VOL.3 Issue 1

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IllumiNation

JAN - MAR 2021

THE LIGHTING MAGAZINE

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[1]Fluence (UV Dose) Required to Achieve Incremental Log Inactivation of Bacteria, Protozoa, Viruses and Algae Revised, updated and expanded by Adel Haji Malayeri, Madjid Mohseni, Bill Cairns and James R. Bolton. With earlier contributions by Gabriel Chevrefils (2006) and Eric Caron (2006) With peer review by Benoit Barbeau, Harold Wright (1999) and Karl G. Linden

CONTENTS

IllumiNation

VOL.3 Issue 1, JAN - MAR 2021

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New Normal in the New Year

How time flies! Another year has passed and now it is time to say Happy New year to all you readers again! The year 2020 has seen many noteworthy events. ELCOMA completed 50 years of its existence and our magazine, Illumination, has completed two years. The past year also saw the emergence of COVID19 that caused a great amount of disruption in our lives along with pain and suffering for multitudes of humanity. While there is a glimmer of hope with the anticipation of a COVID vaccine being available soon, I hope and pray that all returns to normal in a few months.

Though ELCOMA's 50 years celebration could not be celebrated as planned, it has only been deferred and not cancelled. Like many events globally, this event will also be held, upon the first opportunity being available.

This new year is also the time for us to take a look back at what we have done with this magazine, introspect on what we have achieved in the last 2 years and review our magazine format and contents and make some improvements. From this issue of IllumiNation, we have changed the look and feel and revamped the magazine design and its contents. We will also be including technical papers from around the world within this publication and have already tied up with International Solid State Lighting Association (ISA) for presenting various research papers on new and emerging technology. Any feedback and suggestions on these changes would be greatly appreciated.

I hope that the celebrations of the New Year, held this time amid the COVID19 pandemic, will bring cheers to the industry for a happy and prosperous 2021. I would like to take this wonderful opportunity to send my warmest greetings to all of you with the hope that things will be back to "normal" soon. In particular, I would like to send my best wishes to all ELCOMA members and to the Illumination Editorial Board who have worked extremely hard to manage the contents, reviews, editing and submissions for this magazine. My greetings also go to all other readers and contributors of the magazine for their great help in enhancing the value of the magazine with their contributions and feedback.

With best wishes

SHYAM SUJAN
Secretary General
Electric Lamp and Component Manufacturers Association of India (ELCOMA)

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New Beginnings

Happy New Year to all readers! Wishing 2021 to be healthy, prosperous, and peaceful for all.

We launched the IllumiNation magazine in October, 2018; with the editorial team, since then sharing the latest updates in the Lighting Industry. We sincerely thank the support extended by the community, by featuring advertisements as well as helping with regular content.

With great pleasure and humility, I would like to thank the members for choosing the new board and appointing me as the President of the board in the 50th year of ELCOMA and I extend my heartfelt gratitude to all my senior colleagues and the predecessors who made ELCOMA a force to reckon with. We look forward to your continued support and active participation in the activities of ELCOMA with suggestions and constructive criticism, as we attempt to learn the ropes and succeed in this challenging task.

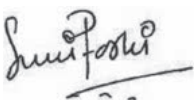
As the world has been dealing with the spiralling effects of the pandemic, the lighting industry also suffered a minor setback in the initial days, due to the complete lockdown situation enforced across the country. However, with the markets opening and consumer demand increasing, I believe the worst is behind us and the lighting industry is coming back stronger. Our industry has become a driving force and accelerator for many innovations and breakthroughs and is witnessing some of the most astounding transformations with UV-C disinfection technology; and digitization with technologies like IoT, bio adaptive lighting, motion sensors, etc.

Lighting Industry in India, predominantly manufactured most products in India for more than 70 years. The advent of LED technology completely transformed the lighting industry, but in the urgency to proliferate LED into households at a fast pace, with government support, we had to rely on imported components. However, as LED technology stabilizes, we are working towards ECLOMA's age old intent of making in India. To further fast-track our mission, Vision 2024 has been prepared for making maximum components in India and exploring the possibility of exporting products and services contributing to about 40% of Lighting Industry's turnover. With the government also supporting- Vocal for Local & the recent announcement of production-linked incentive (PLI) scheme, offering sops to boost up manufacturing in India which includes large scale manufacturing of various finished goods as well as components; ELCOMA is working with various ministries to create an eco-system for local manufacturing, as some of electronic components in lighting industry, are still being imported. With this, more manufacturers will have the resources to align in-house manufacturing and reduce dependence on importing components.

With the help of ELCOMA members, I am confident we will be able to achieve our mission. The knowledge base of my colleagues will go a long way for the new committee to fulfil the mandate to execute various wishful programs, with a vision to promote Make in India and export locally manufactured products.

The past 50 years have been an amazing journey for us. With IllumiNation, our focus will continue to be keeping in touch with our members regularly, understanding their requirements and extending our assistance, whenever it is required. Whatever the future holds, be assured that ELCOMA will continue to strive towards excellence!

With best wishes,



SUMIT PADMAKAR JOSHI
President, ELCOMA

Indian Lighting Industry gets recognization by International Solid State Lighting Alliance (ISA)

ELCOMA gets award for being the outstanding partner of ISA International cooperation during the 10th anniversary celebration.

Shyam Sujan, Secretory General of ELCOMA and Gulshan Aghi, Consultant Lighting have been recognized as Distinguished members of ISA Council of management

Dr. Avinash D. Kulkarni, CMD Litex Electricals Pvt. Ltd. Was recognized as Distinguished Founding Member of ISA

ELCOMA's past advisor Late Mr. Hari. S. Mamak was recognized as the Distinguished member of Board of Advisors.

Lighting is Moving Beyond Illumination

Prag Bhatnagar, Senior Vice President & SBU Head, Havells India Ltd talks to IllumiNation about how his organization is planning to conquer the future

What is the Roadmap for Lighting business at Havells India, given that the company is also a leading player in electrical appliances?

Lighting business continues to be a major revenue contributor for Havells. As the biggest only pure play LED technology provider for residential and commercial markets, we are rapidly adding market share with our customer centric innovations. Well supported by a state-of-the-art factory and cutting edge IoT R&D facilities located at Noida and Bangalore, we are perceived as one of the biggest innovators of LED and IoT products in this space. Being one of most loved Fast-Moving Electrical Goods (FMEG) brand coupled with a strong dealer and distribution channel helps us delight our customers with these new Made-in-India and Make-for-India innovations.

As Lighting technology innovators and solution providers, our products are not only energy efficient and IoT connected but also deliver well-being and safety across product categories. We will continue to focus on the customer needs for launching our innovative lighting solutions across all application segments and geographies.

We believe our competitive differentiation is also delivered through our strong unique customer connect approach, most-experienced and well-trained solutions selling team and our broad-based service network that ensures complete peace-of-mind to our consumers.

"All business ordering is now happening digitally by our channel partners – even a Rural retailer can place an order and can see scheme settlement through a mobile application"

How has Havells been able to cope up with the difficulties faced by the industry during COVID19?

Employee holistic well-being took center stage during this pandemic. As the leadership team, we engaged our employees via various digital modes of communication and assured full support to them during these trying times. We have been conducting regular Town hall meetings and wellness engagement programs for our staff and our teams are continuously staying in touch with our dealers and distributors to dispel their fears. Our factories have resumed operations with strong compliance on hygiene and social distancing. Offices are being operated on a rotational basis to ensure maximum safety of employees and we are striving to fulfil consumer demand through effective production and supply chain process.

The 'new normal' has accelerated the use of IT applications to resume business operations within the teams and customers. For example, we launched an Artificial Intelligence and Computer Vision powered video analytics monitoring system that issues an alert to a factory and office administrator when anyone is at a less than the desired distance from another colleague.

Strong and latest IT infrastructure has provided seamless working environment to our employees for conducting internal and external meetings. All business ordering is now happening digitally by our channel partners – even a Rural retailer can place an order and can see scheme settlement through a mobile application.

Now that COVID-19 has still not been contained, how do you see the markets emerging? What different strategies are required to be taken to face the retail market?

Even though the pandemic has not yet been contained, consumer behavior has adopted the new normal considerably. There has been a huge shift towards an increasing trend of digitally savvy shopping behavior by urban customers. Upcountry and Rural markets are coming back to normal faster. Demand drivers are clearly indicating upward movement in consumption pattern. Few B2B customer segments are lagging in recovery but with government stimulus and reviving demand, we expect Capex cycle to revive soon in these specific segments.

To make products available and keeping consumer in the center of all activities, we launched online to offline program, a program that merges the best of both worlds i.e. technology and execution at the local level. As the consumers are unwilling to step out and staff is concerned about sales, this model offers a solution to both. The program facilitates finding products and paying online from the comfort of home and hyperlocal commerce i.e. execution/delivery at an unbelievable fast pace by local channel partners at the consumer's place of choice.

There is a recent government initiative promoting 'Atmanirbhar' industry and ELCOMA's is also promoting local manufacturing of maximum components. How is Havells participating in this initiative?

The Government programs are supporting make-in-India program with a new vigour. Havells has always been a strong believer of India's manufacturing and R&D capabilities. We have been investing heavily and have set-up our own world class and world scale manufacturing in the last 20 years. We were the pioneers in setting up a state-of-the-art-lighting manufacturing facility in India for local and export markets when China was supplying 60% of the lighting to the world and we unequivocally support ELCOMA's initiative.

However, we have to recognise that for

component manufacturing ecosystem to thrive the five M's (Man, Material, Machines, Methods and Money) are critical. Havells fortunately has all of these. What we need is other like-minded players also to accelerate this process and partner with Government to formulate policy framework and facilitate the transformation to make India a global supply hub. We look forward to the Government to incentivize the Private sector units like us. ELCOMA's facilitator role will be critical in this regard.

Now that many global countries are looking at alternative present China supplies, and India stands a good chance to be able to win export market, are you prepared for this market? What plans have been charted to achieve this and in what time period?

We have one of the biggest state-of-the-art manufacturing set up and world class R&D facilities to leverage this opportunity. We have more than 15 years of experience of catering to the Export market and our Sylvania experience is a differentiator which positions us uniquely. Our manufacturing plants are well equipped to serve any export order and as an organization we have a mindset of scalability that coupled with world class quality systems have delivered growth in past many years. Our export order bank is growing consistently. Any global major shifting operations and looking to source from India can be assured of the same stringent quality and standards. As a responsible Company, our sustainability journey is clear and defined. We have become India's first FMEG Company to achieve 'Water Positive' status duly verified by SGS, a renowned Environment, Health and Safety auditor.

How is Havells addressing the Institutional Sales space? Are government and other large projects a big part of your portfolio?

As per one of the business reports, around 45% of the Indian lighting market potential is in B2B segments. Traditionally Havells has been a preferred brand amongst the B2B customers due to its strong cables and industrial businesses. Similarly, the Sylvania acquisition helped Havells in establishing and strengthening its Lighting business a couple of decades ago. With strong R&D and innovative IoT integrated LED technology we are gaining share across various segments over past few years. We have also partnered in many large projects launched under Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Heritage City Development and Augmentation Yojana (HRIDAY), Smart Cities Mission, Clean India Mission and R-Urban Mission. We have supplied more than one hundred and five thousand lights at Ludhiana and more than one hundred thousand lights at South Delhi Municipal corporations. Similarly, Ports Highways and Railways comprises important milestone in our growth journey. We are launching new ranges and are fully geared up to scale this business with the latest technology and be seen by our customers as the most preferred solution partner for their Lighting needs.

