

# LED Components VISIBLE and UV



passion.experience.reliability.







Familienbetrieb



For almost 70 years, we have been one of the leading design-in distributors for electronic components and systems. At five locations in Germany with a total of 65 employees.



Headquarters:

Weisendorf



Branch Office: Ahrensburg



Offices: Berlin, Dortmund, Munich

### ... and what we do

As a traditional and family-owned company, we work exclusively with renowned and leading manufacturers. Our focus is on individual consulting as well as solutions and custom-fit products for our customers. Because only when our customers are 100% satisfied we have done a good job.

You can also find us here

in X

# Ausbildungsbetrieb

seit 1952 am Markt







We carry light emitting diodes from 280nm (UV) up to 950nm (IR) for all applications. Whether as SMD, COB, THT, OLED or as module, you are guaranteed to find the right LED for your lighting project. In addition to our standard products of well-known manufacturers, we also offer customized solutions according to your requirements.

Whether general, office, industrial or plant lighting: We have the right LED for your application and are at your side with our knowledge and many years of experience at every step.

UV LEDs are much more effective than conventional UV light sources, as they generate high light intensities in the UV range in a narrow wavelength range. Since they are also semiconductor light sources, they can be controlled and regulated without any problems. We offer UV-LEDs from 280nm to 405nm.

Our wide range of visible LEDs (wired, SMD low power, SMD medium power, high power, scrich) enables us to offer the ideal solution for your application. The narrow selection of color temperature and brightness allows the construction of high quality LED systems. Our product range in the visible range includes LEDs from 465nm to 700nm.

Our product selection of IR-LEDs (infrared LEDs) is trend-setting for the infrared optoelectronic range. We supply you with powerful and durable IR-LEDs from 850nm to 935nm in plastic or metal housings. For applications with extremely harsh conditions, the components with an operating temperature range from -65° C to +125° C are suitable.

### LED module development

Customised to your requirements



The path from your product idea to series production is often a complex and costly process. Therefore, each individual step must be coordinated safely, seamlessly and smoothly, just like a gear wheel. Our proven process chain includes all steps of product development. Through adjustments and optimizations we ensure that your product is and remains state-of-the-art according to your wishes.

Further Informations you will find in our LED modules broschure.

### Full spectrum LEDs

Light that comes closest to sunlight

#### Natural Light Why we should return to the light of nature

Due to their structure, full spectrum LEDs do not have a dominant blue peak and therefore provide light that does not negatively affect the human organism.

The possible applications of full-spectrum LEDs range – not least due to their excellent colour fi delity and high contrast – from HCL applications (Human Centric Lighting) to plant lighting (Horticulture) to medical and cosmetic applications.

Full-spectrum LEDs contain the entire colour spectrum. Rich and natural colors, through a light spectrum that is very close to sunlight – without blue peaks as well as with low UV emissions and extremely high CRI – achieved through the combination of patented LED chip technologies and innovative phosphor technologies.



Spectrum of a full spectrum LED



Spectrum of a standard LED



#### TM30 Grafik



#### **Biological effect**

Our day-night rhythm (circadian rhythm) is controlled by the hormone melatonin. Previous LEDs have an unnaturally high blue content and signal to the body in the evening and at night that it is still daytime. This can lead to a suppression of melatonin production and, as a result, to a negative infl uence on the natural day and night rhythm. This in turn can affect important physiological processes such as metabolism, hormone balance, immune defence and the breakdown of toxins.

#### **Excellent color fidelity**

The full-spectrum LEDs are characterized by very high values for color rendering (Color Rendering Index (CRI)) and color quality (Color Quality Scale (CQS)).

Since all LEDs contain the entire colour spectrum - comparable to sunlight - it is possible, for example, to correctly evaluate gold with all its reflections, or even a pale skin tone.





#### Strong contrast

How well a person sees depends on many factors. One of them is the proportion of blue light in the light. This is because blue short-wave) light is refl ected more diffusely than yellow or red light. This is also the reason why the sky is blue. Blue light is also scattered more strongly in the eyeball, which humans perceive as glare. Full spectrum LEDs eliminate the unnaturally high blue component in the light of LEDs. Full-spectrum LEDs lead to a higher contrast and generally better visual performance.





# Basics of plant lighting

Climate change, dwindling resources and a constantly growing world population requires new concepts for the cultivation of vegetables, fruit, herbs and other crops. Urban farming, vertical farming, indoor farming and modern greenhouses are some of these partly new concepts.

