

INDIA'S FOREMOST MAGAZINE ON THE LIGHTING INDUSTRY

Lighting India

₹ 125

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January-February 2017

Lighting a Design Arena for Intellectuals



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Lighting & Tourism

Add up the entire population of Europe, USA, Canada, Australia and the many small islands worldwide and the sum will be less than the population of our country. How come then we get six times less number of visitors than the number of people visiting a tiny country like Italy. Infact, The Colosseum in Rome, is visited by 6 million people a year against about 8.5 million people visiting India. And, we have the world famous Taj Mahal. Has lighting got to do something with tourism? Of course yes.

Continuous redevelopment in the urban areas throughout the world is the result of

economic growth in the tourism industry. It has also necessitated the need to create multiple and dynamic experiences which are very welcoming and unique in its own way and finally memorable. Take for example Dubai, London, Shanghai, Auckland, Toronto, Taipei, Tokyo, New York etc. Practically, all of these cities have a well-defined and well-illuminated promenade. And practically, all of them have their own Towers standing tall and well-lit from where visitors get a bird's eye view of the entire city during the day. And when night falls, it's a whole new experience from atop of these towers. We still have a long way to go.

I still remember a time a decade back when the local municipal authorities in Mumbai wanted to switch off all the sign board lights along the Queens Necklace or Marine Drive. Town planning plays a very important role in getting tourist to your cities and places of interest. Lighting helps in geographic orientation because people can use well-lit focal points like fountains, bridges, sculpture etc as landmarks to help them reach their places. Also lighting highlights the identity and history of an area because a well-lit historic monument draws attention to the uniqueness of the area. People are attracted to a particular place through its monuments and landscapes which are well lit, lightscares and these days with the advent of LED lights the light-based events across the harbour. Some of these lights are there only during festivals and some of them are fixed installations like at the Hong Kong harbour. In fact, in this issue, we have covered the illumination of two 60-metre cranes at the Norwegian port. And look at the output of the light fixtures that are positioned on each crane both at the base of the crane and at the top of the crane each throwing light in the opposite direction.

As I mention Hong Kong, the place I always love to be in, I am glad to inform you that LIGHTING INDIA has once again been selected to be the media partner for the forthcoming Lighting event in Hong Kong in April. I will be present there and I look forward to those visitors from India and my media friends from around the world who will be present there. I will be there at the Media centre on the ground floor just behind the small orders counter. See you in Hong Kong. Bye for now. If you have any comments on anything related to the lighting industry or this issue, do send in your comments at miyer@charypublications.in

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* T&C apply

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The open office design was envisioned as an open culture studio, which breaks hierarchical norms and encourages design thinking. It comprises four zones...



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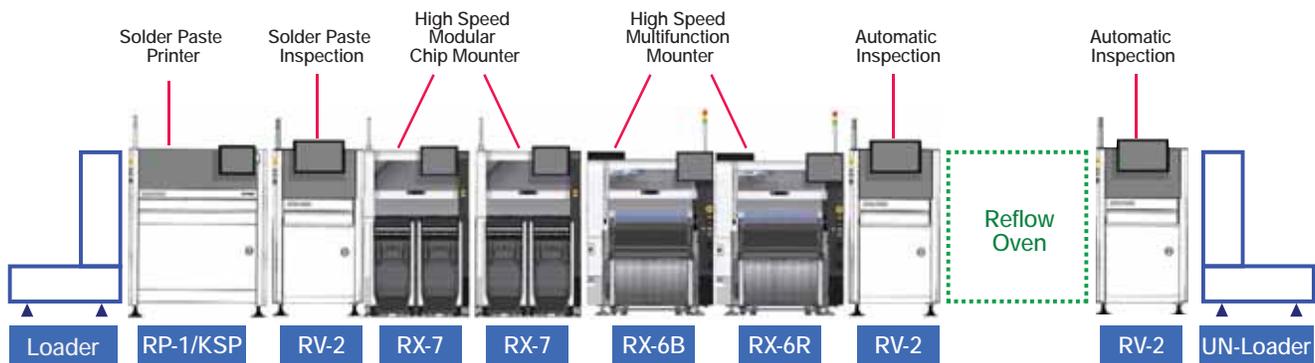
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Exec. Director - India Operations
Managing Director, Trilux Lighting India Pvt. Ltd.



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*Source: 'India Office Fit Out and Facility Management Market Outlook 2020' by Global Infrastructure Facilities and Project Managers Association (GIFPMA)

Hubbell Lighting unveils the evolution of Lighting Education

Hubbell Lighting, a well known lighting innovator, revealed that it has cut the ribbon on its newly renovated Lighting Solutions Centre (LSC).

The LSC, based in Hubbell Lighting's headquarters in Greenville, S.C., serves as the centre piece of its commitment to train, educate and develop solutions as lighting technology continues to evolve. It's a collaborative environment that draws from over 200 lighting and technology authorities including the pre-eminent speakers and presenters at top-tier industry events.



Kevin Poyck

The architect, McMillan Pazdan Smith Architecture, worked closely with the latest in interior materials and systems providers and in conjunction with Hubbell Lighting and Hartranft Lighting Design to ensure the environment is a true reflection of the latest trends in the industry while also providing a best-in-class training facility. It is Hubbell's dedication to customer training and education that makes it one of the best partners and trusted advisors in the industry. The LSC has played an instrumental role in the selection, application and recommendations of Hubbell Lighting product solutions for its customers and industry trade partners.

Kevin Poyck, Group President of Hubbell Lighting, said, "The pace of innovation in the lighting industry continues to accelerate. The evolution of LED technology has changed the paradigm of how we go to market, making the mission of the LSC critical to our success. This new facility, in addition to our R&D labs, will keep Hubbell and its business partners in a leading position for many years to come."

Cree transforms parking garage experience for American airlines

American Airlines Centre, the Dallas area's premier sports and entertainment arena, selected Cree, Inc. lighting to provide a better lighting experience for fans as they enter and exit the world-class arena. Cree IG Series LED luminaires were chosen to replace the high-pressure sodium and metal halide light fixtures in its parking garages, establishing a welcome first impression with improved light quality that enhances visitors' sense of security, safety and comfort. The arena's switch to Cree LED parking garage lighting will generate an anticipated 66 % reduction in energy consumption and \$1.26 million in total lifetime savings.



Located in the Victory Park neighbourhood near downtown Dallas, American Airlines Centre features a façade of brick, granite and limestone to fit the aesthetic of the area. In aligning with the arena's mission, American Airlines Centre sought a parking structure lighting solution that would create an inviting atmosphere and enhance visitor's feelings of security while reducing energy consumption and maintenance costs.

The space's original system contained 150-watt high pressure sodium and 175-watt metal halide fixtures that cast inconsistent colours and uneven illumination, causing deep shadows in corners and between cars throughout the deck. Cree replaced these products with 66-watt IG Series luminaires for a test installation, which demonstrated a significantly improved lighting experience right away. ■

EESL to distribute LED tube lights and LED bulbs in Delhi

Tata Power Delhi Distribution Limited (TPDDL) has launched the Energy efficient fans and LED tube lights for the consumers of Delhi under Unnat Jeevan by Affordable LEDs and Appliances for All (UJALA) programme.

The UJALA scheme is being implemented by Energy Efficiency Services Limited administration of Ministry of India. In Delhi, EESL plans energy efficient fans, 2.5 lakh lights and eight lakh more upfront payment. It is lakh consumers will benefit

Under UJALA scheme buy high quality 20 W LED 210 and energy efficient fans

LED bulbs continue to be available for consumers at ₹65 each. UJALA domestic appliances can be purchased from all the distribution centres spread throughout Delhi state from 10th February, 2017. EESL provides free of cost replacement for all technical faults for 3 years for LED bulbs and LED tube lights and 2.5 years for energy efficient fans. During the distribution, replacements can be done through any of the distribution counters that would be operating within the city.

Praveer Sinha, CEO & Managing Director, TPDDL, said, "The distribution of LED bulbs, energy efficient fans and tube lights in Delhi will not only help ensure energy access for all but will also help consumers in reducing their electricity bills. I sincerely request all citizens to come out in large numbers, avail these schemes and make our state energy efficient. I also request all my co-workers to go to each and every locality to spread awareness about the scheme. This scheme's success will pave the way for a brighter and energy prosperous Delhi." ■



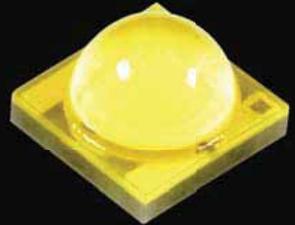
Praveer Sinha

implemented by Energy (EESL), a JV under the Power, Government of to distribute over 20,000 energy efficient LED tube LED bulbs to people on estimated that over 15 from the scheme.

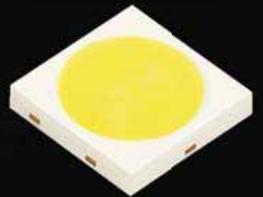
consumers will be able to tube lights at a price of ₹1,150 each on an



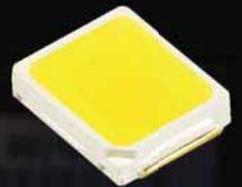
MLS INDIA is a subsidiary of **MLS Co. Ltd.** which was founded in 1997 and is one of the largest manufacturers & suppliers of **SMD & DIP LEDs**. **MLS** was one of the earliest LED manufacturers and light-source provider for various kinds of lighting products. Headquartered in Zhongshan City of China, with a workforce of more than 12000 employees, **MLS** has fully-integrated, world class facilities supported by the most advanced technologies. A wide choice of LM80 certified **MLS LEDs** are available in Warm white, Natural White and Cool White CCTs. Lamp manufacturers using **MLS LEDs** can bid for all BEE, EESL, Municipal Corporation and Government Tenders & BIS based LED projects with our 2835, 3030 and 3535 LEDs. **MLS** also has a wide range of Color LEDs available in 3014, 2835 and 5050 packages.



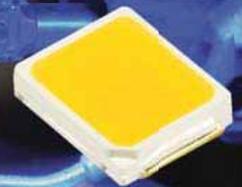
M3535



M3030



E2835 (CW)



E2835 (WW)



M2020

Street and Roadway Lighting Market to be worth 10.94 Billion US\$ by 2022

According to a report by MarketsandMarkets, the street and roadway lighting market is estimated to be valued at USD 10.94 Billion by 2022, growing at a CAGR of 6.03% between 2016 and 2022.

This is primarily due to the increasing demand for LED lights and luminaires in street and roadway lighting applications because of declining prices, low maintenance costs, durability, and energy efficiency over conventional light sources such as fluorescent, high-pressure sodium, and mercury vapour lamps.

The market for LED lights and luminaires is expected to grow at the highest rate between 2016 and 2022. This is primarily due to the increasing adoption of LED lights and luminaires across various outdoor lighting applications such as highways, roadways, bridges, and tunnels. LEDs are replacing HID lamps owing to various advantages such as high efficiency, low maintenance cost, and high lumen output.

The street and roadway lighting market for the 50W–150W segment is expected to grow at the highest CAGR between 2016 and 2022. This is an ideal replacement for outdated sodium fixtures, costly metal halides, and halogen lights. The adoption of LED lighting is rising globally owing to its energy efficiency and low maintenance. This growth is attributed to the increasing use of LED lights and luminaires between 50W and 150W in street and roadway lighting applications. Moreover, conventional HID lamps of more than 150W are being replaced by 50W–150W LED lights and luminaires for improved efficiency and energy saving. ■

Jasco enters into New Smart Home Territory

Jasco Products, well known in industry for its Z-Wave lighting technologies, unveiled its first-ever Enbrighten Z-Wave Plus LED Smart Bulb. Adding to a comprehensive ecosystem of indoor and outdoor dimmers, switches, sensors and Z-Wave smart controls, Jasco's Enbrighten LED Smart Bulb is fully dimmable and offers a new way for users to interact with their smart home without requiring any wiring or complicated installation.

Jasco's Enbrighten Z-Wave Plus LED Smart Bulb joins the largest line of Z-Wave connected lighting controls in the market that work directly with other Z-Wave enabled products from leading home automation hubs and service providers. The 60-watt equivalent bulb works with all standard light fixtures and lamps and can easily replace existing bulbs allowing you to upgrade to smart control without compromising the design of your home. From the convenience of a smartphone or tablet, turn the lights on and off, dim or brighten a room and set lights according to custom schedules, scenes and events. At 750 lumens, the smart bulb consumes only 9 watts of power while burning bright for up to 25,000 hours.

Cameron Trice, CEO of Jasco Products, said, "We continually seek to improve people's everyday lives. Through our growing smart home solutions, we strive to provide the best connected lighting experiences and drive greater energy and cost efficiencies. By extending our solutions to include smart bulbs, we are unlocking even more value for our customers and partners through capabilities and services that go beyond wireless lighting controls." ■



Konica Minolta and Pioneer form strategic alliance

Konica Minolta and Pioneer Corporation have entered into an agreement to establish a joint venture for Organic Light Emitting Diode (OLED) lighting business to accelerate launching business for OLED lighting through integration of their strengths.

OLED has also been more and more in demand for new applications that have never existed before, such as advertisement lighting which integrates lighting with paper or package and beauty lighting utilising high-level colour rendering properties of OLED.

Responding to the market requirements, this strategic alliance will combine Konica Minolta's roll-to-roll method flexible panel manufacturing equipment and production technology and Pioneer's achievement in OLED panel mass production and market rollout and its car electronics OEM business know-how. In entering into the agreement today, the companies expect that the joint venture will be able to provide lighting with new values for customers.

The new company to be established will integrate business and product planning, product development, production technology development and marketing functions of both companies' OLED lighting business to drive its initiatives.

The new company's business will be centred on the new field of automotive lighting, in addition to the lighting for indicators and for advertisement Konica Minolta promoted and special lighting applications for beauty market and for medical market Pioneer promoted. By building up a firm position in the flexible OLED lighting, the jointly invested company will aim to achieve revenue of 25 billion yen on mid- to long-term basis. ■



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Piyush Goyal dedicates world's largest LED Street Lighting Programme to the Nation

Union Minister of Power, Coal, New & Renewable Energy and Mines, Piyush Goyal dedicated the LED based Street Lighting National Programme (SLNP), currently running in the South Delhi Municipal Corporation (SDMC) area, to the Nation recently. It is the World's Largest Street Light Replacement Programme, which is being implemented by the Energy



Efficiency Services Limited (EESL), a joint venture under the Ministry of Power, Government of India.

The SLNP programme is presently running in Punjab, Himachal Pradesh, Uttar Pradesh, Assam, Tripura, Jharkhand, Chhattisgarh, Telangana, Andhra Pradesh, Kerala, Goa, Maharashtra, Gujarat and Rajasthan. A total of 15.59 lakh street lights have already been replaced in the country with LED bulbs, which is resulting in energy savings of 20.66 crore kWh, avoiding capacity of 51.47 MW and reducing 1.71 lakh tonnes of greenhouse gas emissions per annum. The energy efficiency market in India is estimated at US\$ 12 billion that can potentially result in energy savings of up to 20 per cent of current consumption, by way of innovative business and implementation models.

Goyal said that this Government does not believe in taking money from the people, on one hand, and subsidising their electricity bills, on the other. Rather, the Government believes in empowering the people and the power infrastructure in the country so as to make available 24x7 Affordable, Quality Power to all Citizens of the country. ■

NSF International introduces certification program for light fixtures

NSF International, a global public health organisation, has launched a certification program for light fixtures intended for use in controlled environments. The new protocol, NSF P442: Controlled Environment Light Fixtures, offers clients the ability to demonstrate through a single certification that their light fixtures are constructed in a way that enables them to be used in controlled environments where low air pollutant levels, cleanability, durability and structural integrity are critical. These environments may include pharmaceutical processing, biotech research, biosafety laboratories, surgical suites, clean room manufacturing, food processing and horticulture.

Prior to the development of NSF P442, lighting manufacturers had to either generate their own test data or use multiple test organisations to obtain the data required to fully demonstrate the safety of their products. Certification to NSF P442: Controlled Environment Light Fixtures incorporates three different tests into one independent, third-party certification, saving manufacturers time and money. The test elements include:

- Testing required by the standard NSF/ANSI 2: Food Equipment, which establishes minimum sanitation requirements for the materials, design and construction of light fixtures
- Testing to determine an International Protection (IP) rating of 65 or higher, which demonstrates a high level of protection provided against the intrusion of dust and water
- Unique pressure tests developed especially for NSF P442 ■

Retailers enhance store comfort and control with the power of light in their hands

Philips Lighting, a global leader in lighting, revealed the commercial availability of Philips StoreWise, a customisable system of integrated luminaires and controls, specifically designed to create a more engaging and inviting atmosphere for shoppers. With StoreWise, North American retailers can enhance the in-store shopping experience by precisely tuning the appearance and ambience of any store area or activating a lighting scene with the push of a button from a mobile device.