What kind of product portfolio are you planning in the Connected Lighting / Intelligent lighting space?

Today we are ahead of our peers in terms of thought leadership and actions to educate the consumers that Lighting is beyond illumination and efficiency. We at Havells are taking concrete steps to develop the next generation design ranges ensuring the well-being and safety of our customers and integrating digital in all our solutions as an offering. We are having a unique position of end-to-end integration of value chain to deliver seamless experience digitally as consumers are now graduating to connected life. In B2B space, Predictive Maintenance with AI (Model-Based Approach) is integrated as a standard in our Connected lighting platforms. When we started our journey on Smart Spaces, we found that there were several customer pain points in the currently available IoT products. A really Smart Ecosystem was missing as individual products were relying on specific software and hardware with low compatibility with other gadgets. Also we learnt that most of these products were invariably imported and thus not suited to Indian conditions. We therefore developed a unique Made-in-India and Made-for-India Gateway which includes firmware and software addressing this customer issue.

We are clearly witnessing wide acceptance of such customer insights based features of innovations. For Example, Havells LitM™ IoT enabled smart city lighting management system is taking a further step to play the role of the solution provider too. Havells LitM™ in a short span of time has gained wide acceptance by clients, consultants and end users alike. We have many case studies in Campus lighting, Industrial lighting and also in a very large way in indoor Smart lighting using LitM™ platforms. Our ongoing project at Faridabad smart city uses a Digital Controller inside each light that will prevent unexpected failure by controlling its power in any unexpected environmental or external conditions. Operational efficiency by automatic fault/alarm monitoring, prediction and proactive maintenance further increases the lifetime value of our offerings.

Do you believe that Human Centric Lighting has a market in India? In the future where do you see HCL applications being used?

Human health and productivity are at the heart of human-centric lighting (HCL) and it aims to create a work environment that is in harmony with our body's

internal clock, also called the circadian rhythm. At Havells we have initiated a campaign “From energy efficiency to Human efficiency”. Ignoring HCL results in disrupting one's natural system, resulting in health and behavioral issues, and thus declined productivity. As Health is gaining prominence, Human Centric Lighting market looks promising. Smart offices were first to pick up this trend and now smart homes are also evolving. It is important to remember that we need blue light first thing in the morning to shut off your melatonin production. As it is an important part of our circadian rhythm, we should also seek to reduce our exposure to blue light after 7 PM when the sun naturally begins to set. These small adjustments to our daily routine and sleeping area can go a long way toward ensuring an uninterrupted, restful night of sleep — leading to better health.

Would you like to comment on how the last few decades have changed the lighting industry and approach to business in India?

With in a few years due to accelerated LED adoption, India has leapfrogged into largely LED technology market from a dominant conventional lighting market. Government is further accelerating this movement – as energy prices are going up consistently, in the near future entire market will be converted to LED source market. Rapid urbanization and increasing role of interior designers is impacting the way consumers are interacting with lighting products.

In B2B spaces, the role of lighting products has moved beyond giving illumination and just delivering efficiency. With 5G, next generation change will be driven in the digital space and connected offices and homes will pick pace. Consumption data will be of immense importance and IoT devices will further trigger next level of changes. There will be need to enhance the ability of smart lighting systems to effectively react to the surrounding conditions. According to the report 'Smart Lighting Market in India 2019', the smart lighting industry in India was valued at INR 7.63 billion in 2018 and is expected to reach INR 80.56 billion by 2026, growing at a CAGR of ~48.87% during the forecast period. The focus will need to be on real time personalization combining individual consumer behavior and past data to build enriched user profiles.

In view of e-commerce entering the retail space quickly, the Indian consumer behavior in the last decade or so is changing. How has this effected your product portfolio and sales channel?

Consumer behavior is undergoing a transformation since the COVID-19 crisis has begun and businesses across categories are engaging them online to fulfill demand. E-commerce ordering has increased rapidly and Havells is well placed to fulfill customer needs. We have a strong presence in E-Commerce space and are one of the leading digitally enabled companies in this space.

Apart from this, Havells launched Light Line program where a consumer can approach Havells' experts and get expert advice digitally – it is coupled with an Online to Offline program to ensure servicing the customers digitally. As the consumers are unwilling to step out of their homes and want to upgrade the interiors with best of the Lighting experience, this program offers a solution to digitally advise, connect and service their needs.

It is estimated that a large quantity of lighting products being sold in India are non-compliant products. How does this impact Havells and what kind of advocacy would you recommend going forward?

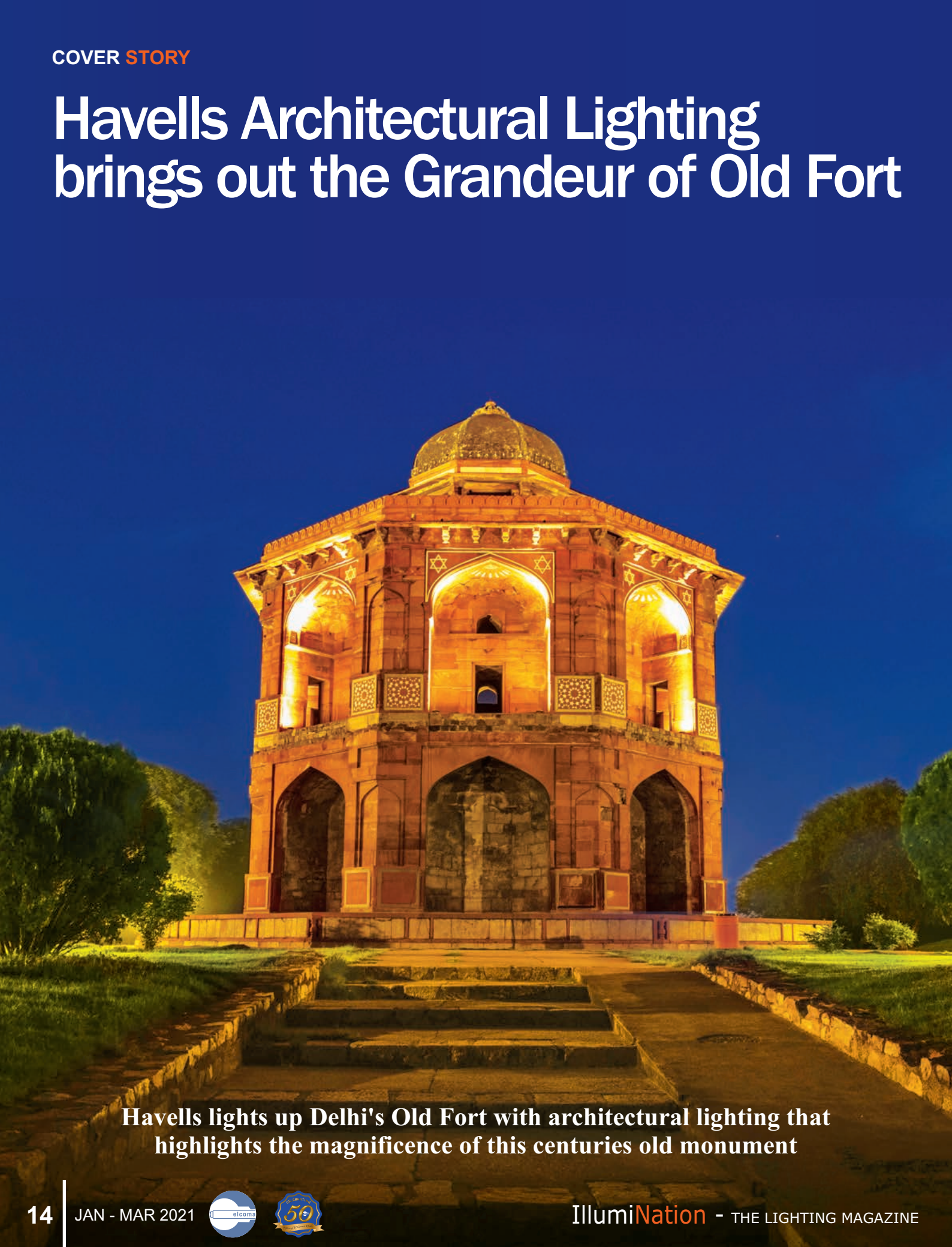
Electrical safety should be the prime focus. However, it is true that sub-standard products dent consumer confidence. LED is undergoing constant innovations and technological disruptions. Government has already taken policy measures in terms of making it mandatory to have BIS and energy star ratings on the products. It is imperative for the sellers to adhere to the mandated safety standards and foster energy efficiency in the country. At Havells, we enforce strict production and certification norms on all our products, including lighting range, and maintain quality control to appeal to our consumers. It is important for the industry, at large, to reinforce corrective measures, conduct rigorous quality checks and ensure products that are safe, secure and standardized. Curbs in the form of both tariff and non-tariff measures are needed to rein in non-compliant products. Also raising duty, stringent regulations and enforcing them should also go in tandem with these measures. If we are vigilant in our approach and make sure to offer products with authentic certification, this in turn will curb influx of low-quality, counterfeit products as well.

How is Havells looking to address the opportunity offered by Connected Lighting / Intelligent lighting space?

Users need and preferences with regards to lighting have also been subjected to a phenomenal shift in the new normal. Havells acknowledges the reinforced sense of awareness for safety and the need for contactless remote IOT-based smart lighting thereby enabling enhanced flexibility, dependability, comfort, and ease to people. We at Havells India are betting big on smart innovation in our products and aspire to extend the smart and Internet of Things (IoT) enabled portfolio across product ranges. Connected Homes and Smart Offices are segments with increasing traction.

INTERVIEWED BY ELCOMA EDITORIAL TEAM

Havells Architectural Lighting brings out the Grandeur of Old Fort



Havells lights up Delhi's Old Fort with architectural lighting that highlights the magnificence of this centuries old monument

India is considered to be one of the most popular tourist destinations due to the large number of remarkable historical monuments and architectural wonders that attract millions of visitors every year. These monuments are triumphs of architecture and finest artistry which leave an indelible mark in the visitor's minds and reminds them of India's vibrant culture and centuries old heritage.

The beauty of such masterpieces should not be hidden after the sun goes down. Installing custom-tailored lighting not just makes the monument visible at night but also contributes to enhance its grand beauty. Architectural illumination notably uplifts the magnificence of these monuments and gives a new energy and excitement to the cityscape. Apart from enhancing overall beauty, lighting also ensures necessary safety measures around the area and facilitates in promoting tourism round the clock.

“Havells has embellished several such structures in India by implementing architectural lighting projects for them. We carried out the illumination project for Humayun's Tomb in 2018, with Havells Energy efficient LED luminaires which has now made the monument a truly striking focal point in skyline of Delhi, clearly visible from an airplane or while driving through the elevated Baba Banda Singh Bahadur Setu or Barapullah Flyover,” said Mr. Prag Bhatnagar, Sr. Vice President, Havells India.

