

IllumiNation

APRIL - JUNE 2021

THE LIGHTING MAGAZINE

Ancient Shri Kedarnath Temple Glitters with Lighting by Surya Roshni



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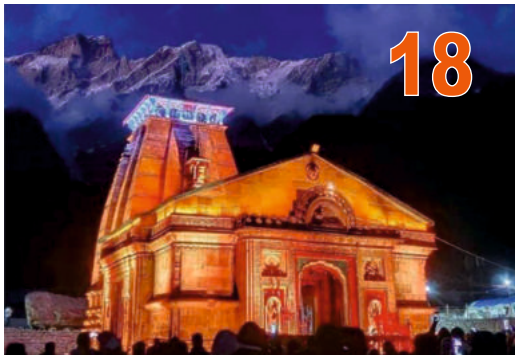


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FOCUS ON SELF regulation, self attestation, self certification



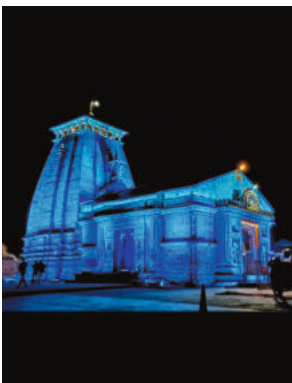
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The Next 50 years

Now that we have completed the celebration of 50 years of ELCOMA, we need to look forward towards the next 50 years. Lighting technology is at a very exciting point of its history. The next few years are going to be revolutionary for the Lighting Industry worldwide. New technologies like VLC, LiFi and Human Centric Lighting are challenging the paradigms of the lighting world. Our industry is going to evolve from an industry in the business of providing 'just' illumination to one that is at the forefront of providing communications, connecting and controlling devices and assets, transmitting and managing large volumes of data, deep space and deep-sea connectivity, health and wellness, sanitization, and many more. As always, I know that our Indian engineers, researchers and other lighting professionals will be at the forefront of these innovations and will make our nation proud of them.

I would like to urge our readers and members to participate in the coming issues by contributing their thoughts on these upcoming technologies and trends and the shape of the Lighting Industry in the coming years.

ELCOMA has already created a vision for the next 4 years of our Lighting Industry called Vision 2024. This document outlines how our industry will become more self-reliant on India made electronic components, a large part of which is imported from other countries at present. Besides becoming almost fully 'Atmanirbhar' on such electronic components, the Indian Lighting Industry also plans to become an export hub for lighting products worldwide. Like ELCOMA's Vision 2020 document paved the way for the rapid introduction of LED technology in India, we are confident that the Vision 2024 will also bring about the indigenization of a majority of our products with the support of all ELCOMA members and the government's schemes.

ELCOMA's 50 year journey started in a small way. When I joined the secretariat in 2004, there was no office and it was being run from a garage at Mr Kansal's residence. At that point, there was a very small income from subscriptions as we had just a handful of members. With the help of Mr H S Mamak, I was given a desk in the office of Thorn Lighting in Defence Colony which also housed ISLE along with the staff of that company. In a period of 10 years, we were able to move to a large office in Jasola which had a nicely laid cabins, test station, workstations and a conference room. We started having various meetings here. International visitors have also held discussions on issues on technology, cooperation and setting up manufacturing units in India.

Though it would be foolish to predict the future, I am confident that the future of the Indian Lighting Industry is very bright.

I wish you all the best and look forward to the next 50 years of ELCOMA.

A handwritten signature in black ink, appearing to read 'S. Sujan'.

SHYAM SUJAN

Secretary General

Electric Lamp and Component Manufacturers Association of India (ELCOMA)



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Atmanirbhar Lighting Industry in India

The Indian lighting Industry has been making most of its products in India for more than 70 years now. However, the advent of LED technology completely changed the scenario for our industry as we had to rely on imported components in order to meet the fast-growing demand for LED lighting in households, in line with the government's vision of an energy-efficient India.

Now that the usage of LED lighting products has matured in India, we have prepared a Vision 2024 plan, under which we intend to localize lighting components in India to the largest extent possible and export 40% of the Indian lighting industry's turnover to other countries. With the government's push of 'Vocal for Local' and its recent announcement of a production-linked incentive (PLI) scheme for LED lighting products to boost

manufacturing in India including 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 of LED lighting products and components in India. I am glad to share that all ELCOMA members have come forward and extended their support to help us achieve our Vision 2024 plan.

ELCOMA has already identified the list of components that are currently imported along with the annual volume requirement to enable interested Indian and global players to join this mission to manufacture in India.

Even though the COVID-19 pandemic disrupted the entire world and the global economy, the good news is that it is slowly ebbing down and life is returning back to normal. We are confident that the situation will be much better by the middle of this year. As most markets have now opened-up and consumer demand has also returned, I believe that the worst is over for our industry and that we shall emerge back stronger. Our industry has been a driving force and accelerator for many innovations and breakthroughs. I am proud to share that even during the COVID-19 pandemic, ELCOMA members continued their work on bringing in new technologies and preparing standards. ELCOMA's involvement in drafting policies, standards, and labelling programs in discussion and together with the government has been commendable.

ELCOMA acknowledges the recent enforcement steps and policy decisions taken by various regulators towards curbing sales of unsafe and non-compliant LED lighting products, but we believe that a lot more needs to be done in this direction to ensure that the safety of the end consumer is not compromised. One of the key steps that the enforcement agencies need to undertake is to drive an awareness campaign for consumers to make them aware of the risks associated with buying non-compliant products and how they can identify non-compliant products using the tools made available by regulators.

With help from ELCOMA members, I am confident that we will be successful in our Vision 2024 mission. By relying on the vast experience and knowledge of all our members, I am sure that the new Vision committee will be able to fulfil the mandate to execute the various wishful programs, with a vision to promote Make in India and export locally manufactured lighting products.

With best wishes

SUMIT PADMAKAR JOSHI
President, ELCOMA

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Pioneering Indian Manufacturing of Specialized Lamps



IllumiNation chats with Dr. Avinash D Kulkarni, Chairman and Managing Director, Litex Electricals (P) Ltd and Arklite Speciality Lamps (P) Ltd on his entrepreneurial journey

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

After graduating from IIT Bombay, followed by a two-year stint with well-known steel consultants in Kolkata, I was awarded a Research Fellowship by an Ivy League University (U Penn). After receiving my PhD, I worked in USA for eleven years with two multinationals, including eight years with Westinghouse Electric where I was felicitated as an inventor for receiving five US patents. I really wanted to return and settle in India but having spent all my years in USA in R&D, the prospect of getting a suitable job in India seemed dim. One of my inventions made it possible to manufacture halogen lamps in SME. The idea of setting up a business in India appealed to me and also to Mahendra Shah who was my colleague at work. We started planning for our "back to India" project which went on for six years. During this period, we carried out a market study for halogen lamps from SICOM and a CA in Bombay was retained to incorporate Litex Electricals as an SSI, to get sanction of MSFC loan, secure import licence for import of plant and machinery and to get allotment of MIDC shed. I returned to India in 1980 and Mahendra followed me a year later, to set up Litex Electricals (P) Ltd in Pune.

What kind of challenges did you have to overcome to see your two organizations reach where they are today?

In early eighties, because of formidable bureaucracy and severe import restrictions, a lot of efforts were wasted just to get the operations going. It took us almost two years to produce the first halogen lamp, in spite of all the planning and preparations we had made prior to returning to India. At that time besides Philips, Litex was the only other halogen

lamp manufacturer. We started branding and by late eighties we were branding for eight Indian lamp companies and our halogen lamp sales, in terms of number, were higher than Philips. During mid-eighties and nineties, we developed and launched a wide range of photocopier lamps and infrared lamps. By mid-nineties, photocopier lamps became our star product but with the advent of digital copiers the market for copier halogen lamps soon disappeared.

Infrared lamps are still a star product of Litex. In 1994 at a special suggestion from CAT (now RRCAT, Raja Ramanna Centre for Advanced Technology, Indore) we started development of Pulsed Xenon Lamps for Laser Pumping. I am very proud to say that till to date we have met all the requirements of these very demanding, advanced lamps for RRCAT which fetch us Rs 10,000 to 30,000 each. Our problem is we do not get enough orders for these lamps.

We have developed a wide range of halogen lamps for film and TV shooting, known as SSTV lamps. LED versions of SSTV will be launched shortly.

Challenges faced in Arklite, which went into commercial production in 1998, were quite different. Double ended quartz jacketed metal halide lamp was the first successful product of Arklite and the company became OE supplier for several Indian and multinational companies. Advent of LEDs has almost completely replaced MH lamps which has been a major challenge. Ultraviolet (UV) lamps made from quartz glass was launched by Arklite in 2004 and we still are the only producers of UV lamps in India. But due to limited market in India for quartz UV lamps we had to rely on their export to USA and Europe. A new application of UV lamps was developed in-house for HVAC industry which enhances Indoor Air Quality, reduces energy consumption by 15% and improves the overall system

performance significantly. The recent pandemic has given a major boost our UV lamp and systems business.

Litex was one of the pioneers in the Halogen Lamps Segment in India. Then you started Arklite which manufactures very specialized products. What made you take these decisions to manufacture specialized products and what efforts were required to make these products as great success?

As a Westinghouse employee I was doing research on halogen and MH lamps along with my main project of tungsten extraction from ores. During my work there I stumbled on an idea which made it possible to make halogen lamps in an SME. The market study carried out by SICOM on our behalf indicated very good prospects for halogen lamp manufacturing in India. When we launched halogen lamps in 1981 its price was about \$10 and now the same lamps fetches \$0.4! New products like copier lamps, IR lamps, Laser Pumping lamps and SSTV halogen (and now their LED versions) enabled us to stay in business.

Metal halide lamp which got us going in Arklite is now almost obsolete, just like floodlighting halogen lamp in Litex. Manufacturing of premium quality in quartz UV lamps and its complete range in Regular, High Output (HO) and Amalgam versions is the basic strength of Arklite. In the past ten years our UV related business expanded significantly because of our focus on application of UVGI (UV Germicidal Irradiation) technology for Indoor Air Quality in centrally air-conditioned spaces. For the past three years we have entered the field of industrial and commercial water disinfection and we see excellent opportunities in water treatment.

You joined ELCOMA and later became its President. Being a small-scale manufacturing company, what challenges did you face during that

time to add value to operations of ELCOMA?

Being from an SME I was quite surprised when I was selected to be the President of ELCOMA. Now I can proudly say that my two-year stint (2002-04) was a ground breaking period for ELCOMA. It took me 13 months to convince our GB that we needed an Advisor of Mr H S Mamak's calibre to make ELCOMA a really effective and dynamic organization. I had to convince this idea to Shekharji (Mr Shekhar Bajaj) first and then I had to sell this idea to Mr Mamak. I will always remain indebted to both of them. Shekharji managed to convince the other GB members and finally we got Mr Mamak to be the Advisor to ELCOMA in November 2003. We appointed Shyam Sujan as the Secretary General and formed several committees like Lamp committee, Luminaire committee, CG committee, LED committee, etc. These committees were chaired by GB members who reported minutes of the committee meeting to the GB. Generally committee meetings are held a day before and therefore ELCOMA quarterly meetings became a two day events instead of just a couple of hours as it used to be prior to the year 2003. I am pleased to note that the template which was created by Mr Mamak during 2003-04 for running ELCOMA is still being followed.

You have travelled the world and have interacted with some of the minds that have developed and implemented new technologies. 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?

In the past 40 years I have travelled round-the-world 18 times, not counting the return journeys to USA, Europe and Far-East. My entry into the lighting

industry happened via R&D at Westinghouse which resulted in deep understanding of the basic technology and confidence to innovate. With the exception of linear halogen lamps, none of the lamps we developed and manufacture in Litex and Arklite are being produced by any other company in India. As of now R&D in the lighting industry is conspicuous by its absence. The last decade has seen very rapid changes in lighting technology and now LED is making all other technologies obsolete. There is a considerable scope for R&D for adopting LEDs to existing conventional lamps and several small units are doing it. But overall the R&D efforts are miniscule compared to other countries. India must create infrastructure to make LEDs locally and government support may be needed for such a major effort.

How are you gearing up for the next generation of lighting products given the success of LEDs?

Linear halogen and MH lamps have already been more or less wiped out by LEDs. Star products of Litex are Infrared and Laser Pumping lamps which will not be replaced by LED in the foreseeable future. The UVC lamps, the star product of Arklite, will be replaced by LEDs in several niche applications but for bulk disinfection needs (air, water and surfaces), LED may take a decade or even longer, as per my guess.

We are launching a couple of very important LED products for film and TV shooting in the near future.

Lighting business will also depend on a strong R&D and Intelligent Lighting and capability to develop newer designs with speed? If you were to diversify, what products would you choose to make in your set-up?

As a speciality lamp manufacturer we belong to the lamp industry but our focus has been rapidly shifting away

from lighting to non-lighting applications. Disinfection of air, water and surfaces by UV is a major and rapidly growing businesses and Arklite is expanding our footprint in this application. Similarly Litex is expanding its heating business with IR lamps and their applications. We also see good prospects for our Laser Pumping lamp range.

IN A LIGHTER VEIN

Favourite Food : Chinese and Italian cuisine are my favourite and I love South Indian dishes too.

Favorite Holiday : I have been a Club Destination Mahindra member and had vacations in many of their locations.

Which is/are your favourite restaurant/s? : I have been patronizing Mainland China and Little Italy for years.

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

I still enjoy my weekly music lessons. Reading and practice of spirituality are very important part of my life. Heartfulness meditation, pranayama, yoga and evening walk are part my daily routine.

Who is your inspiration in life?

My parents. Ours is a big family with eight siblings. My father, raised in an orphanage in Pune, migrated to Gwalior after schooling and retired as Principal of the College of Education in MP. My mother who was a high school pass-out at the time of marriage, studied from books of my eldest sister and both did MA in Sanskrit together. My eldest sister recently stopped teaching Sanskrit in London University at the age of 80 years.