Philips StoreWise features a user-friendly control interface, enabling authorised users to automatically change light levels according to the time of day, special events or seasonal changes. The lighting system can also be used to visually direct shoppers to areas of interest, such as new product offerings, sales, or different departments.

The components in Philips StoreWise are specifically designed to work together in a retail environment, and can be easily integrated into other facility operations systems such as Energy Management Systems (EMS). Grouping and zoning, along with dimming, help control energy costs as the lights are only operating when and how they are needed while establishing a mood and helping guide the customer's journey through the store.

Because Philips StoreWise is woven into a single flexible system with built-in advanced capabilities such as occupancy sensing and daylight harvesting, retailers can benefit from up to 35 % greater energy savings beyond the typical 50 % provided by LED technology alone. In order to meet the evolving needs of retailers near and long term, Philips StoreWise is intended as a platform with more features and functionalities to be added over time. ■





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Utopium illuminates Jake Bugg tour

Following the release of his third album, *On My One*, Jake Bugg embarked on a promotional tour which saw him visit a host of different venues throughout the UK and Europe, including Manchester's O2 Apollo, London's O2 Academy Brixton and The Great Hall at Cardiff University Student's Union.

Utopium was entrusted to build and supply a custom floor



package which included Martin Mac Quantum Profiles, new Martin Mac Aura XB washes to offer additional brightness and tighter beams, Martin Atomic 3K strobes, Thomas 4 Lite Molefays, SGM P-5 LED Floods, Antari HZ500 hazers, Antari AF-3 Fans, 8ft Black Truss Towers and a Road Hog 4 Control Desk. The team also supplied a flown package which incorporated Martin Mac Aura XB washes, 40ft Trusses, 0.5T Prolift Double Braked Hoists, Martin Mac Quantum Profiles, Martin Mac Aura XB Washes, Martin Atomic 3K Strobe and Thomas 2 Lite Molefays.

The back of the stage was lined with five gauze panels which were painted with UV paint and lit up throughout the show using SGM P-5's. For the European shows, the team lost the flown lighting package and utilised the floor package and in-house rigs of local venues.

Jon Newman, Utopium's Project Manager, said, "We've been waiting for the right moment to invest in these lights and the Jake Bugg tour seemed exactly this, enabling us to match the creative requirements of the production team. These new compact LED washes not only bring improved sustainability, which we're finding many of our clients asking about, but because they are small it means they can be easily transported, whilst offering less weight loading, making them perfect for tours. The new kit looks great and we're really happy with it, and it's fantastic to be showcasing it on Jake Bugg's latest tour." ■

Schmitz becomes a member of the Nordeon Group

The Nordeon Group is delighted that Schmitz Leuchten from Arnsberg has been a member of the Nordeon Group since December 1, 2016, further consolidating the position of the Nordeon Group as one of the world's leading professional lighting companies.

Schmitz, a company appreciated worldwide by lighting designers and planners, is renowned for its sophisticated design and high-performance lighting for office, gastronomy, architecture and retail.

As part of the group, Schmitz will tap into Nordeon Group's extensive technological capabilities and expertise, its global sales and support infrastructure, and its strong industrial base, benefiting from being part of its unmatched brand portfolio.

With the Hess, Wila, Griven, Nordeon, Vulkan and now Schmitz brands, the Nordeon Group is able to meet the needs of even the most discerning customer. The combined impressive knowledge in applications, technology, design, specification and customisation make the Nordeon Group a true full-service partner for lighting professionals - and worldwide.

Patrick van Rossum, Chairman of Nordeon Group, said, "The Nordeon Group is proud to welcome Schmitz. This is an important step in strengthening the Nordeon Group - with a highly recognised premium lighting brand, an impressive product portfolio, and very comprehensive customisation, design and development capabilities. The Nordeon Group will allow Schmitz, product development and commercial efforts to further accelerate by opening up our global design, technology and support infrastructure." ■



Patrick van Rossum

Image courtesy: www.hess.eu

VER expands its lighting division

VER, a well known global provider of production equipment and engineering support, has majorly expanded its lighting division with the addition of Orlando and Chicago as full-support lighting locations. The company's lighting division sets standards in the entertainment industry supporting some of the highest-profile productions including the iHeart Music Festival, automotive giant FCA, the worldwide Justin Bieber Purpose Tour, Twenty One Pilots' Emotional Roadshow global tour and most major awards shows.

Susan Tesh, VER's Executive Director of Lighting, said, "More and more staging clients are asking VER to support them on corporate projects. We not only have the largest inventory of equipment in the world, we have experts whose unique experiences on trend-setting projects directly benefit clients in other markets. The corporate market is growing in Orlando and Chicago and therefore the request for our lighting expertise is too."

Steve Hankin, VER CEO, said, "Our staging clients have asked us to provide equipment inventory and seasoned experts in Orlando and Chicago and we are happy to be able to do so. We've invested in these known production hotspots so we can offer on-the-ground support and provide clients with the expertise and equipment they need, when they need it. With all VER product divisions represented in these two cities, clients will also benefit from the diverse team's cross market/cross product collaboration." ■



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Amerlux appoints Linear Systems Product Manager



Eric Craig

Chuck Campagna, CEO/President of Amerlux, proclaimed the appointment of Eric Craig to the newly created position, Linear Systems Product Manager. Craig will report directly to JR Krauza, VP of Product Management, and will be responsible for overseeing the development, service and continued success of the firm's linear lighting systems.

In his new position, he will manage the firm's array of linear lighting systems, which include Linea, Grün, Producer, Fino, Stellina and Quintetta. He will help develop new business, provide sales support and service major projects. He has also been

involved in revitalising the linear specification sheets and the exciting new configurator quotes program.

His previous experience includes serving in several key positions: Product Manager for Simkar Corporation; Product Manager for Lithonia Lighting Corporation, a division of Acuity Brands; New Product/Market Development Manager for the Columbia Lighting division of Hubbell Lighting; and Senior Product Designer for Lightolier, a division of Genlyte.

Craig holds an M.A. in Industrial Design from Pratt Institute and a B.A. Degree from Georgetown University. ■

Tridonic appoints new CEO



Guido van Trartwijk

Guido van Tartwijk has become the new Chief Executive Officer (CEO) of Tridonic, a company belonging to the Zumtobel Group. He succeeded Alfred Felder, who was appointed to the Group's Management Board back in April 2016.

Guido van Tartwijk holds a doctorate in physics and has amassed extensive experience in the lighting and semiconductors industries. In the first

six years of his career, he worked for major telecommunications as well as start-up companies in the Netherlands and the USA. During the subsequent twelve years, he held a variety of top management positions at Philips Lighting, where he was also responsible for establishing the global Philips LED Lighting Hub in Shanghai. Most recently, he was Senior Vice President and General Manager of Philips LED Electronics. ■

v2 Lighting Group expands Sales Team



Pablo Bonnin

V2 Lighting Group, an innovator in modern, specification grade LED lighting, has appointed Pablo Bonnin, as Eastern Regional Sales Manager. He brings design and lighting controls knowledge, serving as an important resource for representatives and specifiers while promoting v2 Lighting Group's products in the region.

Prior to v2, Pablo was at Tech Lighting as a Regional Sales Manager where he worked with New York's top lighting designers. Before that, he was at Lutron Electronics where he planned and

implemented lighting control strategies and sustainable energy solutions to meet today's energy requirements. Pablo holds a Bachelor in Architecture from Miami University along with a Masters in Architecture and MBA from the University of Illinois at Urbana-Champaign.

Mitch Dale, Chief Operating Officer (COO) of v2 Lighting Group, said, "We welcome Pablo to the v2 team, his lighting and architectural knowledge will be a tremendous asset as we continue to grow sales in the region." ■

Appointments

Awards

Recognition

Product Launch

Technical Articles

Lighting India invites professionals and industry experts to write articles on their areas of expertise and interest.

If you feel that the industry needs to know your experiences, its times you write to us. Our team will guide you on various topics we cover in each and every issue. Hence, will help conserve a lot of your effort and time.

We would love your involvement in your favourite magazine!

Think no further just e-mail your interest to – info@charypublications.in

LIA trainers get recognised by ITOL

The Lighting Industry Association's (LIA) Quality Assurance (QA) and Training Development Manager, Paul Sargent, and Andy Guest, LIA's Membership Services Manager have both been recognised as qualified in Certificate Programme & Training Practices by The Institute of Training and Occupational Learning (ITOL).

ITOL is the UK's elite professional body for trainers, learning and development professionals and has become recognised as the premier organisation for everyone



(L2R): Paul Sargent LIA's QA and Training Development Manager, Andy Guest, LIA Membership Services Manager and Julie Humphreys, LIA Commercial Manager

involved in the world of training and development.

This qualification builds on Andy and Paul's vast industry and technical knowledge. Safeguarding their continued professional 'training experience' for the Lighting Industry Academy (Academy), but also respond to the changing world of training and development needs within the lighting community.

Andy and Paul present the Academy's course on BS EN 60598-1 Edition 8. Explaining what the standard requirements are, how to apply them and not forgetting the new LED luminaire requirements. ■

Plessey wins at the Elektra Awards 2016

Plessey, a well known expert in the manufacture of lighting and sensing products and components, won the prestigious Elektra Award for LED Lighting Product of the Year for its Attis-7 grow light. The 14th annual Elektra Awards took place at the Grosvenor House Hotel, Park Lane, London celebrating excellence in design, innovation and technology from across the electronics industry with over 400 guests.

Plessey has over 60 installations in research centres and universities in the UK and overseas demonstrating the clear benefits of using Plessey's LED grow lights. This is now being recognised in the market and is gaining momentum.



Plessey team receives the award...

Plessey's Attis-7 grow light features proven energy saving and plant response, no cooling fan, high efficiency, patented heat dissipation design and a built in power supply.

Jonathan Barton, Plessey's Director for Grow Lights, said, "We are absolutely delighted to have won the award for the category 'LED Lighting Product of the Year' in the prestigious Elektra Awards ceremony. LEDs have largely proven their effectiveness as grow lights and their ability to save energy versus existing sodium grow light technology. The big challenge for adoption in today's market is to make horticultural LED grow lighting a commercially viable proposition for growers." ■

Varroc receives a Prestigious Innovation Award

Varroc Lighting Systems received an Innovation Award at the annual Moravian-Silesian Region Innovation Award Ceremony in the Czech Republic. The annual Moravian-Silesian region innovation competition strives to introduce businesses to the public to raise awareness about successful, global companies located in this region of the Czech Republic. Varroc's winning submission for the Innovation award focused on the stylistic projector headlight module for the Bentley Bentayga. This headlight module combines several innovative technologies such as stylistic plastic



The team receiving the award...

lenses and two LED connected projector modules, one for low beam and the other for high beam.

The high beam contains multifunctional mechanisms that combine several lighting functions which allow for increased visibility and safety regardless of whether driving in a city or on the highway. Basically, the lights automatically adjust to the actual driving situation. This technology allows the driver to see much further as compared to standard headlights. The headlamp module also has a unique cooling system which uses two ventilators and air corridors. ■

Museum Barberini gets revived

After a construction period of four years the Museum Barberini in Potsdam was inaugurated in the presence of Chancellor Angela Merkel on January 20th, 2017. In three opening exhibitions in 17 exhibition spaces the museum shows oeuvres ranging from the Old Masters to contemporary art. Rotating exhibitions of Hasso Plattner's art collection will attract visitors from all over the world to Potsdam in the future...

Prominently located in the city's historic centre and in direct vicinity of the Stadtschloss (City Palace), the baroque Palace Barberini has been reconstructed according to historical records by the architectural office Hilmer & Sattler und Albrecht. With great respect for its historical significance, the interior has received an authentic and modern design. The lighting concept by Licht Kunst Licht utilises state of the art lighting technologies and supports the new building's sublime architecture with a serene and contained lighting concept.

Generous Entry

The museum's foyer with its multitude of columns and subtly illuminated vaulted ceiling conveys an almost sacral atmosphere and welcomes the visitors with an inviting and charming gesture. From here, visitors enter the generous exhibition spaces with their oak flooring and distinct wall colours. The total exhibition area of the museum comprises 2,200 sqm across three levels – here, impressive visual axis emerge and allow for magnificent views of the river Havel or the Old Market.

Uncluttered Ceilings and Flexibility in the Exhibition Spaces

The artificial lighting concept underlines the flow of the spatial sequence and particular charm of the different room types. The spaces located in the wings of the ground floor and first floor, are equipped with newly designed lighting coves engulfing the ceiling. Providing for a pleasantly soft



ambient light, they do not reveal the luminaires' mounting location. Groups of adjustable downlights and a rectangular track frame for the flexible accommodation of projectors cast additional accent light from the centre of the room onto the exhibits. The exhibition spaces with ceiling heights up to five meters, as can be found in the front building and on the 2nd floor are homogeneously illuminated by large, yet maintainable LED-fitted luminous ceilings with textile membranes. Both light coves and luminous ceilings are designed to adapt to various exhibition requirements via tuneable white LED technology. Here, the colour temperature can be adjusted between 2.700K and 6.500K.

The entire luminous ceiling is framed by a light track for the integration of additional luminaires accentuating

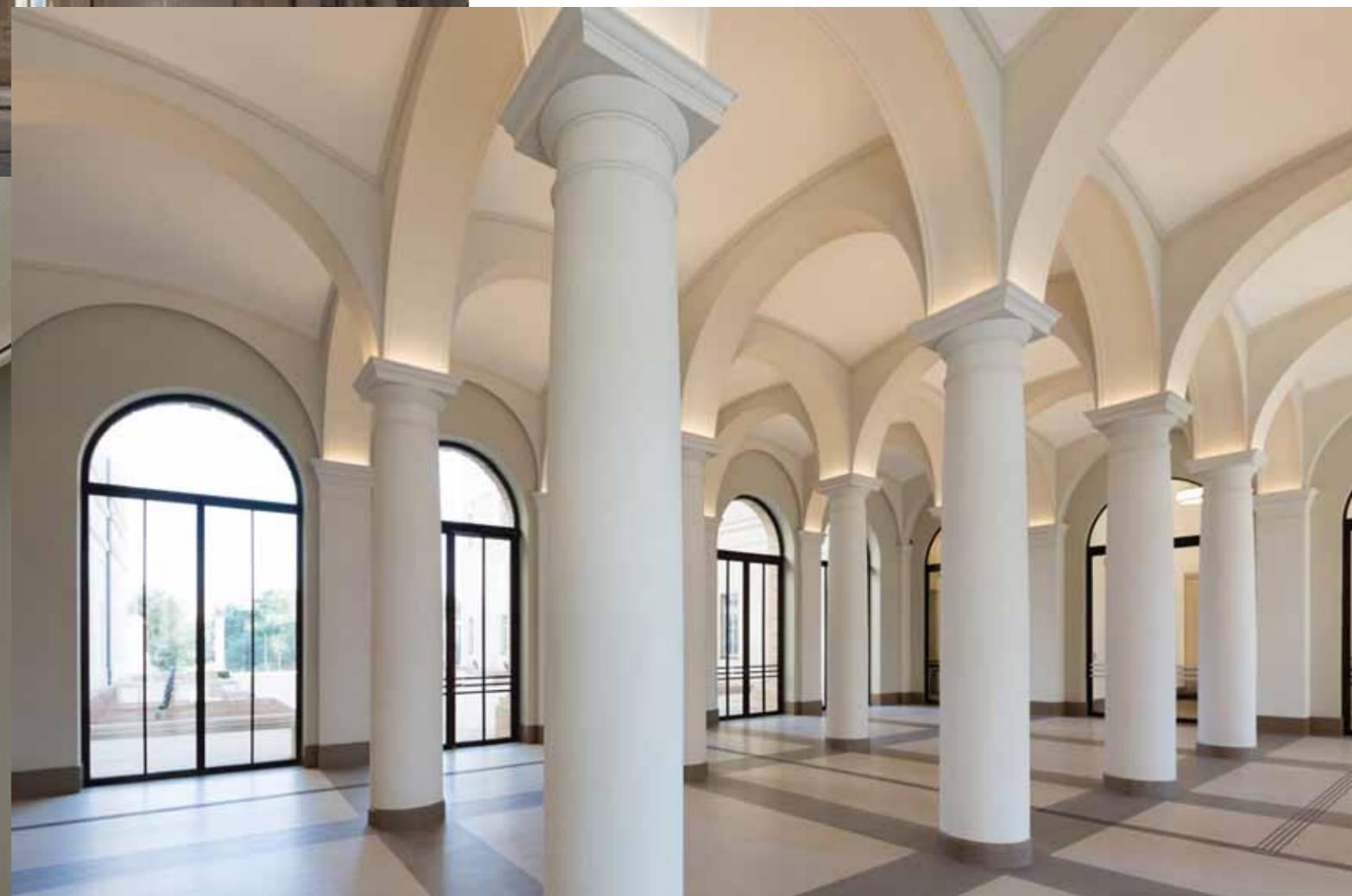
individual exhibits. The illuminance levels in the individual rooms are adapted to the sensitivity of the exhibits on display; hence, illuminance levels can be fine-tuned in compliance with the specific conservation requirements.