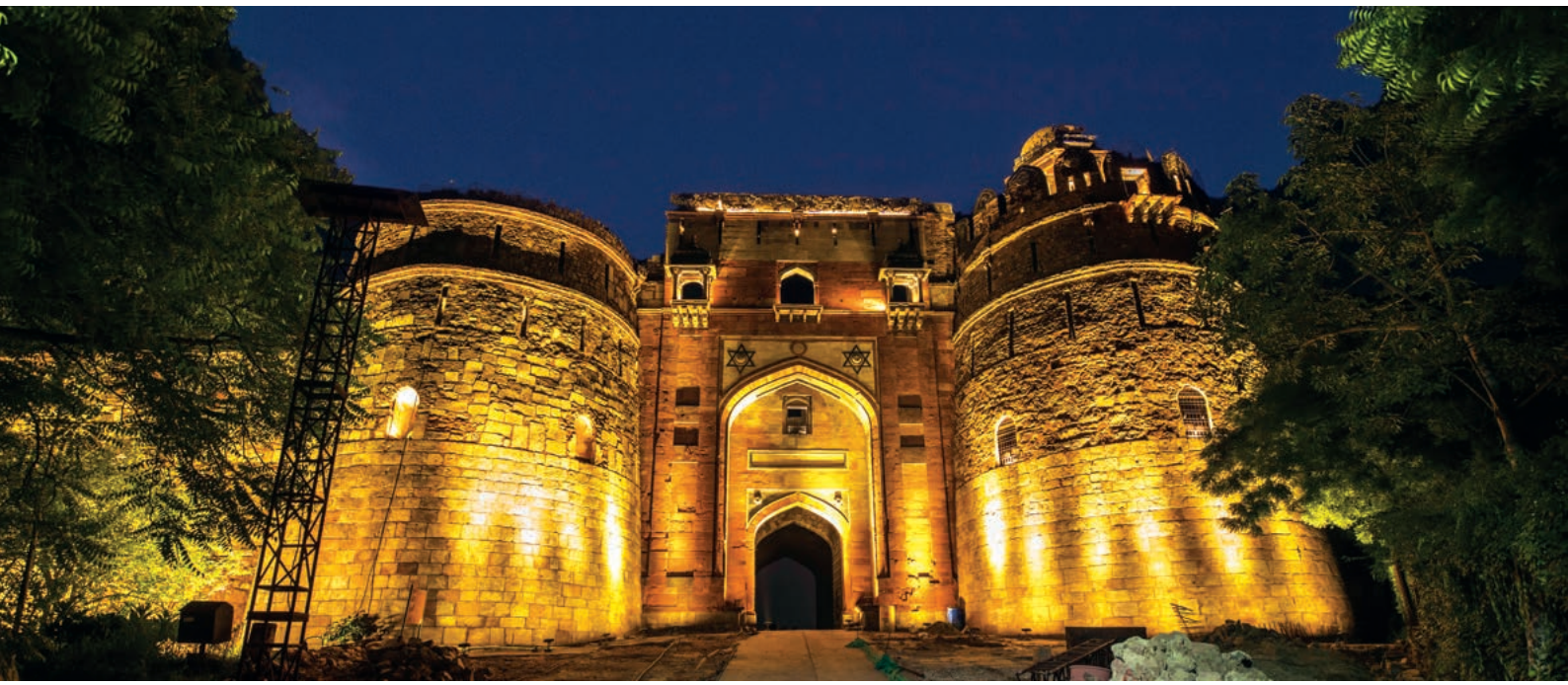
Havells partnered with NBCC (India) Limited to illuminate the Purana Qila with an objective to focus on the living history of the monument. The radiance of the structure went further than the typical façade lighting. Havells' Colorscape range or architectural RGB lights were used to create the monochromatic light effect which encompassed various lighting patterns, accents, and colours to emphasize on the various beautiful aspects of the fort from the within and outside. As an integral part of the initiative, the nearby lake was lit up too. A jogging trail was also formed alongside the lake for urban dwellers to jog during daylight hours or night-time. This project not only enhanced the beauty of the monument but played a key role in attracting visitors round the clock and made it safer too.

The long walls of the Old fort have been witness to many battles in turbulent times as well as festivals in peace time. Uniform highlighting of the fort's walls was achieved through optical excellence provided by elliptical beam angle of 30°x65° in Ranger series 120W LED floodlights, a high-power colour changing LED projector which is best suited for super distance lighting with IP66 and IK07 rating.

The Grand Mosque has been uniformly highlighted with the Ranger 120W in different beam angles of 25°, 60° and 30°x65° to maintain symmetry of the fixtures. The DMX version of this product comes equipped with intelligent logarithmic control technology that helps enrich the colour saturation with added benefits of high heat dissipation and low weight design and beam angle options.

The arches of the Sher Mandal were highlighted with miniature flood light Compass to accentuate the artefacts and enliven the old-time charm created by artisans.

The gates of the fort which have stood tall through the reigns of many kings and their kingdoms, were highlighted with 25° beam angle in Ranger series 45W LED Flood Lights while the 'Jharokha' got the caressing of luminance from lightweight wall grazer series



Lineate which is powered by external BIS rated potted LED Driver. The Fixture comes with integrated IP67 connectors in mono colour as well as DMX versions. The light weight also ensures less dead weight on these architectural marvels. Small niches on the gate wall were rekindled to life with small inground burial light Adorn 2W which are not visible during the daytime due their miniature design. The IP67 rated Flexi Strips gave outline shape to the crown of the Gate and added depth to the structure, engulfing it in a streaming cascade of light, with high lumens efficacy and CRI > 80. The power supply which itself is IP67 rated has also be remotely placed to reduce the installation footprint on the monuments.

All the projectors; wall grazers and in-ground burials have IP67 inbuilt connectors, ensuring seamless and uninterrupted DMX signal transmission.

Mr. Prag Bhatnagar, Sr. Vice President, Havells India Ltd said that “Light is not just an embellishment, but also a catalyst for augmenting great vitality. A well-organized lighting plan stirs inquisitiveness and creates a sense of distinctiveness. Good lighting is also essential for enabling optimum safety measures. Each and every historical monument has an architectural narrative to tell and that story can be told in a better way through beautiful and dramatic lights. Light provides meaning to a building's structure and which was why we chose Havells Colorscape range of Architectural RGB fixtures which are performance-driven, mechanically superior fixtures that are also photographically and electrically ideal for such a project.”

AUTHOR : MR. PRAG BHATNAGAR, SR. VICE PRESIDENT, HAVELLS INDIA LTD.

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Driving Indian Manufacturing to New Heights

IllumiNation chats with Dr J K Jain, Chairman and Managing Director, FIEM Industries Limited on his entrepreneurial journey

How did your journey as an entrepreneur start? What drove you to become a manufacturer at that time?

I was born in an entrepreneur family and you can say entrepreneurship is in my blood. Since an early age I knew I wanted to be a manufacturer and was always fascinated by Automotive Lighting manufacturing. In 1970, I started my journey as an entrepreneur with a modest beginning in manufacturing by supplying Automotive Lamps. Over a period of time, I set my aim to become one of the top players in the Automotive Lighting Industry and supplying to OEMs locally and globally for all segments such as cars, tractors, two and three wheelers.

What kind of challenges did you have to overcome to see FIEM where it is today?

The biggest challenge was to face competition in the Automotive Lighting segment with the bigger players having World class Technology at that time versus our locally developed technology. My biggest challenge was to maintain and grow our position in the industry after gaining momentum amongst leading OEMs, where technology was changing at a very fast pace and the latest technologies hitting the market in very short periods of time.

FIEM was one of the pioneers in the Automotive Lighting Segment in India. What made you choose this as your primary line of business?

As I mentioned earlier, I was always fascinated with Automotive Lighting. My passion and zeal to manufacture high quality lighting products, with our own in-house R&D and technology remained the driving force to keep me focused on the Automotive lighting business.

How did you script the success story for the automotive lighting business?

Success is rather a relative term, there can never be a scale for success. However, I believe our growth oriented approach, passion for quality manufacturing, focus to serve our customers better, keep abreast with the latest technology and in-house R&D strength has remained the prime factors in our growth journey.

Today, we are one of the leading players in Automotive lighting and supplying to all vehicle categories i.e. four wheelers, 2 and 3 wheelers, tractors etc. We are supplying to Indian as well as Global OEMs for their Indian as well as global models.

You have collaborated with several International brands including the Japanese on innovation and R&D projects. What were the key takeaways or learnings that you and your organization got from them?

No one player has the capability to manufacture all products for all vehicles. The technological advancement of the International players is globally well acknowledged including their quality, endurance and durability. Therefore, to diversify our product portfolio and serve our customers better, we have collaborated with reputed international players. Further, learning from their best practices on quality, manufacturing techniques and technology remained some of the additional benefits from such collaborations.

How would you rate our Indian engineers and R&D personnel when compared to these international teams? Where do you think our Indian industry needs to improve most to come at par with these International giants?

To the best of my assessment as an entrepreneur for such a long time, I find

"My passion and zeal to manufacture high quality lighting products, with our own in-house R&D and technology remained the driving force to keep me focused on the Automotive lighting business"

Visit of Japanese delegation to sign collaboration agreement with FIEM

The FIEM staff at Tapukara factory in Rajasthan hailing for success of new manufacturing unit

the Indian engineers intelligent and hardworking, eager to improve technical knowledge, their docile nature and above all respect for the "Guru", whoever he could be – his teacher, his techie colleague, his senior colleague, etc. make them stand out from their international peers. However, I still believe, engineering education should be more practical and experiments oriented in our country.

Regarding our Indian industry, I think we need to improve a lot and the focus of government and their supportive approach is really commendable in this direction.

"I believe our growth oriented approach, passion for quality manufacturing, focus to serve our customers better, keep abreast with the latest technology and in-house R&D strength has remained the prime factors in our growth journey"

What in your opinion should the government be doing to actually promote industries in India, especially the Lighting Industry?

The recent policies of the government are more about the structural improvement in the ecosystem and support for the industry to become competitive at world level. LED adoption and regulatory and standards framework strengthening will be good support for quality manufacturing. Start-ups are being given all round help by the government to achieve big in this direction.

What made you diversify into LED Lighting?

FIEM was the first Indian Company to introduce LED Automotive Lighting and we had setup our first SMT Line in 2007. At that time LED had just arrived in Europe although the plant utilization was just 10%. However, with a vision that LED Lights will be the future, we took that risk. Our technical partners provided the technology for LED Lighting. We started exporting to them in Europe. We setup our Design and R&D Centre in India and Italy. With our R&D Team having vast experience in Automotive, we were able to develop our own technology in Domestic Lighting (LED luminaires for Indoor and Outdoor applications) and Integrated Passenger Information System for Airport, Metros, Railways and Buses. So, our in-house expertise on LED was the driving force for us to diversify in domestic lighting.

What is your opinion of the grey-market or non-compliant lighting products being sold in the country? What can be done to curb this menace?

Grey market or non-compliant lighting products are the biggest challenge as this is most detrimental for growth of organized lighting industry. ELCOMA with other government and semi-government agencies, with enforcement actions are trying their efforts in this direction. Customer education and awareness through media including social media can play a significant role to curb this menace.

How do you plan to participate in the Government's Atma Nirbhar program where there is a push to enhance localization of components specifically to the Lighting Industry?

I appreciate and support the Atma Nirbhar program of the Government of India. In fact, since inception, we have been practicing the formula of being "Atma Nirbhar" in all our 9 manufacturing facilities across the country. As a matter of policy, we have been manufacturing most of the parts/components in-house or buying indigenously. We are buying only few electronic components from other countries.

