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Constitution Hill: Creating layers of memories

LED engine able to withstand voltages of 380 V

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We have often featured articles on museum lighting in this magazine, but I do not recall covering a museum that was part of a heritage site so I was fascinated, when chatting to Morag Campbell of Xhamai Design, to learn just how much effort goes into working on a site that is governed by the strict guidelines of the National Heritage's Act. Everything that is altered must be able to be reversed; so the floor is a wooden deck that is installed on top of, but without damage to, the existing floor and the exhibits are hung on a multi-purpose frame that incorporates not only a horizontal bar for the artworks but also the LED strip lights. Where additional lighting was required, the team incorporated custom designed light fittings onto the conduit round boxes and spotlights were mounted onto partially existing points.

With this simple but effective lighting installation, Campbell, Viegas and the rest of the JV team have created a layer of memories, not just of a negative past, but also of a positive future. By accentuating the vaulted ceiling to illuminate its imperfections and charms; using spots astutely; selecting the right colours to soften the space; and applying bursts of light to break monotony, they have, throughout, intensified the emotion attached to the building. As Campbell correctly says, they have managed to insert something new into what was obviously a very old fabric, without losing the sense of what it was like to be there all those years ago when the venue served as a prison. The result, which highlights light and architecture, is poignant to say the least.

Moving from history of one kind to another, Otto Horlacher of Giantlight has designed an LED engine that tests until now indicate can operate indefinitely at voltages way higher than 230 volts. The new system is made more appealing by the fact that there is no external driver so not only is all the relevant technology onboard, but the board remains stable and can withstand voltages of 380 V. Further tests will be conducted, but Horlacher hopes to introduce his new LED engine to the South African market in 2015. It is likely to be a welcome solution to the 'floating neutrals' frequently experienced during the installation of LEDs and we look forward to following the progress of this new design.

Looking back over 2014, it has been a long year and we have survived elections, black outs and postal strikes. It is therefore really good to hear that in spite of these distractions, many local lighting companies are flourishing, with some not even taking the usual break over December. On this positive note, Adel, Jenny and I would like to thank readers and advertisers alike for your support and wish you all a happy and relaxing holiday season and all the very best for a successful 2015.

Till the new year!

Karen

Editor: Karen Grant (crownmag@crown.co.za) - Advertising manager: Jenny Warwick (jennyw@crown.co.za) - Layout: Adel JvR Bothma - Circulation: Karen Smith
Cover: Cell C Campus, Waterfall Business Estate (Photograph: Dudley Bunn)

Published by Crown Publications cc
PO Box 140, Bedfordview, 2008 - Tel: +27 (0)11 622-4770 Fax: +27 (0)11 615-6108 - Website: www.crown.co.za
Printed by: Tandym Print

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INside ...

Looking at the past to the future

The history of the Constitution Hill Precinct in Braamfontein Johannesburg goes back to 1892 when the Old Fort was built under the *Zuid Afrikaanse Republiek*. Except for the four years of the South African War (1899 – 1902) when it served as a military defence post, the Fort functioned as a prison. During the Apartheid years it became notorious for its harsh treatment of ordinary men and women who were imprisoned for contravening colonial and apartheid legislation, and Mahatma Gandhi, Nelson Mandela, Robert Sobukwe, Joe Slovo, Bram Fischer, Albert Luthuli, Winnie Madikizela-Mandela, Albertina Sisulu and Fatima Meer list among the many political activists who were incarcerated there before being transferred, once sentenced, to serve their prison terms elsewhere.

Although the Old Fort complex was declared a National Monument in 1964, it continued as a functioning prison until 1987. After that time, the buildings and site were left to run down until they were identified as the location for the new Constitutional Court. Today, the city precinct – managed

All photographs by Dudley Bunn.

by the Gauteng Growth and Development Agency and JDA – is considered to have given rise to some of the new South Africa's most admired architecture and, with its interactive guided tours and exhibitions, is a popular destination for tourists and locals alike.

These days, the reception area of the Old Fort – the building where people were logged into the prison system, de-clothed, deloused and given their prison numbers – serves as a museum and it is in this regard that the Joint Venture team of Xhamai Design, Urban Works Architecture and Urbanism, and HMJ Prins Architect (lead consultant Morag Campbell of Xhamai Design) became responsible for designing and overseeing a recent restoration programme that started in November last year and was completed in July 2014.

