



Light is limitless



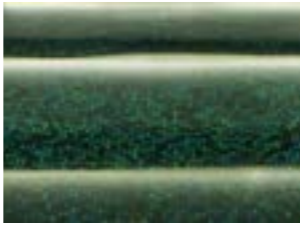



Discover a wide range of possibilities you can realize with light.

Explore new possibilities which make your products shine in new light. Illuminate details, areas or backgrounds, depending on your needs and design wishes.

Light is OSRAM

OSRAM

Content

<h2>Light on the water</h2> <p>Versatile LED-technology for cruise ships</p>	4	
<h2>Sparking desire</h2> <p>How we delivered bespoke lighting design for Doha's Harvey Nichols store</p>	6	
<h2>Golden glow</h2> <p>Using light to transform a heritage building into a luxury hotel</p>	8	
<h2>Let's take it outside</h2> <p>How light elevates facades and architectural features in the Doha cityscape</p>	10	
<h2>Lighting the way to better health</h2> <p>Sterilizing and disinfecting with UV-C mercury vapor lamps</p>	12	
<h2>Light in the digital age</h2> <p>Safety and security in public, private and online spaces</p>	14	



Light – divers as life

Do you know the quote by architect Le Corbusier about light? “The history of architecture is the history of the struggle for light.”

For me, it perfectly captures the obsession most architects have with the role of light in buildings, their interior and exterior spaces, facades and even the landscape architecture surrounding them. I couldn't agree more with the sentiment, as it underlines how light can make the crucial difference between successful and unsuccessful design.

But it is not only in our collaborations with architectural studios that my colleagues and I here at OSRAM see the impact that bespoke lighting concepts can have on a project. It's something we observe across many other sectors, too.

We've seen our LED strips – flexible light sources that can be bent into shape like fabric – transform buildings, facades, spa areas, saunas and even furniture. They can play a key role in providing safety, from emergency lighting in aircraft cabins to sterilizing kitchen appliances. In buses, trams and on boats they can provide a better experience. LEDs even help balance our mental health by imitating daylight where natural sunlight is scarce.

Our project documentations illustrate how LEDs are being used to realize quite heterogeneous types of ventures. On the following pages, we curated case studies on illuminating everything from cruise ships in the US (page 4) to skyscrapers in Qatar (page 10). They are all captivating in terms of unique challenges, refined details and craftsmanship.

If, after reading you, like me, feel inspired by the limitless possibilities of premium lighting, it would be a pleasure for my team and me to help you find out how we can highlight your own design projects – our contact details can be found on page 16.

Michele Gardenal
Business Development Manager

Light on the water

Versatile LED-technology for cruise ships

The brief: two ships of the US shipping company Norwegian Cruise Line (NCL), needed ultra modern lighting systems, consuming little power and providing atmospheric illumination. Here is how we rose to the challenge.



As the electricity is generated on board, energy efficiency is top priority. Apart from power consumption, linking a wide range of lighting applications in very limited space plays an important role. There are high requirements made of the quality and atmosphere provided by the lighting in the cabins and public areas, in the restaurants, bars, shops as well as in the sports and wellness areas. High standards for the lights' resistance to salt water and fire safety regulations had to be met.

Significant energy savings of up to 18%

Using the modern lighting technology from OSRAM and its subsidiary, Traxon Technologies, the two cruise ships are saving energy costs of up to 18% without taking the main drive into account. "Working with OSRAM, we are developing energy-efficient and cost-saving illumination," explains Stephan Schmees, project manager at the Meyer shipyard for NCL.

The cabin as an example, it is clear that optimal LED lighting on board can only be successful with a lot of specialist knowledge.

Schmees is focusing on three factors where light is concerned: "Energy efficiency, costs and the effect to be created. Working with OSRAM, we've made lots of progress over the past few years in the LED sector, and have continued to develop the product portfolio."



LEDs in ship's lighting can only be implemented with technical know-how

Taking the cabin as an example, it is clear that optimal LED lighting on board can only be successful with a lot of specialist knowledge. The LED technology is installed behind mirrors, in wet cells, behind curtains and in the lighting coves among other places. "In these small areas, we have to think about where we accommodate the control gear, how much heat is dissipated and how the lights reflect from the ceiling material," explains shipyard project manager Schmees. In addition to this, the LED technology also involves the special requirements associated with innovative materials, as it has only been in use for a few years now.

"Working with OSRAM, we are developing energy-efficient and cost-saving illumination."