How is FIEM gearing up for the next generation of lighting products given that the success of LED Lighting business will also depend on a strong R&D set up and capability to develop newer designs with speed?

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R&D/Design Centres: India (Rai-Haryana), Japan, Italy | **Units:** Haryana, Rajasthan, Himachal Pradesh, Tamil Nadu, Karnataka & Gujarat

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FIEM already has 3 world-class R&D and Design Centres in India, Japan and Italy and our R&D Team is working on upcoming technologies such as OLED, Graphics and Laser, besides we have already won many accolades from global OEMs for design and development of new LED Lighting Products for 2 Wheelers.

We have won the 'Global Award' for Excellence in Technology and Development from Yamaha Motor Co., Ltd. Japan, in recognition of our outstanding achievement in the development of advanced technology and the "World's Smallest Bi-Function Lighting Module for Two-wheelers'. This is under joint patent held by Yamaha of Japan and FIEM. So, our R&D and Technology capabilities are world class and we are further strengthening the same.

Do you have any plans to expand your manufacturing facilities?

Yes, we are a growth oriented organization and depending upon the business opportunity, we are open for expansion. In last 15 years we have grown exponentially from an annual turnover of around Rs. 100 Crores to Rs.1400 Crores.

How has the COVID pandemic impacted FIEM? How did you overcome the challenge of COVID?

COVID-19 is a global pandemic, so it affected FIEM as badly as rest of the world and the Indian economy. This pain is still continuing. Due to the nationwide lockdown by the government, we had also to suspend all operations across the factories till first week of May 2020. We started resuming our operations in a phased manner after ensuring all measures of social distancing, sanitization, wearing masks and other safety measures.

As far as business scenario is concerned, demand for 2-Wheelers bounced back starting from August month and now we are in a much better position and hope to continue this positive momentum in the months to come. We are quite positive for 2-Wheeler demand outlook as well as our business performance in the coming months. Despite all disruptions and challenges, FIEM aim to emerge much stronger from the present situation.

IN A LIGHTER VEIN

Favourite Food	:	I am a vegetarian and like Indian, Italian & Japanese food.
Favorite Holiday Destination	:	My favorite Holiday Destination is Italy.
Which is/are your favourite restaurant/s?	:	My favorite restaurant is Bukhara and T.Ks.

How do you unwind after a hectic day or week at work?

After work, I always try to spend more time with my family, who always look for me with a smile. My grand-daughter is my sole source of happiness and I feel relaxed and happiest while spending quality time with her.

Who is your inspiration in life?

My inspiration was my Late Uncle, who always taught me to work hard with sincerity and honesty and always thinking about employees welfare and society at large. With his inspiration and teachings, I was able to build this company at the scale where it is today and could contribute to the society in every possible way

INTERVIEWED BY ELCOMA EDITORIAL TEAM

MeitY's Make in India – Public Procurement Order

The Department for Promotion of Industry and Internal Trade (DPIIT) had issued Public Procurement (Preference to Make in India) [PPP-MII] Order 2017 (Order No.P-45021/2/2017-B.E.-II dt 15.06.2017) and subsequent revisions dated 28.05.2018, 29.05.2019 and 04.06.2020 to encourage 'Make in India'.

In order to qualify as manufacturer / supplier to participate in Government Tenders, even if the products meet technical specifications as prescribed in tender notifications, the local content level will be an important factor to determine whether the applicant can participate in Government tenders or not.

The order defines 'Local Content' as the amount of value added to the supplied product/service in India and further identifies the following categories of suppliers

- Class I Local Supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to greater than 50%.
- Class II Local Supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content greater than 20% but less than 50%.
- Non-local supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or less than 20%.

The order also further defined the mechanism for calculation of local content for LED products.

In the Bill of Material (BOM) of LED Products, LED emitters need to be packaging from imported/ domestically fabricated Bare LED Die, subject to the condition that the Bare LED Die shall be domestically fabricated using imported/ domestically manufactured inputs while the Driving Electronics need to be domestically assembled from imported/ domestically manufactured parts and components, subject to the condition that the value of domestically manufactured parts and components (excluding the value of bare PCB) used in the assembly of "Driving Electronics" will be minimum 30% of the total value of parts and components used in the manufacture of "Driving Electronics". In addition to these the weightage of total value of Heat Sink or Thermal Management Solutions, Secondary Optics and System Fixture and Fitting should not exceed 20% of the total BOM of the LED Product. If the order was to be followed then the present Local Content for 9W LED bulb was 47%, 18W TLED was 48% and 150W LED Streetlight was 34%.

In order to support the Government Initiative and promote Make in India ELCOMA proactively pursued the matter with the nodal ministry and proposed a roadmap for a phased implementation of two conditions which has been approved by MEITY who now will be publishing the revised Public Procurement Policy notification to incorporate the changes as recommended by ELCOMA which is a huge relief for the lighting industry.

LED LIGHTING PRODUCTS						
Sl. No.	Main inputs in BOM/Stages for manufacture of LED Products	Value addition required the input to be classified as domestic BOMas per existing notification of Public Procurement	ELCOMA Recommendation for revision of sub-conditions-current (2020)	2022	2024	2026
(a)	Driving Electronics	Domestic assembly from imported/indigenously manufactured parts and components subject to the condition that the value of domestically manufactured parts and components (Excluding the value of bare PCB) used in the assembly of "Driving Electronics" will be minimum 30% of the total value of parts and components used in the manufacture of "Driving Electronics"	17%	21%	25%	30%
(b)	Heat sink or Thermal Management Solutions	Weightage of total value of **b) Heat Sink or Thermal Management Solution, c) Secondary Optics** and **d) System Fixture and Fitting shall not exceed 20%** of the total BOM of the LED Product	40%	40%	35%	30%
(c)	Secondary Optics					
(d)	System Fixture & Fitting					

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ISA Top 100 Awards – Indian Winners

Signify India – Parliament House, New Delhi (India)

The Parliament House or Sansad Bhavan is one of the most impressive buildings in Delhi which was designed by British architect Edwin Lutyens and Herbert Baker and inaugurated in 1927 by Lord Irwin, the then Governor-General of India. The façade lighting design had to incorporate the color, texture and architectural elements of the British era while adapt to modern day flexibility and speed. A dynamic, color changing, and multi-layered lighting system was desired for the important and magnificent structure, of course, with very high energy-efficiency as well as low operation and maintenance costs. And most importantly, the lighting system should enhance the beauty and visibility of grandeur of the over 90-yearold edifice.

Lighting Solution

875 SSL precisely aimed high power luminaires, which can change colour every few seconds, were placed on the facade of the Parliament House, which has 144 pillars measuring 27 feet each. These luminaires are power efficient and use only one-fifth of the energy as compared to conventional luminaires. Lighting system is programmable and accessible remotely (IoT, through Cloud technology) for preemptive operation and maintenance ensuring no down-time to the prestigious installation.

The lighting design was done considering different parameters like glare, sensitivity towards building architecture, site security and ease of maintenance and were compliant to all relevant standards.

The implementation of Dynamic Architectural Facade Lighting was based on Colour Changing High Power LED Luminaries (Flood lights RGBW 270W & 135W, Graze lights RGBW). The

Main House	
Quantity (Nos)	**Items**
189	RGBW Linear Graze
229	RGB Flood Light 45W
14	RGB Flood Light 270W
10	RGB Flood Light 135W
124	RGB Flood Light 45W
100	RGB Spot Light 35W
29	RGB Flood Light 68W
64	RGBW Flood Light 50W

system was based on a combination of KiNET & DMX/RDM protocols.

Luminaires were selected based on their colour accuracy and degree of control which was achieved with implementations of a combination of 3 & 4-channel configurations and Color Kinetics technologies i.e., Powercore - an advanced power management integrating the power supply directly into a fixture's circuitry; OptiBin - proprietary binning optimization process to achieve exceptional color consistency with advanced LED optimization; Chromasync - to provide consistent light performance across multiple luminaires; Chromacore – adjusts the color temperature of white light and creates sophisticated dynamic color effects . 850 Fixtures, 32 Data Enablers and 12 Protocol Convertors were used to complete the project.

ISA Top 100 Awards – Indian Winners

Bajaj Electricals Limited – Old Secretariat Building, Patna, Bihar, India

Patna Secretariat, also known as Patna Sachivalaya or Old Secretariat, is the administrative headquarters of the state Government of Bihar in India. Situated between two iconic buildings of the city, Raj Bhavan in the west and Patna High Court in the far east, the Patna Secretariat is a mighty Victorian construction built by the British in the Indo-Sarcenic style and completed in 1917.

Architectural illumination done by Bajaj Electricals Ltd, enhances its visual appeal & symbolizes the cultural roots of the nation. Controlled by state-of-the-art intelligent control system, the entire architectural lighting system runs on universal DMX 512 protocol and uses tunable RGB LED luminaires supporting the creation of multiple scenes & themes.

Compact-sized outdoor grade LED luminaires have been used which are optically supported with precise beam angles, ensuring minimum spray of light to the surroundings & effectively controlling light pollution. For the project, Bajaj Electricals Limited offered a solution in which the lighting level, energy consumption, light pollution, luminaire maintenance, structural safety, visual comfort etc are perfectly balanced and meets all norms or standards.

ISA Top 100 Awards – Indian Winners

Jaquar Lighting – Rajkot Busport Façade Lighting, Gujrat (India)

More than 500 numbers of facade RGBW outdoor light fixtures were used to enhance the beauty of this façade. RGBW media tubes of 0.3m, 0.5m and 1m length interconnected with 4000m of electrical wiring connections were used to commission the project.

Wiring and circuitry was designed to provide a separate scene for each effect or a combination of 4 or more scenes according to customer's selection. In order to operate these fixtures and to minimize failures, Jaquar Lighting designed additional combinations for the control mechanism and power management.

The System Controller signal is dual redundant with doubled stability and the system supports playing of automatic, regular and preset programs.

Bajaj Electricals' Innovative Street Lighting Solution Brightens Indore Smart City

Bajaj Electricals Limited, recently concluded the supply of innovative smart street lighting solution for Indore Smart City wherein the city streetlights can be controlled by a single software (through mobile or laptop/system) sitting anywhere in the world.

Indore is one of the cities which was selected in the first top 20 smart cities in India. Indore Smart City is emerging as an urban ecosystem that aims to integrate digital technology, knowledge and assets to become more responsive to citizens and improve city services.

The infrastructure across the city was quite ancient and needed an upgrade with high-end technology to withstand the changing economic demands of various businesses. In recent times, Indore is also experiencing a multifold increase in the traffic flow, which has resulted in an increase in accidents. As the city municipal area is quite widespread, it lacks sufficient number of streetlights across the city to meet the growing traffic. Thus high-end streetlights are required to ensure maximum visibility and safety of citizens during their commute. Under the Indore Smart City project, a long-term solution for managing and maintaining the streetlights effectively and efficiently was the necessity.

Bajaj Electricals understood the responsibility that was awarded to it under the project and started working towards achieving the end goal.

Streetlight tenders come with various complexities, in terms of difficult road terrains and inaccessible areas. The execution team used the support of local contractors who could manage such tasks skillfully and ensure positive outcomes. Smart City officials were convinced by the innovative ideas proposed by the team and with the help of a consultant, survey & design officials of the road infrastructure, work for the installation of streetlights was initiated.