The brief given to Campbell by Constitution Hill Manager: Facilities, Events and Marketing, Themba Ntuli, was all-encompassing. The team had to conserve the building in terms of both the National Heritage's Act and internationally accepted guidelines, such as the Burra Charter, while creating a layer of memories, not just of a negative past, but also of a positive future. In doing so it was imperative that damage to the building be minimal and that all structural activities be congruent with the existing structure. This on a shoestring budget.

Revenue generation obviously therefore played a role in the final outcome as the venue had to

attract people to it and be rentable as a space suitable for public and education programmes such as corporate training, book launches and art exhibitions. "It was important," says Campbell, "that we conceived of a solution that was multi-functional with a very specific use for separate artwork exhibitions. We needed someone who knew what they were doing when it came to lighting artwork and maximising the ambient space above the artwork and throughout the interior".

Campbell approached João Viegas of Pamboukian lightdesign to consult on the lighting for the heritage site.

Visitors to the museum enter, what was the reception area for incoming prisoners, from Kotze Street through the 'tunnel' linking the main entrance of the Old Fort to the prison atrium. The imposing gates and the gun crenels in the thick walls give a striking sense of what incoming prisoners must have felt when being brought there. A heavy door opens to a space divided by two arches with the second area leading down a dark corridor to two sizeable exhibition halls at the end of the building. *En route* to these rooms, visitors pass what were two holding cells on their left and a barred window, with no glass, opening into an air shaft, on their right.

Throughout this progress from one side to the other, the conservation approach highlights the old and the new so that it is possible to see the original structure alongside the revamped one. "This," explains Campbell, "is one of the strong concepts of the design. You can see what is old and what is new and the contrast highlights appreciation for both".

Heritage is a subjective concept with many layers and there is lively debate as to what stays and what goes when working on an historical site. In this instance, the graffiti that is now at least 25 years old provided the topic for discussion. In the end, it was preserved as it was deemed to be important in the history of the site.

Campbell explains that there was water damage to the walls and windows throughout the building. Some selected plaster had to be removed and redone and timbers that had rotted were replaced. In addition, a wooden deck was installed on top of,

but without damage to, the existing floor. This was done for a number of reasons: first, the floor was unusable and putting a screed on it would have changed its character; second, the new deck now allows universal access to visitors and third, as an unexpected consequence, it has improved the acoustics throughout. In order to keep consistent the theme of highlighting the old and the new, the design team included glass floor panels allowing visitors to see, by LED strip lighting, the original floor beneath the wooden deck.

The walls and ceilings were wire brushed a number of times to remove loose and exfoliating plaster and paint, mainly because of rain during the restoration. During this process, every effort was made to keep the patina and the end result is good.

An additional variation to the scope of works was the inclusion to prevent water penetration from the grass ramparts above. Until this was installed, each time it rained heavily water ingress would damage some of the plaster and paint in the barrel vault roof.

"When it came to lighting," says Campbell, "João specified the details for all the lights and made sure that the lighting levels were right". Museum lighting is specific, but that level of lighting was not required for this installation. The lighting levels at Old Fort have been specified for comfort and there are controls that allow the focus to switch from artwork to ambience and to increase or decrease the levels, depending on the requirement.

Because it is a heritage site, everything that was altered must be able to be reversed. To adhere to this requirement, the team included in each room a multi-purpose steel frame to deal with the exhibi-

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tions that form a large part of the function of the building. Campbell explains that a horizontal bar is incorporated within the frame, from which artwork used in the various presentations can hang. LED drivers and LED strips of soft light are installed within the steel frame and the LED lights allow the artworks to speak for themselves. The exhibition halls have both general and exhibition lights that can be switched on individually. In general, the soft focused light is atmospheric.

Where the steel frame was not appropriate, lighting has been cleverly incorporated by custom designed light fittings from Dokter and Misses onto the conduit round boxes. Wooden caps on the heads tie in with the wooden floors and the compact fluorescent freestanding elements light top and bottom.

The reception area has a vaulted ceiling which is accented with soft light. When the team designed the lighting for the roof, they intended to show its imperfections as well as its charms. Spotlights are mounted at what were partially existing points at the apex of the arch to prevent glare, placing a night time accent onto the walls opposite. A number of spots have been placed in the air shafts for further effect.