Stephan Schmees, project manager at the Meyer shipyard for NCL

"Particularly when we were starting out, we had to think about the special types of mounting and also consider the need for replacements at the maintenance intervals," said OSRAM engineer Martin Jost.

For project manager Schmees, though, the benefits of LED technology are obvious. "It's more energy-efficient because it consumes less electricity and at the same time generates less heat. This is why we don't have to cool as much. Also, the LEDs are very tough and last longer, with a lifespan of around 50,000 operating hours," says Schmees.

A whole new world of lighting technology

The result we delivered? Guests now move along discreetly lit corridors to their cabins, encounter carefully crafted lighting moods in the restaurants, and bathe in colorful and spectacular lighting effects in the theater.

Read more about OSRAM LED products

Here you can learn about our approach to human centric lighting.

Tunable White allows us to create different moods in interior spaces. Find out how we do it [here](#).

Sparkling desire

How we delivered bespoke lighting design for Doha's Harvey Nichols store

Eye-catching on the outside, versatile on the inside. Developing a brilliant lighting concept that tempts shoppers through the doors of the new Qatar outlet of British luxury department store chain Harvey Nichols was a thrilling challenge. The elegant result speaks for itself.

British luxury department store chain Harvey Nichols has opened a flagship store in the Doha Festival City mall, a new shopping center in the capital of Qatar. Its lighting needed to fulfill two requirements: first, attract the attention of mall visitors to the shop from afar, creating an inviting look. Second, emphasize the inside of the shop and its various products and theme worlds in the perfect light. The solution: efficient, brilliant white LED lights from OSRAM Digital Systems.

Eye-catching shop facade bathed in light

The LED modules from OSRAM Digital Systems were selected because they offer extremely uniform illumination with large LED spacing thanks to their innovative flat-ray technology. What's more, the BackLED L Plus modules

make installation simple, with fast and tool-free connection of the modules ("click & play"). Additionally, they meet the high demands on the economy of the lighting system with their excellent efficiency, a very long life and a five-year guarantee. The lighting of the facade is complemented by flexible, easily divisible LINEARlight Colormix Flex lighting strips in the shop windows.

LED modules from OSRAM Digital Systems were selected because they offer extremely uniform illumination with large LED spacing.

Here a wide range of RGB light colors (an exception to the otherwise purely white shop lighting) match the various retail color themes to attract customers. Efficiency and a seamless appearance were key selection criteria here.

Freedom of design and quality of light

Inside the store, BackLED L units in one- or two-sided light boxes create an eye-catching design for backlighting wall elements for merchandise displays and also functional overhead illumination of the escalators.

The durable LINEARlight FLEX ShortPitch modules play an important role positioned in ceiling cove lighting and integrated into wall units highlighting diverse products, from brightly colored sportswear to softer children's clothing styles. The result is perfect white light, enabling every color to be perfectly visible and attractive to the shopper. Thanks to the ShortPitch, feature light is very even and balanced, with high color consistency and very good color rendering. The modules can also be divided into any length, offering great freedom of design.

Economy and support

The lighting designers responsible for the Harvey Nichols shop in Doha were looking for high-quality lighting that

offers contemporary design freedom, durability and energy efficiency providing cost savings, and not least also offers the exceptional service support from OSRAM Digital Systems.

“For certain projects, we can offer customized solutions. Lighting in warm tones like gold and champagne to bluish white – our portfolio covers almost any color requirement.”

Ivo Folle, Head of Product & Project Management EMEA



Read more about OSRAM LED products

Retail lighting presents unique challenges. More about our approach [here](#). Light, flexible as fabric. Read [here](#) about the design possibilities of LED lighting strips.

Golden glow

Using light to transform a heritage building into a luxury hotel

Every detail in The Langley Hotel had to live up to its five-star status – including the lighting. By providing LED strips, which can be shaped and formed like fabric, we helped create a warm, elegant shine throughout the historical country house and its surrounding estate.