INTERVIEWED BY ILLUMINATION EDITORIAL TEAM



Applications of Tunable White Light

A look at how Human Centric Lighting can be applied to Education, Healthcare and Offices

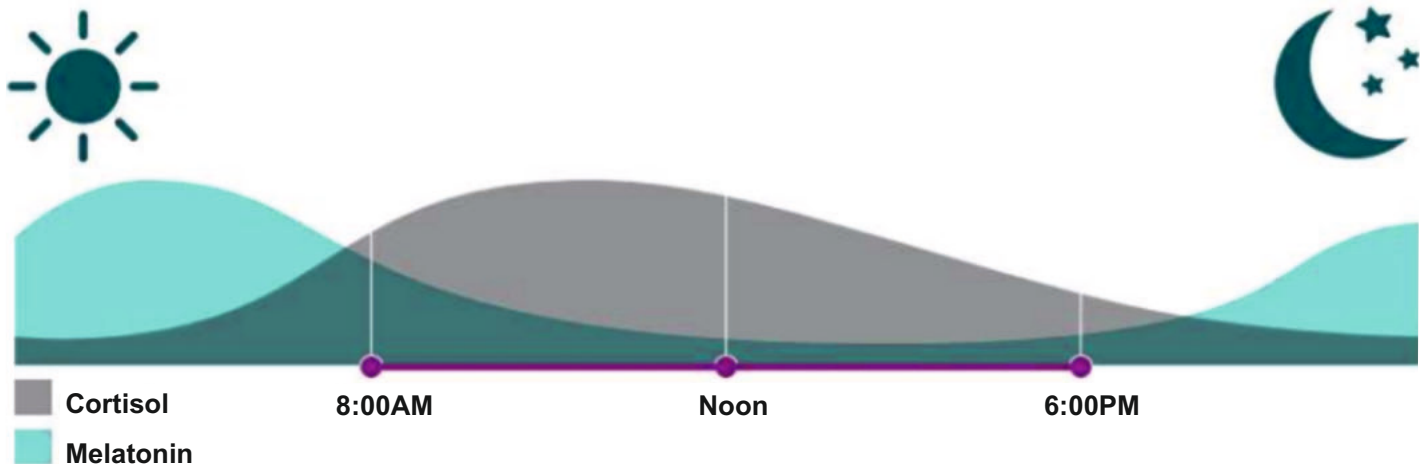


Figure 1: Daylight vs Cortisol and Melatonin production ^[1]

Lighting has a profound effect on the human body. Light is more than just how we see. It also affects how we feel and how we function.^[1]

The effect of light on our biological clock is important as it influences many aspects of our physical and emotional well-being. This biological clock is regulated by light and darkness, by the daily cycles of night and day and the time we spend asleep and awake. In the morning, as the sun comes up, light levels increase, the color of light shifts towards cooler color temperatures, and we wake up and become active.^[1]

On the other hand, in the evening, as the sun goes down and the color of light shifts towards warmer color temperatures, we unwind, relax and prepare for sleep. Our body's hormone levels rise and fall with these light cycles.^[1]

Cortisol production increases with morning light and decreases throughout the course of the day. Melatonin levels increase as darkness sets in and decrease as morning approaches. In our modern society, we spend much of our time

indoors - at home, in a school, office, shop or hospital. Those who must stay indoors for significant parts of their time under static lighting conditions run the risk of disrupting their biological rhythms.^[1] Especially people that have to stay indoors for significant part of their time, like patients in a hospital or a student in a school or an employee in an office, run a risk that they do not get enough light during the day, to regulate their biological clock properly. By compensating for the lack of sunlight entering these workspaces and mimicking the gradual changing natural light on a sunny day, we can induce benefits that are reported for natural daylight.^[2]

In this article, we will discuss about the three major application segments that compel users to stay indoors for a prolonged period of time during day and how a tunable white light solution can help to enhance their experiences indoors. These application segments restrict their users to be exposed to the artificial light for the maximum part of their days and hence the best possible solution currently is to expose them to an artificial light which can mimic the

natural light and provide the right type of light for better performance and wellbeing. These application areas are Education Segment / Schools, Healthcare facilities / Hospitals and Offices.

Education Segment / Schools

Attending school requires more effort for children than for grown-ups since they are undergoing physical, cognitive and psychosocial development.^[3]

Nowadays, children and youngsters live a busy life. They are continuously in contact with their peers via mobile phones, and the Internet. It is a common belief that, in combination with the exposure to external stimuli like television, it is harder for children to relax and sleep. As a consequence, children and youngsters might be less focused at school and their behavior may result in hyperactivity or apathy, which might impact their performance at school.^[3]

Various educational research has provided valuable insights into the importance of various aspects of learning environments, such as learning tasks and materials, time on task,

teachers' instructional behavior and the relationship between teacher and student. As human centric lighting has gained importance in recent past, many systematic empirical research has been done to understand the influence of physical aspects of students' learning environment.

Research into the effect of lighting on school performance can play a vital role in improving learning environments in schools. Good educational lighting should provide a visual environment that supports the learning process. Light is a strong signal to the human body: Light allows for visual performance and alertness, and it regulates a large variety of bodily processes and some important hormones such as melatonin and cortisol, essential for a healthy rest-activity pattern. Moreover, lighting plays an important role in evoking emotions such as feeling confident and feeling safe.^[3]

The period between infancy and adulthood involves many changes. During the first twelve years children grow physically, cognitively and psychosocially. Specific aspects related to lighting and school performance are the maturation of the eye, changes in circadian rhythm and the development of visual and cognitive skills. These changes cannot be seen separately: changes in one aspect of a child's development have implications for other

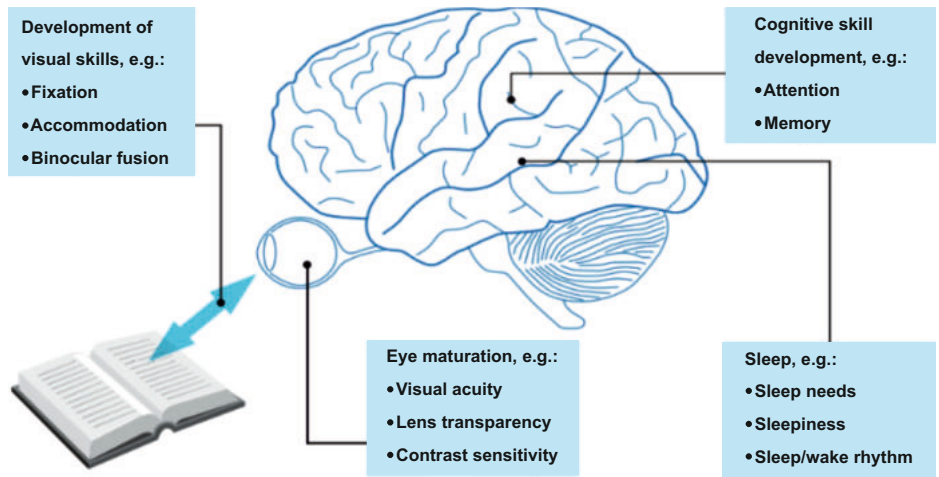


Figure 2: The development of the visual system is dependent on the development of visual skills, maturation of the eye and cognitive skills.^[3]

developmental aspects. For instance, the development of reading depends on both perceptual and cognitive abilities.^[3]

The fact that youngsters are still in development has consequences for their visual capacity, circadian rhythm, and cognition. This in turn affects their school performance. Figure 3 shows schematically the relationships between well-being, visual capacity, cognitive capacity, circadian rhythm, behaviour, environmental appraisal, and mood, and consequently, the child's school performance.^[3]

The past few decades have seen increased awareness that the indoor environment has a major effect on humans. A good classroom lighting design is beneficial to teachers and

children alike and supports children's academic performance.^[3]

A direct link between school performance and lighting conditions with respect to intensity, spectrum and color temperature is claimed by many researchers. A study by Schulte-Markworth, Barkmann, Wessolowski (2010) at the University Medical Center in Hamburg-Eppendorf showed that the reading speed of children can be improved by offering them different light settings. With the 'concentrated light setting', children scored significantly better on the reading speed test.^[3]

With the wide availability of tunable white light in the current market, it has become quite necessary to develop solutions for schools. It has been proven from various studies that different light settings – by varying color temperature, spectrum and intensity – stimulates different type of response in the children. The results of these studies can be put in application with the commercially available tunable white luminaires in the market.

Schools can be installed with tunable white lights with various scene setting options. By empowering the teacher to change the lighting depending on the activity, the time of the day, or the

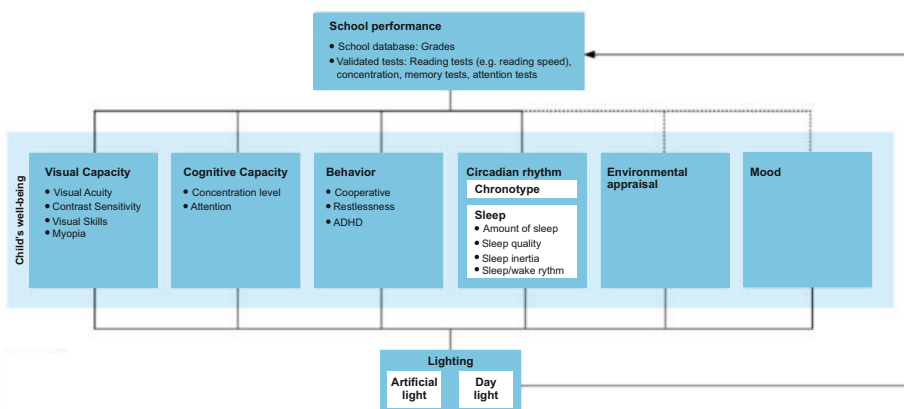


Figure 3: The relationship between a child's development and school performance^[3]

atmosphere in the class, the different task settings can be created very easily. A simple push on the button can allow for a classroom ambiance that supports the task at hand and transforms the educational space for the next activity. These settings need to mimic the natural patterns of daylight that human bodies respond to, which have been shown to help children stay focused and alert. High intensity cool white light can be used when concentration and reading speed are important, whereas warm white light can be used when cooperation is required.^[3]

The right kind of tunable white solution for the schools helps by ^[3]:

- **Increased learning performance** – Focus light setting supports students to learn, concentrate during instruction or exam.
- **Enhance creativity and restoration** – Calm light setting enhances the creativity of students and supports them to relax.
- **Increased satisfaction** – Teachers are supported in teaching and class management, while students are motivated by the variations in atmosphere.
- **Increased visual comfort** – By offering targeted lighting for up-close visual tasks and soft illumination when it is time to relax.
- **Reduce hyperactivity** – Students calm down faster down when the lighting is changed from one setting to another i.e. from focus setting to calm setting.

The WELL Building Standard™ version 2 (WELL v2™) is a vehicle for buildings and organizations to deliver more thoughtful and intentional spaces that enhance human health and well-being. WELL v2 includes a set of strategies—backed by the latest scientific research—that aim to advance human health through design interventions and operational protocols

and policies and foster a culture of health and wellness.^[6]

The WELL building framework covers 11 “concepts,” including water, materials, thermal comfort and light, with the goal of defining design features that support and advance human health and wellness. There is a WELL recommendation for generic spaces (WELL v2 Pilot; IWBI 2019) and a separate recommendation for classrooms (WELL Education Pilot).^[5]

By designing schools with artificial light having proper WELL parameters, we can create an indoor space that mimics the natural light in the best possible way. The two important parameters as defined by the WELL standards that can measure the biological quality of daytime electric light is expressed by:

- Melanopic daylight efficacy ratio: Melanopic DER (MDER) – which measures Strength
- Melanopic equivalent daylight illuminance (lux): Melanopic EDI (MEDI) – which measures Intensity^[6]

In schools, findings from a series of studies employing fluorescent lighting with various intensities and spectra indicate that settings with a higher melanopic output (melanopic EDI >500 lx) can improve measures of concentration and reading comprehension compared to current standard lighting (typically providing melanopic EDI <200lx). Similar benefits of short-wavelength-enriched (17000K) vs standard 4000K fluorescent light on reducing sleepiness have also been shown in college-aged students during daytime lectures.^[7]

By using a tunable white solution in the classroom settings, an indoor space with a higher MEDI can be designed. In conclusion, designing a school with these parameters not only helps the student to have a better circadian rhythm and sleep cycle but also impacts their academic performances.

The right use of lighting at school can enhance the learning process in children. Having enough daylight at school is important and contributes to school performance. In addition, a good lighting system can help transform the entire school experience with lighting that meets children's visual, emotional and biological (rhythm) needs.^[3]

Healthcare facilities / Hospitals

Impaired sleep is a known hospital stressor and hospitalized patients struggle to get sufficient sleep at night due to factors such as discomfort, worries, noise, inappropriate light exposure and pain. Sleep is an important factor to promote the wellbeing and recovery of patients. Proper timing of the light exposure is critical: brighter daytime light conditions are associated with better mood and sleep quality, while excessive light exposure during the evening or night-time has an acute disruptive influence on sleep.^[8]

The typical daytime illuminance indoors is insufficient to generate the same benefits as the outdoor illuminance (2000–100000 lux of blue-rich light) under which we have evolved. Daytime exposure to high illuminances, from either sunlight or a few hours of bright-light therapy, is known to have beneficial effects on clinical parameters such as recovery, length of stay, delirium, depression, anxiety and use of pain medication.^[8]

Moreover, in neonatal intensive care units cycled lighting has a favourable influence on many outcomes as compared to 2-h dimmed light or continuous light. In people with dementia, night-time sleep increased significantly after 3 weeks of exposure to either morning or all-day bright light. Moreover, a single 2-h bright-light pulse in the morning advances the circadian rhythm and can help prevent sleep-compromising delays of the body clock.^[8]

As part of the Signify (Formerly Philips Lighting) initiative to develop and validate the tunable lighting solution for patient rooms, a field study was carried out at the Maastricht University Medical Centre (MUMC) in the Netherlands. This study was performed in cooperation with the Clinical Trial Centre Maastricht and Maastricht University as research partners. In this study, the effects of a dynamic patient room lighting cycle on sleep, appraisal and mood during hospitalization on a cardiology ward. Patients either stayed in control rooms with standard lighting or in intervention rooms equipped with a new dynamic lighting system. Subjective ratings were used to evaluate sleepiness, sleep quality, headache, eye-strain, depression, anxiety and lighting appraisal.^[2]

The findings of this study showed that a tunable white luminaire which can mimic the outdoor natural light in an indoor scenario has the following benefits:^[2]

- Better sleep quality
- Improved patient orientation and sleep patterns assist recovery
- Less wandering at night and slower cognitive decline for dementia patients
- Improved daily activity pattern for institutionalized clients
- A stimulating workplace, supporting the well-being and performance of staff

Regular 24 h light/dark patterns with sufficient daytime brightness, and night-time darkness (or dim light), can help health- and elderly-care residents to maintain their circadian rhythm. Moreover, evening/night-time light exposure acutely suppresses melatonin production. This sleep-disruptive effect can be reduced by lowering light intensity, by offering a preceding (daytime) exposure to bright light. Furthermore, 4 weeks of midday bright light are known to increase nocturnal

melatonin levels in elderly insomniacs.^[8]

Bringing the benefits of daylight to living rooms in nursing homes and patient rooms in hospitals and working areas for staff by using tunable white luminaires creates a positive impact by^[2],

- Providing a better sleep-wake rhythm essential for recovery of patients
- Improving the daily activity pattern for institutionalized clients

Lighting has a strong impact on the timing and strength of the circadian sleep-wake rhythm and with that on our sense of wellbeing during the day. Bright light in the morning and warm lighting conditions at the end of the day strengthens the circadian system. The biorhythm support by tunable white dynamics will be reflected in better health, increased daytime wakefulness, greater well-being and better mind-of-state.^[2]

To create a better healing indoor space in hospital settings mimicking the natural daylight in the patients room a dynamic lighting similar to figure 4 needs to be simulated as per the insights in the chronobiology.^[2]

Tunable lighting system which mimics the outdoor lighting conditions improves patient experience in hospitals.^[2] The flexibility to alter both the colour temperature and the intensity creates an indoor environment that supports healthy sleep, alleviate anxiety, and biorhythm of patients and staff.

