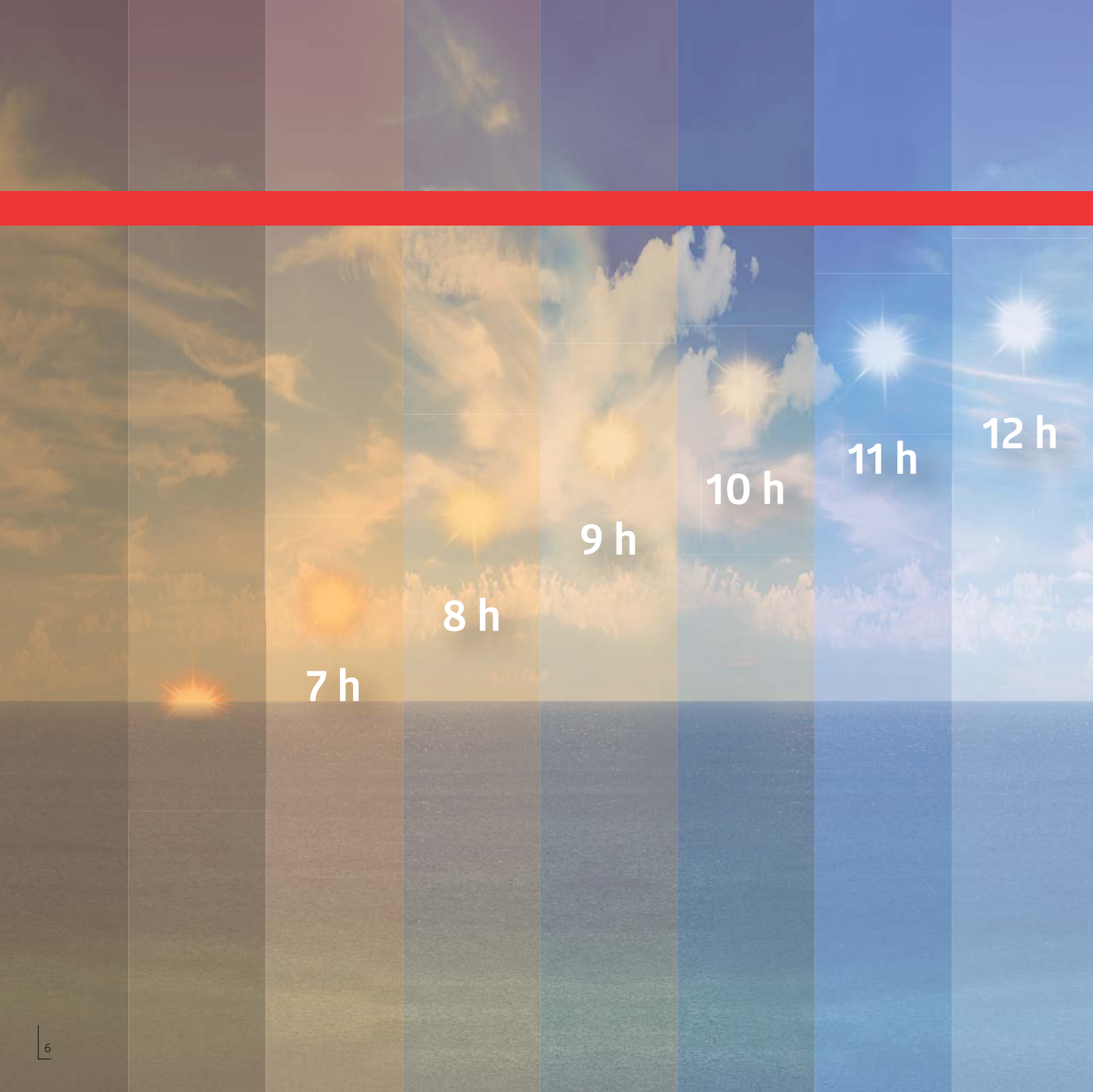
In 2002, scientists discovered a third kind of photoreceptor in the retina of the eye. These are not primarily for vision, but are very sensitive to light with a high level of blue in it. Among other things, they regulate the production of hormones that are essential for the human “body clock”. This new discovery made sense of many things: for thousands of years, daylight has synchronised the biorhythms of people living predominantly outdoors.