A South African indigenous hard wood was used for all the flooring and Viegas specified warm light throughout to highlight the colour of the timber and to create a softened and inviting space.

Intensifying the emotion attached to the building, glass panels expose 'time-worn' steps in the bigger exhibition room showing the age of the structure and giving the visitor a sense of the number of prisoners who walked up and down those steps over the years. In the same room, an old toilet and graffiti are reminiscent of the purpose that the building once served.

In the two smaller rooms the space just beneath the window is dark, creating an area of high contrast. To break the contrast, the lights have been installed opposite the window to provide full light while, in the corridor, bursts of light break the monotony of the passage and at the same time make a feature of the conduit.

The finished project achieves its goal. Visitors cannot fail to gain an understanding of what it must have felt like to walk into the cold and dank prison reception area. However, with the exhibitions in place there is a definite sense of positivity at what we have managed as a country to achieve since 1994.

"The challenge," concludes Campbell, "was to establish a balance between being sensitive to the heritage while allowing something new to take place. We feel we attained this by inserting something new into an obviously very old fabric. The result, we believe, is good and visitors do not lose sense of what it was like to be here". LiD

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Linear lighting in design

by Randal Wahl, Regent Lighting

With the evolution of lighting from HID to LED sources over the past number of years, many manufacturers have had to make comprehensive modifications to their product ranges in order to accommodate this development in the industry. For lighting companies, the advance has required a radical shift in investment to include design facilities and the industrial designers to manage them, as design capability is now the only true differentiator for lighting manufacturers in South Africa.

The changes brought about by LEDs have caused further disruption in that previous barriers to entry into the lighting market have evaporated, allowing pioneering newcomers to enter markets that they would never have been able break into in the past.

With a concomitant growing emphasis on corporate identity and workplace environments, LED lighting can play a vitally important role in complementing innovative interior design, and it is in this regard that the linear light source has come to the fore. The days of lighting being a purely functional element of a building to ensure that the required lux levels are achieved, are diminishing rapidly as designers are beginning to understand the benefit of using linear lighting for the overall design theme.

Standard recessed lighting will be available on our continent for years to come and it continues to play an important role in certain types of commercial office lighting installations, but it is linear lighting that has opened up new possibilities. Examples here include the entrance halls of buildings such Empire Place and 8 Melville Road, where vertical and horizontal linear fittings have been used to define the space, creating – in the case of 8 Melville Road where the fittings are reflected off the glass doors – the illusion of lines of light.

Exposed concrete ceilings have, historically,

posed problems for lighting designers and it is here that light selection becomes important. The designer does not have the luxury of hiding services in the ceiling so more planning and design is required to ensure that the space is well illuminated. All fixing details are exposed and electrical fixing points cannot be moved easily, or at all. In this application, linear light sources offer flexibility since they can run as continuous sources, reducing the amount of electrical connections.

Also, loop connections within the light source allow the light fitting to run to many metres. The longest single linear light source Regent Lighting has manufactured was that for the University of Johannesburg where the company manufactured a fitting of over 90 m long with only two supply feeds. The light source was used to link two buildings, creating improved uniform lighting levels and a consistent light source.

On a more functional level, up/down linear light sources installed at the parking entrances of the recently upgraded Rosebank Mall create a greater sense of space in the void and supply sufficient light levels on the floor. It is in this type of installation that it is possible to see the different effects achievable by linear systems, which offer the flexibility of suspending the fittings off a ceiling or surface mounting the fittings onto lower concrete ceilings. At the lift areas of this particular installation, the plaster ceilings were even lower and supplying recessed linear light allowed the designers to maintain the consistency of light fitting while increasing the light levels where required.

The flexibility of application created by linear light sources means they offer a vast number of opportunities for the design of internal areas. No other light source can be mounted in four different ways and at different angles following the internal lines of the building: suspended up or up/down light; surface mounted; recessed, with frame or without; and semi-recessed.