LED lighting systems play a central role here. This is because the photosynthesis and photomorphogenesis that are so essential for plant growth can be enhanced by additional artificial lighting increase the harvest yield.

Professional LED lighting systems can optimize these processes and also offer numerous advantages: wavelengths specially adapted to the needs of the respective plants, fl exible control as well as low energy consumption, less heat generation and a long service life.

The lighting can be individually adapted to each type of fruit, vegetable or fl ower and the lights can be placed in close proximity to the plants without damaging them. For plants, the additional LED light means healthier growth and faster fl ower formation.

Thanks to the fl exibility in controlling the light, all-round lighting of the plants is possible. How plants consume no energy to align with the sun and grow faster



PAR curve according to Hoover in the representation suggested by MacCree



Optimal plant lighting according to PAR with Deep Blue, Deep Red and Far Red LEDs

#### Main areas of application



Greenhouse lighting



Vertical Farming





Indoor Farming

Urban Farming



#### Horticulture LEDs: Mix the optimal spectrum for each growth phase with our LEDs



High blue content for the growth phase



#### Photosynthesis

In order for plants to grow, they need energy. They generate this energy by photosynthesis, absorbing light, water and CO2 and processing them into oxygen and sugar.

High Red content for the Flowering phase

In order to carry out photosynthesis, the plant needs both violet-blue (400-490nm) as well as orange-red (640-730nm) light. The light in a spectral range of 400-700nm that can be used by plants is also called PAR radiation (Photosynthetically Active Radiation). However, not every wavelength in the light spectrum has the same effect on the photosynthesis of a plant. The effi ciency of each wavelength is shown by the MacCree curve.

#### Photomorphogenesis

To control growth, the so-called photomorphogenesis, plants need special wavelengths that occur naturally in daylight. Length growth and flower formation are mainly controlled by the interaction of red light (660nm) and dark red light (730nm).





## Visible LEDs

#### Always the right LED

Our product diversity for the LED lighting industry is unparalleled. As a distributor of leading manufacturers, we only sell products that offer a maximum of functionality, performance and reliability.

We carry light emitting diodes for all applications. Whether as SMD, COB or Acrich high voltage LED solutions, you are guaranteed to find the right LED for your lighting project. Besides the standard products of our well-known manufacturers, we also develop customized LEDs according to your requirements.



#### Full spectrum LEDs **CRI95+ | CQS95+ | COB + SMD**

We offer you two innovative full spectrum LED series, whose light is almost the same as sunlight and is perfectly matched to the human biorhythm. This natural light spectrum – without blue peaks as well as with low UV emissions and extremely high CRI – is achieved by combining patented LED chip technologies and innovative phosphor technologies. The possible applications of full-spectrum LEDs range from HCL applications to plant lighting and medical and cosmetic applications – not least because of their excellent color fi delity Full spektrum LEDs and high contrast.



#### COB LEDs

#### Worldwide highest Luminous efficacy

COB LEDs (Chip-On-Board) are highly sophisticated and very effi cient high-power LEDs. The extremely fl at COB LEDs are unhoused directly bonded to a highly thermally conductive aluminum circuit board or ceramic board. The very compact and fl at design of COB LEDs leads to a very high light output / cm<sup>2</sup> and the effect that the chips perceived as a common surface and not as points of light.

#### CSP-LEDs csp-leds

The highly minimized form factor of this design has many advantages. For example, an extremely high color temperature homogeneity can be achieved while at the same time signifi cantly reducing the size. This allows extremely compact and effi cient LED modules to be implemented. Due to the direct SMD mounting of the chip and the associated short thermal path, this design is thermally very robust and has extremely good lifetime values. The absence of bonding wires also increases the reliability.



#### SMD LEDs (High-Power) Highly efficient and durable

Our High-Power SMD-LEDs of well-known manufacturers are characterized by a very good effi ciency, temperature resistance as well as an extremely high lifetime prognosis. Due to their compact dimensions and high light output, the Highpower SMD-LEDs can be used in many different applications.



#### SMD LEDs (Mid-Power) Flexibly applicable

The highly efficient Mid-Power SMD-LEDs of our manufacturers are characterized by an extremely good thermal stability as well as a very high life expectancy prognosis. And all this with colour rendering values (CRI) of >80 as well as >90! These characteristics make Mid-Power SMD-LEDs highly interesting alternatives for various lighting applications.