### The biorhythm needs daylight

Without daylight, the biorhythms get out of step. Modern humans mostly live in rooms which are not always flooded with sufficient daylight and are generally lit artificially. Therefore, for many hours in the day, daylight’s influence on biorhythms is missing, which can have negative effects on our well-being, concentration and health.

### Artificial lighting solution

In practice, this means trying to track daylight as closely as possible by changing the colour temperature and adjusting light output. The lights themselves must therefore be dimmable and must allow for different white tones, known as “Tunable White”. Hence daylight can to a certain extent be brought into a building, even if the building’s design means little or no true daylight is available. Using lighting to replicate daylight is known as “circadian lighting”, from the



7 h

8 h

9 h

10 h

11 h

12 h

## Non-visual effect of light

13 h

14 h

15 h

16 h

17 h

18 h

Latin "circa" for "around" and "dies" = "day". The skill now is to define the right colour temperature and the right light level for every hour of the day. These parameters differ according to latitude, longitude and time of year. The change in lighting should take place as smoothly as possible and should not be noticeable by the user – natural daylight provides the yardstick.

### **New possibilities thanks to innovative technology**

Variation in the white tone can also serve other purposes, e.g. a calming atmosphere can be created by warm white tones. Using high light levels and a greater blue component in the light can produce an increase in the ability to concentrate, a so-called "light shower". There are practically no limits to creativity in this field, and different profiles for different application scenarios are listed in DIN SPEC 67600.

Many studies show that biodynamic lighting / HCL, with colour temperature and lighting levels adjusted to the current situation, generally improves well-being, productivity and health.



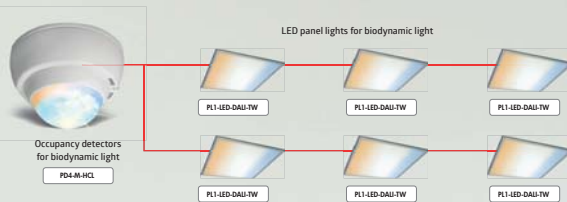
PD4-M-HCL





## Biodynamic light – the perfect solution

### Biologic effective illumination



### PL1

But since HCL usually provides, at least part of the time, a higher minimum lighting level than workplace regulations require, and thus increases the energy consumption of the lighting, the use of occupancy detectors is more important with an HCL installation, in order to save as much energy as possible. Therefore it is not enough to install dimmable and colour-changeable “Tunable White” lighting, but an intelligent lighting control system must be used as well, to make HCL control energy efficient.

The bidirectional PD4-M-HCL occupancy detector with integrated DALI controller and Tunable White function for Human Centric Lighting controls different luminaire groups depending on presence and daylight and also has daylight-dependent control of brightness and colour temperature using a real-time clock.



PD4-M-HCL-FC - 93006





## Better concentration in schools



When you learn, you need good light. Studies show that biologically effective lighting has a positive effect on learning behaviour and helps students to work more attentively and with more concentration. Biologically effective lighting achieves the best effects if it is used for a long time and stabilises the circadian system in the long term. But positive results can also be seen in the short term: Short light showers with a high blue content have been proven to promote concentration.



**PL1-600-LED-AG-DALI-TW - 93681**





## Increased performance in the office



**PL1-31125-LED-AG-DALI-TW - 93066**

Nowadays, the majority of people no longer work outdoors, but indoors. Structural measures cannot always ensure that sufficient daylight is available everywhere. With HCL lighting you can compensate for this deficiency and noticeably improve the workplace.

Biorhythms will be stabilised, and studies show that good HCL lighting very often improves well-being, concentration, performance and also health.



PD4-M-HCL-SM - 93007



## Reduction of errors in industry



Many people in industry work shifts, for example, have to get up very early. They often complain of poor sleep and fatigue during the day. This also reduces productivity, because those who cannot regenerate are not efficient. Whether at the machine or during assembly: if a biologically effective lighting system provides light at the workplace, employees in industry are more alert and concentrated. They sleep better at night and are more rested during the day. This reduces the error rate and increases safety.



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