Auditoriums are notoriously difficult to light and unappealing installations in any number of such venues across the country are testament to this. A common sight in many such venues is sections of light from the ceiling onto specific areas below,

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creating zones of high light intensity with segments that are not sufficiently illuminated and certainly not conducive to a learning environment. In projects where linear lighting has been used, the resultant effect is a great improvement on the previous high intensity directional lighting creating much improved lighting uniformity. Combine this with LED high output linear PC boards and integrated DALI control protocols that allow the lecturers to control lighting levels for different visual presentations, and you have a winner.

Whether subtle or exposed, light should be designed into a structure – that way it caters for function, energy efficiency and aesthetic impact. Linear light offers task lighting, effect lighting – to transform spaces or illuminate vertical and horizontal elements – and, when combined with a suitable control system, maximum energy efficiency. LiD

7000 LEDs illuminate the Sistine Chapel

The Sistine Chapel in Rome has been illuminated by a novel lighting solution from OSRAM. After 500 years, this extraordinary piece of art history, bathed in the light of more than 7000 LEDs, can be experienced in unprecedented quality. The installation that has been put in place over the last few months is designed to protect the artworks while enabling much improved lighting. At the same time, it will use up to 90 percent less electricity than the previous installation. The European Union supported the project.

Dr Klaus Patzak, Osram's CEO and responsible for the Luminaires and Solutions segment of the business, explains that Osram has developed an LED lighting solution that sets standards in terms of technological strength, quality and innovation. "It's the first such solution in the world and paves the way for completely new possibilities for our clients. We will now rapidly turn this potential into reality."

The Sistine Chapel contains some of the most extraordinary works ever conceived and is Michelangelo's masterpiece. According to Prof. Antonio Paolucci, Director of the Vatican Museum, they wanted to honour the 450th anniversary of Michelangelo's death by providing new lighting for his work.

The lighting of the Sistine Chapel is a pilot project with the working title LED4Art. It is supported by the European Funding Program for Information and Communication Technology within the Framework Program for Competitiveness and Innovation (PSP-CIP). The aim of the subsidy program is to demonstrate new possibilities for LED technology with regard to energy efficiency and improved quality of light, and thus to achieve more rapid market penetration for the new technology. In addition to the project coordinator OSRAM, other partners involved are the Pannonian University in Hungary, the *Institut de Recerca en Energia de Catalunya* in Spain and the planning offices of *Faber Technica* in Italy.

Osram: Tel. +27 11 207 5600

LED engine stable at 380 volts

Otto Horlacher of Giantlight has designed what he believes will be a welcome solution to the 'dropped neutrals' frequently experienced during the installation of LEDs in the construction phase of a building.

A dropped or floating neutral effectively occurs when the grounded conductor or neutral wire is somehow disconnected from the original source to the load. It is, according to Horlacher, a common problem that occurs when electricians on site are still busy fitting the electrics but proceed with the installation of the light fittings nevertheless.

The electrician makes the relatively easy error of mistaking one of the phases for neutral and in so doing creates a voltage of anywhere between 270 and 380 instead of the usual 230 V. Dropped neutrals are disastrous for LEDs and it is usually the lighting supplier who bears the brunt of the fault as it is difficult to 'prove' the mistake once the electrician realises what has happened and fixes the connection.

Higher than normal voltage supply on control gear designed to operate at voltages not exceeding 230 V, or sometimes even 220 V, will result in premature failures. Control gear that can handle and withstand 380 V is obtainable, but it comes at a cost and is not readily available.

Horlacher is confident that his company will soon be in a position to supply a range of LED engines that can operate from 180 V to 380 V without being damaged in any way. The robust design will be ideal for areas, such as certain districts north of Pretoria; Alrode; and others, where the 'normal' supply voltage can often exceed 245 V.

For about a year, he has been working with an electronics company to find a solution specifically for LEDs and he believes that he has found one that cannot only withstand 380 V but can function quite comfortably at that voltage.

Working with a test board, Horlacher demonstrated the product by stepping up the transformer from 230 V to 380 V and noting the reaction by measuring the onboard temperature, current and voltage. Essentially, the system remained stable where, normally, 380 V onto any device would blow the power supply.

He explains, "Preliminary tests (exceeding 100 hours at 380 V) indicate that the LED engine we have created can operate indefinitely – at voltages way higher than 230 V – as it is self-regulating. The most important device, the current regulator (the brain of the system), has a temperature threshold – if it reaches that threshold it automatically reduces its own current output to protect itself and, in so doing, protects the LEDs as well.