The key factor that led to the success of the project was effortless integration with various departments, consultants and contractors throughout the project. The challenges faced were accepted, and every commitment was delivered at per the agreed timelines. Also, all the teams involved right from planning to the execution played a vital role in overcoming all the challenges. This particular noteworthy achievement assisted Bajaj Electricals team to successfully supply 14,000 street lights in various wattages, 200 units of smart panels and 400 units of light poles.

With the constant determination and efforts of the team involved in the project, Bajaj Electricals successfully completed the project of central lighting poles that were erected between Choithram Hospital and Silicon City on AB Road in the given time frame. The company successfully installed its first smart city project in India with smart panel supply, street lights (group control) and poles. Smart panels with feeder control mapping, supervision, commissioning, operation and maintenance for five years across main roads were covered under the project.

The project was inaugurated by the then Honourable MP, Mr Jitu Patwari from Rau constituency.

AUTHOR : BAJAJ ELECTRICALS LIMITED

Standardization in the Field of Lighting

A look at how Standardization for Lighting Industry is structured in India

Light plays a vital role in our daily lives. It produces in us a sensation of vision and it gives us the ability to see. In the past, our ancestors were mainly dependent on the natural sun light for doing their daily tasks. But in today's world, lighting includes the use of both artificial light sources like lamps and light fixtures, as well as natural illumination by the sunlight.

Artificial lighting technology began to be developed tens of thousands of years ago starting with widespread control of fire by early humans, burning of hollow rock, shell, or other naturally found objects filled with moss or a similar material soaked in animal fat, oil lamps, candles etc.

The development of artificial light based on electric energy sources can be classified in to following three main stages:

Stage 1 – development of bulbs based on heating of a wire filament or an arc for example incandescent lamp, halogen lamp, carbon arc lamp

Stage 2 – development of gas discharge lamps for example fluorescent lamps such as TFL, CFL

Stage 3 – development of solid-state lighting for example LED lamps

LED lighting has gained a prominent spot in the global lighting market due to its numerous advantages over conventional light sources. As the demand for energy efficient, smart and connected lighting is increasing, the Indian LED lighting industry is expected to grow tremendously over the long term. This is being driven by increasing government energy conservation initiatives, rising consumer awareness about energy-efficient LED products etc.

The Bureau of Indian Standards which is the national standards body of India, has supported the lighting industry over the years by publishing Indian Standards on various lighting products, test methods, code of practices and their strict implementation under various certification schemes. This has been the foundation stone in putting a ban on the import/manufacture of sub-standard quality lighting products in the country.

Lamps and related equipment sectional committee, ETD 23	Illumination engineering and luminaires sectional committee, ETD 49	Lighting IEC TC 34	Lamps and related equipment sectional committee, ETD 23 and Illumination engineering and luminaires sectional committee, ETD 49	Lighting IEC TC 34 & its sub-committees (IEC SC 34A, IEC SC 34B, IEC SC 34C, IEC SC 34D)
To prepare Indian Standards for all types of electric lamps (including LED), caps, control gear and their auxiliaries (luminaires excluded)	To prepare Indian Standards for luminaires (including luminaires for use in hazardous area, aviation lighting, emergency lighting etc.) and codes of practice for interior/exterior lighting	To map and maintain the standardization structure and to prepare, review and maintain international standards and related IEC deliverables regarding safety, performance and compatibility specifications for: (a) Electric lamps and electric light sources (b) Caps and holders (c) Controlgear and control devices for electric lamps, electric light sources, and electronic lighting equipment (d) Luminaires (e) Lighting systems Miscellaneous equipment related to items a), b), c), d) and e)	The committees comprise of all the relevant stakeholders viz. experts from lighting industry, industry associations (ELCOMA), lighting society (ISLE), laboratories, research & academic institutions, experts in individual capacity, users, consumer associations, government regulatory departments etc.	The IEC committees comprise of membership from various countries which can be either 'Participating' member or 'Observer' member. India is a 'Participating' member in IEC TC 34 and its sub committees.

Lighting Standardization Bodies

Historically, the lighting industry has relied on standards, and the products within the scope of these standards must have market relevance. These lighting standards ensure interoperability and interchangeability, electrical, mechanical and thermal safety and energy efficient performance of the light sources and lighting systems.

Initially artificial lighting was supposed to make objects visible when natural day light was not there. However, the rapid technological changes in the lighting market has led to a diversification of product portfolios focusing on the effects of light beyond making objects visible, for example, horticultural lighting, human centric lighting and disinfection with UV-C radiation.

Considerable efforts are being made, both at national and international level, to standardize the requirements for lighting products and lighting systems. At the national level, the standardization work is being carried out by the Bureau of Indian Standards (BIS) technical committees – 'Lamps and related equipment sectional committee', ETD 23 and 'Illumination Engineering and Luminaires sectional committee', ETD 49 whereas at the international level the work is being carried out by International Electrotechnical Commission technical committee on 'Lighting', IEC TC 34 and its sub committees.

AUTHOR : AMAL SENGUPTA, GENERAL MANAGER, ELCOMA

Farewell to Mr. R. K. Jaggi

Mr R. K. Jaggi retires from Surya Roshni Limited as Sr President on 31 Dec 2020.

Mr Jaggi's journey in the Lighting Industry started in October, 1974 with Sylvania & Laxman Limited and he has continued to serve the industry for more than 46 years. Always articulate and knowledgeable, he has been the inspiration for many in the lighting industry who have learned and flourished under his mentorship, guidance and experience.

Mr Jaggi has been a very important part of all representations of the Lighting Industry across various forums including BIS, BEE, MeitY and also chaired several ELCOMA technical committees.

We wish him success in all future endeavours and thank him for his service to the Indian Lighting Industry.

Welcome Mr. Nirupam Sahay

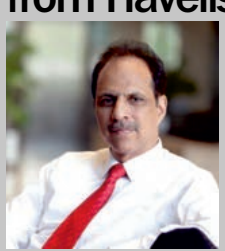
Mr. Nirupam Sahay has joined Surya Roshni as Executive Director and Chief Executive Officer, Lighting from October 29, 2020.

Mr. Sahay's most recent roles were in Philips Lighting (now called Signify), as Senior Vice President and Global Business Leader of the €1 Billion global Consumer Lamps business and before that as President and CEO, Philips Lighting Indian Subcontinent. He was also the President of ELCOMA from 2012-14.

Prior to joining Philips, he has held key positions at GE Capital India, as Chief Marketing Officer, SBI Card (a JV between GE Capital and SBI) and later as Vice President, Strategy and Business Development. He has also held senior management positions in Whirlpool and Asian Paints, has been on the Board of Directors of GE Money India and of two Joint Ventures of Philips Lighting in China. He is also on the Board of Advisors of the Institute for Advanced Studies in Complex Choices, based in Hyderabad, India.

Mr. Sahay graduated in Economics Honours from St. Stephen's College, Delhi, completed his MBA from Narsee Monjee Institute of Management Studies (NMIMS), Mumbai, and completed an Advanced Management Program at Wharton.

Mr. Anil Bhasin Retires from Havells



Mr. Anil Bhasin, President Havells India Ltd retired from service in October 2020.

Mr. Bhasin has had an illustrious and extensive career spanning 38 years with 18 years at Bajaj Electricals and 16 years with Havells besides a stint with Singer India Limited.

We wish him all the success in all future endeavours and thank him for his service to the Indian Lighting Industry.

Human Centric Lighting and WELL Standards

Lighting has a profound effect on people. The reason is simple; light is the most powerful regulator of our circadian rhythm. Light also has visual, biological and emotional benefits: it makes people see better, feel better and function better. And that makes human-centric lighting paramount for people's health and wellbeing.

Natural daylight provides the right light, in the right quantity, with the right spectral content, at the right time to keep our circadian rhythm in sync. In a perfect world, we would all spend more time outdoors to boost our health and wellbeing with natural daylight. But the reality is, we live more than 90% of our time indoors, and 36% of that is in the workplace. Indoors, most of us do not receive the right amount of daylight that we need to feel healthy and happy.

Organisations of today are getting more mindful of this fact and indoor spaces are being designed keeping in mind not just the functional priorities for the employees but also the wellbeing priorities for the employees. With this in mind, the International WELL Building Institute has developed the WELL Building Standard, a global rating system designed to enhance health and wellness in the workplace. It focuses on several key concepts that have an impact on health, such as air, water, nourishment, light, fitness, comfort and mind.

Humans have been designed to work in the natural light and these features create an indoor environment which help us to align our biological cycle in the best manner as it was designed to be. The WELL Light concept aims to provide a lighting environment that reduces circadian phase disruption, improves sleep quality and positively impacts mood and productivity.[4] As per the WELL rating guidelines, each WELL features has been divided into

preconditions (P), which must be met, and optimizations (O) that can boost your points total for the different categories of WELL building certifications:

LIGHT EXPOSURE | P

This WELL feature requires projects to provide appropriate light exposure in indoor environments through lighting strategies and to provide indoor light exposure through daylight and electric light strategies. [4]

Access to appropriate levels of light in indoor environments can be achieved through building design, façade design, space layout and lighting design.

Option 1: Daylight simulation[4]: The project demonstrates, through computer simulations, that one of the following conditions are achieved:	a. Regularly occupied spaces achieve one of the following targets:		
	Calculations per IES LM-83-12	or	**Calculations per Annex A of CEN 17037:2018**
	Average $sDA_{200,40\%}$ is achieved for >30% of regularly occupied floor area		Target illuminance 19 fc is achieved for >30% of individual unit throughout 50% of daylit hours of the year
(either a **OR** b criteria is met to suffice option 1)	b. Common spaces that have unassigned seating for at least 15% of regular occupants at any given time achieve one of the following targets:		
	Calculations per IES LM-83-12	or	**Calculations per Annex A of CEN 17037:2018**
	Average $sDA_{300,50\%}$ is achieved for >75% of floor area		Target illuminance 28 fc is achieved for >30% of individual unit area and average illuminance 9fc achieved for >95% of individual unit area throughout 50% of daylit hours of the year
Option 2: Interior Layout[4]: (either a **OR** b criteria is met to suffice option 2)	a. At least 30% of the regularly occupied area is within a 20 ft horizontal distance of envelope glazing in each floor and/or in each individual unit. b. Common spaces have unassigned seating and can accommodate at least 15% of regular occupants at any given time. At least 70% of all seating in the spaces is within a 16 ft horizontal distance of envelope glazing.		
Option 3: Building design[4] (either a **OR** b criteria is met to suffice option 3)	a. The envelope glazing area is min. 7% of the floor area for each floor level or individual unit. b. The floor plate is no more than 65 ft between opposite walls that each have transparent envelope glazing, and there are no opaque obstructions higher than 3.2 ft within a 20 ft horizontal distance of the transparent envelope glazing.		
Option 4: Circadian lighting design[4]	The project achieves at least one point in Feature: Circadian Lighting Design		

Option 1: Visual lighting design[4] (both a **AND** b criteria is met to suffice option 1)	a. All indoor and outdoor spaces (including transition areas) comply with the illuminance thresholds specified in one of the following lighting reference guidelines: 1. IES Lighting Handbook 10 Edition. 2. EN 12464-1: 2011. 3. ISO 8995-1:2002(E) (CIE S 008/E:2001). 4. GB50034-2013. 5. CIBSE SLL Code for Lighting. b. The illuminance thresholds take into consideration the tasks and the age groups of the occupants.
Option 2: Predetermined light levels[4] (both a **AND** b criteria is met to suffice option 2)	a. More than 50% of the occupants are under the age of 65. b. At least 90% of the project area is comprised of the following space types and meets the associated illuminance thresholds: 1. Offices and classrooms: minimum 30 fc at task surface. 2. Lobby, atrium and transition (incl. corridor & outdoor pathways): min. 10 fc at floor level. 3. Storage spaces: minimum 10 fc at floor level. 4. Dining, Lounge and Restrooms: minimum 10 fc at task surface.