Light Quality for the Art

The lighting designers from Licht Kunst Licht based the development of the lighting concept for the exhibition spaces on the museum's conservational requirements: Excellent colour rendering, low UV emissions as well as control of light quantities at a consistent colour temperature are considered as important as a strict glare control for the lighting equipment. ■

Credits

www.lichtkunstlicht.com





Norwegian Port brightens the winter atmosphere

After a construction period of four years the Museum Barberini in Potsdam was inaugurated in the presence of Chancellor Angela Merkel on January 20th, 2017. In three opening exhibitions in 17 exhibition spaces the museum shows oeuyres ranging from the Old Masters to contemporary art. Rotating exhibitions of Hasso Plattner's art collection will attract visitors from all over the world to Potsdam in the future...

Since the time of the Vikings, the natural port at the mouth of the Drammen River, about 40 kilometres from Oslo, has been a bustling trading centre. Today, two 60-metre high cranes serve as a focal point for incoming and outgoing cargo ships. Deciding to add a festive touch to these utilitarian structures, the Drammen Port Authority has illuminated them with a rich array of colours from CHAUVET Professional and ILUMINARC fixtures supplied by Rubicon.

The opening ceremony, when the lights were officially turned on, was filmed live by Norwegian National Television Channel (NRK) with many celebrities present. They and the national audience watching on TV were undoubtedly impressed by what they witnessed. Using 13 CHAUVET Professional COLORado 2 Quad Zoom IP and 4 ILUMINARC Ilumipanel 90 IP fixtures for each crane, Rubicon illuminated the towering structures in dramatic and vibrant light visible for miles around the city.

A key factor in achieving this impressive result was the output from the ILUMINARC Ilumipanel fixtures, which were positioned on each crane, both at the top of the control tower facing downwards and at the base of the crane lighting upwards. Pål Erik Gulbrandsen, Project Manager at Rubicon, said, "We selected the Ilumipanel 90IP fixtures for their incredible 450W output. Given the huge surface area of the structures, the fixtures had the somewhat impossible task of providing consistent and strong illumination. The Ilumipanel illuminated the general structure of the cranes exceptionally."

Gulbrandsen was able to bathe the structures in intense saturated colour with the help of 90 RGBA LEDs contained within the fixtures. He said, "The Ilumipanel was also specified for its ability to produce extremely saturated colours, especially with regards to hues and vibrant greens. Most importantly, we were able to completely transform the cold metal structures into something





much warmer, which looked fantastic both in person and on television.”

To illuminate the crane in a number of more tricky to reach areas, Gulbrandsen relied on the COLORado 2 Quad Zoom IP fixtures that were installed on each crane – six units mounted on the legs of the crane lighting upwards, three on the roof of the control tower, and four on the crane structure itself covering the whole crane structure.

“Among the most difficult thing about lighting the cranes was getting all angles of the structures evenly

illuminated,” continued Gulbrandsen. “To ensure even coverage, I chose the COLORado 2 Quad Zoom IP because of the excellent zoom capabilities of the fixture. This made it easier for me to play around with the zoom to cover as much area as I could.”

The COLORado’s punchy 14 x 15W LEDs output also met Pål’s requirements. “Despite their extremely compact size and light weight, the fixtures are more than powerful enough to illuminate the various parts of the structures. The beams are brilliant and intense.” he said.

Given the harsh Norwegian winter conditions in the port of Drammen, one of the key practical considerations of the installation was the need for reliable all-weather fixtures. By utilising Ilumipanel and COLORado fixtures’ IP67 and IP66 respective outdoor use ratings, the team at Rubicon could rely upon the fixtures despite the harsh northern conditions. ■

Credits

www.iluminarc.com

Designers of grow lights for greenhouses, vertical farms and other horticulture applications can speed up their time to market by using this online calculator...

Speeding Up Grow Light Process

Lumileds has introduced an online calculator that fixture manufacturers can use to more quickly optimise the design of their grow lights. The calculator allows the user to input various LED combinations and operating conditions to generate the spectral power distribution, Photosynthetic Photon Flux (PPF), and power usage of a fixture using Lumileds LUXEON SunPlus Series LEDs. Designed to allow easy modifications of LEDs and operating conditions, the calculator facilitates fixture design by generating real-time feedback on spectral power distribution. Lumileds LUXEON SunPlus Series of LEDs are the only horticulture LEDs on the market that are binned by PPF and wavelength to ensure ease of system design and enable wavelength tuning for maximum crop yield in both greenhouse and vertical farming environments.

Jennifer Holland, Product Manager of the LUXEON SunPlus Series LEDs and Horticulture Lighting Calculator, said, "With the Horticulture Lighting Calculator, fixture manufacturers can test many lighting scenarios in a short period of time, so that their optimum designs can be brought to market much more quickly and efficiently than if each potential fixture were built and tested individually."



Horticulture Lighting Calculator Exported Results

A	B	C	D	E	F
nm	Beta Carotene	Chlorophyll A	Chlorophyll B	LED Simulation	
380	3.35401588	4.01084399	2.003524718	0.00447492	
381	3.362842238	4.021398843	2.008797151	0.003532181	
382	3.371668596	4.031953890	2.014009585	0.005614997	
383	3.380494953	4.042508548	1.851003517	0.002271354	
384	3.728253442	4.053063401	1.855896581	0.002309829	
385	3.737962435	4.063618253	1.691572404	0.001800946	
386	3.747671429	4.074173106	1.628127455	0.004867924	
387	4.09896046	4.084727959	1.547327412	0.003749397	
388	4.109552089	4.095282811	1.483135535	0.004893147	
389	4.291816373	4.105837664	1.435683633	0.001481837	
390	4.474963293	4.116392516	1.387968111	0.00211697	
391	4.831548139	4.279797272	1.374347657	0.003719815	
392	5.016901649	4.290743045	1.36063993	0.001800469	
393	5.029699867	4.608952305	1.364110349	0.002987044	
394	5.584135819	4.774702583	1.384892524	0.002994645	
395	5.578257991	4.941234702	1.405762574	0.004962537	
396	5.592380163	5.263353166	1.444119527	0.003505894	
397	6.132111929	5.431839888	1.482652228	0.004177814	
398	6.147558055	5.756094796	1.521306077	0.004188337	
399	6.515175848	5.927138119	1.577775715	0.004831453	
400	6.531504609	6.25472747	1.616879597	0.005511639	
401	6.72480184	6.427123396	1.673777942	0.007199787	
402	6.918981707	6.600301163	1.713277256	0.007419666	
403	7.11404421	6.774260771	1.752952317	0.008245328	
404	7.131698925	6.791070351	1.775052601	0.010284614	
405	7.506817122	6.96620272	1.779448296	0.0113645	
406	7.525352473	6.983403221	1.962223989	0.012918282	
407	7.723504201	7.159708351	1.967057053	0.016179002	
408	7.742480869	7.177299772	1.971890117	0.018092711	
409	7.941958551	7.194891193	2.156425289	0.023089598	
410	8.323255198	7.212482614	2.181697722	0.025885169	
411	8.524937469	7.230074035	2.347551002	0.032469574	

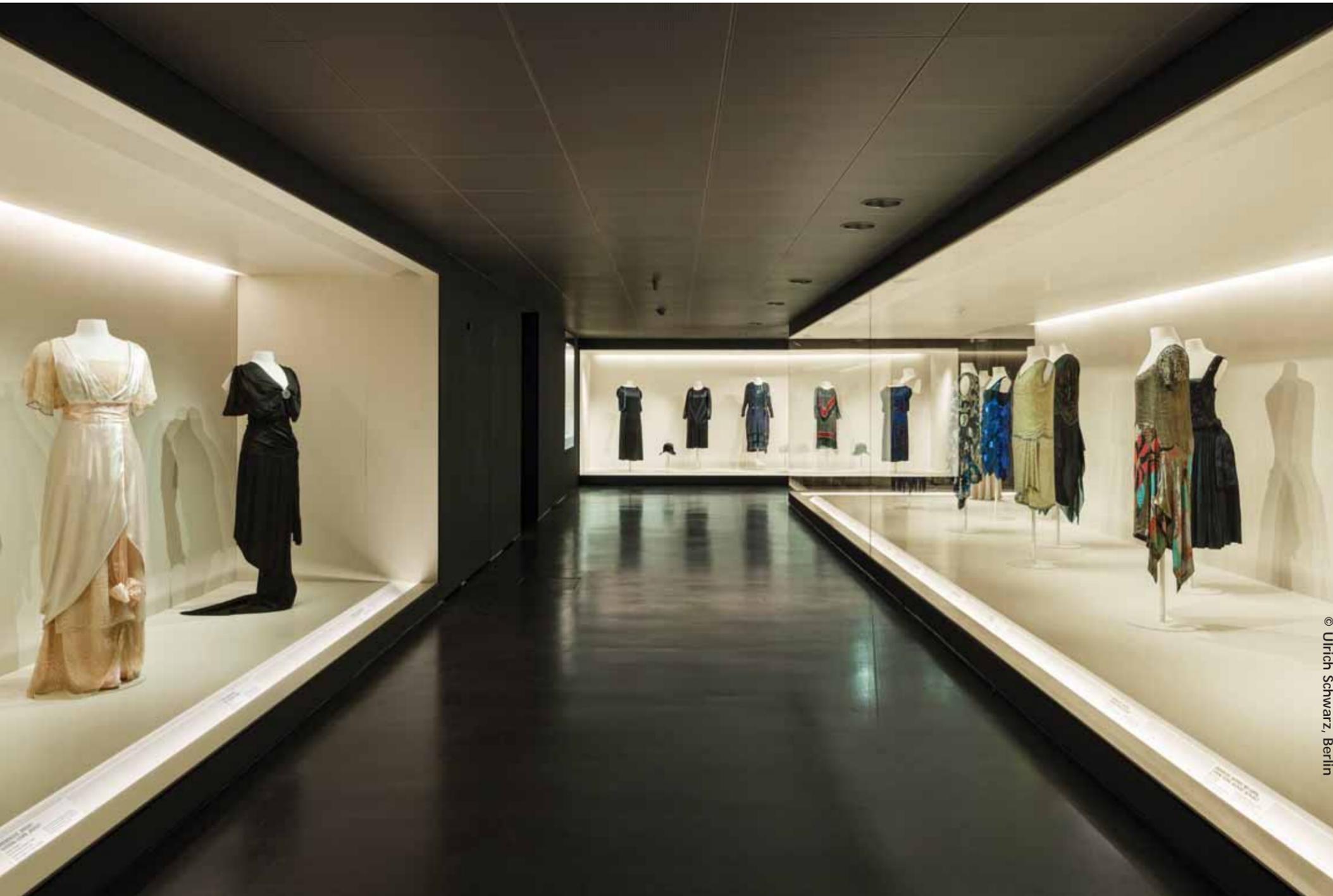
The LUXEON SunPlus 20 Line of LEDs is optimised for commercial greenhouses and uses 2.0 x 2.0 mm LEDs in Royal Blue (445 -455 nm), Deep Red (655-670 nm), Far Red (720-750 nm), Lime (broad spectra) and Cool White. The LUXEON SunPlus 35 Line is optimised for vertical farming, using Royal Blue, Lime, and three shades of Purple LEDs in 3.5 x 3.5 mm format.



Fashion Gallery at Berlin Refurbished

The architectural and lighting installations represent the perfect stage for extraordinary fashion collection...

The renovated building has been remodelled by Kuehn Malvezzi. In the foyer, the ticket desk, information desk and cloakroom have been housed in white, cube-shaped installations. New visible lighting elements enhance the architectural and signage language by graphical layout of fluorescent tubes and highlights the typical visitor. The new fashion exhibition is to be entered through a tunnel which allows the adoption of the eyes onto the 50lx presentation gallery. In large showcases, installed in spaces lit with



© Ulrich Schwarz, Berlin

Tunnel to the fashion gallery (© Lichtvision)

two main components, wallwash and front lit of fiber optics spots, present mannequins model and accessories. Representing fashion history, the display conveys a sense of strolling along windows.

The foyer perspective gives an idea of the merging of the post-modernism architecture by architect Rolf Gutbrod and the cube-shaped, white exhibition casings of Kuehn Malvezzi. The foyer and staircase with

its sculptural quality connects the different museum levels and represents the starting point of our tour through the new fashion gallery.

Important orientation points of the foyer as the information and ticket desk, the wardrobe or exhibition entrances are highlighted by the graphical lighting layout supported by the lettering of the new guidance system of Double Standards. Bare fluorescent tubes, arranged in a strict parallel



Ticket desk © Ulrich Schwarz, Berlin



Foyer © Ulrich Schwarz, Berlin



Accessory cabinets (© Lichtvision)

pattern, underline the clear architectural language.

The entrance of the fashion gallery leads into a dark coloured tunnel to adapt the visitors eye to the low exhibition illuminance level of 50 lx. The tunnel ceiling is equipped with a regular fluorescent lamp pattern with diminished and dimmed luminances.

The large-scaled cabinets with their impressive glass front and the uniform coloured surfaces are designed for the optimised presentation of the fashion mannequins. The lighting elements are hidden well and defining the space in a perfect manner. The lighting components are a linear and diffuse wallwash and backlight luminaire, a linear and indirect cove lighting for the inscriptions and a ceiling channel with a row of adjustable fiber optic spots as the main exhibit illumination element.

The fashion gallery is a 250m long drawn-out room sequence equipped with large-scaled mannequin and smaller accessory cabinets. The pathway illumination is realised only by the scattered light of the cabinets. Therefore the low pathway light level of about 5 lx together with the dark coloured surfaces guarantee the low adaptation level of



Cabinets with their impressive glass front and the uniform coloured surfaces (© Lichtvision)

the visitors eye and so supporting the 50 lx exhibit presentation on a noticeable higher perceived brightness level.

The accessory cabinets are designed for the presentation of smaller fashion accessories as watches, shoes, hats or bags. The cabinet ceiling and the intermediate shelf is fitted out with a row of fiber tail endlights in a recessed reflecting channel cover ed by a diffusor material. Thus the cabinet space is lit exceptionally uniform on a 50 lx illuminance level. The dimmible halogen lamp projector guarantees the very good colour rendering.

The gallery is a walk through 150 years of fashion history with about 130 creations of such famous couturiers as Paul Poiret, Elsa Schiaparelli and Christian Dior. And the architectural and lighting installations represent the perfect stage for this extraordinary fashion collection. ■

Credits

www.lichtvision.com



“Trilux is primarily focusing on office spaces. Human asset is of prime importance to any organisation.”

As per my understanding, **TRILUX** represents the most simple and reliable path to customised, energy-efficient and sustainable lighting solutions. The firm offers a wide portfolio of technologies as well as high-performance partners within the **TRILUX Lighting India Pvt. Ltd.**, and unites single components to create custom-designed complete solutions. **Mayank Gupta, Exec. Director - India Operations** of the firm, talks to **Lighting India** about the lighting industry and the company...

Q What is your view on the growth of the global lighting industry?

A Internet of Things (IoT) will transform workplaces into digital spaces. IoT is enabling new products and network innovations that will generate more speed, cost savings, security and better overall customer experiences. For instance, you walk into a store and the floor lights up to show you the way to the product that you are searching for, like your favourite books category? Or if you enter a shared office space and the room knows who you are and adjusts the lights and temperature to your liking?

The global companies are digitising their business operations, and buildings are central to this kind of digital transformation. These kinds of changes can turn out to be competitive advantages for the companies that embrace them, from those in retail to hotels to all kinds of customer service companies. The idea is to create better experiences for workers and guests and to save both money and energy. This requires a system that controls everything from badge swipes to lighting and air conditioning and must work together as if they were one. And they must be secure and incorporate real time analytics

for cost and energy saving. The system will also reduce power outages and increase power efficiency way up.