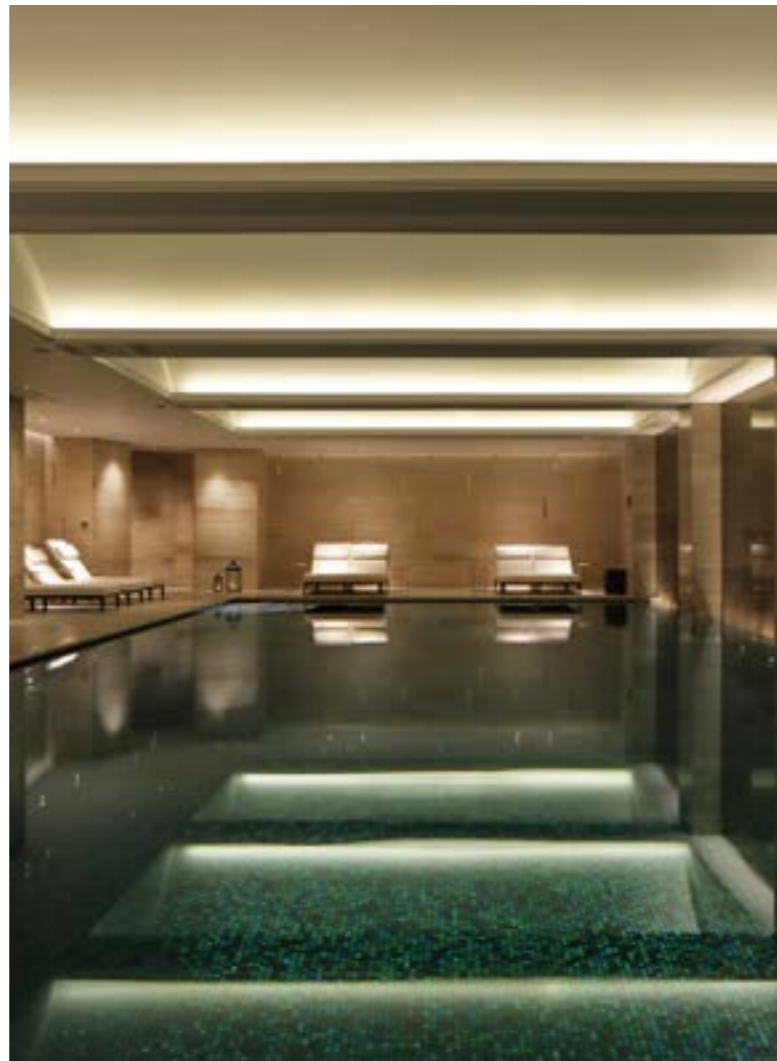
In leafy Buckinghamshire, a quaint English county 35 kilometers northwest of London, City & Country Hotels has restored a former hunting lodge and turned it into a five-star hotel. The aim was to incorporate state-of-the-art hotel standards into the historic structure of the country estate, while complying with stringent monument-protection regulations.

Atmospheric, functional and in line with monument protection

Both in the outdoor areas and in the private and public spaces of the hotel, the aim was for the lighting to create a luxurious atmosphere and to be comfortable and functional. The lighting designers at dpa lighting consultants carefully considered the product selection and decided to use a robust and flexible LED strip from the OSRAM LINEARlight FLEX product family for various spaces throughout the hotel. Using LEDs from one product family throughout the hotel means that the property now appears in uniform light.

“The flexibility and adjustability of the OSRAM products were ideal for this project. In heritage buildings with listed status exact measurements are not always known so it was helpful that the LED strips could be adapted on site.”

Stephanie Harris, lighting designer at dpa lighting consultants



Simple, flexible installation

LED strips are easy to cut and mount on a range of materials. “The flexibility and adjustability of the OSRAM products were ideal for this project, as a heritage building with listed status meant that exact measurements were not always known and so it was quite helpful that the LED strips could be adapted on site,” says Stephanie Harris, lighting designer at dpa lighting consultants. Easy handling also meant that the OSRAM products could be used by different companies involved in the project, as Harris confirms: “The OSRAM products were able to offer a certain degree of consistency within the project as they were versatile and easily usable by the different contractors on site.” And finally, the unobtrusive lighting strips could also be integrated into the architecture so discreetly that they do not disturb the view of the listed building.

The aim was for the lighting to create a luxurious atmosphere and to be comfortable and functional.

Award-winning lighting concept

In choosing OSRAM LINEARlight FLEX LED strip lighting, the lighting designers from dpa implemented a tailor-made lighting solution that meets the requirements of the historic building and the exclusive demands of the hotel guests, rightly taking home the renowned Ahead Award in the Best Conversion category.



Read more about OSRAM LED products

Light for public buildings? We have LED strips for that, too. Read more about lighting up a library in China [here](#).

Let's take it outside

How light elevates facades and architectural features in the Doha cityscape

Lighting for outside spaces and building exteriors can be a challenge, as weather conditions like strong sunlight or salty sea air put more stress on LEDs. At OSRAM, we know exactly how to handle such conditions. Read more about two success stories from Qatar.

The smooth interplay of light and shade makes a building stand out from its environment. Modern LED strips can add a further dimension to its facades. So it comes as no surprise that several reputable companies in the Qatari capital city of Doha wanted to benefit from the power that innovative facade lighting can bring to their brand.