Windows, atriums, and skylights are design features that can be utilized to increase daylight in a space. [4] The interior layout of the space also has an impact on the daylight exposure received by users. Lighting strategies using electric lighting can be utilized to achieve required light exposure when appropriate daylight exposure is not available. [4] For the institutional projects, either of the following options must be met to achieve this required precondition:

VISUAL LIGHTING DESIGN | P

This WELL feature requires projects to provide appropriate illuminances on work planes for regular users of all age groups, as required for the tasks performed in the space.[4]

While developing a lighting strategy to accommodate the visual acuity of users, it is critical to consider the tasks conducted, as well as the age of the users. Lighting recommendations published by authorities provide a range of lighting levels for different age groups and tasks. [4] For the institutional projects, either of the following options must be met to achieve this required precondition:

CIRCADIAN LIGHTING DESIGN | O

This WELL feature requires projects to provide users with appropriate exposure to light for maintaining circadian health and aligning the circadian rhythm with the day-night cycle. [4]

Since circadian response of humans to light is dependent on the light that enters the eye, factors such as spectral properties of the light, brightness levels, duration, and timing of exposure should be considered. The light levels must be achieved on the vertical plane, at the eye level of the occupant to simulate the light entering the eye of the user. It is also important to consider the duration of exposure to light, as well as the timing of exposure. Stimulating the circadian system at night through exposure to bright light can negatively impact sleep quality. [4] For the institutional projects, either of the following options must be met to achieve this required precondition:

ELECTRIC LIGHT GLARE CONTROL | O

This WELL feature requires projects to manage glare by using strategies, such as calculation of glare and choosing the appropriate light fixtures for the space. [4]

Glare is the negative sensation produced by luminances in the visual field that are so much greater than the luminance to which the eyes are adapted that they

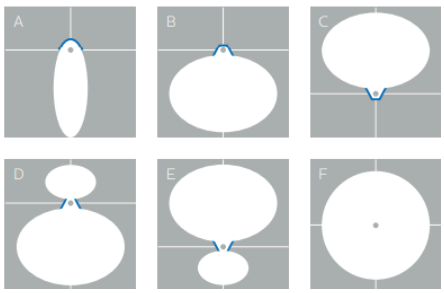
Option 1: Luminaire considerations[4]	Each luminaire meets one of the following requirements for regularly occupied spaces at light output representative of regular use conditions, except for wall wash fixtures, concealed fixtures, or decorative fixtures: a. 100% of light is emitted above the horizontal plane.
Option 2: Space considerations[4]	b. Classified with Unified Glare Rating (UGR) of 16 or lower. c. Luminance does not exceed 6,000 cd/m at any angle between 45 % 90 degrees from nadir. a. Unified Glare Rating (UGR) of 16 or lower.

For workstations used during the daytime, electric lighting is used to achieve the following thresholds[4]

a. The light levels are achieved on the vertical plane at eye level to simulate the light entering the eye of the occupant.

b. The following light levels are achieved for at least four hours (beginning by noon at the latest) at a height of 18 in above the work-plane for all workstations in regularly occupied spaces:

Threshold	Threshold for Project with Enhanced Daylight	Points
At least 150 EML [136 M —EDI(D65)]	or	The project achieves at least 120 EML [109 M-EDI [D65] and LO5 Part 1 or LO6 part 1
At least 240 EML [218 M —EDI(D65)]	or	The project achieves at least 180 EML [163 M-EDI [D65] and LO5 Part 1 or LO6 part 1



Calculations per IES LM-83-12		Calculations per Annex A of CEN 17037:2018	Points
Average sDa300,50% is achieved for >55% of regularly occupied floor area	or	Target illuminance of 28fc is achieved for >50% of individual unit area throughout 50% of daylit hours of the year	1
Average sDa300,50% is achieved for >75% of regularly occupied floor area	or	Target illuminance of 28fc is achieved for >50% of individual unit area average illuminance 9fc is achieved for >50% of daylit hours of the year	2

cause discomfort, reduced visibility, or both. [3] Electric lighting, the light source, type of luminaires and lighting layout can help to reduce glare. [4] Either of the following option needs to be met achieve this optimization feature:

DAYLIGHT DESIGN

STRATEGIES | O

This feature aims to provide daylight exposure indoors through design strategies. [4]

Building design and interior layout have a substantial impact on the amount of daylight in an indoor space. Indoor daylight access should be accounted for at all stages of building planning from architectural and façade design to interior design and layout. Indoor daylight planning should be coupled with glare control strategies. [4]

Following criteria needs to be met achieve this optimization feature for different types of projects:

DAYLIGHT SIMULATION | O

This WELL feature requires projects to conduct daylight simulation calculations to make informed decisions around fenestration and shading, so as to provide appropriate daylight exposure for occupants. [4]

Building design and planning has a substantial impact on the amount of daylight in an indoor space. [4] For the institutional projects, the following conditions are achieved for regularly occupied spaces through computer simulations [4]:

VISUAL BALANCE | O

This WELL feature requires projects to develop and implement strategies to create visually comfortable lighting environment.[4]

Development of a lighting layout and operations schedule to complement the lighting design in a space is key to increasing the comfort of users. Consideration of the ages of users, tasks performed and existing physical features in the space are also integral to creating a productive space. [4]

ELECTRIC LIGHT QUALITY | O

This WELL feature requires projects to consider characteristics of electric light, such as color rendering & flicker.[4]

Identifying and utilizing lighting fixtures that emit a high quality of light and do not display signs of flicker contributes to a comfortable and healthy space. Light fixtures with higher color rendering emit

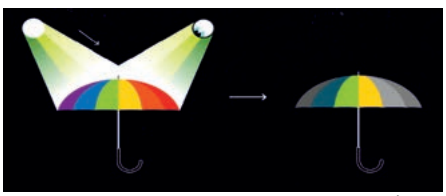


Figure 4a: An umbrella viewed under a high CRI light source[3]

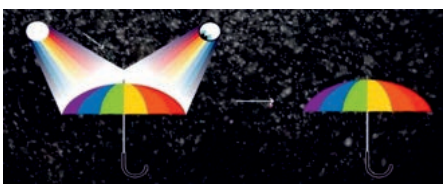


Figure 4b: An umbrella viewed under a low CRI light source[3]

light that show colors realistically. CRI and IES TM-30-15 are commonly used metrics used to determine the color rendering properties of a light source. [4]

OCCUPANT LIGHTING CONTROL | O

This WELL feature requires projects to

Part 1 Implement Daylight Plan. One of the following requirements is met for interior daylight exposure[4]:

Interior Layout		Facade Design	Points
70% of all workstations are within 25 ft of transparent envelope glazing. Visible light transmittance (VLT) is greater than 40%	or	Envelope glazing is no less than 15% of the regularly occupied floor area or individual unit. Visible light transmittance (VLT) of windows is greater than 40%	1
70% of all workstations are within 1G ft of transparent envelope glazing. Visible light transmittance (VLT) is greater than 40%	or	Envelope glazing is no less than 25% of the regularly occupied floor area or individual unit. Visible light transmittance (VLT) of windows is greater than 40%	2

Part 2 Integrate Solar Shading. For regularly occupied spaces, all vertical transparent envelope glazing shading meets one of the following[4]:

Type of Shading	Points
Manual shading controllable by occupants at all times. Shades are regularly opened once a day for all days that the project is in use	1
Shading is automated to prevent glare	2

Option 1: Parameters for visual balance[4]	Ambient lighting in all regularly occupied spaces meets at least 3 of the following requirements: a. Horizontal and vertical luminance contrast ratios for an ambient light system is no more than 10 between adjacent independently controlled zones. b. Illuminance uniformity ratio of at least 0.4 or 1:2.5 (minimum light level: average light level) is achieved on any horizontal task plane within a space. c. Automatic changes in lighting characteristics, such as light levels, changes in color and distribution take place over a period of 10 minutes. d. The CCT in each room for similar fixtures is consistent (±200 K) at any point of time.
Option 2: Design for visual balance[4]	Lighting is designed by a lighting professional & takes into account the following considerations: a. Luminance ratios on vertical and horizontal adjacent zones. b. Illuminance uniformity on horizontal task planes. c. Changes in lighting characteristics, such as light levels, changes in color and distribution. d. Color temperature of lights used.

implement innovative lighting strategies that take into account personal preferences of users, as well as their interaction with the physical space. [4]

Developing a lighting environment that not only seeks to satisfy the visual and circadian requirements of individuals, but also creates a customizable environment helps to improve productivity, mood and well-being. Lighting environments can help to improve mental health, reduce stress, and improve visual acuity. [4] For the institutional projects, following criteria needs to be met achieve this optimization feature for different types of projects:

Part 1 Enhance Occupant Controllability[4]

Option 1: Lighting zones[4]	For ambient lighting systems: a. All regularly occupied spaces contain lighting zones as shown in the table below (note: individual rooms smaller than the areas below and/or that have occupancies less than those listed in the table are considered separate zones):				
	Number of Zones	**Number of Zones**	**Points**		
	One per 650 ft^2 One per 320 ft^2	or or	One per 10 occupants One per 5 occupants	1 2	
Option 2: Lighting control system[4]	a. Lighting systems have at least three lighting levels or scenes that allow for changes in light levels and have the ability to change at least one of the following: 1. Color. 2. Color temperature. 3. Distribution of light by controlling different groups of lights or through preset scenes. b. All regular occupants have control over their immediate lighting environment through at least one of the following: 1. Manual controls located in the same space as each lighting zone. 2. Digital interface available on a computer or phone. c. Lighting for presentation or projection walls are separately controlled.				

Part 2 Provide Supplemental Lighting[4]

Option 1: Supplemental lighting requirements[4]	a. Occupants are provided supplemental lighting, the light fixtures provided increase the light level on the task surface to at least twice the recommended light levels based on the reference used to meet Feature: Visual Lighting Design. b. The supplemental light fixture is positioned to create minimal visual discomfort for the occupant or per manufacturer recommendations for installation. c. The supplemental light fixture is installed at least 9 in from the front edge of the workstation or other work surface (horizontal distance) or per manufacturer's instructions.
Option 2: Supplemental lighting availability[4]	a. Supplemental light fixtures are provided to occupants upon request at no cost. Requests are fulfilled within eight weeks. b. At least one supplemental light fixture is available to occupants for trial purposes.

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Internet Of Things (IoT) in the space of Connected Lighting

The internet is a global communications network that hosts the largest information system in the world – the World Wide Web or WWW. Most people use the terms "internet" and "World Wide Web" interchangeably, but technically speaking, the two are different. The internet is the transport network and the World Wide Web is an application running on the network. In addition to the World Wide Web, there are many other internet applications commonly used including email, web browsing (search), instant messaging, online communities and more.