Q What are the advantages of LED lighting? How is the acceptance of these in India?

A Energy conservation is driving adoption of LED Lighting and the market has seen growth exponentially. Low voltage LED Lighting adoption is also a critical component in concept of smart cities and smart buildings. LED Lighting has also given a new edge of growth in retail, hospitality and commercial offices verticals in terms of mood lighting, health centric lighting and entertainment lighting. These verticals are seeing new applications due to flexibility in using LED Lighting solutions. India market has seen a major shift from tradition fluorescent to LED Lighting in last 2-3 years, reaching almost 50% or more market share in 2017.

Q Who are your major clients from lighting industry?

A In India, Trilux has primarily focussed in Office Spaces in last four years. Our customers have been both government as well Indian and MNC corporate offices – covering all areas of the building such as workspaces, meeting rooms, corridors, stairs, lobby areas, car parking, including light around the building. We have also executed street lighting projects in Delhi.

Q Your company is into indoor and outdoor lighting... How is the growth of each of these segments?

A The LED Lighting is driving the growth for both indoor as well outdoor Lighting. The focus of India government on infrastructure development for attracting FDI under 'Make in India' program as well development of over 100 Smart Cities will be driving the growth of lighting industry – both indoor and outdoor. Combined with going green and energy

saving initiatives, the lighting industry is set to grow much faster in next 5-7 years, beating the previous growth trends.

Q What kind of service do you offer to your customers?

A As a manufacturer of indoor, outdoor, architectural lighting solutions, our main focus has been to supply high quality, highly energy efficient, high on aesthetics, weather proof and simple to use lighting solutions for every lighting application such workspaces, hotels, restaurants, retail, airports, train stations, street lighting and entertainment verticals. Trilux solutions also include Human Centric Lighting such as – 1) Circadian daylight-

The global companies are digitising their business operations, and buildings are central to this kind of digital transformation. These kinds of changes can turn out to be competitive advantages for the companies that embrace them, from those in retail to hotels to all kinds of customer service companies

synchronous systems - These solutions are oriented to the 24-hour rhythm of daylight, simulating this based on various colour temperatures and intensities; 2) Dynamic Light Systems - These track rhythms oriented to individual requirements instead of the course of daylight? Activating light at 11.15 am and a relaxing light atmosphere at 2 pm each day; 3) Emotional Lighting Systems - Such systems use lighting with coloured light (RGB-controlled) or special white tones and create emotions, experiences and accenting.

Q What is your advice to the prospective buyers of lighting solutions?

A In India, Trilux is primarily focusing on office spaces. Human asset is of prime importance to any organisation. The productivity and efficiency of this human asset is very important to any organisation which wants to succeed in today's very dynamic and competitive world. My advice to buyers is to consult Trilux while designing their workspaces. Trilux will discuss with them on maximising human productivity and efficiency in their day-to-day workspaces, through scientific lighting management of their individual requirements. ■

Access Fixtures Unveils New 6-Lamp T5 Fluorescent High Bay Light Fixtures

Access Fixtures announces the launch of its new 6-lamp T5 high bay fixtures. The 6-lamp T5s with Philips Advance ballasts are available in three styles: Lensed, caged, and open. Compared to less-efficient T12 lamps that emit approximately 2,000 lumens, these T5s deliver a superior 5,000 lumens each.

With T5HO lamps from Access Fixtures, these fixtures deliver a total light source lumen output of 30,000 lumens with a high efficacy of 92.59 lumens per watt. If installed in a commercial facility averaging 12 hours per start, the rated life leaps to 40,000 hours. These lamps, which are available in three Kelvin temperatures, meet US Federal minimum efficiency standards and have a minimum CRI of 85.

Steven Rothschild, CEO, Access Fixtures, said, "The new 6-lamp T5 high bay fixtures come with Philips Advance Centium Ballasts, the best fluorescent ballasts on the market. Better yet, these T5 fixtures are offered at an unbeatable price with lamps that are efficient, easy, and inexpensive to replace."

If you're a facility manager looking to minimise electricity costs, HENO fixtures can be equipped with motion and occupancy sensors that will turn the lights on only when someone is in the room. Their TCLP certification also means they are environmentally safe and an excellent choice for a range of facilities.

These 6-lamp T5 high bay fixtures are ideal for facilities such as warehouses, manufacturing facilities, and other high-ceiling spaces. Lamps are available

Featuring Philips Advance Ballast

- T5HO lamps (optional) - Motion sensor (optional)
- Wire guard - UL listing - ETL listing - 120v-277v



AccessFixtures
Commercial and Sports Lighting for Less

in 3000K, 4100K, and 5000K. If purchasing many HENO fixtures or looking to keep extra lamps in stock, you can buy lamps by the case; otherwise Access Fixtures will ship you the exact number of lamps you'll need for each unit. The HENO family runs deep—whether you need fixtures with acrylic lenses, wire guards, or occupancy sensors, Access Fixtures has the best low-cost, energy-efficient T5 fluorescent high bay for you. ■

Source: www.accessfixtures.com

In a new study, researchers of BIDMC have discovered that a narrow band of green light reduces headache for migraine patients...

A Narrow Band of Green Light Serves as Migraine Relief

Light sensitivity, or photophobia, is a frequent symptom of migraine headaches, which affect nearly 15 % of the world's population. A new study, led by researchers at Beth Israel Deaconess Medical Centre (BIDMC), has found that exposing migraine sufferers to a narrow band of green light significantly reduces photophobia and can reduce headache severity.

The lead author Rami Burstein, PhD, Vice Chair of Research in the Department of Anesthesia, Critical Care and Pain Medicine and Academic Director of the Comprehensive Headache Centre at BIDMC, as well as the John Hedley-Whyte Professor of Anaesthesia at Harvard Medical School (HMS), said, "Although photophobia is not usually as incapacitating as headache pain itself, the inability to endure light can be disabling. More than 80% of migraine attacks are associated with and exacerbated by light sensitivity, leading many migraine sufferers to seek the comfort of darkness and isolate themselves from work, family and everyday activities."

Five years ago, Burstein and colleagues made the surprising discovery that blue light hurts migraine patients who are blind. This finding prompted the thinking that abnormal sensitivity to light during migraine could be alleviated by blocking blue light. However, because that study involved only blind patients, who cannot detect all colours of light, Burstein and his colleagues devised a way to study the effects of different colours of light on headache in patients without visual impairment.

In this new study, Burstein and colleagues found that of all light to which migraine sufferers are exposed, a narrow band of green light worsens migraine significantly less than all other colours of light and that at low intensities green light can even reduce headache pain. The researchers asked patients experiencing acute migraine attacks to report any change in headache when exposed to different intensities of blue, green, amber and red light. At high intensity of light – as in a well-lit office – nearly 80% of patients reported intensification of headache with exposure to all colours but green. Moreover, the researchers found – unexpectedly – that green light even reduced pain by about 20%.

To understand exactly why green light causes far less



pain to patients with migraines, Burstein and colleagues designed experiments in which they measured the magnitude of the electrical signals generated by the retina (in the eye) and the cortex (in the brain) of these patients in response to each colour of light. They found that blue and red lights generated the largest signals in both the retina and the cortex and that green light generated the smallest signals.

Next, applying innovative techniques recently developed by Rodrigo Nosedá, PhD, also of BIDMC and Assistant Professor at HMS, they used animal models of migraine to study neurons in the thalamus, an area of the brain that transmits information about light from the eye to the cortex. These neurons were found to be most responsive to blue light and least responsive to green light, explaining why the migraine brain responds favourably to green light.

Burstein is now working to develop a more affordable light bulb that emits "pure" (narrow band wavelength) green light at low intensity, as well as affordable sunglasses that block all but this narrow band of pure green light. Currently, the cost of one such light bulb is prohibitively high, and the technology to block all but pure green light in sunglasses is available only in light microscopy, which is also very costly. ■

Source: www.bidmc.org

Light can be more than Just Lighting

Osram supplied lighting solutions to the headquarter of Siemens at Munich, fulfilling the requirements of the globally active technology corporation. The light in this case supported the successful architectural union of heritage building sections with a highly modern new construction, and the well-being of approximately 1,200 employees at the site.



Arktika LED semi-recessed luminaires with DALI drivers are used throughout the office tracts and are controlled according to employee occupancy.



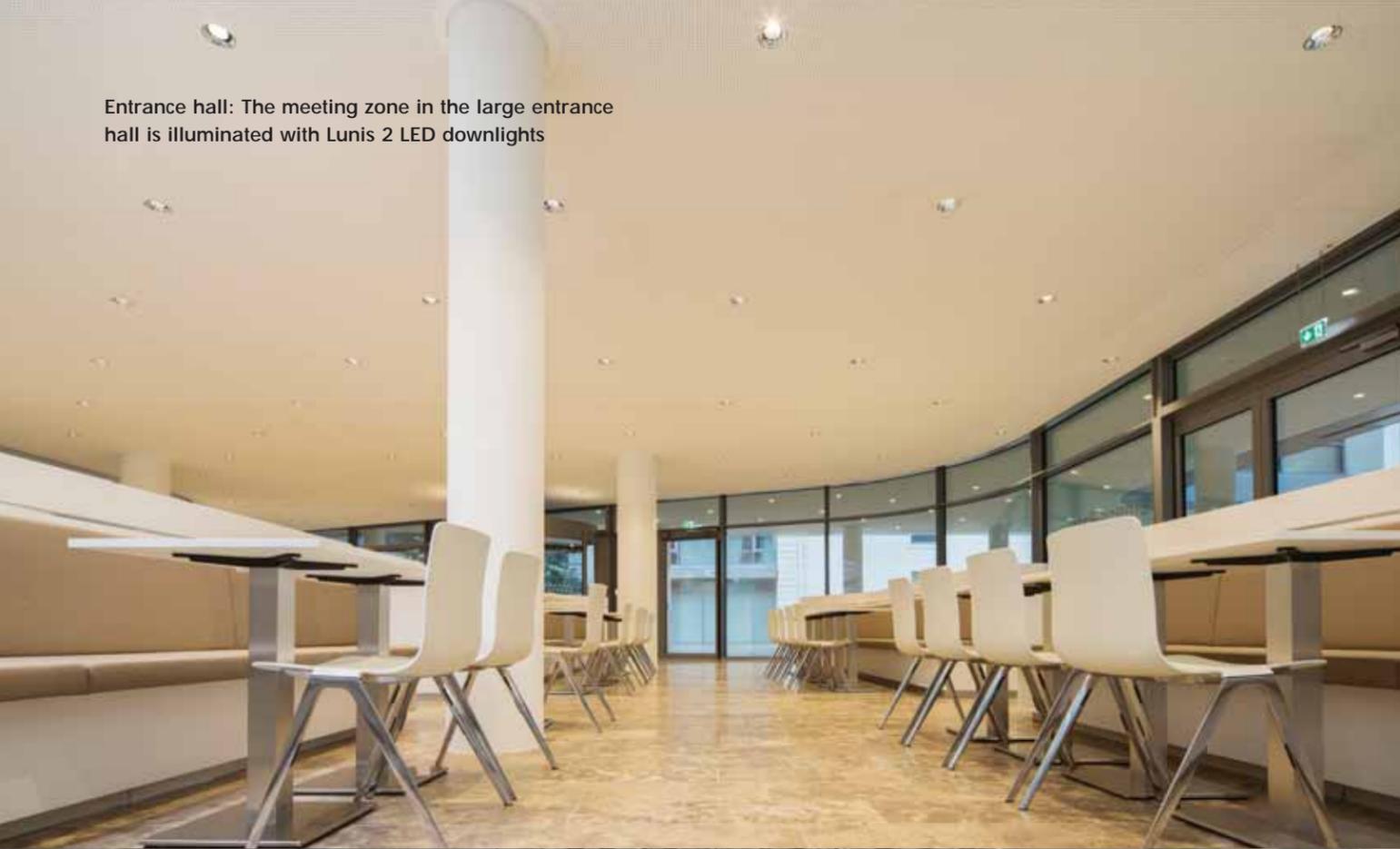
Arktika LED semi-recessed luminaires with DALI drivers are used throughout the office tracts and are controlled according to employee occupancy.

The headquarters of Siemens AG in the city centre of Munich saw a complete redesign in previous years. Siemens Real Estate connected the historic Palais Ludwig Ferdinand with a new, modern building characterised by a high level of transparency. An overground building space of around 45,000 square metres now accommodates an open and inspiring work environment for approximately 1,200 employees at the location. The freely accessible ground storey provides an open, inviting passageway for the public. The new headquarters complies with the most stringent sustainability standards in the world.