#### SMD LEDs (Low-Power) Wide portfolio

The high quality Low-Power SMD LEDs of well-known manufacturers are available in color temperatures from 2.700K to 10.000K and in wavelengths from 460nm to 635nm. For each application the suitable LED is available.



#### Acrich LEDs

#### Direct operation on AC voltage

Think small with Acrich on the whole. Acrich LED modules are high voltage LED solutions that can be directly powered by AC power. AC mains voltage of 50 / 60Hz and operating voltage of 6V to 230V are supported. The elimination of AC / DC converters, advanced LED drivers and patented multi-junction technology (MJT) make Acrich LEDs smaller, more efficient and less expensive than conventional DC LEDs.

# UV-A | UV-B | UV-C

Much more effective than conventional UV light sources, as they generate high light intensities in the UV range in a narrow wavelength range. Since they are also semiconductor light sources, they can be controlled and regulated without any problems. We offer UV-LEDs from 255nm to 405nm.

Typical fi elds of application:





#### SMD UV LEDs

#### 255 - 405nm

UV LEDs in SMD housings are versatile and offer the highest design fl exibility. Special features include the long life and high temperature resistance of SMD UV LEDs. Our portfolio includes different performance classes (1-chip and multichip), as well as various housing designs. Our SMD UV LEDs are available in wavelengths from 255nm-425nm.



#### UV-A | 320nm – 415nm

UV-A (near UV) penetrates glass and transparent polymers, it is also colloquially called "black light". Possible applications of the UVA LED are in particular the curing of paints, coatings, lacquers and adhesives as well as light therapy. In addition, UV-LEDs of the UV-A spectrum are also used for authentication of banknotes, documents, material testing and for forensic purposes.



#### UV-B | 280nm – 320nm

UV-B (medium UV) affects the human body and is used, for example, in phototherapy (dermatological treatment of skin diseases) and promotes the formation of vitamin D in the human body. Another fi eld of application is the irradiation of plants. Here, UV radiation of very specifi c wavelengths contributes to the better development of the plant as well as to the increase and quality of the yields.



#### UV-C | 255nm – 280nm

UV-C (far UV) is very short-wave as well as energy-rich and is used for air and water disinfection in medical and other areas that require protection, especially against germs and bacteria. UV-C light effectively destroys the DNA of microorganisms and is highly bactericidal. UV-C light with wavelengths below 100nm is called extreme ultraviolet radiation (EUV, EUV radiation, extreme ultraviolet, XUV).



#### UV LEDs (COB) Chip-on-Board | 275nm – 405nm

Our COB-UV-LED solutions (Chip On Board) in the UV range are convincing due to their very high optical performance on a small area. UV LED chips are bonded directly to a good heat-conducting carrier material and protected by a window cover. Our chip on board solutions are available in the wavelengths 275nm-405nm.



#### UV LEDs (Flip-Chip)

#### Never again chip bonding | 385nm | 395nm | 405nm

With innovative Chip Scale Technology it is possible to equip UV-LED Flip-Chips without wire bonding. The Flip-Chips can be refl ow-soldered like SMD LEDs. This technology is particularly suitable for the printing industry where high light output is required. Currently the fl ip chips are available in the wavelengths 385nm, 395nm and 405nm.



#### UV LEDs (THT) leaded LEDs | 255nm – 405nm

Our leaded UV-LEDs in THT packages are available in a wavelength range from 230nm - 405nm. Standard products as well as customized solutions are possible. In addition, a number of multi-wavelength LEDs and fiber-coupled versions are available. Please contact us.

# Customized solutions

#### Professional UV application development

Every customer has his own ideas and criteria, which are particularly important to him. To meet such requirements, we offer customized UV applications based on your individual wishes. Especially in the UV range, solutions are often sought in addition to the standard in order to optimise processes and stay one step ahead of the competition. Whether it is a matter of adapting a standard product or a completely new development, we support you from the idea to series production - all Made in Germany.

Examples: UV LED modules | multi-wavelength LEDs ...



Gewerbegebiet Ost 7 91085 Weisendorf

Tel.: +49 9135 73666-0 Fax: +49 9135 73666-60

E-Mail: info@neumueller.com www.neumueller.com

**Office North** Beimoorkamp 3 22926 Ahrensburg Tel.: +49 4102 66601-0 **Office Dortmund** Tel.: +49 231 21781240

Office Munich Tel.: +49 9135 73666-42 **Office Berlin** Tel.: +49 9135 73666-32