Offices

Our response to light depends on several factors: the internal time of our biological clock, the light spectrum, intensity, preceding light exposure (we respond more if coming from darkness or dim light), but also our preceding sleep behavior. There are lessons in all this for lighting at home, and in offices, schools and hospitals. During the day,

blue-rich light is good for us. A joint study of office lighting in 2008 by Signify (Formerly Philips Lighting) and the University of Surrey showed that

- people rated their alertness and performance as being higher with a higher CCT level,
- they were less troubled by evening fatigue and reported improved sleep quality.

All these parameters showed significant improvements, around 10 to 20% better than the control condition with standard white lighting of 4000K. This clearly shows that enhancing daytime light exposure can help us to get better sleep at night. The study was done in winter in the UK, so there was very little daytime light exposure outdoors. When companies design new offices, they pay a lot of attention to factors like air conditioning, infrastructure and ICT, but they rarely consider light at all. Doing so could, however, bring real benefits for sleep, health and well-being, thus improving productivity and creativity.^[9]

According to the current circadian metric models, it is important to increase lighting stimulus in intensity and short wavelength spectral content during the day, particularly in spaces absent of daylight, and reduce light levels and short wavelength spectral content in the evening and at night to support healthy sleep.^[5]

The current workplace is evolving with many challenges such. With the rising cost of real estate and continuous distraction due to the current lifestyle of the employees, it has become more important than ever to increase the productivity of the employees. The workplace is now designed with a more flexible layouts to support different activities and different age group of workforces. Personalisation is becoming more important, and the spaces are designed to create a more personal area for the employees, yet the lighting

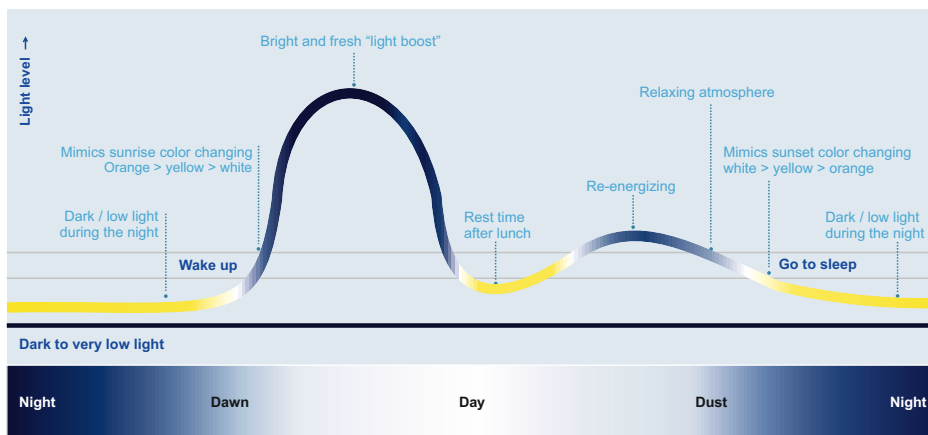


Figure 4: The dynamic curve which mimics a healing setting for a patient room lighting based upon the newest insights in the chronobiology.^[2]

designs are kept impersonal and static. As the competition in the market is on rise not only for the employees to attain the best job but also for the employers to be attractive to the prospective employees and to retain the best talent and increase the retention rate. All these challenges can be addressed by using a tunable white solution in the office space.

There are proven results in various studies and experiments which can quantify these effects. According to the results of the office simulations carried out by Pacific Northwest National Laboratory^[5], a tunable white solution for the office space solution is needed to meet circadian metrics for design.^[5]

Average equivalent melanopic lux are generally largest for the simulation conditions with higher CCTs and vertical illuminance levels.^[5] With a tunable white solution in office space we can achieve a higher equivalent melanopic lux levels.

Melanopic (non-visual) light has direct connection with:

- Light intensity cycle
- Dark-light cycle and circadian rhythm
- Light spectrum

We experience too little light during the day as we spend most of the time in offices. And at night we are exposed to too much light due to usage of electric light, which disturbs our sleep-wake cycle. Both of which have a negative effect on the way our bodies function.

During the day we need effective, melanopic light nutrition.

In offices, light exposure during the day drops significantly as compared to the natural daylight. Due to electric light, the light distribution of the light source has a huge impact on how much light reaches our eye. In the current working environment, exposure to light at night is considerably more compared to living outdoors. Too little light during the day and too much light during the night, can have negative effects on our sleep. It shifts the timing of melatonin production, which in turn puts our circadian rhythm out of sync with the

natural dark-light cycle.^[6]

Apart from our sleep-wake cycle, the central body clock synchronizes with the clocks in the other organs and cells. As a result, it affects a whole range of physiological processes such as metabolism, restoration/recovery processes, heart rate and blood pressure. In the end a weak circadian health can lead to an increased risk of diabetes, weight gain, cardiovascular disease, mood disorders and even cancer.

In the office, we are exposed to electrical lighting for many hours in the working day. However, its melanopic effectiveness does not compare to that of natural daylight because^[6]:

- The melanopic strength of the electric light is much less
- The amount of electric light (intensity) is much less

Keeping the WELL rating building parameters, in standard office lighting designs (500 lux), with a recessed direct 4000 K LED solution, the melanopic EDI is about 100-130 lux. In standard office lighting designs (500 lux) containing the cyan enhanced spectrum projects achieve melanopic EDI of more than 163 lux.^[6]

Projects that achieve melanopic EDI of at least 163 lux meet healthy building design requirements for biological light.^[10] As such the electric light is designed to contribute to a sound sleep and easy wake up, daytime vitality and daytime alertness, ability to concentrate and mentally restore makes office workers less sensitive to late evening light. The tunable white solution achieves a higher MEDI and hence creates a circadian lighting design.

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Views expressed in this article are those of the contributors and do not necessarily reflect those of the editors or publishers

Reference :

- 1 - Color Kinetics White paper: Integration of OneSpace TW panels with circadian rhythm control, Version 2.2
- 2 - Philips HealWell White paper - Backgrounds on Light & Health and description of the HealWell System
- 3 - Philips White Paper – The role of lighting in primary and secondary schools
- 4 - Philips White Paper – The role of lighting in primary and secondary schools
- 5 - Safraneck S, Collier JM, Wilkerson A, Davis RG. (2020): Energy impact of human health and wellness lighting recommendations for office and classroom applications. Energy & Buildings. Available online 12 August 2020
- 6 - WELL v2, The next version of the WELL Building Standard, International WELL Building Institute, pbc., 2020
- 7 - Timothy et al., (2020): Recommendations for healthy daytime, evening, and night-time indoor light exposure, 1 December 2020
- 8 - Gimenez et al (2016): Patient room lighting influences on sleep, appraisal and mood, The Authors. Journal of Sleep Research published by John Wiley & Sons Ltd on behalf of European Sleep Research Society.
- 9 - Philips White Paper - The effect of light on our sleep/wake cycle by by Luc Schlagen, principal scientist at Philips

3000 year old Shri Kedarnath Temple Illuminated by Surya Roshni



The sacred temple situated at a height of 3500 meters is illuminated with Special Lighting Fixtures from Surya



Standing magnificently at an altitude of 3,580mtrs, enveloped on all sides by the mighty Garhwal Himalayas, the Kedarnath Temple is one of the twelve 'Jyotirlingas' of Lord Shiva and is one of the four sites of the 'Char Dham' pilgrimage. It tinders an unflustered ambience with its colorful rhododendron woods, snow covered mountains and splendid sights of nature. This sacred temple is visited by lakhs of tourists each year to seek the blessing of Lord Shiva and revel in the glorious scenery of this region.

Legend has it that the Pandavas constructed the Kedarnath Temple which was later reconstructed by Guru Adi Shankaracharya in 8th century AD, making the Kedarnath Temple over 3000 years old. Having stood the test of time, it is claimed by geologists that the magnificent structure was under snow for 600 years during the Little Ice Age (1300 AD – 1900 AD).

The extravagant and impeccable structure of Lord Shiva's shrine is made of grey stone which are interlocked by the use of iron clamps. No mortar has been used in the construction of this wondrous temple. The steep climb to reach the temple that starts at Gauri Kund brims with abundant beauty of nature. The paved and steep path makes for fantastic views of snowy-peaks, alpine meadows and delightful forests of rhododendrons. A large stone statue of Nandi Bull gazes at the shrine, guarding it, sitting right opposite it.

Over the years, the Kedarnath Temple has withstood natural calamities like avalanches, earthquakes, and most recently, the flash floods of 2013 when a huge rock was lodged behind the Kedarnath Temple, diverting the flow of river and debris to the sides of the temple and protected it from the ravages of the flood that destroyed everything

else in its path.

Surya Roshni Limited recently illuminated the Kedarnath Temple in association with the Kedarnath Charitable Trust/Uttarakhand Tourism Department in an effort to provide permanent illumination of the temple for the duration of the yatra with energy efficient, ecofriendly and robust luminaire installation that can sustain the harsh weather conditions.

The new illumination makes for a spectacular sighting of the temple, sprucing up the magnificent structure and highlighting the various facets of the building, while being a substantially economical and environment friendly lighting solution.

The Project

Based on customer needs, the product designers at Surya Lighting Company carefully selected fixtures that can efficiently work at -40°C Celsius

COVER STORY

temperatures and zeroed down at the 'BELLISSIMO' range of façade lighting luminaries to irradiate various architectural elements of the temple. In consultation with a team of project consultants, detailed lighting designs were made using 3D simulations to create true scale visualizations for depicting various lighting effects prior hand. Surya's design and site engineering teams recreated a scaled down mockup at site to reproduce and validate design concepts and precise identification of luminaire placements.

State of the art LEDs with 4-in-1 color changing chips of RGBW ensured the creation of numerous scenarios within White (2400K – 6500K) or Color options. High efficiency 150W linear wall washers in a mix of narrow, medium and elliptical beam angles were selected to highlight various elements of temple architecture including the

Mandap, the Garbhgrah and the Shikhar. The control system is a power packed solid state intelligent controller and can control up to 5 zone programs running simultaneously. Various lighting schemes are designed and stored in the onboard memory of controller that are triggered automatically during Main Aarti, Dwar closure timings and other related timelines. An in-built astronomical clock ensures precise triggering of predefined scenes at related timelines thereby eliminating any manual interventions. In addition to this, a dedicated user interface remote is also made a part of system to ensure a real time override by user to instantaneously select a particular lighting color or prescribed scene.

The high reflective index from the surface of temple, the clean air and serene environment provides a soothing aura of reflected lights in prangan area

where devotees experience elevates with joy, enthusiasm and divine bliss.

This project adds another milestone to SURYA's journey of successfully executed projects like Leh Palace (a listed Adarsh monument under Archeological Survey of India), Illumination of Kumbh Mela 2019, Indo-Pak Border Lighting, Smart Cities of Indore and Navi Mumbai, DMRC, Ahmedabad Metro and many more. Surya Professional Lighting enables the intertwining of these ancient and wondrous structures with new technology and magnificent lighting solutions in an effort to amplify the beauty of these landmarks in an electrifying and inspiring manner, creating an experience that will be etched in pilgrim's minds forever.

AUTHOR : SURYA ROSHNI LIMITED

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Industry Feedback on Budget 2021-22

Mr Avinder Singh, Managing Director & Chief Executive Officer at OSRAM Lighting, India provides his opinion of the Budget 2021



What are the key takeaways of the Union Budget of 2021?

It was the first-ever digital Union Budget in the Parliament which was very unique about this budget.

India's 2021 budget comes against the backdrop of a recession, with the economy expected to shrink by 7.5-8% in the current fiscal. In the last few months, the recovery has been faster than many expected but the economy is not out of the woods yet. There could be a second wave of infection (some of the states are already witnessing a surge in COVID cases); MSMEs remain under stress; Bank lending is still constrained, and the real investment cycle has not picked up meaningfully.

Given these circumstances, the Budget needed to support the current momentum while also keeping an eye on

the longer term. To an extent, the Budget did a respectable job – an intelligent & smart attempt to bridge the dangerously growing fiscal gap!

Is it a boon or a bane for the Indian Lighting Industry?

I believe that the budget is not focussing on the lighting industry sector. To that extent it is neutral!

With lighting not mentioned as a specific and focused sector we have to rely upon the growth and boon of the other sectors and likewise be cautious for the bane of other sectors. So, when it comes to focusing on sectors like infrastructure, agriculture, power, housing, healthcare, and automotive then indirectly lighting industry sees an opportunity. Our digitisation & intelligent does see an opportunity in the said sectors besides smart and dynamic

lights.

What more could the FM have done to promote the Lighting industry in India?

I did not find anything specific for the lighting industry per se. Of course, indirectly we get influenced by the budget's sectoral specific focus like on Infrastructure, Power, Housing, Agriculture, Automotive etc.

To be fair, we should have been treated like any other important sector to get focussed attention and booster to grow especially looking at our contribution to EESL's various national programs wherein we participated wholeheartedly.

Any other specific comment you would like to make regarding the budget?

The Budget is themed on 6 key pillars of building an Aatmanirbhar Bharat (self-reliant INDIA – localisation focus) and outlining a sense of overall development - Health and Well-being, Physical and Financial Capital and Infrastructure, Inclusive Development for aspirational India, Reinvigorating Human Capital, Innovation and R&D and Minimum government and Maximum governance.

On the other side, a few additional rules proposed to be imposed in customs, GST (some of them even retroactively) could have been avoided to reduce the complexity and dis-ease of doing business!