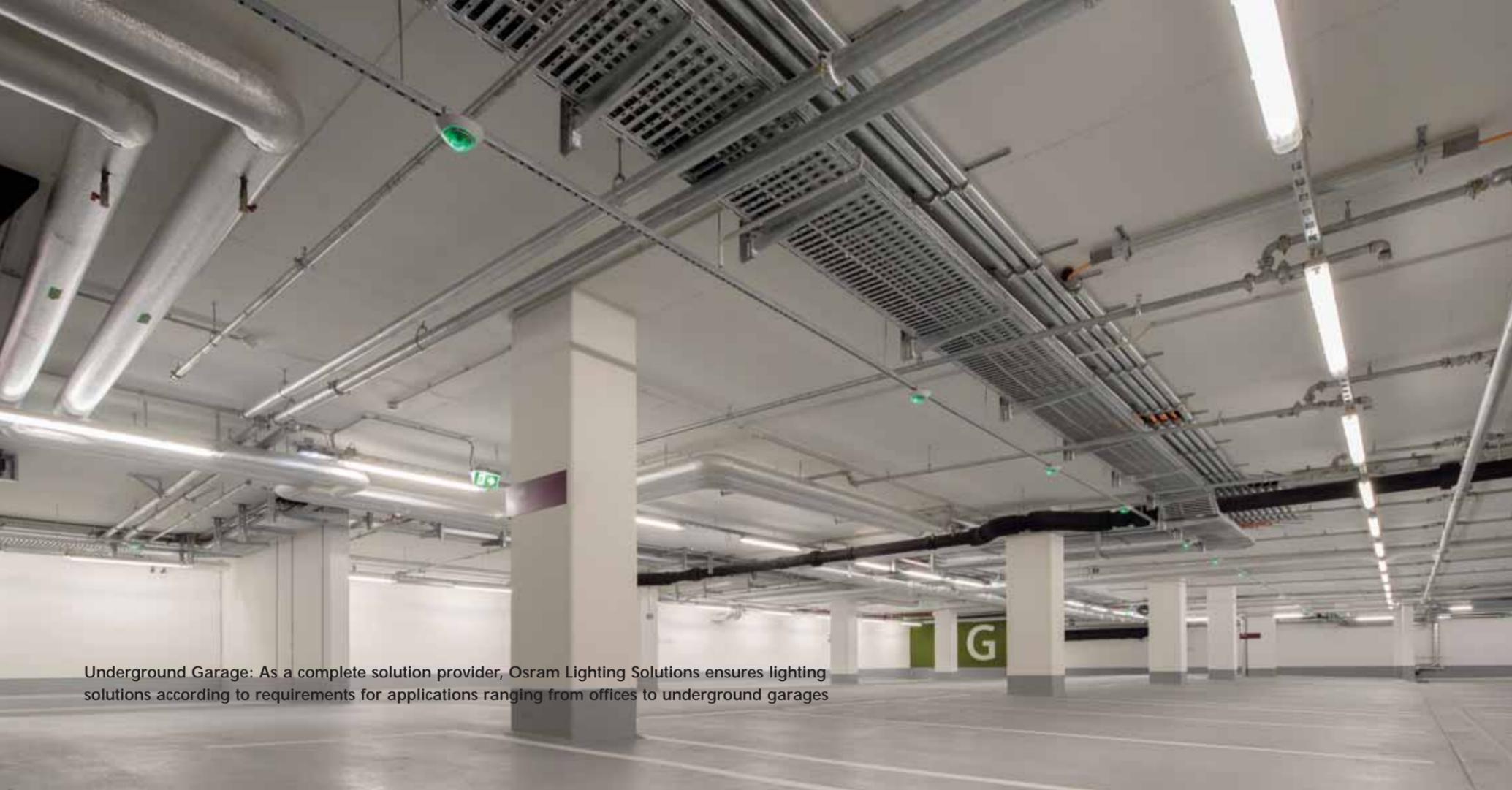
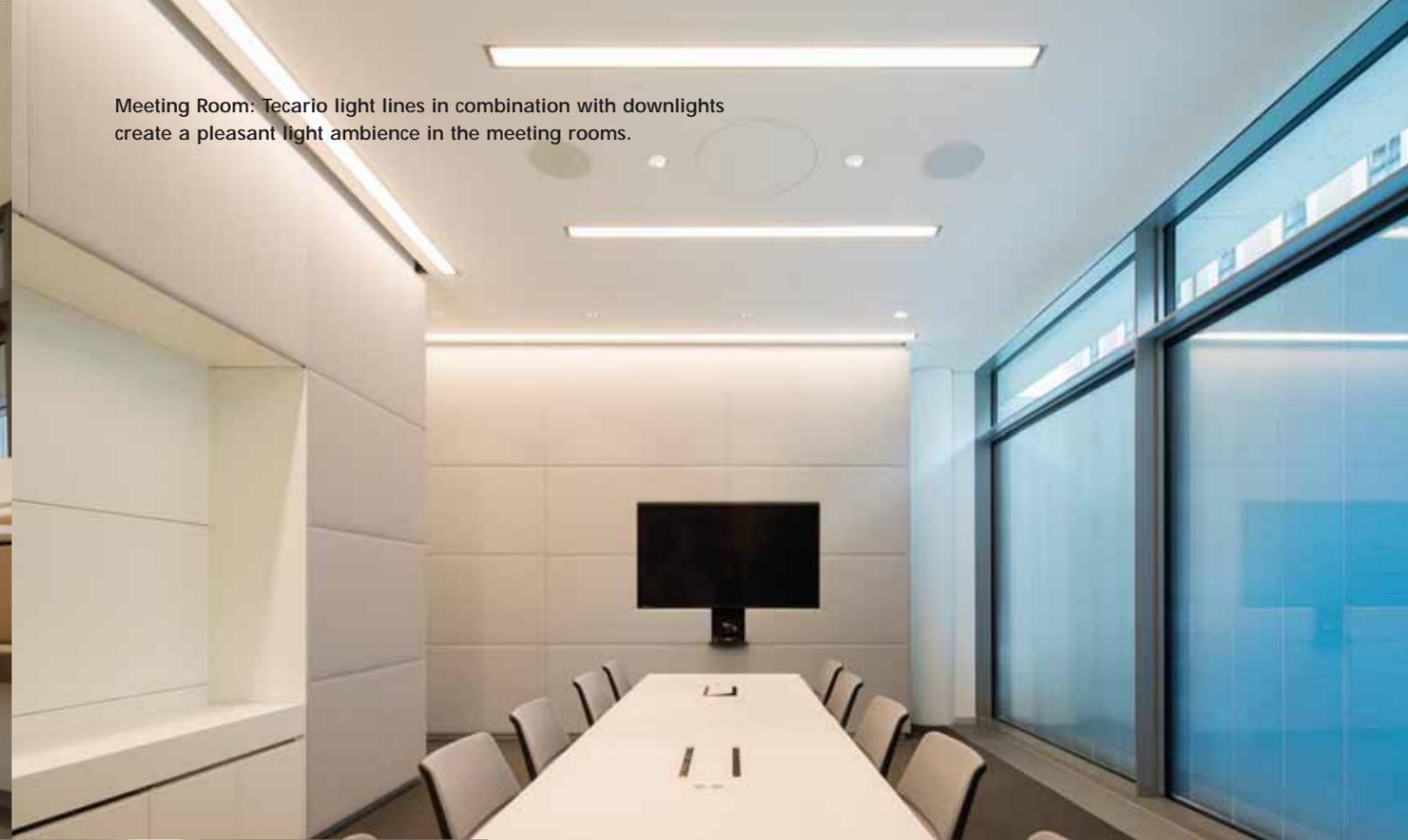
Maximum requirements were also placed on spatial concepts for the employees. The new office sections and equipment correspond to modern forms of work and organisation – as reflected by the openly designed office areas with think tanks, phone boxes and lounges as well as many communication zones throughout the building.

Premium-quality LED solutions were installed in almost all building areas, in some cases manufactured according to customer specifications. All luminaires are equipped with DALI drivers to enable maximum energy savings and are controlled and monitored via the central building system technology. The

Entrance hall: The meeting zone in the large entrance hall is illuminated with Lunis 2 LED downlights



Meeting Room: Tecario light lines in combination with downlights create a pleasant light ambience in the meeting rooms.



Underground Garage: As a complete solution provider, Osram Lighting Solutions ensures lighting solutions according to requirements for applications ranging from offices to underground garages

lighting itself can be switched and dimmed according to needs via daylight and occupancy sensors in the building – thus saving further energy.

Around 3,500 customer-specific units of the Arktika luminaire were set up throughout the offices as semi-recessed luminaires in various lengths. This luminaire, featuring high visual comfort matched to the needs of modern places of work, supports open and transparent spatial effects. Special hexagonal-shaped reflector technology achieves highly efficient light distribution with minimum glare, and the opal light emission surfaces on the sides provide an indirect light component for ceiling illumination.

Around 3,000 Lunis 2 LED downlights were installed in the meeting rooms of the historic Palais Ludwig Ferdinand as well as in all circulation areas, the sanitary rooms and other ancillary rooms of the office building. These downlights generate high lumen-output lighting and create a concise, transparent atmosphere with their purist design.

The downlights were supplemented with the Tecario LED light line system – almost 200 metres of this solution were installed in the circulation areas and larger meeting rooms. The special look of the system is ideally suited to the sophisticated architectural interior of the new building. The modular insert options of the Tecario LED provide high levels of flexibility and therefore the preconditions for setting eye-catching accents in the lighting design.

Individual visual accents are also set by the Linearlight Flex LED in the historic Palais Ludwig Ferdinand: these flexible LED modules were installed as an indirect light source in the peripheral coves around the central meeting rooms. The lighting concept is completed by 1,500 Monsun 2 damp-proof luminaires, reliably providing good visual conditions in the underground garage of the corporate headquarters. ■

Credits

www.osram.com



“We are striving to become the component supplier for all lighting fixtures in future”

MLS India is a subsidiary of MLS Co. Ltd. which was founded in 1997 and is one of the largest manufacturers & suppliers of SMD & DIP LEDs. In an exclusive e-interview with Lighting India, Ivan Hu, Chief Marketing Officer of the firm, speaks about the Indian market and its dynamics...

Q Can you tell us a bit about MLS Brand?

A MLS India is a subsidiary of MLS Co. Ltd. which was founded in 1997 and is one of the largest manufacturers & suppliers of SMD & DIP LEDs. MLS was one of the earliest LED manufacturers and light-

source provider for various kinds of lighting products. Headquartered in Zhongshan City of China, with a workforce of more than 12000 employees, MLS has fully-integrated, world class facilities supported by the most advanced technologies. A wide choice of

LM80 certified MLS LEDs are available in Warm white, Natural White and Cool White CCTs. Lamp manufacturers using MLS LEDs can bid for all BEE, EESL, Municipal Corporation and Government Tenders & BIS based LED projects with our 2835, 3030 and 3535 LEDs. MLS also has a wide range of Colour LEDs available in 3014, 2835 and 5050 packages. In recent years, we have become major component supplier for LED package in India with a huge manufacturing base in China. MLS is ranked 5th largest LED package manufacturer in the world. We are striving to become the component supplier for all lighting fixtures in future.

Q Can we have your views about Indian LED market?

A The Indian LED lighting market is expected to reach Rs. 31,000 Cr, growing at a CAGR of 62% between 2016-2020. There has been increased focus by the government towards energy conservations and efficiency in the last few years. Govt. has expressed increased interest in converting existing street lights into LED and this is expected to increase demand. Govt. has announced UJALA scheme to replace all incandescent bulbs with energy efficient LED bulbs.

Q Can you talk about a product that has worked well in the Indian Market?

A Yes, our products 0.2W, 0.5W and 1W in 2835 has done very well. It is widely accepted by all big players in the Indian Lighting industry. Our 3535SMD LED for street lighting has done well too. We recently, launched our range in filament LED, which also got a good recognition in industry. We rapidly moved into decorative and commercial segment and proved itself a revolutionary

product in LED market. Moreover, the Chip Scale Package (CSP) is one of our recent launch and most advanced technology for automotive Lighting. We have CSP1313 and CSP2020 for various automotive applications.

Q What are MLS Brand's future goals?

A Our future goals are;

- To be a LED component supplier with best Cost Performance Ratio to the customers.
- To be a pioneer in LED filament market.
- To be a major LED supplier in automotive lighting segment.
- To not only be a bulk supplier but also a quality supplier.
- We wish to be a top supplier of the country, participating in almost every project of it.

Q Who are your major clients from the lighting industry?

A As we are LED package manufacturer, LED packages are the main light source for our every lighting product. We at MLS provide LED packages to all major organisations who are manufacturing LED products like LED Bulbs, tubelights, downlights, streetlights, flood lights. We are supplying to all major lighting brands in India like HPL, Surya, HQ Lamps, Century LED etc.

I believe, market is moving towards eco friendly lighting. The automotive industry is also replacing traditional lighting with LED, which is a positive sign for lighting industry. The non renewable energy is being utilised to its fullest

Q What is your comment on the growth of the global lighting industry?

A I believe, market is moving towards eco friendly lighting. The automotive industry is

also replacing traditional lighting with LED, which is a positive sign for lighting industry. The non renewable energy is being utilised to its fullest. Most of the players in the industry promote solar lighting over conventional sources of energy. ■

Lighting A Design Arena For Intellects

The open office design was envisioned as an open culture studio, which breaks hierarchical norms and encourages design thinking. It comprises four zones...

Intellect Design Arena Limited is a global leader in Financial Technology for Banking, Insurance and other Financial Services. This \$100 million business is a specialist in designing advanced fully integrated technology products for global financial platforms such as Global Consumer Banking [iGCB), Central Banking, Risk, Treasury & Markets [iRTM), Global Transaction Banking [(iGTB) and Insurance [Intellect SEEC) that run in over 200 financial institutions, across 30 countries. Its Chairman and Group



CEO, Arun Jain strongly believes that good design is at the heart of making a disruptive transformation on how technology can be used. Most people think of design as an art, but Jain wants to turn design thinking into a science. Intellect's 'Next Level' Second floor office spread over 30,000 sq. ft. within its 22-acre campus in Chennai was set up with this thinking in mind.

The open office design was envisioned as an open culture studio, which breaks hierarchical norms and encourages design thinking. It comprises four zones: first is the work zone consisting of linear coloured workstations; second is the relaxation zone consisting of a coffee shop; and third is the peripheral zone consisting of a library, cabins and meeting rooms;



the performance of building features that impact on occupants' health and wellbeing (1). WELL is administered by the International WELL Building Institute [IWBI], a public benefit corporation whose mission is to improve human health and well being through the built environment. It identifies seven concepts – air, water, nourishment, light, fitness, comfort and mind – which all focus on people including features that are either preconditions [mandatory] or optimisations [optional]. The WELL Building Standard for Light provides illumination guidelines that are aimed to minimize disruption to the body's circadian system, enhance productivity, support good sleep quality and provide appropriate visual acuity where needed.

As per the WELL Standard, the visual lighting design feature sets a target for background illuminance at 215 lux on a horizontal plane 0.76m above the finished floor along with localised lighting wherever the illuminance needs to be 300 lux or 500 lux. The circadian lighting design feature sets a target of

250 equivalent melanopic lux [EML] measured vertically at 1.2m above finished floor level. However, 250 lux must be present in 75% of workstations for four hours a day, everyday of the year, and can be a combination of daylight and electric light. The WELL standard offers a table of lamp correlated colour temperature [CCT] factors to calculate the EML. Using this method, a 4,000K neutral white lamp having a factor of 0.58 and providing an illuminance of 100 lux will provide $[0.58 \times 100 =]$ 58 EML. Therefore it can be deduced that a cooler 6,500K lamp having a factor of 1.02 will deliver the 250 EML far more efficiently than the neutral 4,000K or a warmer 3,000K lamp having a factor of 0.45 (2).

A preliminary survey of the offices on other floors suggested that users had a preference of 4,000K instead of 6,500K for their workstations. Research reveals that blue-rich ambient light leads to smaller pupils, which in turn increase individuals' depth of field and visual acuity compared to blue deficient ambient light; this means that blue-rich light is suitable for visual performance of tasks as it produces higher contrast (3,4). Research also reveals that high CCTs in the range of 17000K could provide a useful intervention to improve wellbeing and productivity in the corporate setting (5). Therefore a combination of 4,000K and blue-light was used so as to respect users' preference, meet the desired EML and improve visual acuity. Localised lighting is provided using a combination of direct and direct-indirect suspended profile LED luminaires over each desk. The direct component consists of 4,000K LED while the indirect component consists of Blue LED. Instead of providing a uniform blanket of light, the indirect blue-light is used in a randomised intermittent bright and less-bright pattern so as to break the monotony and create visual interest (6).

Research indicates that people prefer warm white lighting for more pleasant and emotional activities (7). Therefore, warmer colour temperatures of 2500K

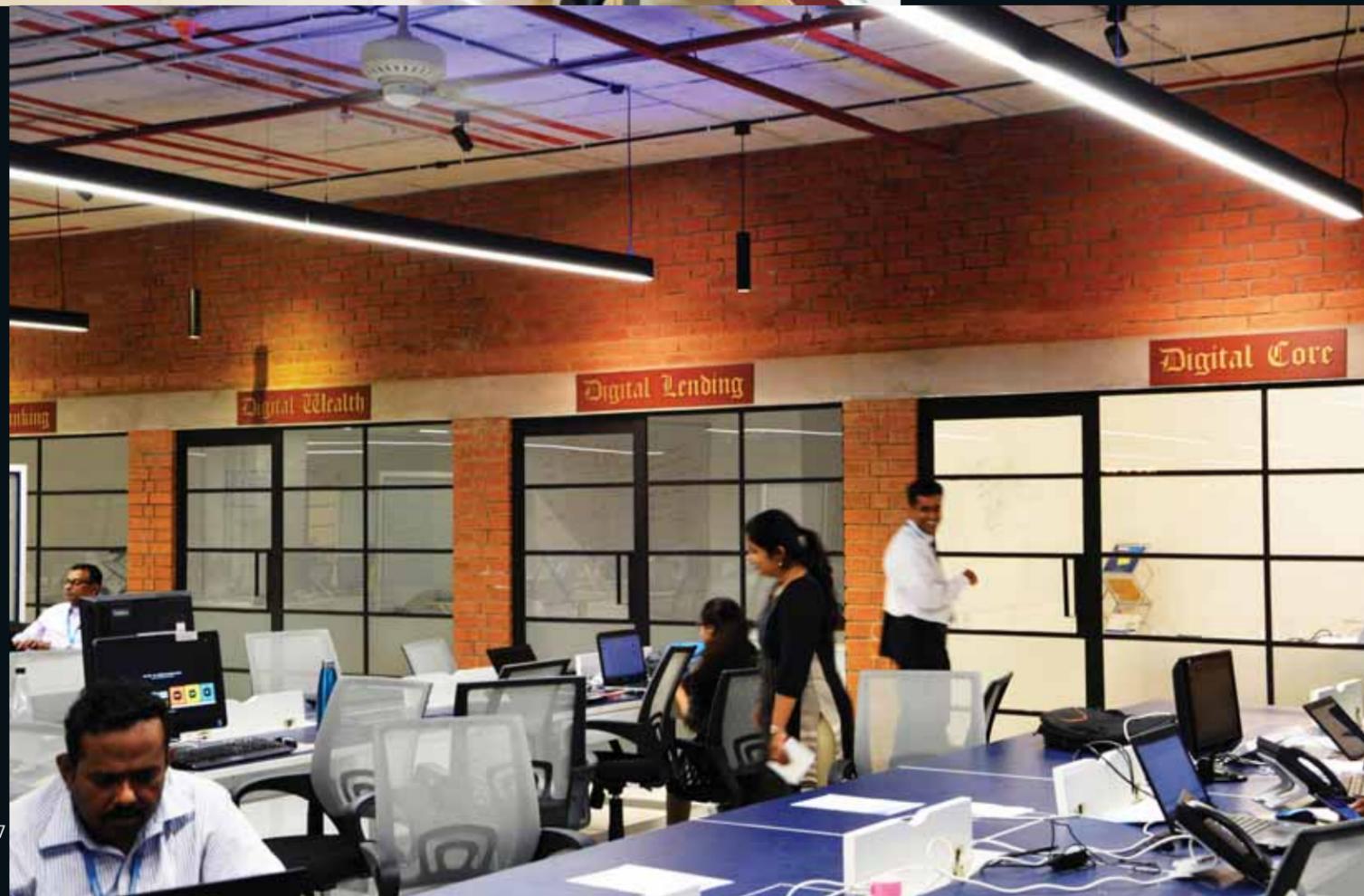
and 3000K were used for the lighting of the relaxation, peripheral, and circulation zones. Decorative pendants and wall brackets with exposed 2500K LED filament lamps were used in the coffee shop and library areas to further enhance the rustic look of this modern workspace. Suspended 3000K LED semi-diffuse linear profiles and industrial pendants were used in the cabins and meeting rooms respectively to provide soft diffuse illumination conducive for discussions. Suspended 3000K LED downlights creating accentuated spots on the floor were used to define the circulation routes between the different zones. Use of 100% SSL technology resulted in an overall LPD of 0.36 W/ft², which is well below the prescribed energy standards. ■

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and fourth is the circulation zone consisting of passages interconnecting all these zones. The exposed ceiling with exaggerated HVAC ducts and exposed brick finish for the wall provides a rather rustic look and feel to this modern workspace. Each of the cabins are also named in an unconventional format such as 'Omega Room' for the large discussion space and 'Digital Core', 'Digital Wealth' etc., for the smaller cabins so as to enhance this open culture of design thinking.