"Furthermore, the 'onboard' current control to the LEDs remains stable to within 20%. For example, if the LEDs are operating at let's say 50% of their rated maximum current, at 230 V ac in, then at 380 V ac in, the current only increases by 20%; still well below the LED's maximum threshold. Then if the LED PCB begins to get warm, the constant current regulator throttles back to further protect the LEDs."

What makes the new system even more appealing is the fact that there is no external driver and all the technology is onboard. As Horlacher says, "You buy the board, put it in your light fitting and connect 230 V to it. You do not use a driver at all – everything is computed into the board. So not only is all the relevant technology onboard, but the board remains stable and functions at 380 V".

The onboard LED engines are also dimmable with normal leading edge technology (subject to verification by Giantlight of the dimmer manufacturer's equipment).

Horlacher notes that normal thermal and other LED luminaire manufacturing considerations still need to be adhered to.

Giantlight has been at the forefront of LED lighting technology in this country for a number of years and has established a name for itself for the design, manufacture and installation of comprehensive lighting solutions. The company intends to introduce its new LED engine to the South African lighting industry early in 2015.

Giantlight:
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New campus for Cell C

Located within Midrand's Waterfall Business Estate, Cell C's 44 200m² facility includes a main head office building, a customer service centre, an operations centre, a distribution warehouse, call centre facilities and an upmarket canteen. The campus also includes ample parking and jogging trails in the rehabilitated wetland. *Lighting in Design* spoke to Chris le Roux of Eksteen & Le Roux (ELR) Electrical Engineers about his involvement in lighting this impressive establishment.

Eksteen & Le Roux's client was Attacq Waterfall Investment Company (Pty) Ltd; AWIC Business Estate, the developer of the Cell C Campus in Waterfall City. Despite Cell C's tenant status, the company was heavily involved in the project's design to ensure that the campus suited its functionality and business requirements. Bentel Associates International was the principal agent and architect.

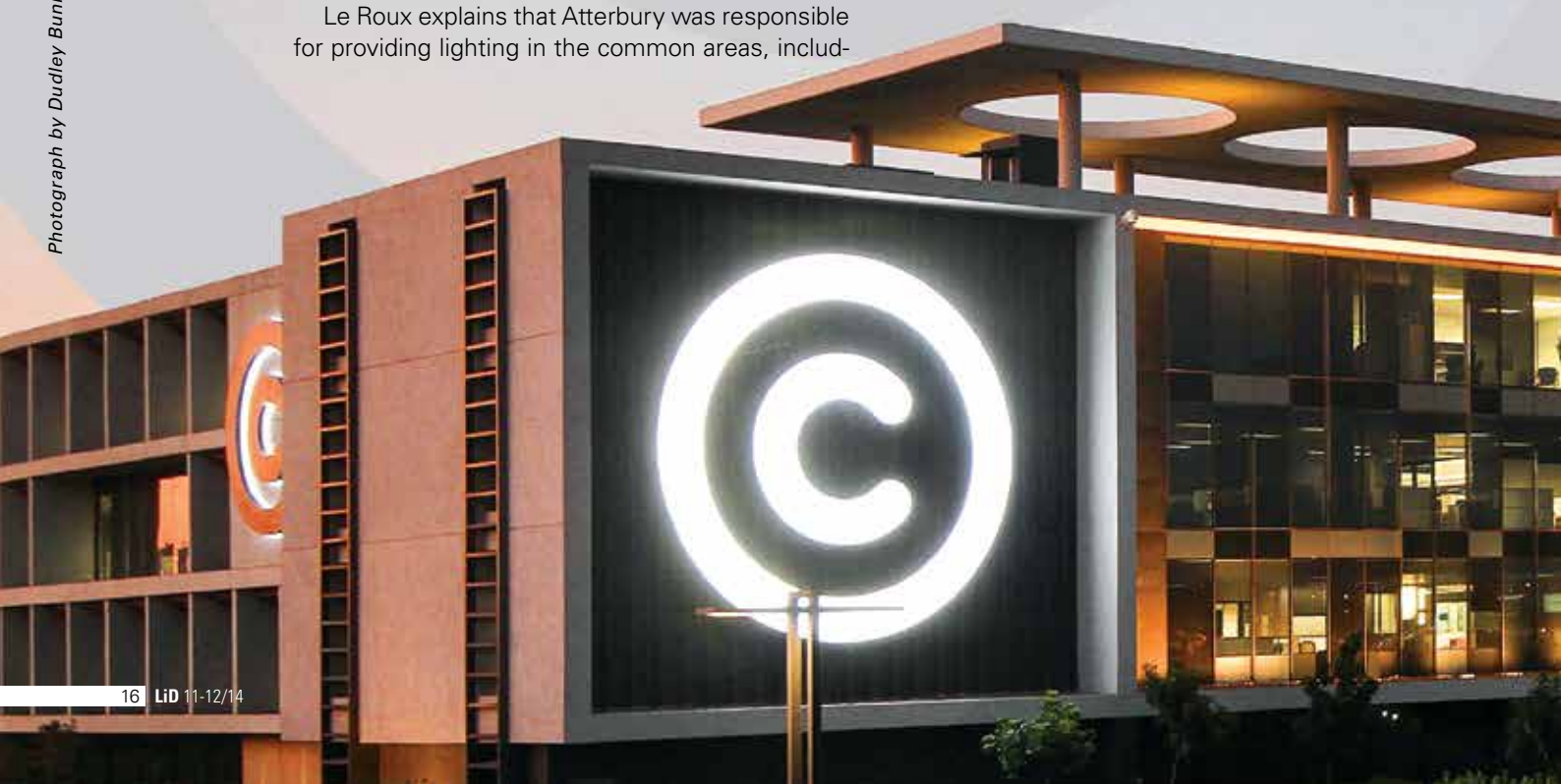
The development was fast tracked and construction – which began in August 2012 – was completed by the third quarter of 2013, with occupation at the end of 2013. The nature and size of the development and the speed with which it was undertaken required a high level of collaboration and co-ordination between the professional teams involved. The brief from Atterbury regarding lighting was to provide energy efficient lighting in the areas under its responsibility. Although there was no requirement to attain a specific green building rating, the building itself is contemporary owing to its lightweight external framework and the modern materials that were used in its construction and there was an obligation to be judicious in the use of energy.