INTERVIEWED BY ILLUMINATION EDITORIAL TEAM

Need to ensure India is recognised as a quality conscious nation at global level: Piyush Goyal



Shri Piyush Goyal Minister for Consumer Affairs & Food and Public Distribution, Railways and Commerce and Industry virtually addressed the participants of a Workshop on Easing Compliance of BIS Certifications on 3 March 2021 and stressed on improving Indian quality standards to ensure that India is

recognised as a quality-conscious country with which people can do business with confidence.

"We must work towards ensuring India's recognition at the global stage as a quality conscious country, as a country with which people can do business with the confidence that they will get what we say, they will receive what they

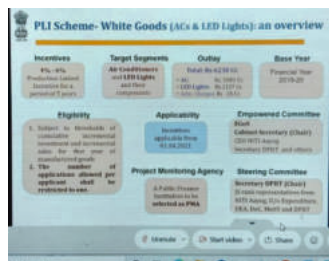
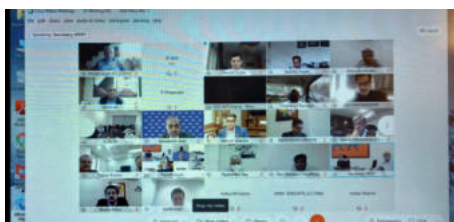
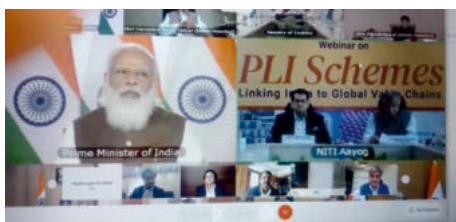
require" he said.

Speaking at the concluding session of the Workshop on Easing Compliance of BIS Certifications, he said that Quality is profit, and it prepares businesses for greater profits. He said that Quality speaks for itself, and Quality is not expensive. It adds to the productivity, helps businesses to get bigger markets so that they can get economies of scale and helps to eliminate wastage.

Urging for a greater collaborative effort through our industry associations, Shri Goyal said we should make the Indian standards world-wide accepted standards. He said that Bureau of Indian Standards (BIS) should operate on 'QUICK' Model - Quality, Uniformity through One Nation One Standard, International Mindset, Conformity Assessment and Knowledge Sharing. He said that Our Mantra should be Quick Action, Quick Response, and Quick Absorption of best practices and Quicker Ways of Working.

The Minister called for more and more use of artificial intelligence, big data and other technology related solutions to help resolve standardisation issues facing industry and other entrepreneurs. Shri Goyal said that 'ISI Standard Mark' should represent Quality, Productivity, Affordability & Accessibility.

The Minister said that the certification process will be simplified in the future. Stating that BIS should ensure the cost of testing never becomes a detriment to conforming to quality and getting certification, he said that there will be reduction of fee for the certification for MSMEs. He said that this is a dawn of a





new era of an Aatmanirbhar Bharat where digitalization & efficiency are going to determine India's success in the future. The Minister mentioned that it is protected by quality consciousness of consumers & also by our collective consciousness.

Addressing the Hon'ble minister Shri Piyush Goyal and other dignitaries present at the meeting, Mr Sumit Joshi, President, ELCOMA expressed the views of Lighting Industry.

On behalf of the Indian Lighting Industry he wholeheartedly welcomed this great initiative of DPIIT to promote make in India LED lighting products/components in alignment with Hon. Prime Minister's vision to push for products made local for local and local for global.

Mr Joshi said that the Indian Lighting Industry, predominantly has been making all products in India for more than 70 years. He recalled that in 2014 Shri Piyush Goyal played a very important role in bringing LED to India on large scale, when ELCOMA proposed an initiative to promote LED products in India. He opined that the Indian Lighting Industry's connect with the hon'ble minister is not new and it is under the hon'ble minister's able leadership and visionary thought process the Indian Lighting Industry had seen a leap frog approach to shift from conventional incandescent lamps and CFL to LED lighting.

Mr Joshi thanked the hon'ble minister

for considering LED Lighting as one of the sectors with high growth potential for manufacturing not only for local market but also for global market under the proposed PLI schemes of Government of India. He also requested the government to consider focussing the PLI scheme more towards component manufacturers so that the infrastructure for electronic component manufacturing can be strengthened in India.

Mr Joshi informed the august gathering that "ELCOMA is ready with a Vision document called 'Vision 2024' that proposes to achieve maximum indigenisation by 'Making in India' and targets to export over 40% of our turnover to the world. In this regard the Indian Lighting Industry seeks the continued support of the government not only in form of the proposed PLI scheme but by addressing the issues we raise from time to time with the ministry which impacts the local manufacturing ecosystem of lighting in India"

The meeting was attended by more than 200 delegates from over 100 Associations.

Mr. Chandrajit Banerjee, DG, CII, presented the list of issues / suggestions made by participants which included

- Harmonization of standards modified to Indian conditions
- Legislation/ Compliance should be adhered to seriously
- There are 20,000 global standards and the cost of standards compliance is very high. The cost of standard should be reduced to make them more affordable by all.
- Standards/certifications should be acceptable to all stake holders, especially the manufacturers. Strict action to be taken against those non-compliant
- Training on technology and standards must be undertaken

- Information sharing on Quality / Standards for Industry/Manufacturers should be carried out
- Compliance of standard must be carried out to the grassroots level

Mr. Dilip Chenoy, DG, FICCI opined that more testing labs were required to meet the ever growing demand that there should be a possibility for creation of a cluster of labs for various sectors required under joint ventures. Mr. Vineet Agarwal, President, ASSOCHAM, Mr. Sanjay Aggarwal, President, PHDCCI and Mr. Pramod Kumar Tiwari, DG, BIS presented their views and support required to be extended by the government for their respective associations.

Secretary, Department of Consumer Affairs Smt. Leena Nandan also addressed the workshop. She applauded the workshop saying that the workshop was a very fruitful and rewarding session for all participants to reach out to the industry. She said the Department of Consumer Affairs and the DPIIT have been working closely to remove the difficulties faced by the industry. In her closing remarks, she assured those present that "We will give full attention to each and every suggestion received during the meeting"

The workshop was organized jointly by Department of Promotion of Industry and Internal Trade, along with the Department of Consumer Affairs and Bureau of Indian Standards, to facilitate closer interaction between various sectors of industry and the apex national standards body. This workshop was been organized to facilitate closer interaction between various sectors of industry and the apex national standards body. Four technical sessions on Standardization, Testing Activities, Certification Activity and Implementation of QCO's were also organized during the workshop.

AUTHOR: ILLUMINATION EDITORIAL BOARD

PLI scheme likely to boost India's manufacturing output by USD 520 billion in five years: PM Modi

Addressing a webinar, PM Modi said that the government is continuously carrying out reforms to boost domestic manufacturing.



P rime Minister Narendra Modi on 5 Mar 2021 said the Production Linked Incentive (PLI) scheme, aimed to boost domestic manufacturing and exports, is expected to increase the country's production by \$520 billion in the next five years.

“\$520 billion of production is estimated to take place in India in the next five years through PLI alone. There is also an estimate that workforce will double in the sectors that have been given PLI. This will help increase income and demand,” PM Modi said while addressing India Inc at the webinar on PLI schemes organised by the Department of Industry and

International Trade and NITI Aayog.

He said the government has provided for Rs 2 lakh crore in this year's budget for PLI schemes wherein an average 5% of production has been given as incentive.

The Centre has announced 13 PLI schemes in wake of the COVID-19 pandemic last year to encourage large companies to ramp up manufacturing base and boost exports from India. The total incentives under the PLI schemes, covering sectors such as telecom, electronics, auto part, pharma, chemical cells and textiles, are pegged at Rs 1.97 lakh crore over a five-year period.

These 13 sectors include Mobile Manufacturing and Specified Electronic

Components, Critical Key Starting materials/Drug Intermediaries and Active Pharmaceutical Ingredients, Manufacturing of Medical Devices, Automobiles and Auto Components, Pharmaceuticals Drugs, Specialty Steel, Telecom and Networking Products, Electronic/Technology Products, White Goods (ACs and LEDs), Food Products, Textile Products: MMF segment and technical textiles, High efficiency solar PV modules, and Advanced Chemistry Cell (ACC) Battery.

“We have to change the situation of exporting limited products to limited countries from limited locations,” Mr. Modi said.

Emphasising that earlier, industrial incentives meant open ended provisions but now they're target and performance-based, Prime Minister said: "To bring 13 sectors in such PLI shows our commitment. Besides impacting the respective sectors, they will benefit the ecosystem". PM Modi also said the quality of our products is good, people will be willing to pay extra for it and that India has to attract more cutting edge technology and investment in sectors with core competency.

The government, Mr. Modi said, is working to reduce compliance burden, further improve ease of doing business and cut down logistics costs for the industry. "Our effort is to reduce 6,000 compliances burden on entities at the state and Central level. With technology, we can get rid of the need to continuously fill up forms," he said.

"We believe government's interference

in every issue creates problems rather than solutions. Hence, our focus is on self regulation, self attestation, self certification," he said.

Sectoral impact

In auto and pharma, PM Modi said PLI will help reduce foreign dependence on auto parts, medical equipment and raw material for drugs while the support given to advance cell batteries, solar PV modules and specialty steel would help modernise the country's energy sector, giving a boost to India's own raw material, labour and talent.

Mr. Modi said textile and food processing PLI will benefit the entire agriculture sector.

The Prime Minister said the PLI in electronics will improve domestic value addition to 20-30% from 5-10% now. In telecom equipment manufacturing, Rs 2.5 lakh crore production in next five

years is expected and India can benefit from the export opportunity of Rs 2 lakh crore. Similarly, an increase in pharma production of Rs 3 lakh crore and exports of Rs 2 lakh crore is estimated.

"Rs 35,000 crore production was done during the pandemic under the PLI scheme for electronics and new investment of Rs 1300 crore has come," he said.

While successful efforts have been undertaken to encourage the Make in India initiative in the last 6-7 years, Mr. Modi said to take these efforts to the next level, big steps and improved speed and scale have to be taken.

To enhance India's manufacturing capabilities and exports, an outlay of Rs 1.97 lakh crore has been announced for Production-linked incentive (PLI) schemes for 13 key sectors for a period of five years starting from fiscal year (FY) 2021- 22.

Easing Business, Manufacturing

PLI SCHEMES TO LEAD TO PRODUCTION worth \$520 bln in 5 yrs

SECTORS WITH PLI scheme to witness workforce doubling

13 SECTORS given PLI worth **₹1.97 lakh cr** in Budget

AVERAGE OF 5% of production is given as incentive in PLI

LOWER COMPLIANCE

AIM TO REDUCE 6,000 compliances

LOWER LOGISTICS costs crucial for industry

FOCUS ON SELF regulation, self attestation, self certification

Key to cut foreign dependence on auto parts, medical equipment

Textile, food processing PLI to benefit entire farm sector

Graphic credit The Economic Times

AUTHOR: ILLUMINATION EDITORIAL BOARD

Mr Shekhar Bajaj Conferred Honorary PhD



Mr Shekhar Bajaj, Chairman and Managing Director, Bajaj Electricals Ltd, was recently conferred an honorary doctorate from Amity University for his significant contribution to the industry. Accepting the award, Mr Bajaj expressed his gratitude to Dr. Ashok Chauhan - Founder President, Ritnand Balved Education Foundation and Dr. Atul Chauhan - Chancellor, Amity University, for conferring him with the honour. At the ceremony, Mr Shekhar Bajaj humbly accepted the award. He shared that the award did not belong to him personally but to the impact that Bajaj Electricals had achieved over the eight decades, powered by the collective strengths of its stakeholders and supporters.

With a market capitalisation of about US\$ 80 billion, 40 Group Companies and approximately 36,000 employees, the Bajaj Group is spread across diverse B2B and B2C industries.

Mr Shekhar Bajaj also proudly mentioned the rock-solid foundation laid by late Mr. Jammalal Bajaj almost a century ago and said that the organisation has firmly believed in the philosophy that "common good was more important than individual gain" which has stood the test of time and that the principle has been successfully taken forward by the next generations.

The entire Indian Lighting Industry congratulates Mr Bajaj for an honour well deserved.

3D Printed Luminaires for Aesthetics, Customisation and Sustainability

Polymer 3-D Printing is changing the luminaires of the future



Fig1: 3D Printing at LRC

(Photo courtesy of the Lighting Research Center, Rensselaer Polytechnic Institute)

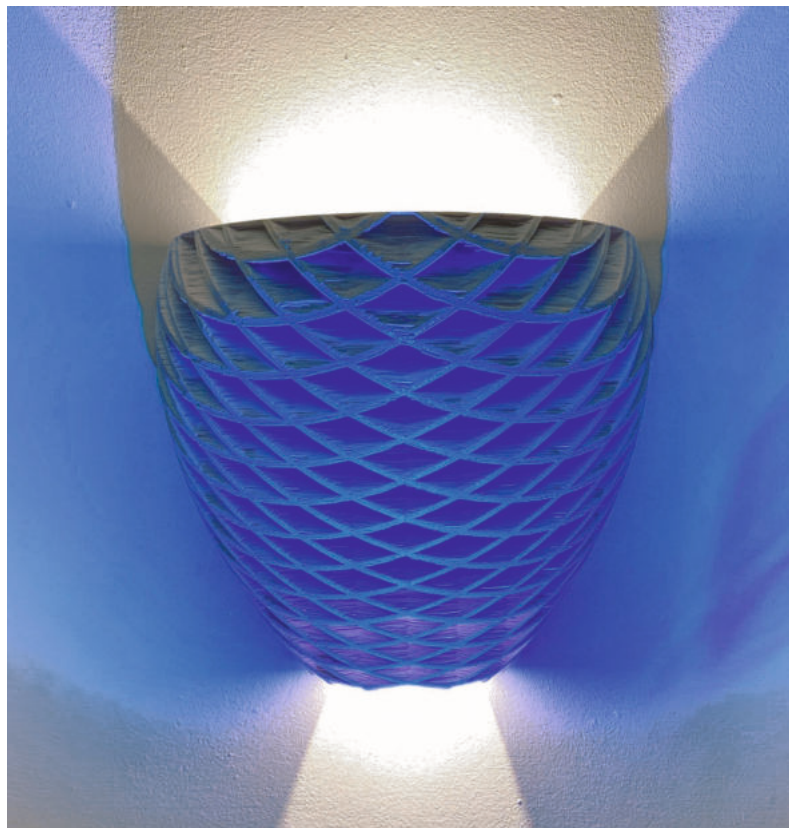


Fig2: 3D Printed Lampshade at LRC

(Photo courtesy of the Lighting Research Center, Rensselaer Polytechnic Institute)

In the 21st century, 3D printing technology or additive manufacturing is a generic revolution in the advanced engineering domain. Recent trends in the lighting industry include lighting fixtures with built-in radios for wireless connections to control light and colour and with sensors for detecting a variety of factors like occupancy, daylight, toxic gases and others to make built environments more intelligent. With a 3D printing solution, the value proposition becomes mass customisation rather than mass

production and can customize fixtures that better match the built environment and improve visual appeal and function. Such trends call for custom light fixtures.