For the lighting of the work zone, absence of any false ceiling resulted in a breakaway from the typical checkerboard grid recessed 600x600 luminaires. Additionally, visual and circadian lighting design features mildly inspired by the WELL Building Standard for Light were used in the overall design process. The WELL Building Standard is an evidence-based system for measuring, certifying and monitoring



Dr. Amardeep Dugar
Founder
Lighting Research &
Design

Future Photonics

The photonics revolution is akin to the improvements seen in computers, where cell phones now have the same performance as the discrete-component supercomputers that took up entire warehouses decades ago. Photonics is the technology of generating and harnessing light and other forms of radiant energy whose quantum unit is the photon...

Light to Photonics

It was only in the 17th century that Sir Isaac Newton showed that white light is made of different colours of light. At the beginning of the 20th century, Max Planck and later Albert Einstein proposed that light was a wave as well as a particle, which was a very controversial theory at the time.

How can light be two completely different things at the same time? Experimentation later confirmed this duality in the nature of light. The word '*Photonics*' appeared around 1960, when the laser was invented by Theodore Maiman. Photonics is the science and technology of generating, controlling, and detecting photons, which are particles of light. The



characteristics of the waves and photons can be used to explore the universe, cure diseases, and even to solve crimes. Scientists have been studying light for hundreds of years. The colours of the rainbow are only a small part of the entire light wave range, called the electromagnetic spectrum. Photonics explores a wider variety of wavelengths, from gamma rays to radio, including X-rays, UV and infrared light. Photonics underpins technologies of daily life from smartphones to laptops to the Internet to medical instruments to lighting technology. The 21st century will depend as much on photonics as the 20th century depended on electronics. Even if we cannot see the entire electromagnetic spectrum, visible and invisible light waves are a part of our everyday life. Photonics is everywhere; in consumer electronics (barcode scanners, DVD players, remote TV control), telecommunications (internet), health (eye surgery, medical instruments), manufacturing industry (laser cutting and machining), defense and security (infrared camera, remote sensing), entertainment (holography, laser shows), etc. All around the world, scientists, engineers and technicians perform cutting edge research surrounding the field of Photonics. The science of light is also actively taught in classrooms and museums where teachers and educators share their passion for this field to young people and the general public. Photonics opens a world of unknown and far-reaching possibilities limited only by lack of imagination.

The photonics revolution is akin to the improvements seen in computers, where cell phones now have the same performance as the discrete-component supercomputers that took up entire warehouses decades ago. Silicon photonics is also likely to lead to many new applications, some of which can be imagined now. Circuits are already being developed for processing analog radio-frequency signals, particularly for the frequencies ranges that are difficult to control electrically. These are likely to

yield ultra-stable oscillators, analog communication systems, or high sensitivity Terahertz imagers (like the ones currently used in airports but with improved sensitivity). It is also possible to steer light beams emitting from the chip by controlling the relative phase of the light (e.g., phased arrays), which will be particularly useful to robotics or self-driving cars. Photons can also be used to realise sensors that, when implemented with other biological or chemical technologies, can be used to detect minute changes in the environment, which will benefit fields from health care to security. And one of the ultimate goals of photonics has always been to realise an optical computer. While this still remains very far off due to limitations of photons (they do not interact strongly with each other), there are future computing technologies that photons may benefit, such as quantum computing. Light has the nice advantage that the signal speed is twice as fast as electrical signals. Imagine the benefit if we could use integrated optics to distribute clock signals in our processors. In best case scenario, we could make them twice as fast without making them smaller. The applications for integrated photonics are endless and will have direct impact on future supercomputers, improved health care, faster telecommunications, and longer lasting cell phones. As the integrated photonics efforts in the Rochester region ramp up, there will be tremendous opportunities for research, innovation, education, and commercialisation.

The U.S. National Academy of Sciences' Harnessing Light Committee has released a landmark report discussing the current state of optical sciences and goals for the future. The NAS study, which is a follow up to the Harnessing Light report published in 1998, identifies the technological and economic opportunities the science has enabled, assesses trends in market needs, gives examples of where progress in photonics innovation has translated into economic benefits, and

makes recommendations for future research and policies that are intended to advance the optics and photonics discipline. The NAS report examined the use of optics and photonics in seven content areas —communications, information processing and data storage; defense and national security; energy; health and medicine; advanced manufacturing; and strategic materials—focusing on the enabling nature of optics and photonics and their role in facilitating economic growth. The Harnessing Light committee members also made a number of specific recommendations on how to best capitalise on the opportunities optics and photonics provides.

Role in Quality of Life

Photonics is the technology of generating and harnessing light and other forms of radiant energy whose quantum unit is the photon. Photonics involves cutting-edge uses of lasers, optics, fiber-optics, and electro-optical devices in numerous and diverse fields of technology – alternate energy, manufacturing, health care, telecommunication, environmental monitoring, homeland security, aerospace, solid state lighting, and many others. Photonic technologies directly increase our quality of life. Photonics could bring out products in many fields related to our life.

For example, in telecom, fiber optical communication system has already advanced and upgraded the communication network; in healthcare, many low-cost and portable biomedical optical devices such as optical micro-endoscopy are being developed for application in setting-limited regions; in energy saving, novel solar cells with enhanced conversion efficiency using Photonic techniques are being researched. These are only several of the whole possibilities that Photonics could do. As we can see, photonics is really broad and has lots of applications. The applications of photonics as an "enabling" technology are extremely broad. Rapid growth in the number and complexity of photonics and photonics-



enabled technologies has caused the demand for technicians to exceed supply.

Photonics is everywhere, from communication and healthcare, to materials processing for the factories of the future, to lighting and photovoltaics, and to consumer products like smart phones and other internet devices. It is sure that photonics in the 21st century will revolutionise healthcare and provide new ways of detecting, treating and preventing diseases. In manufacturing, laser processing will become a prerequisite for high-volume, environmentally-friendly and low-cost production. This is true in particular in the aerospace domain, where manufacturers are starting to make use of laser processing for machining composite materials, or for non-destructive treatment and control of these materials. Another growth area for photonics is in helping overcome the limitations of electronics in computers. Hopefully, the 21st century will offer the possibility to have the first generation of quantum computers. Lasers and other

light beams are the 'preferred carriers' of energy and information for many applications. For example:

- Lasers are used for welding, drilling, and cutting of metals, fabrics, human tissue, and other materials.
- Coherent light beams (lasers) have a high bandwidth and can carry far more information than radio frequency and microwave signals.
- Fiber optics allow light to be 'piped' through cables.
- Spectral analyses of gases and solid substances provide positive identification and quantifiable concentrations.

Importance of Photonics for the Future Computing

Our modern day electronic devices are based on transistors and other semiconductor devices. Moore's law has proved to be nearly accurate as we develop better and smaller circuits having more number of transistors per square inch. However, there will be a time maybe after two decades (as

predicted by Moore himself) where we may not be able to make any further development with the integrated circuit based devices. The future computing devices, be it quantum computers or for that matter even simple photonic integrated circuits, have already given us a new perspective to the power and versatility of computation in the future. With the ever increasing demand for faster and more efficient computing, photonics seems to be a promising candidate. Technology giants such as Intel, IBM and Google already have made huge investments in this direction. Wearable technology like the Google Glass and Microsoft's HoloLens have shown how we can use light to connect our digital world to our lives. So all we can expect is a better and a more interactive computing experience in the future.

Metamaterials

Metamaterials are artificial, precision-engineered materials which can exhibit peculiar properties not found in natural materials, which make them interesting. Many scientists had

predicted and modeled such artificial materials in electromagnetics, wave interactions and mechanics. However their true potential was realised only after they were fabricated at the end of the 20th century. One of the hot topics in metamaterial research and a simple applications to manufacture metamaterial cloaks (like the one Harry Potter had) to prevent from being sighted. As of now, there are no optical metamaterials that cover the entire visible range of the spectrum however there has been considerable progress with microwaves. Costly fabrication techniques have been an obstacle to metamaterial research. Metamaterials are predicted to be of great use particularly in defence applications to impart stealth and conceal units. Other applications of metamaterials include superlenses which are lenses that are almost free of aberrations and that can focus images below the diffraction limit. We can expect better antennas and other devices based on metamaterials in our mobile phones in the future.

Imaging

Imaging allows us to see the various physical and chemical changes taking place in a system. With the first camera-like device referred to as 'camera obscura' to the modern day DSLRs, our cameras and imaging systems have changed drastically. Imaging plays a crucial role particularly in life science, medicine and security issues but is also important in many fields of physics and chemistry. Imaging with super-high frame rates has given us a way to study ultrafast phenomena like chemical and electron transfer reactions that occur in an infinitesimally small duration of time. This has been achieved with the help of pulsed femtosecond lasers which allow us to carry out pump-probe studies for repetitive events and also burst mode studies for non-repetitive events. Some famous ultrafast imaging systems for both repetitive and non-repetitive events are – the streak camera dubbed as Femto-photography, STEAM, STAMP, etc. Fingerprinting is the underlying concept for spectroscopy.

Scanning devices at airports and other important locations for safety measures are based on such spectroscopic systems. We can expect cheaper, safer and faster imaging systems based on Terahertz radiation. Terahertz waves are electromagnetic waves which fall between the visible spectrum (10¹⁵ Hz) and high radio frequency waves (10¹⁰ Hz). Today we have high resolution cameras having as many as millions of pixels embedded in our smartphones to give us sharp images! Maybe in the future, we can have single pixel based efficient and smaller cameras which not only capture the visible spectrum but also infrared radiations.

Material Processing

The importance of light in material processing was understood after the development of photography. Since then laser-cutting of metallic blocks in the industry and various other processes were developed. Today, material processing using light has become highly sophisticated. 3D printing has been used so widely and in unimaginable ways. Nanofabrication and material processing at the nanoscale are very important not only for basic research but also for industrial applications. Structured hydrophobic surfaces which are based on the lotus leaf model have been demonstrated using femtosecond laser pulses on metals. Optical data storage has been revolutionised and new technologies have shown an almost 36 fold increase in data storage compared to the conventional Compact Discs of the same size. The conventional electron beam lithography used for making electronic devices at the nanoscale maybe someday replaced by an optical nanofabrication technique which is diffraction limited that is the minimum feature size depends on the wavelength of light used. Optical techniques are faster, portable and enable us to design 3D free standing structures like nanowires.

Energy & Communication

With the need for better renewable sources of energy, solar cells have demonstrated their mettle. Newer and

newer designs based on bandgap engineering allow us to utilise the solar spectrum in the most efficient way and in the process avoiding damage to the cell. Moreover, detailed study of photosynthesis and light-matter interactions may someday allow us to fabricate the most efficient energy harvesting devices. This will help us solve our energy crisis and up to some extent thwart deterioration of our environment. Trapping solar energy in space and wirelessly transporting it to earth using lasers has also been proposed by NASA, JAXA etc. This approach is called Space-based Solar Power. We have already seen how wireless charging has made our lives hassle-free. Li-Fi (light based communication) is another idea which will give us an edge over the existing radio wave communication systems. Simple LED's could be used as transmitters in this technique. With light we have more bandwidth and we can use division multiplexing techniques to send more information over the same channel. Use of entangled photon pairs for highly secure communication is another interesting future prospect for important online transactions.

Basic Sciences and Research

Last but not the least, I personally believe that there is a lot of scope for research and development in optics and photonics. Since the development of the first laser, we have seen so much of technological advancement in this field. The interdisciplinary nature of this science is bound to amaze us in the future! In the past few years, we have seen some great advancement like self-accelerating light beams which have interesting properties like self-healing and curved trajectories. Also, a lot of research on plasmonics has allowed us to think for newer optical devices. The ability to squeeze light, slow it down, and impart angular momentum to it and the ability to cool macroscopic objects with the help of light are some of the cool applications developed in the last few decades. Who knows what these photons have in store to amaze us.

Understanding Our Universe

With time, the average person's understanding of the universe has grown, thanks to the efforts of untold numbers of scientists, researchers, engineers and others around the world. From America's first image of the moon — taken by NASA's Ranger 7 spacecraft in 1964 — to the remarkably clear pictures of Pluto's cratered, mountainous and glacial terrains — acquired by the New Horizons spacecraft within the last year — optics and photonics technologies are bringing us ever closer to the planets in our own solar system and all that lies beyond. Today, light-based technologies are helping to improve our understanding of the universe. One such technology — optical spectrometry — is playing a role. It has allowed engineers to measure the spectral content of a beam of light — specifically, how many photons of a certain color it contains. Applying this technique to astronomy, we're able to gain a formidable amount of information about the universe, for instance by measuring what elements stars and planetary atmospheres contain and at which temperature and pressure they are. Astronomy and photonics are now merging in the field of astrophotonics, which aims at using photonics to enhance astronomical instruments. This could mean that bulky free-space-coupled spectrometers may be replaced by miniaturised fiber-coupled, on-chip spectrometers. Photonics technologies also extend beyond studying planets. Advancements could ultimately determine if there is life beyond Earth but for now, there is an entire universe of information yet to be gathered and examined, and photonics is taking the front seat on the spacecraft.

Towards integrated photonics

Integrated photonics is the intersection of microelectronics and photonics. Microelectronics (design and fabrication of electronic devices, systems, and subsystems using extremely small components) has been the driver of technology and the world's

economy for several decades. Its success is a direct result of the integrated circuit where billions of electrical components (transistors, wires, resistors, capacitors, etc.) are seamlessly integrated together on silicon wafers using manufacturing processes that have followed the scaling trends of Moore's law. Photonic technologies are now at a point similar to where microelectronics was in the early 1970s—where just a relatively small number of components were tediously integrated together. By leveraging the manufacturing equipment and techniques that made microelectronics a success, it is now beginning to be possible to realise the same economies of scale to make integrated photonic circuits. Since similar manufacturing technologies are being used, photonics and electronics can be directly integrated together to make both the electronic and photonic elements of the circuits function better—not only reducing size, weight, and power but enabling entirely new applications, many of which have not been envisioned.

In order to understand how integrated photonics works, it is important to first define the broader area of photonics which is the study of the generation, manipulation, and detection of light. Light is made up of photons, similar to how electric current is made up of individual electrons. However, photons have the distinct advantage that they travel at the speed of light and don't consume any power during their propagation. For example, photons routinely travel across the entire universe (albeit after approximately 13 billion years) with just the energy required to initially produce them. Photons are also very efficient information carriers. They are electromagnetic waves (just like a radio wave) that oscillate at very high frequencies, and as a result can easily encode terabytes/second of information in their amplitude, phase, and/or polarisation. There have been many platforms for photonics over the

decades, such as fiber optic networks, where discrete components (lasers, the actual fiber optic cable that transmits light and detectors) are separately manufactured and put together. In the early 2000s the promise of silicon as an integrated photonics platform emerged. It is ideal for manufacturing since silicon wafers are also used to make the vast majority of integrated electronic circuits. Early on, though, it was not clear how well silicon would work for photonics. But after multiple breakthroughs over the past decade it's proven to excel at controlling light. Specifically, silicon is excellent at guiding light in "photonic wires," known as waveguides, because it has a very high refractive index that tightly confines light and easily supports total internal reflection—even for a ~90-degree bend. Consequently, it is possible to realise very complex integrated photonic circuits that are now rapidly growing in density. Furthermore, silicon is transparent at the same wavelengths used for fiber optics, enabling direct interfacing of silicon photonic chips with optical fibers, which is key for many applications. However, for silicon to be the integrated photonics platform of the future, it also needed the ability to generate, control, and detect light.