They opted for the flexible LINEARlight FLEX LED strips from OSRAM to realize individually tailored lighting solutions. Thanks to their superior lighting quality and high robustness, they fulfilled the customers' needs to the highest standards.

“Whether four or eight meters – we cut our products to length so that light attenuation cannot even occur. Alternatively, there is the option of laying a higher copper cross-section so that current can flow smoothly to every detail piece. Either way, a suitable electrical concept for each design is precisely calculated in our evaluation.”

Thomas Zampieri, Product Marketing Manager



Enhancing architectural details with light

Our LED strips provide best-in-class color consistency, making it the basis of splendid and efficient lighting. Thanks to dot-free and shadow-free building illumination, the Y Tower and the Al Man- soura hotel apartment building are now being presented in the best light possible. The protected LED strips are both UV- and salt-mist-resistant, and direct sunlight exposure cannot harm them. High-performance silicone ensures superior flexibility and durability. The broad range of combinable accessories enabled quick and easy installation. The smooth external surfaces and architectural structures of the buildings are now skillfully orchestrated, attracting admiring looks throughout the night.

Our LED strips provide best-in-class color consistency, making it the basis of splendid and efficient lighting.

Upgrading facades with RGB LED technology

The innovative new facade lighting for the Al Sulaiman Jewellers HQ and the Al Khaliji Bank offers two prime examples of how to effectively make a building's characteristic structures stand out against the night sky. To implement unique concepts, the lighting designers and architects opted for

LINEARlight Colormix FLEX Protect and LINEARlight FLEX Protect ShortPitch LED strips from OSRAM. The installations have a brilliant, vivid but homogeneous appearance based on constantly changing light colors. Since both buildings are located near the seashore, a salt-mist- and UV-resistant version was chosen in order to ensure reliable operation outdoors. Thanks to the self-adhesive tape on the back of the LED strips, installation on the smooth surfaces and contours was easy, making this project a great success story.

[Read more about OSRAM LED products](#)

We're experts in providing lighting systems in built environments. Find out more about the quality products we work with [here](#).

Lighting the way to better health

Sterilizing and disinfecting with modern LEDs

Clean air, surfaces and water. Imagine a world in which light makes your everyday life healthier, safer and more pleasant. We're on a mission to make that reality.

Today like never before, global developments have raised the attention on topics of disinfection and sterilization. Whether at work, at home or on the move, people everywhere are confronted with a new reality and awareness for health and safety.

The OSOLON® UV series is designed to provide efficient UV-C radiation for medical, home goods and consumer applications. It allows for flexible designs for various types of UV-C applications in the areas of air, water and surface disinfection and purification, as well as treatment or sensing. Design possibilities are endless, and range from point-of-use water treatment, to automotive interior disinfection, to air purification in portal devices or air conditioning systems.

What is UV-C?

UV radiation is naturally emitted by the sun each day. The spectrum can be subdivided into UV-A, UV-B and UV-C. While UV-A and UV-B can reach the surface of the earth, UV-C is absorbed in the atmosphere.

“Long-term stability, even after years, is of course a given for a quality product. For us, this starts with the selection of the LEDs – here, we work with absolute precision.”

Ivo Folle, Head of Product & Project Management EMEA



Each kind of UV radiation can also be generated artificially. Take UV-A as an example: it's widely used in the printing industry or in sensing applications for detecting counterfeit money. UV-B on the other hand can be deployed in phototherapy or horticulture. And lastly, UV-C is effective in disinfection and purification of air, water and surfaces. Typical application areas are water purification for wastewater or in public pools, disinfection of surfaces in hospitals, or air purification in air conditioning systems.

Design possibilities are endless, and range from point-of-use water treatment, to automotive interior disinfection, to air purification in portal devices or air conditioning systems.



How does UV-C work?

UV-C radiation effectively renders bacteria, viruses and fungi harmless. UV-C radiation has a highly disinfecting effect since UV-C is absorbed by the DNA of microorganisms, inactivating their reproduction process. The dose necessary to achieve a certain inactivation or reduction depends strongly on the application and pathogens targeted. UV-C radiation is able to effectively reduce harmful microorganisms without the use of chemicals.

Why is it so important?

Bacteria, viruses and other microorganisms can cause illness and irritation. By reducing them, we can promote health and overall well-being.

In an interconnected world, new challenges arise, such as those we have recently been witness to. We are confronted with microorganisms every day. At home and at work, from running an errand, to seeing a physician or using plain tap water.