Polymer 3D printing or additive manufacturing is a CAD assisted spontaneous three-dimensional architecture manufacturing process to make complex 3D models. Polymers are widely used as 3D printable materials as these have a certain advantage compared to other materials like the ease of processing, wide range of material

selectivity, design flexibility, lightweight articles, low cost of fabrications, etc. There is a range of polymers that are used as 3D printable materials, namely PLA, ABS, PP, PU, PET, PETG, PC, ASA, PEEK, PEKK, PEI & NYLON etc.

While allowing tremendous flexibility of design, 3D printing also gives the business several practical benefits. Some of the advantages of 3D printing are as follows.

- On-demand production



Fig 3: Image courtesy of Bajaj Electricals Limited

- Enhanced aesthetics
- Easy design iterations
- No requirement of post-processing
- Shortened cycle times
- Customised production for small volumes

- Perfect fit in retro cutouts
- Printing options in polymers, metals & ceramics
- Lightweight
- Cost-effectiveness at lower volume

- Reduced storage, logistics & inventory
- Reduction in carbon footprint

Among all the 3D printable materials, PLA is widely used and has its own advantages and disadvantages. It is developed from biomaterials, such as cornstarch and it has been commercialised widely for both proto development and commercial purposes due to its low cost and easy processing temperature range. PLA has a limited heat resistance and inferior mechanical properties compared to 3D printable ABS and PET materials. Although PLA is a food-grade polymer, in 3D printing application, it is no longer food compatible. PLA based 3D printed materials are used for food packaging, automotive, medical & biomedical prosthetic research and household applications.

3D printed lampshade for household applications is cutting edge technology which is functional since early 2019. Many reputed global leaders have adopted this application. PLA based 3D printed lampshades are widely marketed

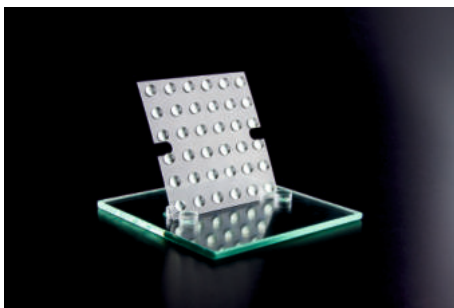


Fig 4: Spherical Lens Array

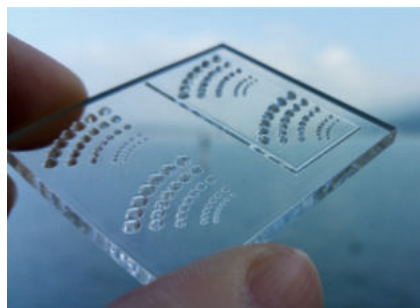


Fig 5: Gradient of Microlenses



Fig 6: Micro Lens Array on Substrate

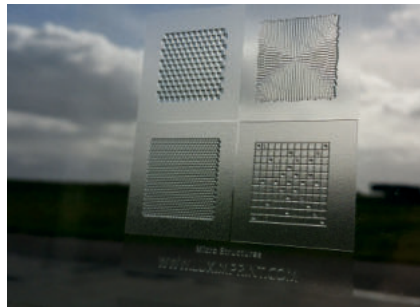


Fig 7: Micro Lens Textures

Images in fig 4-7 courtesy of Luximprint



Fig 8: Image courtesy: Bajaj Electricals Limited

temperature at the junction (by liberating heat generated by LED) to enhance the LED life. Using thermally conducting additives in 3D printing technology for making heat sinks might be another avenue in the direction of the light-weighting and cost-cutting approach. Lighting applications need various optical

due to its innovative architecture and aesthetics for household applications, office activity zones, breakout areas, cafeterias, reception desk, lounges and other areas where beautiful ambience blends with right mood and/or functionality seamlessly.

In the lighting industry, 3D printing is a widely accepted proposition due to its ability to make customised and complex shapes at a lower cost, especially for lower volume. LED fittings always require metal heat sinks to reduce the

components for shaping its beam, and therefore, optically reflective, and transmissive 3D printed components might be used very promisingly in these segments. With current progress, it can be anticipated that the 3D printing technology in the lighting industry would become an integral part of the manufacturing of cost-effective and customised light fixtures within the next few years.

3D printed optics can offer novel features.

- Thin transparent optics with internal printed features
- Optics which are otherwise difficult to manufacture using traditional methods.
- The output beam shape can be customized.
- Thin planar optics to produce uniform illuminance on the task plane & high efficacy. This will also offer ease of integration.
- 3D printed reflective optics shows improved reflectance, up to 92% with thickness control as against 70% for traditional reflectors.
- Reflective optics of good performance are already manufactured with available materials.
- Search is on for better materials to improve the transmissive optics.

Research is in progress at Lighting Research Centre, Rensselaer Polytechnic Institute, to manufacture complete SSL Luminaire through additive manufacturing.

3D Printing is changing the way products are designed, fabricated and transported. It is about the 'localization' of manufacturing. Utilizing 'Industry 4.0 Thinking' with a just-in-time methodology is gaining traction and could be potentially disruptive.

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Views expressed in this article are those of the contributors and do not necessarily reflect those of the editors or publishers

References:

- 1) Bajaj Electricals Design Studio
- 2) Lighting Research Center, Rensselaer Polytechnic Institute, <https://www.lrc.rpi.edu/programs/solidstate/3DPrinting.asp>
- 3) www.luximprint.com
- 4) 3D Printing. Lighting

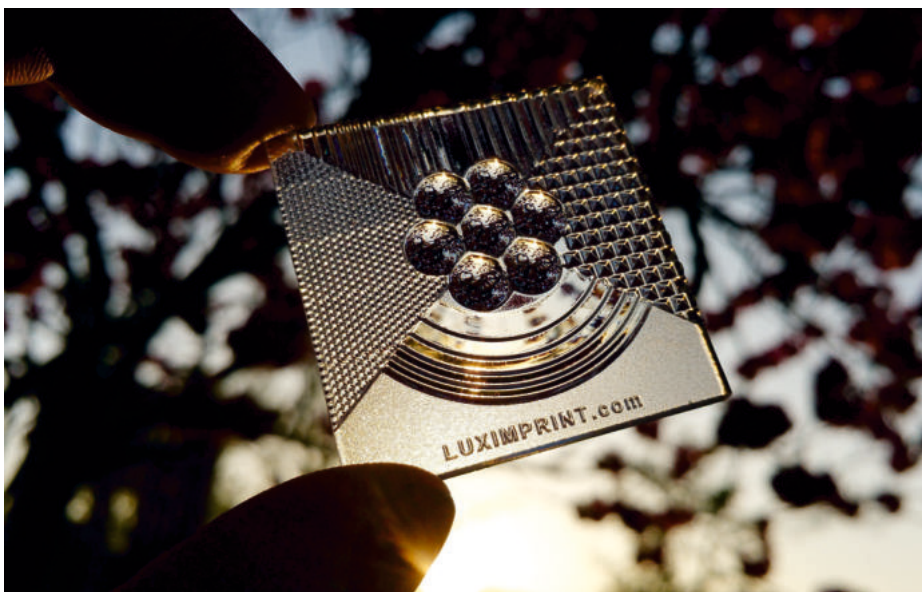
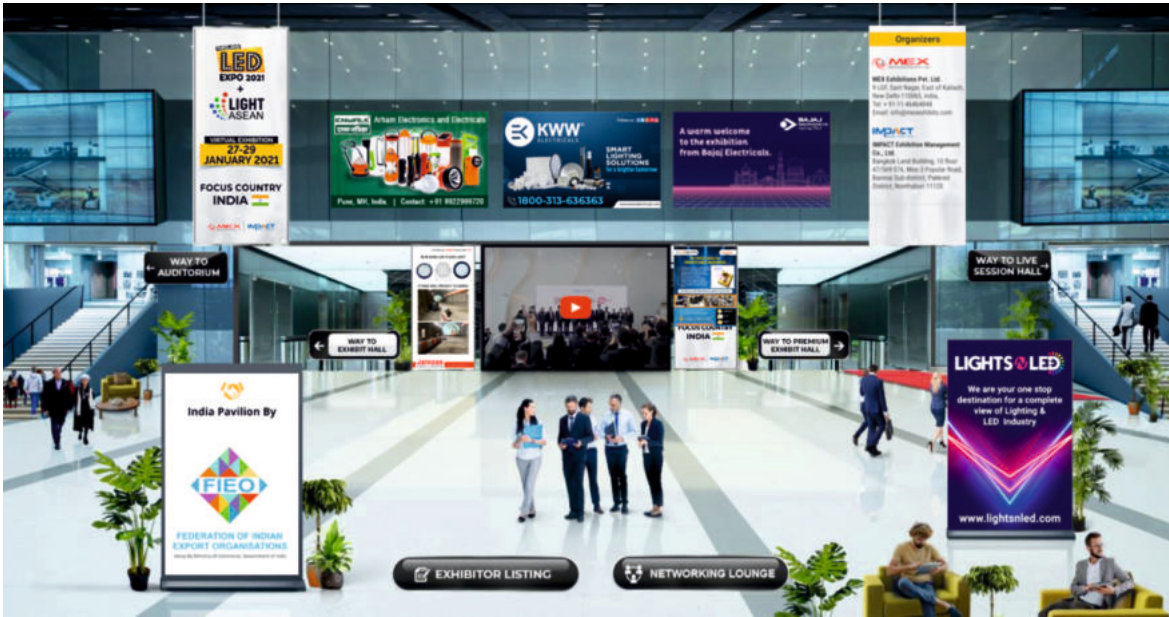


Fig 9: Image courtesy of Luximprint: Gradient of Microlenses

Virtual Exhibition LED Expo Thailand + Light ASEAN 2021 - FOCUS COUNTRY INDIA



- Keynote address by Mrs. Suchitra Durai, Ambassador, Embassy of India, Thailand
- Inaugural Address by Mr. Shyam Sujan – Secretary-General, ELCOMA
- Address by, Mr. Loy Joon How, General Manager, Impact Exhibition Management Co. Ltd, Bangkok (Organizer)

The second edition of the Virtual Exhibition LED Expo Thailand + Light ASEAN 2021 was held from 27th to 29th January 2021. This innovative Virtual Edition was quite well received and encouraging Indian exhibitors.

The entire exhibition was held online with product demonstrations, face to face meetings, online booths and webinars for 3 consecutive days. It got a good response from buyers as well as



suppliers from across the ASEAN region.

The organizers claim that more than 974 business queries were generated for exhibitors at the online show. The overall concept was to encourage Indian exhibitors to tap the potential of export markets in the ASEAN region. The buyers attended the show from various countries like India, Thailand, Malaysia, UAE, Japan, Nepal, Bangladesh, Singapore, China, Sri Lanka, and Indonesia.

The platform enabled a seamless visitor experience to give the same feel as physical shows which included interaction options, brochures, catalogs, product details & much more in a digital & innovative manner.

The event was inaugurated by distinguished dignitaries:

- Welcome address by Mr. S. K Saraf President, FIEO

- Concluding remarks and vote of thanks by Ms. Himani Gulati –Director, Mex Exhibitions Pvt Ltd. New Delhi (Organizer)

LED Expo Thailand + Light ASEAN's 2nd virtual edition included several informative webinars on varied topics.

Speakers at these sessions were experts from the industry; namely Amardeep M. Dugar (Founder & Principal - Lighting Research & Design), Prakash Barjatia (GB Member & Director- Education & Training, Indian Society of Lighting Engineers), Michael J. Immecke (Lighting Designer), Prachie Ganesh Jagtap (CEO - Kwaliti Photonics & LEDchip Indus P Ltd.), Arun Bhatia (CEO & Consultant - Luminescence Technologies), Sudhir Patil (CEO - Leap Info Systems Pvt. Ltd.)

AUTHOR: ILLUMINATION EDITORIAL BOARD

BIS Conducts Enforcement Raids – Confiscates 19000 LED Products

Bureau of Indian Standards, Southern Regional Office conducted enforcement raids on 1 March 2021. Four teams from the Chennai branch offices conducted enforcement raids at 6 different locations in and around Chennai based on complaints received regarding misuse of the BIS Registration mark on LED Products. Cases of misuse of BIS Registration mark were detected and a huge haul of around 19000 numbers of

LED Products pertaining to different brands was found and seized by the enforcement teams.

Head, Chennai Branch Office I, Smt. G. Bhavani, informed that such raids are being conducted in and around Chennai regularly. All such cases of misuse detected are suitably dealt as per BIS Act, 2016.

She further informed that BIS has launched a new android based app called

“BIS CARE” wherein the information about BIS licensees like name, address including validity and varieties covered can be viewed. The App can be downloaded on mobile phone and the product details can be verified immediately. The App provides facility to register complaints also. She advised the general public to give information about any misuse of BIS licenses which comes to their notice.

19 ஆயிரம் எல்.இ.டி., பொருட்கள் பறிமுதல்

சென்னை, மார்ச் 3- பி.ஐ.எஸ்., தர விதிகளை தவறாக பயன்படுத்தி விற்பனை செய்யப்பட்ட, 19 ஆயிரம் எல்.இ.டி., பொருட்களை, இந்திய தர நிர்ணய அதிகாரிகள் பறிமுதல் செய்துள்ளனர்.