Silicon itself is not ideal in these roles as it is an indirect bandgap semiconductor. In contrast, many III-V semiconductors (named from the groups on the periodic table), such as gallium arsenide and indium phosphide, are direct bandgap semiconductors and can easily be made into lasers. Fortunately, it is now possible to bond or even grow III-V lasers directly onto silicon through advances in manufacturing technology. III-Vs can also be used to detect light, but the most commonly used detector material is germanium, because it is straightforward to grow on silicon and is already used to make silicon transistors operate faster while using less power. It is now possible to also actively encode information on light by combining photonics and

microelectronics. Light is Photonic Wafer: A working integrated photonic wafer made by RIT researchers. It contains thousands of integrated photonic devices including waveguides, filters, fiber-chip couplers, modulators, and more. These devices will make computers, Internet communications, and sensors operate at a much higher performance and at a much lower cost than what is available today. 8 Spring/Summer 2015 Research at RIT 9 Focus Area | Harnessing Light sensitive to the same electrons and holes that microelectronic devices excel at controlling. Specifically, free-carriers change the refractive index and absorption of silicon. As a result, by combining silicon photonic waveguides with PN diodes it is possible to change the transmission of the light electrically. These electro-optic modulator devices are now able to switch the light on/off

at staggeringly high rates of greater than 40 GigaBits/second, while using incredibly low amounts of energy of less than 1 femtoJoule and have the potential to approach the same energy used by just a few state-of-the-art transistors. With all of the key components now in place the potential of silicon photonics is enormous. In just the last few years the number of devices that have been integrated together has rapidly grown to over 10,000. The natural application of these integrated photonic circuits is high bandwidth communications, particularly since data centers are expected to consume a few percent of the entire power generated in the United States and a vast majority of that power usage is used to simply move data around. Consequently, the integration of all of the previously used discrete components onto silicon photonic chips will yield dramatic

reductions in power along with orders of magnitude improvements in bandwidth.

Challenges ahead

Challenges remain, however, with the biggest being the ability to cost effectively package photonic chips. Packaging currently accounts for most of the cost because optical fibers must be precisely positioned to the waveguides using time-consuming procedures. However, solutions based on microfabrication are now being realised and will dramatically improve packaging throughout and reliability. ■



Dr S S Verma

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Motwane renders lighting solutions

Motwane is a leading Test & Measurement company in India serving diversified customer base across various customer segments with its indigenous Research & Development (R&D) products known for quality and reliability.

Towards Motwane's efforts to provide value added assets to its customers impacting directly on their profitability with direct cost saving, automation, ease of operation, etc. and to contribute towards clean environment, the Company has developed through its own R&D efforts, a Smart Street Lighting Solutions which shall help its customers across various segments like Smart Cities, Townships & Parks, Industrial Lighting, Pathways/Highways/Roadways/Ports/Airports etc., Bridges & Tunnels, Defense/Railways etc...

This solution provides Return on Investment (ROI) within 14 months to 20 months to the customer with 50%+ reduction in energy usage and it also provides huge saving on maintenance efforts with automation of various maintenance parameters & enabling pro-active decision making, reduces big CO2 emission helping better environment etc..

The key features of the solution are as follows:

- Remote control and operation of each light pole as well as logical groups of light poles
- Preferred dimming options for additional saving
- Pre-programmed schedules and real-time management for routine and special conditions.

- Proactive and simpler maintenance supports real-time inventory management for reduced costs and improved performance
- Secure and encrypted communication at each layer of communication
- Pre-configured and freely assignable parameter like events and status for Alarms via SMS and Email alerts
- The web-based central management and control software works in conjunction with our lighting controllers provides accessibility from any browser
- Exhaustive and customised reports on various parameters of operation, performance and consumption
- Integrates with google map for pin pointing of the location
- Data backup facility at each controller so no loss of data in event of Power or Communication loss
- Availability of historical live data for 2 years and archived data for 7 years with cloud services

The smart street lighting solution is modular and can be integrated to other smart solutions for Smart city projects.

Being 100% indigenous the designed platform has capability to integrate and interface various other sensors and solutions of event based intelligent control, security and augmentation of specific features based on the unique requirements for the project. ■

Website: www.motwane.com

Balancing Artwork and Lighting

The design Oasis makes Oceana BAL Harbour glow with CHAUVET Professional. The grand opening of such an extraordinary edifice called for more than a mere ribbon cutting. Argentinian art collector, Eduardo Costantini celebrated its completion...

The new 28-story Oceana Bal Harbour condominium has elevated the art of luxury to a new level, quite literally. This is readily apparent as soon as one steps inside the gleaming understated, but elegant, structure, which is located at the northern edge of Miami Beach Island. Inside its two grand lobbies, with their 22' vaulted ceilings is a multi-million dollar collection of 10 modern art masterpieces, including the dazzling liquid gold "Pluto and Proserpina" statue by the world-renowned sculptor Jeffrey Koons.

The grand opening of such an extraordinary edifice calls for more than a mere ribbon cutting. Argentinian art collector Eduardo Costantini, who developed the \$1.3 billion sellout condo, celebrated its completion recently with an A-list event orchestrated by ACT Productions that featured star-studded

entertainment, an art show and celebrity appearances. In conjunction with this event, the exterior of the building was illuminated from lobby to rooftop by a collection of CHAUVET Professional COLORado fixtures supplied by The Design Oasis.

Abbas Ritscher of The Design Oasis said, "This was really an exciting project to be involved in, because the building itself is a work of art. Our idea with the lighting was to accent the aesthetics of the building against its beautiful five-acre setting."

To accomplish this goal, Ritscher and his team relied on COLORado 2-Quad Zoom IP and COLORado COLORride fixtures placed at the front of the building and around the side of the structure that faces the roundabout drive. The throw





distance of the COLORado fixtures made it easy to illuminate the top of the high-rise structure with even fields of colourful light.

Ritscher especially praised the wide (7.7° to 35°) zoom angle of the COLORado 2-Quad Zoom IP. He said,

“The COLORado 2-Quad Zoom IPs were invaluable, because their zoom allowed us to hit any dark areas at the top the building or zoom out and create a smooth and complete wash. Given that this program was so art centred, the exterior lighting had to be perfect in

its coverage.”

COLORado 2-Quad IP and COLORado 1-Tri Tour fixtures were also used to wash the palm trees and other foliage on the condo grounds with vividly coloured light. Ritscher said, “We used an Avolites controller on a PC to create the right colours, mainly blue and purple to complement the building and its surroundings. We limited colour changes in keeping with the understated elegance of the event. The building and its artistic sculptures remained the focus.”

The aesthetics of those sculptures was accented by uplighting from CHAUVET Professional WELL FLEX fixtures. Ritscher explained, “We positioned the uplights at strategic points around the sculptures. Our goal was to achieve a sense of balance between the lighting and the artwork itself. If I had two words for the evening, it would be ‘stylish sophistication, and I’m proud that our lighting contributed to that mood.” ■

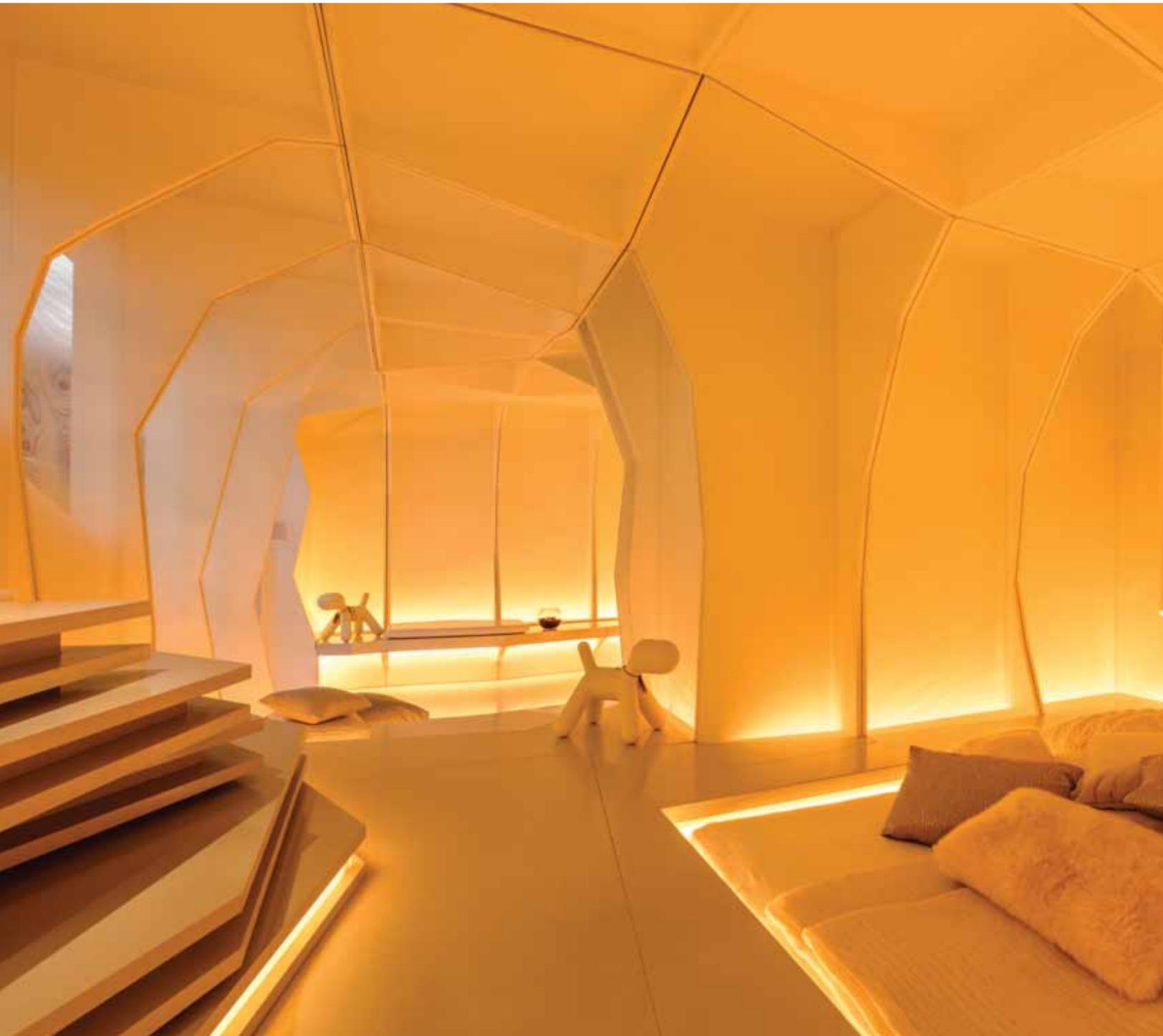


Credits

www.chauvetlighting.com

Sensation Orientated Sleep Set

Aukett Swanke interpreted the sensation orientated guest to be potentially not a high earner but one who spends a significant amount of their income on travel...



Susan Lake Lighting Design designed a lighting scheme for Aukett Swanke's Sleep Set, a conceptual hotel room for the Sleep Event, an international hotel design event held in London. The brief to Aukett Swanke for the Sleep Set was to design a space for a 'Sensation Orientated' guest. This type of guest or 'tribe' was identified by research carried out by the Sinus Institute in Germany, which recognised alternative customer segmentation based on lifestyle and values as opposed to income and age



group. Aukett Swanke interpreted the sensation orientated guest to be potentially not a high earner but one who spends a significant amount of their income on travel.

The perception is that the Sensation Orientated guest identifies closely with subcultures and tends to travel, usually in a group, to undertake alternative activities such as adventure sports, music festivals and other large experience-driven events. The sensation orientated guest considers travel to be their real life, not an escape from it. But for them, the room itself becomes an escape and a completely immersive experience.

In addition to a sleeping and bathroom area, a third space has been created as a social space, where people can congregate within the room. To create this Aukett Swanke based the design on ideas of landscaping, terracing and amphitheatres to create a

stage within the room to allow the guest to themselves create a 'performance' within the room through their own interaction with it.

The lighting scheme is based on the concept of creating the "immersive experience" for the guest. This has been achieved by developing a unified lighting and interior design scheme, in which the lighting compliments and emphasises the form of the space whilst creating an inviting and relaxing environment for the guest.

Lighting has a significant impact on our sensory perception of a space for the simple reason that we have more sensory receptors in our eyes than in any other part of our body. And this impact becomes evident just by raising or lowering the brightness levels in any space we are occupying. In order to achieve a soft, engulfing environment the lighting has been integrated into the

interior details to conceal the light source allowing only the light effect to be visible. This creates a subtle and considered design that allows the guest's visual sense to fully immerse in their surroundings without any disturbance from glare. Throughout the bedroom and social space linear LED has been integrated into the wall cavity at floor level to wash light up the walls. All of the walls in the room consist of two layers of a fine mesh which appears slightly transparent at close proximity, and more opaque from further away. This fluidity and constantly changing effect created by the moiré patterns generated by the two layers of mesh, allows your visual perception of the wall surface to change as you change your viewing position within the room. The concealed linear LED lighting within the depth of the wall, transforms the layers of mesh from a simple finish into an interactive experience.

A slightly brighter environment has been created in the social area, with linear LED concealed under the bench to cast light onto the floor, whilst the bedroom area is darker and more intimate. Through the use of an indirect linear LED creating a soft halo of light around the perimeter of the sunken bed, the bed itself becomes a feature which allows the guest to feel cocooned and embraced with light, whilst thin bedside pendants symbolise icicles dripping down from the roof of a cave.

The steps from the social space to the bedroom continue to form a sculptural multifunctional piece of furniture taking inspiration from rock formations in the landscape. This concept was reinforced by the use of lighting. Linear LED lighting was integrated into the steps and under the furniture piece to create glowing panels in between the dark edges of the staggered floor planes.

To further enhance their experience, the guest can actually control the lighting to create different light scenes appropriate to the time of day. The controls allow them to adjust the different layers of light to suit their mood, like creating a fresh environment in the morning and a warm environment in the evening. But beyond being able to create mood lighting, the guest can also change the colour of the artificial lighting to mimic daylight, allowing their visual sense to adjust to a new time zone if they have travelled internationally. This technology can be used by the guest to alter their circadian rhythm by, for instance, matching the colour of the lighting to the daylight at the hotel's location or matching the light to the daylight of the time zone they have travelled from, which can help to reduce their jetlag.

In the bathroom, the focus has been on highlighting the different finishes





and feel, creating a contrasting experience to the main space lighting. This allows the guest to become absorbed in another immersive environment. The jewel-like cave inspired bathroom with reflective faceted walls and reflective ceiling and floor creates a kaleidoscopic effect, emphasised with the use of small delicate point source lighting which reflects on all the surrounding surfaces amplifying the jewel cave concept.

The success of the scheme is down to a true collaboration between Susan Lake Lighting Design and Aukett Swanke. Through this collaboration, SLLD was able to create a lighting design that perfectly demonstrates how light itself has the ability to totally transform the atmosphere of the space it is illuminating. ■

Credits

Susan Lake Lighting Design

ERCO Rolls Out New Compar Range Of Recessed Luminaires

ERCO has developed the new Compar range of recessed luminaires with a striking linear design that delivers light distributions previously restricted to round or square ceiling apertures. As a result, Compar adds to the design options in typical recessed lighting applications

such as foyers, circulation areas or conference rooms in administration buildings, restaurants or galleries whilst also meeting every ergonomic requirement for perfectly efficient lighting solutions in the office environment.

The Compar range of recessed lighting tools is able to



implement differentiated lighting concepts in projects requiring a variety of functions and uses. For example, in a large office building areas such as the prestigious foyer, the lift lobby and corridors or the company restaurant need different lighting to the auditorium, conference rooms or shared offices. With its sleek linear aesthetic and integrated technology, Compar offers a wide range of lumen packages with variable distribution options and design details, providing the right lighting tool for every scenario. The result is an economic, creative lighting design



based on a reliable and efficient concept.

Slim design with five light distributions

The ERCO luminaire system builds on a modular concept defined by specific parameters creating a logical system that gives the designer flexibility in the combination of different ERCO luminaires. Taking the same approach, Compar is available in the three lengths 120mm, 210mm and 390mm, with a width of just 62mm, each with twice as many LED lenses – and double the luminous flux – as the previous one, and in two wattages, resulting in six outputs from 630lm to a powerful 4920lm for high illuminances particularly in high rooms.