This massive number of connected devices and applications has created a global network infrastructure of information.

Traditional Internet Applications vs. the Internet of Things

The World Wide Web (WWW) was originally designed for people to create, share and consume information (content) with other people. An email, job posting or presentation is created and posted to the WWW by an individual. It is then transported over the traditional internet to other individuals to view or download. Human interaction with the internet to date has been transactional—you ask a question and get an answer; you search for a gift and place an order; you send or receive emails.

The Internet of Things (IoT) is a new application for the internet and is very different from the World Wide Web. In simple terms, the IoT consists of sensors and smart objects (devices with embedded sensors) connected to the internet that collect, send and receive data. Data from these devices is analyzed with the result triggering a notification or action to another connected device or system. Data and communication is primarily created and used by machines. People oversee and interact with these objects and systems in the way we engage with other smart technologies.

The most basic premise of IoT is that virtually any device will be able to connect to the internet--not just computers and cell phones. In your home, that could mean your heating system, kitchen appliances, television, or fitness equipment. In the workplace, machinery, sensors, cameras, and building systems such as HVAC, security, and lighting are connected.

More than 20 BILLION devices will be connected to the internet by 2020.

Source: Gartner

IoT: The Age of Digital Transformation

Computing and connectivity have quickly evolved since the introduction of the mainframe computer in the 1960s and the World Wide Web in 1991. With each technology advancement, the number of devices and users has increased exponentially. With the IoT, the age of digital transformation is here. Every machine and device will have intelligence and have the ability to connect to a greater network of both people and devices. It is changing the way we work, play and live by bridging the gap between the physical and digital worlds.

What are the Driving Forces for IoT?

Simultaneous technological advancements are enabling the development and adoption of the IoT.

Device Connectivity

Beyond laptops and smart phones, almost every type

of electronic device is now capable of connecting to a network.

Sensors

Primarily fueled by IoT, the global sensor market is expected to reach $241 billion by 2022. The cost of sensors has declined by 54% over the past 10 years making it economically feasible to embed them in almost every device. Advancements in sensor miniaturization continues and is enabling the use of sensors in a rapidly increasing number of applications.

Communication

Mobile devices and wireless connectivity are now commodities making them widely available. At the same time, the cost of bandwidth has declined by 97% over the last 10 years.

Software

Big data analytics and visualization tools with supporting infrastructure such as efficient databases have emerged and evolved over the last 5 years. The cost of processing has declined 98% in the same timeframe.

Cloud Computing

IoT generates an enormous volume of data, and you need to store and process this data. Only cloud computing has the potential to scale quickly as well as store and process the enormous volume of data that IoT will generate and require. Gartner expects Software-as-a-Service (SaaS), the largest segment of the cloud market, to reach 45% of total application software spending by 2021.

Wireless Broadband

5G is the newest mobile network that will ultimately replace current 4G technology with improvements in speed, coverage, and reliability. 5G availability is just around the corner and when it deploys, we will see another hyper-speed jump in technology evolution. 5G will be 10 times the speed of 4G, 20 times at peak speeds, and network latency will be in single-digit milliseconds. 5G opens the airwaves for more internet-enabled traffic and the response speed will seem instantaneous.

IoT is Here Today and Here to Stay

IoT is already here and some businesses have begun to reap the benefits including increased productivity, streamlined operations, and adding new business models that increase profitability.

Businesses are using IoT applications to:

- Optimize commercial office space and offer occupants a more comfortable, productive work environment.
- Enhance the retail buying experience with benefits to the retailer and the customer.
- Eliminate mundane or repetitive tasks by leveraging automation solutions, allowing us to focus on more interesting or important tasks in our daily lives.

This digital transformation is reaping huge business benefits by providing operational efficiency, workforce productivity, improved customer experiences, improved safety and security and reduced maintenance costs

IoT platforms are designed to:

- Deploy applications that monitor, manage, and control connected devices
- Connect and collect data from a potentially vast number and variety of endpoints
- Provide data management, computing, security and edge process control

What's the Connection between IoT and Smart Lighting?

An intelligent Light Management System (LMS) is an ideal IoT platform. It integrates sensors, control software, cloud connectivity, wireless communications and more to create a flexible infrastructure solution that supports data-driven automated solutions for lighting and other smart building-related applications.

Here are some advantages to using a smart lighting system as an IoT platform:

Lighting is ubiquitous throughout commercial spaces. When sensors are a significant part of the light management system, the solution provides the ideal means of collecting data about the environmental conditions and use of the building.

- Lighting has direct access to a power supply and when sensors are integrated into each luminaire, they also have direct access to that power supply eliminating the need for batteries or external power.
- Unlike its predecessors, LED lighting is based on digital technology. This means that LEDs can send information and receive commands from software or other digital devices on the network.
- Each light point on the network can be configured as an individually addressable data node or as groups of nodes providing significant configuration and application flexibility.
- Historical and real-time data can be analyzed and used for decision-making.
- Smart lighting solutions act as the aggregation point for data collected from lighting system nodes.
- Smart lighting solutions act as the data gateway to other smart building applications.

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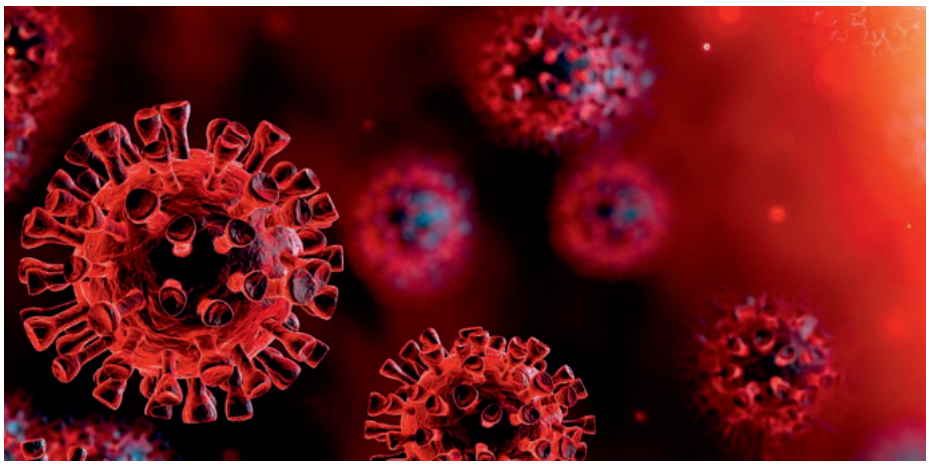
Germicidal UVC Dose for Disinfection

An in-depth look at the right dosage for UV Disinfection



UV light is a component of sunlight that falls in the region between visible light and X-rays on the electromagnetic spectrum, with a wavelength range of 100-400 nanometers (nm). This light can be further categorized into

- UVA : 315—400 nm
- UVB : 280—315 nm
- UVC : 200—280 nm
- Far UV (or "vacuum") : 100—200 nm

How Does Germicidal UV Work?

Radiation in the UVC range of 250-280 nm deactivates bacteria, viruses, and other microbes by attacking their DNA. UVC light is able to penetrate the cells of microorganisms and disrupt the structure of the DNA molecules. It does this by destroying the genetic information inside the DNA. The microorganisms, in turn, lose their reproductive capability and are destroyed, rendering them inactive and no longer harmful. The germicidal nature of UV is well suited to treat microorganisms which become extremely resistant to chemical disinfectants, as they are unable to develop immunity to UV radiation.

What is a UV Dose?

Different pathogens have unique resistances to UV light—some are very susceptible, while others require more UVC exposure for complete inactivation. A correct UV dose is critical to thoroughly deactivate the intended microbes.

UV dose, also called UV fluence, is calculated using the following equation

UV Dose = UV Intensity (I) x Exposure time (t)

In other words UV Dose = I x t,

where UV dose is measured in joules per meter square (J/m^2) or millijoules per centimeter square (mJ/cm^2).

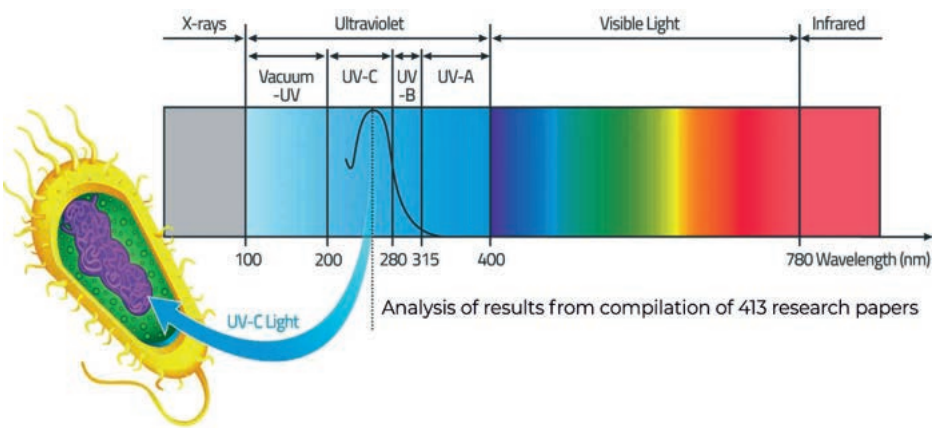
UV Intensity (also called UV irradiance) is measured in milliwatts per centimetre square (mW/cm^2)

Exposure time is measured in seconds

What is Log Reduction?

The predictable amount of dosage required for a specific degree of disinfection is referred to as a "log reduction" (i.e. logarithmic reduction). Log reduction relates to the percentage of microorganisms physically removed or inactivated by a given process. For example, a 1 log reduction will see the pathogen of interest reduced by 90% from the influent level before UV disinfection. The microbe count is reduced by a factor of 10—or 1 log. Thus, a 2 log reduction will see a 99% reduction, or microbe reduction by a factor of 100, and so on.

UVC FLUENCE (DOSE) RECOMMENDED FOR DISINFECTION



Log Reduction	Reduction Factor	% Reduced
1	10	90%
2	100	99%
3	1000	99.9%
4	10,000	99.99%
5	100,000	99.999%
6	1,000,000	99.9999%

UV Dose Response

The UV dose-response relationship determines what proportion of a specific microorganism is destroyed after a particular dose of UV radiation. This figure can be expressed as either the proportion of microorganisms inactivated or the proportion remaining as a function of UV dose.

The UV dose-response is calculated using the following equation:

Log inactivation = log10 (N0/N) Where:

- N0 = concentration of infectious microorganisms before exposure to UV light
- N = concentration of infectious microorganisms after exposure to UV light

Ultraviolet Susceptibility of pathogen and viruses

In a published report by Purplesun it is mentioned that the range of D90 values (UV dosage for 90% inactivation) for coronaviruses is 7-241 J/m^2, the mean of which is 67J/m^2, should adequately represent the ultraviolet susceptibility of the SARS-CoV-2(Covid19) virus. As per the data provided 241 J/m^2 is the max D90 dosage needed for any type of corona viruses clinically known.

In a recent communication published by Signify, a study by Boston University validated the effectiveness of Signify's UV light sources on inactivating the virus that causes COVID-19. As per this report, the dosage recommended for SARS-CoV-2 for 99% deactivation is 5mJ/cm^2 and dosage of 22mJ/cm^2 will lead to 6 log reduction.