Read more about OSRAM LED products

Read more about OSRAM UV-C light [here](#).

Light in the digital age

Safety and security in public, private and online spaces

From face recognition technology to accident-preventing lights for cars – learn how we can provide a range of products that prevent damage and accidents.

Light is a key technology that improves our security in the modern world. It is crucial for emergency services and the security sector, for keeping public places safe and your personal data secure.

The higher the level of interconnectivity between companies, communities, and countries, the higher the demands are on security. Access and monitoring technologies from OSRAM allow businesses, authorities and citizens to stay one step ahead.

The increasing complexity of our society increases our need for security. OSRAM contributes to making the world a safer place – both in analog and digital terms.

OSRAM technology focuses on safety in digital and public spaces. We concentrate on three main areas: biometric identification (to ensure individual unlocking of cars, mobile devices and digital applications), personal safety (where light and sensors indicate hazards and prevent damage and accidents) and public safety (intelligent lighting of streets and public spaces as well as surveillance products).

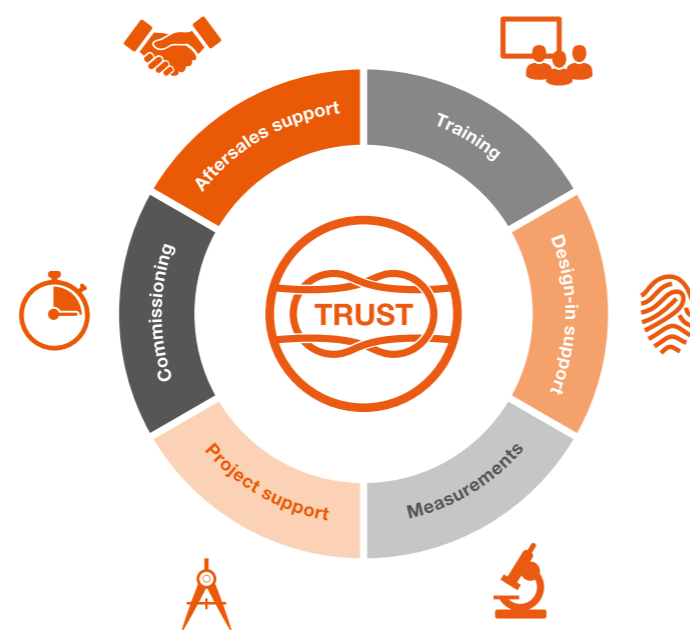
OSRAM contributes to making the world a safer place – both in analog and digital terms.

Read more about OSRAM LED products

Curious to find out more? Discover our product range around safety and security [here](#).

“With these products we are covering a number of different applications and have now succeeded in extending biometric identification to cars. Once more, light-based technology is laying the foundation for innovation.”

Walter Rothmund, Marketing Manager Automotive for Emitter Laser Sensor at OSRAM Opto Semiconductors



Application vs. requirements for integration of light sources

Typical light source requirements	Outdoor resistant	Miniature	Bendable	Fit to length / Cutable	Long Guarantee	SELV 24V	Uniform Light emission	High quality of light
Applications								
Transportations	✓	✓		✓	✓	✓	(✓)	(✓)
Interior design		✓	✓	✓	(✓)	✓	✓	✓
Outdoor design	✓	✓	✓	✓	✓	✓	✓	✓
Wellness	✓	✓	✓	✓	(✓)	✓	✓	✓
Building materials	(✓)	✓	✓	✓	✓	✓	✓	✓
Innovative areas [^]	✓	✓		✓	✓	✓	(✓)	✓
Disinfection [*]	(✓)	✓	(✓)	✓		✓		✓
Professional Food & Beverage appliances	(✓)	✓		✓	(✓)	(✓)		✓
Industry/Health equip.	✓	✓	(✓)	✓	✓	✓		✓

Legend
 ✓ = typical
 (✓) = optional

^{*}e.g. electric car charging stations [^]surfaces/air

OSRAM Services

Whatever you want to achieve, we support you throughout the entire process – from first idea to successful delivery. We offer guidance, tools and exactly the technical support you need.

Our team

We're keen to hear about your lighting project! If you have questions or you're interested in a general consultation, please feel free to reach out to us. We're looking forward to hearing from you.



flex-support@osram.com

OSRAM GmbH

Head office:

Marcel-Breuer-Strasse 6
 80807 Munich, Germany
 Phone +49 89 6213-0
 Fax +49 89 6213-2020
www.osram.com

OSRAM Digital Systems



OSRAM