இது குறித்து, இந்திய தர நிர்ணய, தெற்கு மண்டல துணை இயக்குனர் ஹெச்.அஜய் கண்ணா வெளியிட்ட செய்திக்குறிப்பு: சென்னை மற்றும் சென்னை சுற்றியுள்ள பகுதிகளில், இந்திய தர நிர்ணய விதிகளையும், ஐ.எஸ்.ஐ., தர முத்திரையை தவறாக பயன்படுத்துவதாக தகவல் கிடைத்தது. இதையடுத்து, இந்திய தர நிர்ணய தெற்கு மண்டல தலைவர் பிரசாத் ராவ் ஆலோசனை படி, சென்னை மற்றும் சென்னை சுற்றியுள்ள ஆறு பகுதிகளில், நான்கு குழுவினர் சோதனையில் ஈடுபட்டனர். அதில், பல்வேறு நிறுவனங்களின் பெயரில், எல்.இ.டி., பொருட்களில், ஐ.எஸ்.ஐ., முத்திரையை தவறாக பயன்படுத்தியும், இந்திய தர நிர்ணய விதிகளை மீறியும் தெரிய வந்தது. இதையடுத்து, ஐ.எஸ்.ஐ., முத்திரையை தவறாக பயன்படுத்திய, 19 ஆயிரம் எல்.இ.டி., பொருட்களை, இந்திய தர நிர்ணய அம்லாக்க அதிகாரிகள் பறிமுதல் செய்தனர். இந்திய தர நிர்ணய சட்டம், 2016ன் படி, சம்பந்தப்பட்ட நபர்கள் மீது நடவடிக்கை எடுக்கப்படும். மேலும், இந்திய தர நிர்ணயத்தால் வழங்கப்பட்ட ஐ.ஐ.எஸ்., முத்திரை, அதன் பதிவு எண் உட்பட, பல்வேறு தகவல்களை நுகர்வோர் அறிந்து கொள்வதற்காக, 'பி.ஐ.எஸ்., கேர்' என்ற மொபைல் செயலி உருவாக்கப்பட்டுள்ளது. இதை பயன்படுத்தி, தவறாக பயன்படுத்தப்படும் ஐ.எஸ்.ஐ., முத்திரைகள் குறித்து, நுகர்வோர் புகார் அளிக்கலாம். இவ்வாறு, அதில் கூறப்பட்டுள்ளது.

Dinamalar Dt 3 Mar 2021

Sleuths confiscate 19,000 LED products misusing BIS mark

TIMES NEWS NETWORK

Chennai: Raids by sleuths of the Bureau of Indian Standards (BIS) on Monday unearthed sale of LED products that have been misusing its registration mark.

Four teams from the Chennai office raided six different locations in and around Chennai based on complaints received. Around 19,000 LED products of different brands were found and seized by the enforcement teams.

Times of India Dt 3 Mar 2021

போலியான தரச்சான்று முத்திரை: 19 ஆயிரம் எல்.இ.டி. பொருட்கள் பறிமுதல்



சென்னை, மார்ச் 3- இந்திய தர நிர்ணய அமைவனத்தின் (பி.ஐ.எஸ்.) தென் மண்டல அலுவலகத்துக்கு, சில நிறுவனங்களின் எல்.இ.டி. தயாரிப்புகளில் போலியாக தர நிர்ணய முத்திரை பதிக்கப்பட்டு விற்பனை செய்யப்படுவதாக ஏராளமான புகார்கள் வந்தது. இதையடுத்து, இந்திய தர நிர்ணய அமைவனத்தின் தென் மண்டல தலைமை அதிகாரி எம்.வி.எஸ்.பி.பிரசாத் ராவ் உத்தரவின் பேரில், சென்னை கிளையின் தலைமை அதிகாரி ஜி.பவானி தலைமையில் அதிகாரிகள் 4 குழுவினர் சென்னை மண்டலில் உள்ள 6 இடங்களில் சோதனை நடத்தினர். இந்த சோதனையில் வெவ்வேறு நிறுவனங்களின் பெயரில் இந்திய தர நிர்ணய அமைவனத்தின் முத்திரையை போலியாக பயன்படுத்தி விற்பனைக்கு தயாராக வைக்கப்பட்டிருந்த 19 ஆயிரம் பொருட்கள் பறிமுதல் செய்யப்பட்டன. இதுபோன்ற சோதனைகளை தொடர்ச்சியாக மேற்கொள்ள சென்னை கிளை தலைமை அதிகாரி பவானிக்கு உத்தரவிடப்பட்டுள்ளது.

'பிஸ் கேர்' என்ற செயலியை இந்திய தர நிர்ணய அமைவனம் அறிமுகப்படுத்தியுள்ளது. பொதுமக்கள் இந்த செயலியின் மூலமாகவும் இந்திய தர நிர்ணய அமைவனத்தின் முத்திரையை போலியாக பயன்படுத்துபவர்கள் தொடர்பான புகார்களை தெரிவிக்கலாம்.

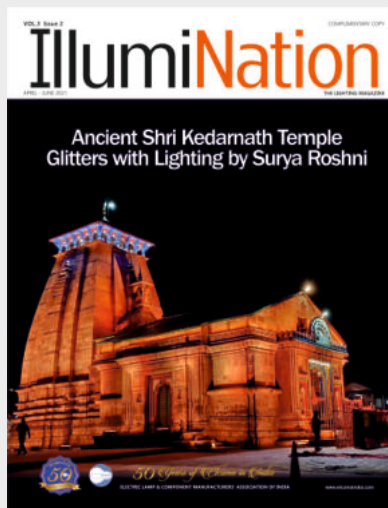
மேற்கண்ட தகவல் இந்திய தர நிர்ணய அமைவனத்தின் நுகர்வோர் விவகார துறையின் துணை இயக்குனர் எச்.அஜய் கண்ணா வெளியிட்ட செய்திக்குறிப்பில் கூறப்பட்டுள்ளது.

Dinamalar Dt 3 Mar 2021

BEE Sends Notice for Non - Compliance of BEE Star Label

	<p>BUREAU OF ENERGY EFFICIENCY (A statutory body under Ministry of Power, Government of India) 4th Floor, Sewa Bhawan, R.K. Puram, New Delhi-110066 (INDIA) Website : www.beeindia.gov.in, Ph: 011-26766700</p>
<h2>PUBLIC NOTICE</h2>	
<p>It has been brought to the notice that M/s Ajanta India Limited is selling LED bulbs with unauthorized BEE Star Rating label, which is in violation with Section 14 of the Energy Conservation Act read with the Provisions of Regulation No. BEE/S&L/LED/2017-18/ Dated 28th December 2017. Consumers are hereby informed that Bureau of Energy Efficiency (BEE) has not approved Star label for any LED bulb model of M/s Ajanta India Limited till date.</p> <p>M/s Ajanta India Limited has already been advised to withdraw all such products from the market and not to sell such products.</p>	
<p>Secretary</p>	
<p>Always check for the authenticity of Star Label while purchasing a BEE Star Labelled Product.</p>	
<p><i>davp 34106/13/0015/2021</i></p>	

In February 2021, BEE had publicly sent notice to Ms Ajanta India Ltd for selling LED bulbs with unauthorized BEE Star Label and advised them to withdraw all such products from the market.



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 Tel: +91-11-41556644/46604947

BIS CARE App allows checking of compliant products



Salient Features of BIS CARE Mobile App

	Verify licence number available on ISI marked products
	Verify details of hallmark licensed Jewellers
	Verify licence number available on Registered products under Compulsory Registration Scheme
	Get list of Registered manufacturers under Compulsory Registration Scheme
	Lodge your complaints with BIS related to misuse of standard marks, quality of marked products and misleading advertisements

BIS has launched a mobile app BIS CARE for consumers using Android Smart Phones which is available for downloading from Google Playstore. The BIS CARE App enables consumers to check details of licensed manufacturers by entering the license number. It also allows users to lodge complaints under different categories.

Verification of details of licensed manufacturer, registered jeweler and registered manufacturer of electronic goods without any login credentials:

Users can verify details of license holders of BIS such as validity of license, varieties covered under scope, address of the licensed premise etc. Users can also verify details of registered manufacturer of electronic goods such as brands covered under

scope of registration, validity of registration etc. Similarly, users can also verify details of registered jewelers.

In addition, the app also has provision for finding Registered Manufacturers by selecting a particular product category and model. This feature is a great help for the consumers looking for various manufacturers which are registered for a product category/model.

Provision to lodge complaints:

BIS CARE app allows users to lodge complaints in a very easy and user friendly way as they are required to enter just their Name, Email ID and Mobile No. for registration. Following types of complaints can be lodged using the app:

- Complaints on misuse of BIS Standard Marks (ISI, Registration Mark, Hallmark etc.)
- Complaints on quality of BIS

certified goods

- Complaints on purity of Hallmarked articles
- Complaints on misleading advertisements related to BIS certified products
- Other miscellaneous complaints

List of products under Mandatory Certification

BIS CARE App enables users to view different products which are under Mandatory Certification under different Conformity Assessment Schemes of BIS along with details of relevant Quality Control Order

The BIS CARE App allows users to switch language (English & Hindi) according to their convenience and also has a feature allowing users to view locations of various offices of BIS across the country.

Connectivity on track with Trulifi

Light-speed solutions for new age of train travel from Signify



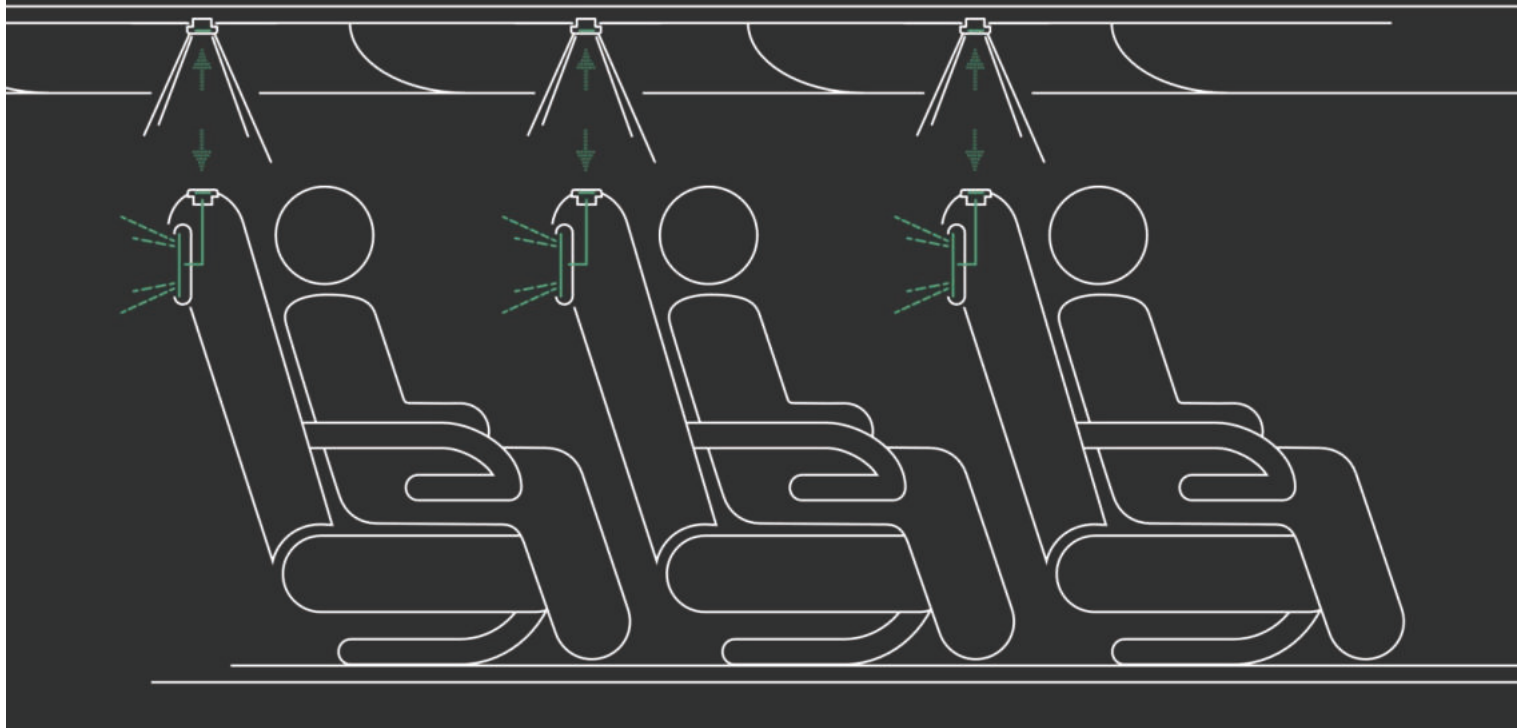
Trulifi from the world leader in lighting - enjoy a reliable, secure and fast Internet connection while you travel

Ideal connectivity:

Reliable network

Secure communication

Fast data rate



PHILIPS



Most efficient[#] solar street light under the sun!
Philips Sunstay
All-in-one solar street light

innovation ✦ you

[#]175 lumens/watt

lighting.philips.co.in/prof



Off-grid and hybrid solar versions available.



All-in-one design with lithium ferro phosphate battery, solar panel and charge controller built into the luminaire.



Durable housing made with pressure die cast aluminium.



Pole mounting bracket that allows different tilt angles and lateral and top mounting.

Across the globe, metro train travel is having something of a moment.

Metro is not only about connectivity – it's about convenience, too. For time-constrained travelers, it is easy to see the appeal of riding the metro trains: avoiding the road traffic downtime,

arriving directly at your destination instead of having to drive for an hour or looking for parking, and clawing back your travel time that can be used more productively, whether that's catching up on your emails, or relaxing with a Netflix binge. The destination matters, but increasingly, the journey does, too. Today's metro train operators have a

challenge that didn't exist in the golden age of the steam engine: keeping all those passengers and their devices online.

Light years ahead

Signify is addressing the challenge of connectivity on board public transport through the power of lighting. Not only



can lighting now provide connectivity on the go, but it does so at blistering speeds that far surpass the WiFi connections. And this flawless connectivity is of course in addition to great quality lighting.

Signify's latest offering called Trulifi, is a connectivity technology that uses light waves to enable an internet connection that's fast, stable and reliable. It's great for super speed internet in the workplace, and for transportation services like metro rail, the benefits are further multiplied. What's more, unlike the radio spectrum, the light spectrum is license-free. This means no upfront investment for network operations in government-issued spectrum licenses.

No compromise

Indeed, internet connectivity is one distinct advantage that the metro has over other forms of transport, and it's a topic on which travelers are unwilling to compromise. Going forward, passengers expect to stream high definition movies, upload heavy files, and make video calls, every kilometer of their journey. And in our connected world, the train itself has connectivity requirements; for example, high definition cameras collect security footage that must be offloaded on physical hard disks for processing.