Numerous reports have been published on bacteria and pathogens mentioning the required amount of D90 dosage. It has been seen and inferred that if we can ensure the worst case dosage (from the table) as 241J/m^2, it can kill most of the corona viruses and bacteria.

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Table 1: Summary of Ultraviolet Studies on Coronaviruses

MICROBE	D_{90} DOSE j/m^2	UV K m^2/j	BASE PAIRS KB	SOURCE
Coronavirus	7	0.35120	30741	Walker 2007[a]
Berne Virus (Coronaviridae)	7	0.32100	28480	Weiss 1986
Murine Coronavirus (MHV)	15	0.15351	31335	Hirano 1978
Canine Coronavirus (CCV)	29	0.08079	29278	Saknimit 1988[b]
Murine Coronavirus (MHV)	29	0.08079	31335	Saknimit 1988[b]
SARS Coronavirus CoV-P6	40	0.05750	29829	Duan 2003[c]
Murine Coronavirus (MHV)	103	0.02240	31335	Liu 2003
SARS Coronavirus (Hanoi)	134	0.01720	29751	Kariwa 2004[d]
SARS Coronavirus (Urbani)	241	0.00955	29751	Darnell 2004
Average	**67**	**0.03433**		

[a]*(jingwen 2020)* [b]*(estimated)* [c]*(mean estimate)* [d]*(at 3 logs)*

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GLA Position Statement on Germicidal UV-C Irradiation – UV-C SAFETY GUIDELINES, https://www.globallightingassociation.org

Research@purplesun.com, www.signify.com

Overcoming the Pandemic

Prag Bhatnagar, Senior Vice President & SBU Head, Havells India tells us how his organization adapted to succeed during the COVID pandemic

The COVID-19 pandemic has ravaged industries and businesses around the world. What has been the impact of COVID-19 pandemic at Havells?

The pandemic has changed the way we plan for businesses and operate within the ecosystem. The crisis gave us an opportunity to go back to the drawing board and come up with future-ready plans which account for the "new normal". This entailed assessing preparedness for creating demand, investing in technology and creating more digital avenues for sales. This also meant aligning our production as well as our logistics and IT capabilities, to meet the needs of the post pandemic scenario.

During the lockdown, Havells utilized the true potential of digitalization to address service-related issues. This will continue to be an important part of our aftersales experience going forward as well. Overall, our way of selling is also going through a paradigm shift from being traditional, more physical to more virtual relying on the digital media where technology will play a key role in our connect with our partners.

How has Havells looking to overcome the impact caused by the COVID-19 pandemic?

As with all businesses, the impact was quite profound for companies that are essentially dependent on domestic consumption. While April'20 was practically a washout and May'20 witnessed little recovery, we saw a better recovery in the month of June'20 with an increasing contribution from smaller towns and semi-urban geographies. Semi-urban and rural areas are almost back to normal, while urban centers like Delhi, Mumbai, Chennai and Kolkata are gradually coming back on track. This is quite consistent with what we are seeing in the industry at large.

Do you think that the COVID-19 pandemic has changed the industry perspective? How is the Indian Lighting industry going to look in the future?

The year 2020 has been a difficult year for most of the industries and the situation is same for the Lighting Industry as well. But we were able to accomplish decent growth in B2C owing to our efforts in expanding distribution and focus on rural markets. B2B is a concern area for us because of slow pick up of demand, continued price erosion and delayed capex impacting project timelines. Largely B2B business were affected more than B2C. With increasing inflation in the commodity prices and complexities on the border, the component supply chain has been impacted.

We are optimistic that the Lighting Industry will bounce back to growth soon. As a leading player, Havells is going to keep investing in innovation, new technologies, latest manufacturing systems and brand building. In the foreseeable future, our emphasis will be more on developing new, affordable, make-for-India technological innovations, driving cutting edge connected lighting with AI to provide customized solutions in B2B space and to promote a sense of well-being to consumers at their home. In the current market scenario, having one of the largest local manufacturing setups in India coupled with our R&D facilities in Noida and Bangalore will be an advantage.

Many industries are looking to hedge their bets against a situation similar to COVID-19 pandemic occurring in the future and are insulating their supply chains. Are you looking at something similar?

We are going to make constant efforts to take as much as learning possible from the COVID-19 pandemic and be well equipped to deal with somewhat similar situation, if it ever comes. We will ensure to continue investing in innovation, new technologies and brand. To mitigate the risk, we are working on having fully India-sourced products and to manufacture them locally. We have digitalized our process to ensure seamless supply chain.

By when do you believe the sales in India return to normal levels? Will customers be back soon?

Initial green shoots of recovery have begun last quarter. Indian economy due to its favourable demographics and economic strengths is showing resilience and revival. Favorable policies by the government, intent to push for infrastructure investment and improving consumer sentiments are indicating upward trend. We are optimistic that the recovery will be resumed to normal by next quarter across all segments except on Retail and Hospitality front where it may continue to be subdued.

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Orient UV Sanitech launched to address growing sanitization needs

Orient Electric Limited, part of the diversified USD 2.4 billion CK Birla Group, has launched UV Sanitech, a box-shaped sanitising appliance that uses short-wavelength ultraviolet (UV-C) light to kill viruses including coronavirus, bacteria and fungi on the surfaces of all inanimate objects in 4 minutes. The product is part of the company's commitment to continuously develop innovative products which are healthier safer and add convenience to life.

Amid the Covid-19 pandemic outbreak and post easing of the lockdown there is an ever increasing fear amongst people about bringing contamination inside their homes and offices with the purchased goods and everyday use objects which get exposed to the external environment like mobiles, wallets, electronic gadgets, food items currency etc. Orient UV Sanitech ensures maximal surface exposure of the UV-C light and kills 99.9% of viruses and bacteria. Its Ultraviolet Germicidal Irradiation (UVGI) method breaks down the chemical bonding and scrambles the structure of DNA, RNA and proteins of the viruses, thus disabling them. It comes with a pre-set electronic timer that ensures exact 4 minutes of exposure to the UV-C light, sufficient for killing viruses and bacteria on surfaces of objects.

Orient UV Sanitech has 34 litres capacity and it uses two UVC lamps of 11 watts each placed diagonally providing sufficient UV germicidal irradiation with the surround reflectivity ensuring uniform spread of the UV irradiation from different angles thus increasing the efficacy of disinfection and ensuring 360-degree surface disinfection. It generates Ultraviolet light in the germicidal wavelength of 200nm - 280nm, specifically at 254nm, killing 99.9% of microorganisms.

Halonix drives innovation with Speaker Bulb and All Rounder Bulb

Halonix is the first brand in India to launch a Speaker Bulb, an energy-efficient 9W LED light bulb with built-in powerful and clear Bluetooth speaker. The Halonix 9W LED Light Speaker Bulb has been designed and manufactured in India and can be used for both playing music and lighting. You can easily stream music with a Bluetooth enabled device and also brighten and dim the light in a blink of an eye. You can play music in two light mode settings - bright 9W white light and dim 0.5W yellow light. It works seamlessly and there are no hassles of cables & charging.

The Halonix All Rounder LED light bulb, provides the convenience of three different wattages (with different brightness) in one bulb. You can switch between Bright, Right and Night light mode as per your convenience. You can also optimize your lighting for studying/reading, watching TV/relaxing or sleeping by simply switching off/on the bulb. All Rounder adjustable LED light bulb gives you the convenience of three light settings in one.

Halonix is amongst India's fastest growing electrical company that caters to both retail and institutional buyers with its innovative and smart-tech offerings across Lighting, Fans, Smart IOT products and products focusing on Safety & Security.

Surya Launches the NeoMaxx Night Lamp

Surya has been one of the pioneers of the LED bulb category in India and recently launched another product in its range - the Neo Maxx 0.5W in the night lamp category ahead of the festive season. The lamp has been designed with increased lumens and more brightness keeping in mind the needs of the consumers. The product comes with surge protection of 4KV and high voltage protection of upto 410V. this product has been completely designed and manufactured in India at the Surya world-class research and development centre at Noida.

This eco-friendly product has a lifetime of 25000 hrs and provides max life, max savings and max brightness.

C&S Electric launches Orion-H LED Sports Lighting solution

The Orion-H series LED Floodlights are Ultra-High Wattage, Ultra-High Throw floodlights that are ideal for any area which requires high lux levels such as security lighting, sports floodlighting, open cast mine adit lighting, jetty lighting, etc. Available in wattages of 600W, 750W, 800W and 1000W these floodlights provide wide photometric options for extreme flexibility to the user and the lighting designer and have a standard luminaire system efficacy of 110lm/W. Higher efficacy luminaires can also be provided on need basis. The Orion-H series is available in beam angles of 13deg, 30deg, 60deg, 90deg and 120deg (i.e. NEMA beam angles 1, 3, 4 , 5 and 6) allowing lighting designers to create extremely efficient lighting designs with minimum light spillage and wastage.

The drivers are built into the luminaire and standard 230V/50Hz, powerfeed cables are required to power the luminaire which eliminates the need for long DC cables. All or a group of luminaires can be powered by a single cable with a distribution box at the headframe so there are no extra ballast-room costs.

Dead weight of the floodlights including drivers for 1000W and 800W is about 34kg and for the 750W and 600W is 26Kg which is equal or less than the weight of the photometrically equivalent conventional metal halide sports lights and due to this it is easy to retrofit these into existing towers or tower designs.

Modular design and rounded edges ensure a low windage area which is designed not to exceed conventional luminaires. The required cradle space is less than 0.5m and the height is less than 0.75m which again means that the Orion-H can easily retrofit into existing towers and tower designs.

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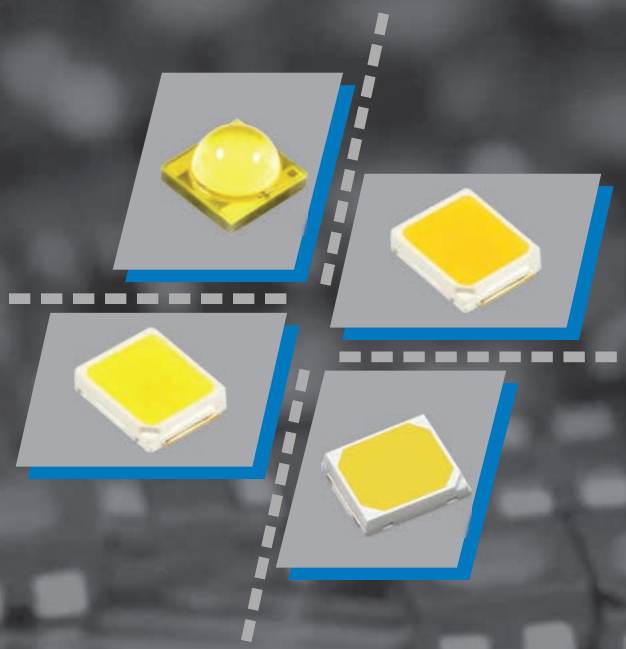

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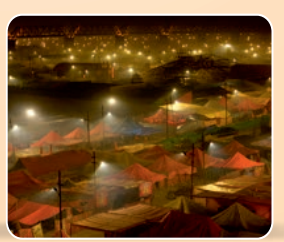

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