Extremely efficient lenses specially developed by ERCO shape the light of the LED modules into the rotationally symmetrical light distributions wide flood and extra wide flood, the asymmetrical light distribution wallwash for uniform vertical illuminance, and the two axially symmetrical distributions oval flood and oval wide flood. The new oval wide flood answers the stringent standards of workplace lighting.

Ergonomic office lighting in a striking linear design

In contrast to the oval flood lens which is designed in true alignment with the luminaire for the efficient illumination of corridors, ERCO has developed the new oval wide flood distribution particularly for office workplaces. A single Compar luminaire with oval wide flood distribution provides ergonomic light of superior standard for up to four workplaces. Achieving superbly uniform illumination with cylindrical illuminances of 175lx, and 300lx or 500lx on the work surface, as well as a UGR < 19, the new oval wide flood lens meets the requirements of EN 12464-1 for office workplaces. The extra wide flood lens, meanwhile, allows the luminaires in areas such as circulation zones or



foyers to be spaced unusually far apart – saving both investment and operating costs.

Details that make the difference

The downlight characteristics of Compar are complemented by the powerful lens wallwashers adding vertical illuminance as an essential component of perception-orientated lighting design in a linear system. With a recess depth of 100mm, the aluminium housing is quick and easy to install. Compar recessed luminaires are supplied with a covered mounting detail. Flush mounting frames are available as accessories, as are louvres in silver or black to enable Compar to blend with the architecture and ceiling design. Light colours include warm white (3000K) and neutral white (4000K), with control gear options covering switchable, phase dimmable and DALI versions.

Offering a set of tools for a wide variety of lighting solutions, Compar presents itself as the new powerhouse for linear aesthetics in the ERCO product range – making it a welcome alternative to round and square downlights in recessed lighting concepts and to conventional linear luminaires and fluorescent lamps for the illumination of workplaces. ■



Credits

www.erco.com

Enhance more Business Opportunities for Industry to Shine

Findings indicated that LED and related green lighting products (as chosen by 40% of respondents) continue to be viewed as the category with highest growth potential in 2017...



Last Year's Fair

The 9th edition of HKTDC Hong Kong International Lighting Fair (Spring Edition) will be staged from 6 to 9 April 2017 at the Hong Kong Convention and Exhibition Centre. Around 1,300 exhibitors are expected to join the fair, offering global buyers a one-stop sourcing platform for all finished products, parts and components.

LED Lighting and Smart Technology Continues to Drive the Industry

HKTDC Research conducted a survey on prospects for the lighting market at the end of 2016. Findings indicated that LED and related green lighting products (as chosen by 40% of respondents) continue to be viewed as the category with highest growth potential in 2017. In terms of LED product

applications, respondents believed that indoor household lighting (32%) and smart lighting systems (21%) will see the largest increase in the coming two years. As regards to future development, the majority of the respondents (84%) indicated that smart technology will drive the evolution of the lighting industry over the next two years.

Various Thematic Zones for Easy Sourcing

With energy efficiency being one of the significant trends in the global lighting industry, LED & Green Lighting zone continues to be the highlighted zone, featuring both functional and decorative LEDs and Green Lighting products.

The lighting industry is actively developing smart lighting technologies and products in response to the development of 'smart city and smart home' driven by the Internet of Things.

In order to cater market demand, the inaugural Smart Lighting & Solutions zone is established this year, showcasing state-of-the-art lighting systems, remote control and smart lighting products. Furthermore, the inaugural Startup Zone is set up for young designers and startup to showcase their original ideas and new concepts, as well as to communicate with global industry players.

Another highlighted zone, Hall of Aurora provides an elegant and extraordinary setting for top-notch branded collections of lighting fixtures. Interior designers and architects, as well as fashion-forward retailers can find high quality and trendy lighting products in the zone. Leading brands taking part in the zone include Viribright, Forest Lighting, Jaykal, SKY-LIGHTING and many more.

Avenue of Chandeliers spotlights glittering and splendid



HKTDC 2016



HKTDC 2016

chandelier collections. Chandeliers in both modern and traditional styles are having a fashion resurgence, which is desirable to interior decorators and stylists, also contractors outfitting hotels, restaurants, shopping malls and other development. And World of Professional & Industrial Lighting will cover a broad range of situation-specific lighting, including lighting for warehousing, stadiums and other commercial purposes, safety lighting and emergency lighting. Other product zones include Advertising Display Lighting, Commercial Lighting, Outdoor Lighting and Lighting Accessories, Parts & Components, etc.

Enlightening Events

Different seminars and buyer forums are organised to keep traders abreast of the latest market information. Co-organised with the Hong Kong Institution of Engineers - Electronics Division and Hong Kong Electronics & Technologies Association, the Asian Lighting Forum covers subjects such as global market trends and applications of smart lighting. In a range of informative events, buyers will share market insights at forums on business opportunities in different markets, and industry representatives will give the latest update on lighting design trends.

The 10th Hong Kong Lighting Design Competition organised by HKTDC returns. The theme of this year's competition is 'Blooming Aura', which aims to stimulate participants' innovation and demonstrate the feeling of liveliness and vibrancy brought about by blooming lights. The Hong Kong Lighting Design Competition Award Presentation Ceremony will be held on Day 1 (6 April) of the fair and all winners' and finalists' works will be showcased at Hall 1C Concourse during the fair period.

Following HKTDC Hong Kong International Lighting Fair (Spring Edition), two fairs will also be held on 13 - 16 April 2017 concurrently: HKTDC Hong Kong Electronics Fair (Spring Edition), Asia's largest electronics fair, to showcase the latest consumer electronics; and HKTDC International ICT Expo, which offers the newest enterprise solutions, retail technologies, mobile applications, cloud computing solutions, telecommunications and network products for all businesses. ■



SKY LIGHTING stall 2016

For further information, please log on to: www.hktdc.com/hklightingfaire

1,639,265 Street Lights Replaced with Led Bulbs

Prime Minister Narendra Modi had launched the Street Lighting National Programme (SLNP) on 5th January, 2015 to attain significant savings by promoting LED based lighting. The scheme is being implemented by Energy Efficiency Services Limited (EESL), a joint venture company of four Public Sector Undertakings under the Ministry of Power. There is no element of Government of India subsidy in the scheme. EESL has evolved a service model to enable municipalities to replace conventional lights with LEDs at no upfront cost. The resultant reduction in Energy and maintenance cost of the municipality is used to repay EESL

over a period of time. The target is to install 3.5 crore LED streets.

Lights in all the Urban Local Bodies (ULBs) of the country by March, 2019, which will result in avoided capacity generation of 1500 MW and save 9 billion KWh per year.

Recently, Piyush Goyal, Minister of State (IC) for Power, Coal, New & Renewable Energy and Mines in a written reply to a question in Rajya Sabha stated that 1,639,265 street bulbs have been replaced with LED Lights throughout the country under Street Lighting National Programme (SLNP).

The details are as follows:

State/UT-wise details regarding number of street lights replaced by LED lamps under SLNP Programme:

State/UT	No. of LED street lights
Andhra Pradesh	575,625
Bihar	150
Delhi	226,718
Himachal Pradesh	12,681
Kerala	9,707
Maharashtra	24,154
Puducherry	300
Rajasthan	593,523
Telangana	2,671
Tripura	36,789
Uttar Pradesh	41,646
Assam	4,798
Gujarat	44,147
Jharkhand	2,800
Madhya Pradesh	9,407
Punjab	3,682
West Bengal	300
Jammu & Kashmir	700
Uttarakhand	500
Goa	48,306
Chhattisgarh	661
Total	1,639,265

Aura Light's UltiLED lives longer

The Swedish lighting company Aura Light is well known for its light sources with long lifetime and high quality. The Swedish made LED tube, Aura UltiLED Long Life, has a guaranteed lifetime of 58,000 hours. After additional testing the company confirms an even longer lifetime expectancy of this particular LED light source. The tests show a theoretical lifetime of up to 147 000 hours, equivalent to almost 17 years of non-stop burning light.

The first generation of the LED light source, Aura UltiLED Long Life, was launched in 2012, leading the way for modular and energy efficient, high quality LED light sources. Recent testing indicates that this particular high quality LED tube has very low lumen depreciation, exceeding the guaranteed lifetime by 150 %.

Aura UltiLED Long Life has a lumen depreciation of only 7, 8 % after 42,000 actual testing hours. The modularity capability means that the whole luminaire does not need to be discarded at upgrades and replacements. The LED light source is not a retrofit tube but is designed for new LED luminaires systems without replacing the entire luminaire. The Aura UltiLED Long Life range has excellent thermal and electrical design, making it highly suitable for car parks, refrigeration, offices, supermarkets, retail and signage. The light source provides high efficiency, up to 153 lm/W and high light output up to 4900 lm. The diffused glass offers soft and even light with a fluorescent look, resulting in minimal light loss. ■

Email: www.auralight.com



Kichler introduces New Décor Ceiling Fan Line in 2017

Kichler, a company well known for its innovative lighting, introduces a new Décor Line to its ceiling fan collection. The new category provides designer inspired looks with options in a variety of finishes and blade sweeps, offering unprecedented style and dramatic effect.

The new Décor Line includes six featured products that showcase Kichler's on-trend designs and promote the energy efficiency and performance that customers have come to expect from Kichler.

Inspired by a stirring whirlwind, the sleek design of Spyra features spirals that encompass the light kit and spin with the blades. Featuring origami blade shape and jagged edges, Jade makes a distinct style statement. Bisc is the perfect addition to modern, minimalist design themes. Voya's modern airplane design boasts horizontal layers of acrylic disks that allow light to flow through the multiple layers.

Industrial inspiration is updated with the transformative design of Xety. With an exposed motor and framed blade design, this 56" fan includes an integrated LED light that can be positioned up to 30 degrees in two directions.

The smooth, sweeping contour of Flyy is inspired by the wings of nature. With a 60" sweep, the blades feature a painted woodgrain finish. Flyy is damp rated and includes an integrated LED light and light cap. ■



Website: www.kichler.com

Nora Lighting reveals its New LED Track Light with Adjustable Beam

Nora Lighting introduces the industry's first LED track fixture with a completely adjustable beam spread. The new Nora LED Flex Beam features precise beam control from 14° to 40° in a single fixture.

The flexible fixture is designed with a unique, telescoping die-cast aluminium shroud that glides forward and back to adjust the beam spread from a narrow spot to a flood. Beam spread indicators on the side of the shroud make it easy to vary the beam for precise, consistent illumination and desired lighting effect.

The LED Flex Beam can also be tilted and offers 350° rotation and 90° vertical movement.

This energy-efficient fixture features a 25-watt Bridgelux LED behind a spherical optical lens. Colour temperatures include 2700K (with 1650 lumen output); 3000K (1800 lumen output); and 4000K (2000 lumen output) at 80 CRI. Additionally, the Nora Flex Beam can be specified with a "J" or "L" adaptor for use in "J" or "L" track systems.

Nora Lighting has been at the forefront of the development of LED lighting fixtures for residential and commercial installations. The company has recently introduced the Diamond Series of LED retrofit downlights, LED track and rail fixtures, LED linear lightbars, LED puck lights, LED high-output and RGB tape lights, LED pendants, LED step lights and LED emergency and exit signs. ■

Website: www.noralighting.com



NTL Lemnis adds another innovation to its portfolio

NNTL Lemnis, a well known LED Lighting solutions company has added another innovative product Pharox Apollo Retrofit LED bulb (18W) to its product portfolio. This innovative product is an ideal replacement of CFLs and ICLs bulbs that are used in various places in residences like Living Room, Common hall, Kitchen, etc. Pharox Apollo Retrofit LED bulb can be replaced in the existing bulb holders without any hassle.

The Pharox Apollo Retrofit 18W LED bulb is made of Polycarbonate and over molded plastic which ensures reliability and durability. It's clear illumination capacity and a superior heat sink helps in proper heat dissipation. This bulb is aesthetically pleasing with pure white colour and provides bright and clear light without any fluctuation and flickering. It has a colour temperature of 6500 K and a light output lumen of 1800lm/W.

The product will be available across India at the MRP of Rs. 495 for 18W.

The other features of the product include:

- Luminescence: Light output of 1800 lumens for 18W,
- Colour Temperature: Cool Daylight (6500K),
- Beam Angle: >120°
- Product Lifetime: Up to 25,000 hrs



Email: www.ntlelectronics.com

Shuffle of Schröder gets recognised

Schröder has been recognised as a global leader in LED lighting solutions by one of the most important and influential bodies for companies involved with lighting equipment on UK highways: the Highway Electrical Association (HEA).

The 'Shuffle by Schröder' - a smart, interactive lighting column designed to encourage social connectivity in towns and cities - was awarded 'Product of the Year' at the HEA Awards 2016.

The Shuffle goes far beyond professional lighting; One curved, multi-functional column integrates a range of connected features including loudspeakers, CCTV, night vision, wireless internet, electric vehicle (EV) charging and visual guidance.

The HEA Awards recognise the very best organisations, employees and initiatives in the highway electrical sector. Celebrating excellence from the industry's top performers, the Awards recognise the valuable contribution made by the HEA member employees who are bringing new lighting technology to life in the UK.

The key features are as follows:

- Multiple configurations with up to 5 modules per column
- Total versatility with 360° rotatable modules
- 6 different lighting modules for a variety of solutions (360° lighting, 180° reflector, 180° LensoFlex2, 180° spot, luminaire bracket and light ring)
- Modules with beyond light features (CCTV camera, loudspeaker, WLAN, EV charger)
- Multiple photometric engines like LensoFlex2, reflectors and Refractor Lighting technology
- Designed to incorporate Owllet range of control solutions, photocell and presence detection sensors
- ThermiX: withstands high temperatures (Ta 55°C)



Website: www.schreder.com

Chelsom introduces an innovative wall light

LED Dock Combination by Chelsom is a slender hotel guest room or ship cabin wall light ideal for the bedside with main room illumination from within the fabric shade.

A warm white LED reading light is housed within a cylindrical head that swivels 90 degrees and 'docks' into a semi recessed backplate. The innovative wall light also features a USB charging port which remains powered even when the lights are switched off.

LED Dock Combination is available in two standard finishes including Polished Chrome and an industrially inspired Black Bronze finish.

Website: www.chelsom.co.uk



MEGAMAN unveils New RICO LED Downlight

MEGAMAN, a well known LED lighting solution provider, launches a new series to its RICO LED downlight at the Hong Kong International Lighting Fair (Autumn Edition) 2016. The ultra slim RICO HR series features the ground-breaking Hybrid Reflector and U-DIM Technology for excellent beam control and compatibility with external dimmers.

Designed to be an environmental-friendly replacement for halogen MR16 and GU10 downlights, the RICO HR series with a height of only 30mm is ideal for any ceiling recess with a limited depth. The Hybrid Reflector LEDs combine the best features of MEGAMAN's popular faceted reflector range with the total internal reflection of its optical reflector to provide a solution that performs even better than competing LED technologies. This technology enables it to deliver excellent beam control in directional lamps, optical efficacy and less spill light. It is suitable for small cabinets and furniture lighting where space is severely restricted.

The new RICO HR LED downlights also incorporate MEGAMAN's U-DIM technology, ensuring maximum compatibility with the majority of both leading-edge and trailing-edge conventional dimmers at a dimming range of 100% to 5%.

Available in 6.5W (up to 500lm) and 9W (900lm) options, 2800K and 4000K colour temperatures and with 50,000-hour lamp life, the 36° beam angled RICO HR LED downlight is IP44 rated, making it suitable for humid indoor areas or outdoors where water may drop or flow against the bulb or fixture.

A 9W Rich Colour option is also available and is ideal for those looking to maximise the richness and quality of colours of objects on display with high colour rendering of up to Ra95.

The ultra slim size of RICO HR LED downlight allows for minimum storage and transportation costs, making it an obvious choice for modern-day lighting professionals and consumers. ■



Website: www.megaman.cc

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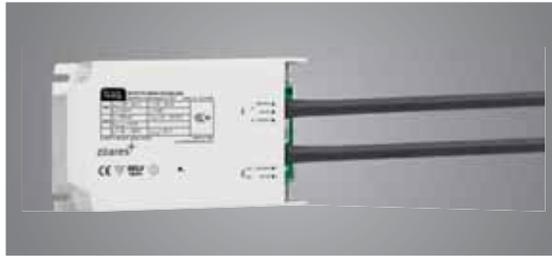
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PCS - LW - 9W - 15W ; 250mA - 700mA



Applications :



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