When you look behind the curtain, how

to keep the connection going is a substantial question that operators must face. At home, our WiFi router passes a radio signal to our TV or smartphone in more or less a straight line. A large, moving vehicle however presents more challenges. Trains are full of metal surfaces and also full of people. Both of these elements affect the ability of radio transmissions to reliably hit their destinations. Heavy, constantly-moving carriage couplings that lie open to the elements do not play well with the data cabling needed to link carriages to one another. And linking the train to the outside network requires costly cellular data connections, which are also unable to penetrate tunnels or mountains along the way.

Stellar speeds

By adding Trulifi to the connectivity mix, seamless connections and stellar speeds become possible. High-definition streaming and even online gaming are on the table.

Right now, Signify is already working with Latécoère to provide Trulifi on commercial aircraft, connecting seat-back screens to fast Internet with a speed up to 250 Mbps. Trains and buses are a logical extension.

Connectivity could also be extended to passengers' own devices through a seat

point USB connection in the future. As we witnessed with the adoption of WiFi; when the infrastructure becomes more widespread, we'll likely see LiFi receivers built into a new generation of laptops, tablets and eventually, smartphones, rendering a wired connection unnecessary.

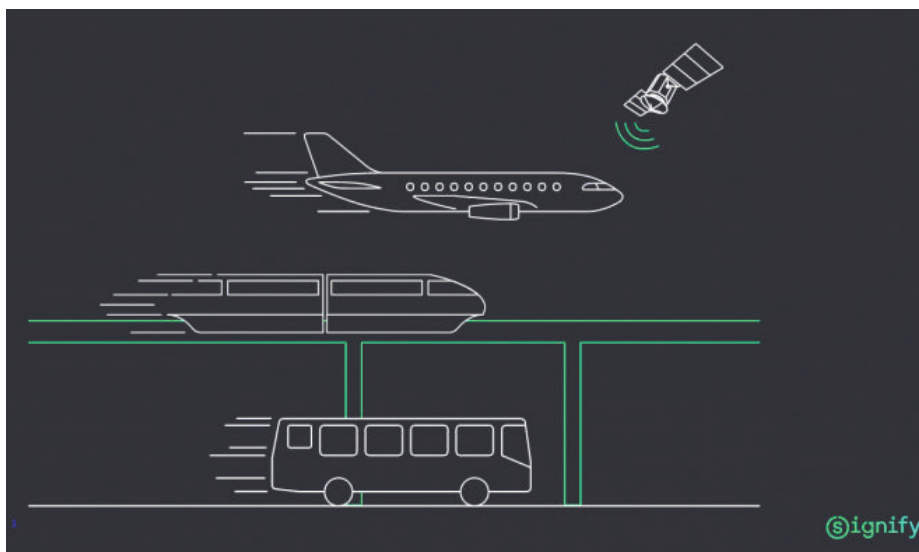
In future, LiFi can revolutionize the way we make the connection towards the train. LiFi-equipped poles, paced at intervals along the track, follow the moving vehicle, beaming high speed internet underground, through tunnels and even hilly terrain.

Trains that talk

Behind the scenes, Trulifi offers a robust wireless platform to connect the growing demands of digital equipment and IoT sensors between train wagons. It offers the connected train greater reliability and safety and also provides "plug and play" wireless communication when regrouping trains or doing maintenance.

Those chunky security video files that are currently stored on local hard disks in the train along with other data can be downloaded and processed at high speeds the moment the train pulls into a station, improving passenger safety.

Arthur C Clarke famously said that sufficiently advanced technology is indistinguishable from magic. You could also say that really effective technology is completely invisible. For passengers, uninterrupted high-speed internet connection is something that's supposed to just work. Meeting that expectation is a differentiator that can help keep metro train travel on its upward trajectory – and help people and the planet too.



The Signify logo, featuring a stylized '@' symbol in a green circle followed by the word 'signify' in a lowercase, green, sans-serif font.

AUTHOR : SIGNIFY INNOVATIONS INDIA LIMITED

Flicker Control Technology

A Deep Dive into Flicker Technology and its implementation

From headaches to underexposed photographs, the consequences of flicker can manifest in many ways. Though lighting industry has readily adopted solid-state lighting as the energy-efficient source, but it has generally fallen short in addressing the causes and effects of periodic modulation in LEDs which leads to present of flicker in light output if left unchecked.

Flicker is the constant fluctuation of light output from on/ off because electricity is delivered through alternating current (AC) at a power line frequency of 50/60 hertz, the voltage delivered to a source bounces between on and off as it rides the sine wave between the positive and negative poles. As a result, the potential flicker frequency is twice the power line

frequency, or 100/120 hertz. Without the proper electronic circuitry—such as a ballast, driver, or capacitor—a source will flicker.

Humans can perceive light oscillation at frequencies slower than 50 hertz, although some people notice it up to 100 hertz. Slow frequencies, of approximately 3 to 70 hertz, can cause seizures in highly sensitive individuals, while moderate flicker frequencies, from about 100 hertz to as high as 500 hertz, can lead to indirect perception of stroboscopic effects, in which objects in motion can appear as a series of still images. But what may be desirable in a dance club can be dangerous in an industrial setting. For example, flicker can make moving gears or blades look slower or even stationary, and it has also been associated with adverse health

effects such as

- Neurological problems, including epileptic seizure
- Headaches, fatigue
- Blurred vision, eyestrain
- Apparent slowing or stopping of motion
- Reduced visual task performance and Distraction.

Currently, there is no standard procedure for manufacturers to measure flicker, but the Illuminating Engineering Society (IES) has developed two metrics to quantify flicker that are described in RP-16-10, Nomenclature and Definitions for Illuminating Engineering. The first and more commonly used metric is percent flicker. It indicates the average amount of modulation, or reduction, in light output over a single on-off cycle. A source with 100 percent flicker would indicate that, at some point in its cycle, it produces no light, while a completely steady light would have zero percent flicker.

The other metric is the flicker index, which ranges from zero to one. It accounts for the percent flicker and two other variables: the shape of the light's waveform, or output curve, and the duty cycle, which refers to the percentage of time that the light source is on in a single on-off cycle. The lower the percent flicker and flicker index, the less a source oscillates or produces perceptible stroboscopic effects. An example of a periodic waveform is shown in Figure 1, along with equations for both flicker metrics.

LED light output is directly related to the current through the LED, and by nature LED light output reacts instantly on changing LED current conditions.

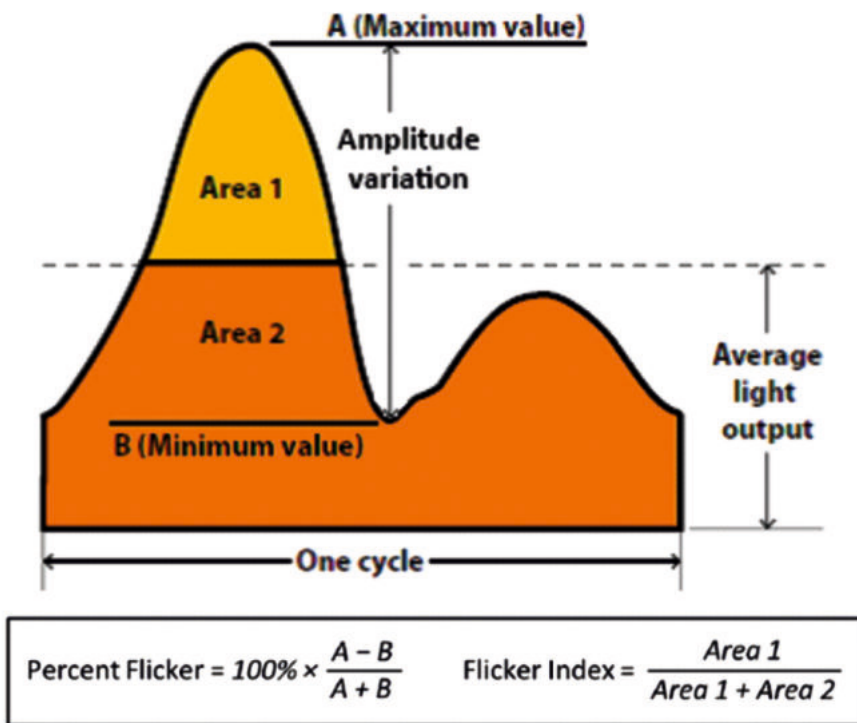


Figure 1. Periodic waveform characteristics used in the calculation of flicker metrics. (Source: Modified from IES Lighting Handbook, 10th Edition.)

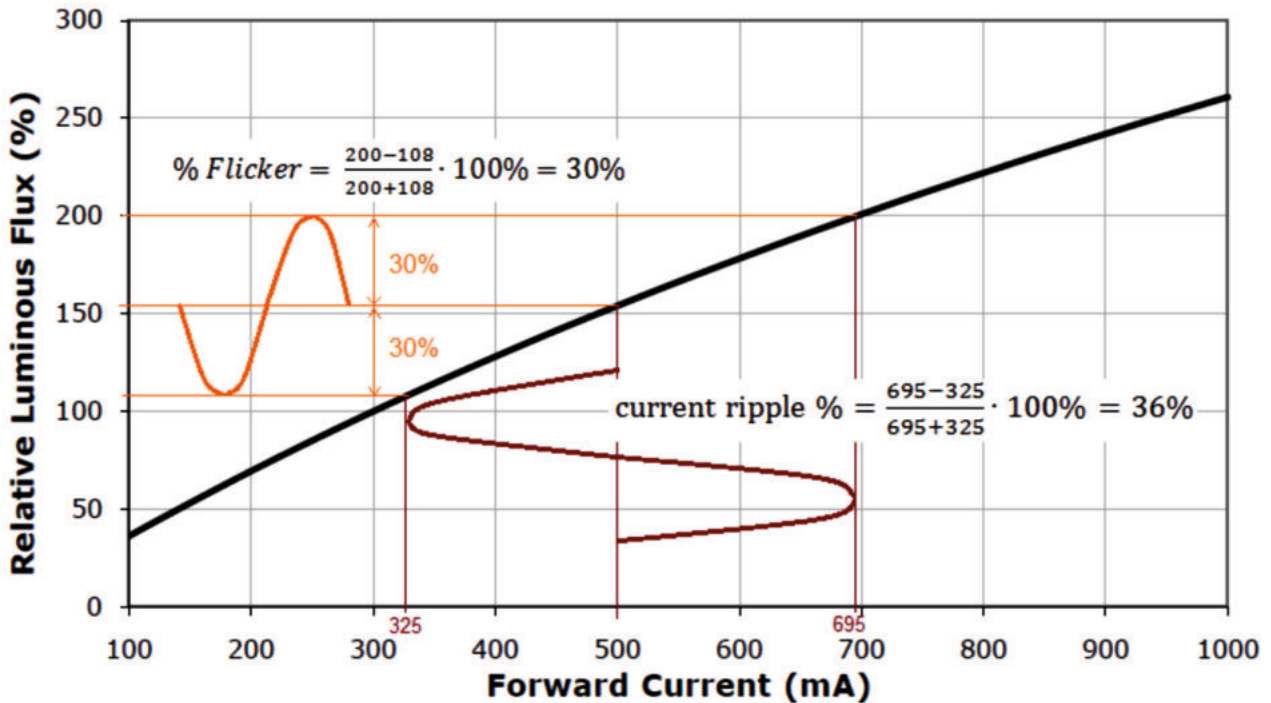


Figure 2. Extrapolating LED current ripple to luminous flux variation for a Cree high brightness LED

Stable LED driving current is therefore the main criteria to achieve flicker free operation in LED lamps.

The key to mitigating flicker lies in the driver, which can eliminate the problem

by supplying the constant non-oscillating current to the LED. But manufacturers must weigh several factors—cost, size, reliability, and efficiency—when choosing which driver

to build into their products.

To determine *the relation between light flicker, LED current ripple and the LED driver output voltage ripple*, the LED string characteristics need to be

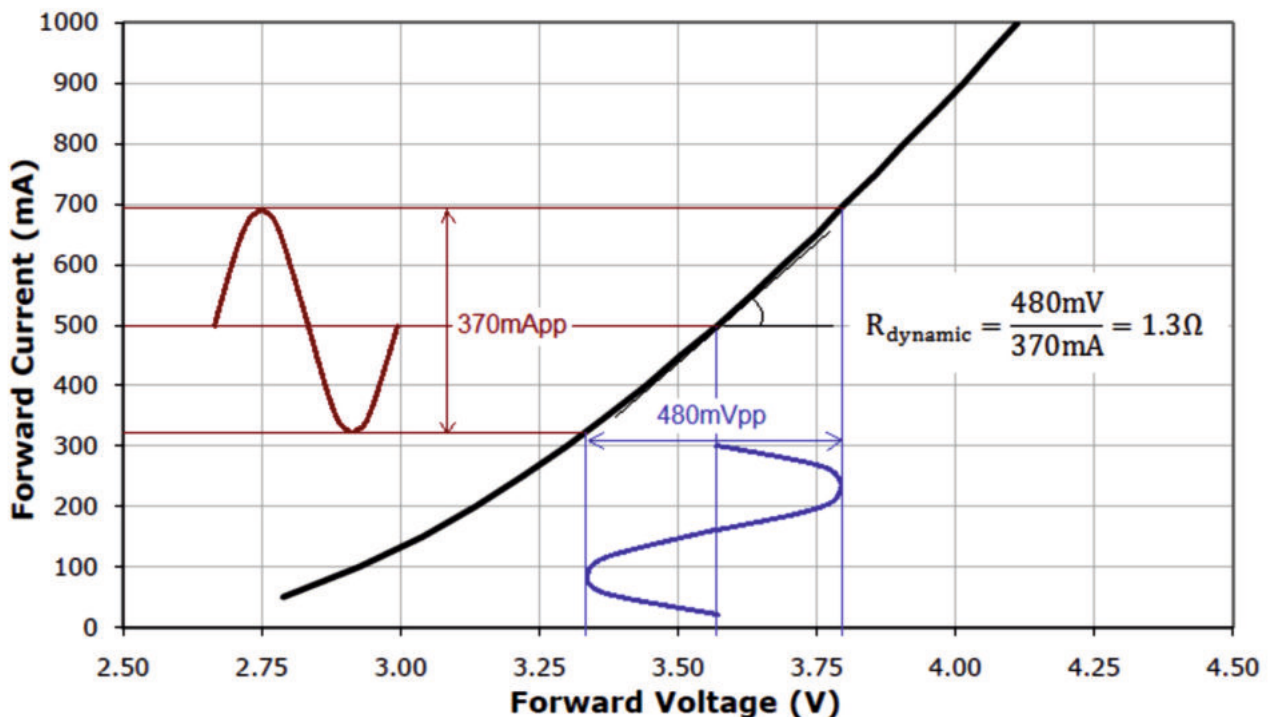
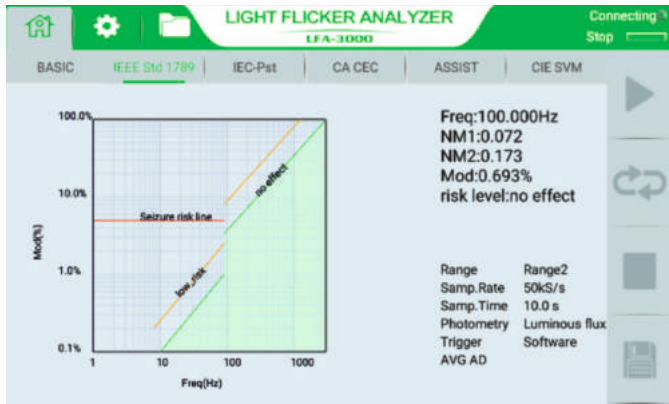
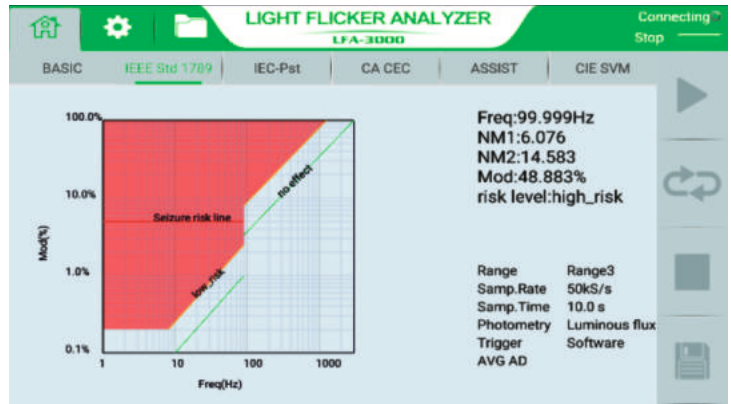


Figure 3. LED I/V curve with dynamic resistance measurement



Orient's Flicker Controlled Product



Other Product

examined.

A sine shaped LED current ripple is drawn in the graph, and the resulting luminous flux variation is extrapolated. So, changing LED current has an immediate effect on the light output, but the curve is not exactly linear. The relation between LED current ripple and resulting flicker % is therefore not linear either, and for most LEDs, the % light flicker is lower than % current variation.

In most offline LED drivers, the circuit parameters control the output (LED) voltage ripple, and the LED current ripple is a result of the output voltage ripple. Therefore, it is important to know the relation between the voltage ripple across the LED string and the current ripple through the LED. This relation can be found from the LED I/V curve in Figure 3.

The dynamic resistance of the LED at a certain operation point will determine the relation between the voltage ripple on the LED and the resulting current ripple through the LED. This dynamic resistance is quite small, which means that a very small voltage ripple can already result in large current ripple. Since the slope of the I/V curve changes at different operating points, the

dynamic resistance needs to be determined around the average LED current operating point.

When LEDs are in series, the dynamic resistance needs to be multiplied by the number of LEDs. When it is parallel, the dynamic resistance needs to be divided by the number of LEDs in parallel.

Methods to Minimize Flicker

To reduce the flicker in LED drivers, the LED current ripple must be reduced. There are several ways to do this:

- **Reduce peak to peak amplitude of the output current in an LED driver:** This can only be done by reducing the power factor of the design, i.e. by increasing the input capacitor and increasing speed of the current feedback loop. PF and THD may not meet the requirements, and this solution is normally only used for low power designs.
- **Increasing the output capacitor:** To reduce the ripple to very low levels, a very large capacitor is needed, which increases cost and size.
- **Increasing the dynamic resistance of the LED string:** choosing LEDs with higher RDYNAMIC, or operating the LED in the lower

region of the I/V curve. One could also place a resistor in series with the LED string, but this will add extra losses and reduces the converter efficiency.

- It is also possible to **use a linear post regulator** to remove the output ripple, thereby minimizing the LED current ripple.
- By **using a two-stage design** with AC/DC front end PFC converter and DC/DC isolated converter on the back end, the flicker produced by this design can be less than 5%, but the cost of this design is very high for some of the applications.

The comparison test results of Orient's flicker-controlled product with another product using Flicker analyser instruments is provided below. In Orient's EyeLuv series LED lamps the flicker is controlled from the light output and is within the range provided in IEEE1789 standard.

As per above comparison Orient's **EyeLuv** series products follow's IEEE 1789 standards and thus operated in green zone which means the risk level is very low in using these lamps compared to the other product.

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References:

- 1.LEDs: Fighting Flicker - By Wandy Lau - www.archlighting.com
- 2.Flicker performance in LED lighting – www.eldoled.com
- 3.US DEPARTMENT OF ENERGY, Building Technologies Office SOLID-STATE LIGHTING TECHNOLOGY FACT SHEET
- 4.Technical Information| Temporal Light Artifacts | 01-2018|en – TRIDONIC
- 5.Minimizing Light Flicker in LED Lighting Applications, Application Note AN022 – Roland Van Roy – Richtek



Mr. Rajat Kumar Sud joins as Managing Director, Energy Efficiency Services Limited (EESL)



Mr. Sud has wide-ranging experience of 25+ years in the energy sector and as a trusted advisor to governments and utilities and is currently leading the implementation of impactful energy efficiency initiatives across sectors.

Before joining EESL, Mr Sud served as the EVP at Sterlite Power Pvt Ltd, where he was responsible for the growth of the services business, with a focus on

providing solutions for enhancing power delivery through congested transmission lines and corridors. He has also served in leadership positions at Siemens IT solutions and PWC. Mr. Sud has a post-graduate diploma in management from the Indian Institute of Management, Ahmedabad (IIM-A), and Bachelor of Engineering from SGS Institute of Technology and Science (SGSITS) Indore in India.

Dr Ajay Mathur appointed Director General at International Solar Alliance



Prior to joining ISA, Dr. Mathur was Director General of The Energy and Resources Institute (TERI). At TERI, he has spearheaded the move to accelerate action towards a low-carbon and cleaner economy through the promotion and adoption of

renewable energy and green hydrogen in the Indian electricity sector, enhancing efficiency in buildings and industry, and promoting environmental quality through institutional and policy measures to enhance air quality across the country, adoption of resource efficiency and waste recycling measures, and biotechnology-based solutions, especially for agricultural and industrial environment improvement. He was co-chair of the global Energy Transitions Commission and of the Clean Cooling Initiatives of the One Planet Summit. He earlier headed the Indian Bureau of Energy Efficiency and was responsible for its foundational programs which mainstreamed energy efficiency through initiatives such as the Star Labeling program for appliances, the Energy Conservation Building Code, and the

Perform, Achieve & Trade program for energy-intensive industries. He was a leading climate change negotiator and was the Indian spokesperson at the Paris climate negotiations. He served as the interim Director of the Green Climate Fund during its foundational period.

Dr. Mathur received a Bachelor's degree in Chemical Engineering from the University of Roorkee, and Masters and PhD degrees from the University of Illinois. He has also received the Distinguished Alumnus Awards from both his alma maters.

He was appointed a Chevalier de l'Ordre national du Merite by the President of France in recognition of his outstanding commitment to the preservation of the environment and coping with energy-related challenges.

Dr Vibha Dhawan takes charge as Director General, TERI



Dr Vibha Dhawan, Senior Programme Director, TERI has taken charge as the Director General of TERI from March 1, 2021. She takes over from Dr Ajay Mathur, consequent to his appointment as the Director General of the International Solar Alliance.

Dr Vibha Dhawan has been associated with The Energy and Resources Institute since 1985 and also served as the Vice-Chancellor of TERI School of Advanced Studies from 2005-2007. She is also a Fellow of the National Academy of Sciences, India.

Dr Dhawan is actively involved in research as well as policy development, both at the national and international level. She is a task force member of a number of committees of the Department of Biotechnology (DBT), the Biotechnology Industry Research Assistance Council (BIRAC), the Biotech Consortium India Limited (BCIL) etc.

She has served on the boards of prestigious organizations in India and overseas including Jawahar Lal Nehru University, Ambedkar University, Ayurved Foundation and Centre for Agriculture and Bioscience International (CABI).

Dr Dhawan as a researcher was instrumental in the establishment of the highly successful Micropropagation Technology Park at TERI. Her recent research interests are in the area of biofuels. She is currently the coordinator of the DBT-TERI Centre on Integrated Production of Advanced Biofuels and Biocommodities. She has authored 6 books and over 50 publications.

C&S Electric Limited lighting business transitions into Trimaster / True North



In a recent press release, C&S Electric Limited have transferred their lighting business to Trimaster Private Limited (Trimaster), as a going concern together with all employees,

assets and liabilities relating to the business. Trimaster will operate the lighting business through True North Technologies Private Limited, its wholly owned subsidiary (True North). As a

consequence of such transfer, the products of the business, for which the relevant registrations, accreditations, test certificates and reports obtained by C&S Electric Limited, will be manufactured and distributed by Trimaster through its subsidiary, True North. True North shall continue to supply its lighting products under C&S brand for another approximately 12 months. True North is now one of the flagship companies of the former promoters of C&S Electric Ltd. True North has elaborate plans for investment in technology and manufacturing, in training, in manpower and network building.

Orient Electric Launches Motion Sensor LED Products



Orient Electric Limited recently introduced range of Motion Sensor LED products which not only provide convenience but also conserve energy for customers.

Using motion sensor technology, a sensor inside the LED light detects the movement of a nearby person/object at a distance of about 15 feet and switches the light ON and OFF accordingly. It helps in conserving the energy by only powering the light during the presence

of a person/object. The light will be switched off automatically after certain period of time. A 'PIR' sensor inside the LED driver configured in a differential mode detects the movement within the 'line of sight' of the sensor, a pair of complementary pulses are processed at the output pin of the sensor which helps in switching ON and OFF the light.

Orient Electric has launched 4 products in this category - LED Lamps for staircase/balcony installations, LED Battens for parking areas, LED Panels for offices and LED Street lights for installation on roads. All products have a lumen efficacy of 100 lm/W, have higher surge capability, a wide voltage operation range and meet all safety standards and BIS specifications.

Surya Launches Smart Downlighter



Surya's 15W SMART Downlighter provides the convenience of different light intensities and light colour setting. The product is dimmable i.e. from dim to bright, and tunable from 3000k to 6500k. i.e. warm to cool light. It gives you the flexibility of the timer facility as well. The Product is based on RF technology, and is easy to operate with a remote from a distance upto 25 meters.

- Choose Warm to Cool Light
- Control Light Intensity
- Timer Facility
- Multiple products can be controlled by a single remote

Signify Introduces T-bulb and T-beamer Wi-Fi



Signify has recently launched its smart range of T-bulbs.

The T-bulb and T-beamer WiFi are smart products that can be connected to any existing Wi-Fi network and the user can choose any of the dynamic light modes to make any room glow in their favorite shade of white. The dimmable and tunable white light of these products can be set as per the user's mood. They can be set to work or relax or even in a night lamp mode.

These products are available in three wattages - 10W, 12W and 20W.

Additionally these lights can be controlled from anywhere using the WiZ lighting app or any compatible voice control device. The product only requires a WiFi connection to operate wirelessly. All Philips Smart Wi-Fi LED smart bulbs are compatible with WiZ apps and products along with Google Assistant, Amazon Alexa and Siri Shortcuts

Halonix launches PV Rotation Solar LED Street Light



Considering the increasing use of renewable energy products, Halonix has recently launched a Solar LED Street Light, which is an integrated product comprising of solar PV panel, inbuilt lithium battery, LED

luminaire and a smart control system. This stand-alone product is suitable for installation on any existing pole and is easy to maintain. It is made up of MS duly powder coated and aluminium sheet which is used as a heatsink for adequate heat dissipation that ensures robustness and longer life span.

The PV Rotation Solar LED Street Light is entirely designed and manufactured in India and is available in range of 12W to 36W with 30Wp to 75Wp PV panel, 12AH to 36AH lithium battery and with MPPT & smart control system. The product has been designed in such a way to maintain the desired PV panel direction and tilt angle irrespective of direction of LED luminaire to light-up the specific pathway in any direction.

This product has inbuilt red and green indicators to provide real-time status of low battery, charging mode or fully charged battery. The PV Rotation Solar Street Light is also equipped with hybrid 230V AC operation, Bluetooth based control & monitoring, Wi-Fi/GSM based real-time remote monitoring for monitoring solar power generation, battery charging status with light ON/OFF and energy saving mode status.

The PV Rotation Solar LED Street Light comes with automatic dusk to dawn ON/OFF and inbuilt PIR motion sensor features that switches the light to 100% power once motion is detected which also helps to enhance the overall backup time.

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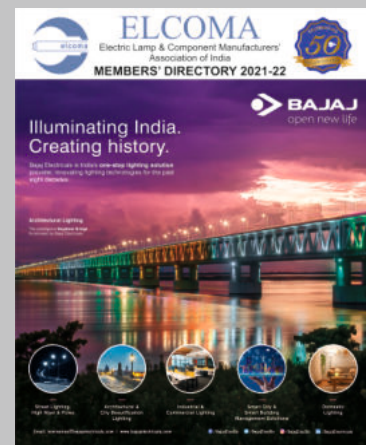
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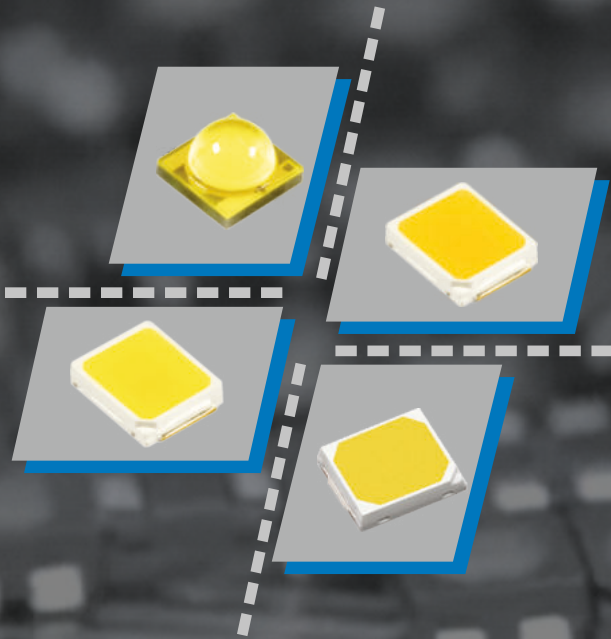


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