Le Roux explains that Atterbury was responsible for providing lighting in the common areas, including outdoor and indoor parking spaces, common passages, stairways and toilet facilities. There was provision for lighting in the tenanted areas, though Cell C was responsible for funding lighting that exceeded the specification sanctioned in the standard tenant allowance.

ELR was required in the initial stages to provide an outline of the existing, up-to-date lighting technologies available, including those attached to fluorescent lighting. Though ELR recommended T5 lamps for the luminaires in the office areas, Cell C elected to use T8 lamps in preference. Dennis van Rooyen of Lighting and Allied Manufacturers, who was responsible for sourcing the bulk of the lighting for the entire project, explains that the recessed low brightness fittings that were chosen (T8 3 by 36 W) have good ballast and are energy efficient. These were supplied throughout the 23 000 m² of office space. Open channel, vapour proof luminaires with T8 light sources were used in the basement and substations.

Atterbury specified energy efficient light sources for the common areas and here, Le Roux explains, Softlight 800 11 W and Softlight Plus 21 W downlights using the latest LED technology were installed in the outdoor parking areas, and in the passages, toilet facilities and stairways in all the buildings.

In the common corridors in the office building, an existing Regent Lighting linear luminaire was modified to accommodate LED technology. The design of the luminaires, which ranged in length from 1.2 to 7 metres, suited the corridors and complemented



Photograph by Dudley Bunn.

the modern design and finishes in these areas. The effect was replicated in the glass walled main staircase where the linear luminaires, using LED technology, were mounted vertically on the steel mullions of the windows. "The total effect," says Le Roux, "was exactly what we hoped to achieve and the end result of the lighting solution we adopted in the common areas was that the LEDs combined high quality and energy efficiency. Also, the long life of the LEDs used in the luminaires supplied for these areas will reduce maintenance costs throughout the life of the building".

In order to attain the required lux levels onto the vertical areas of the racks in the 14 000 m² distribution warehouse, T-Bay luminaires using 4 by 80 W T5 lamps were specified. The small diameter of the T5 makes it easier to control the light so it works well for the high mounting height of the warehouse environment.

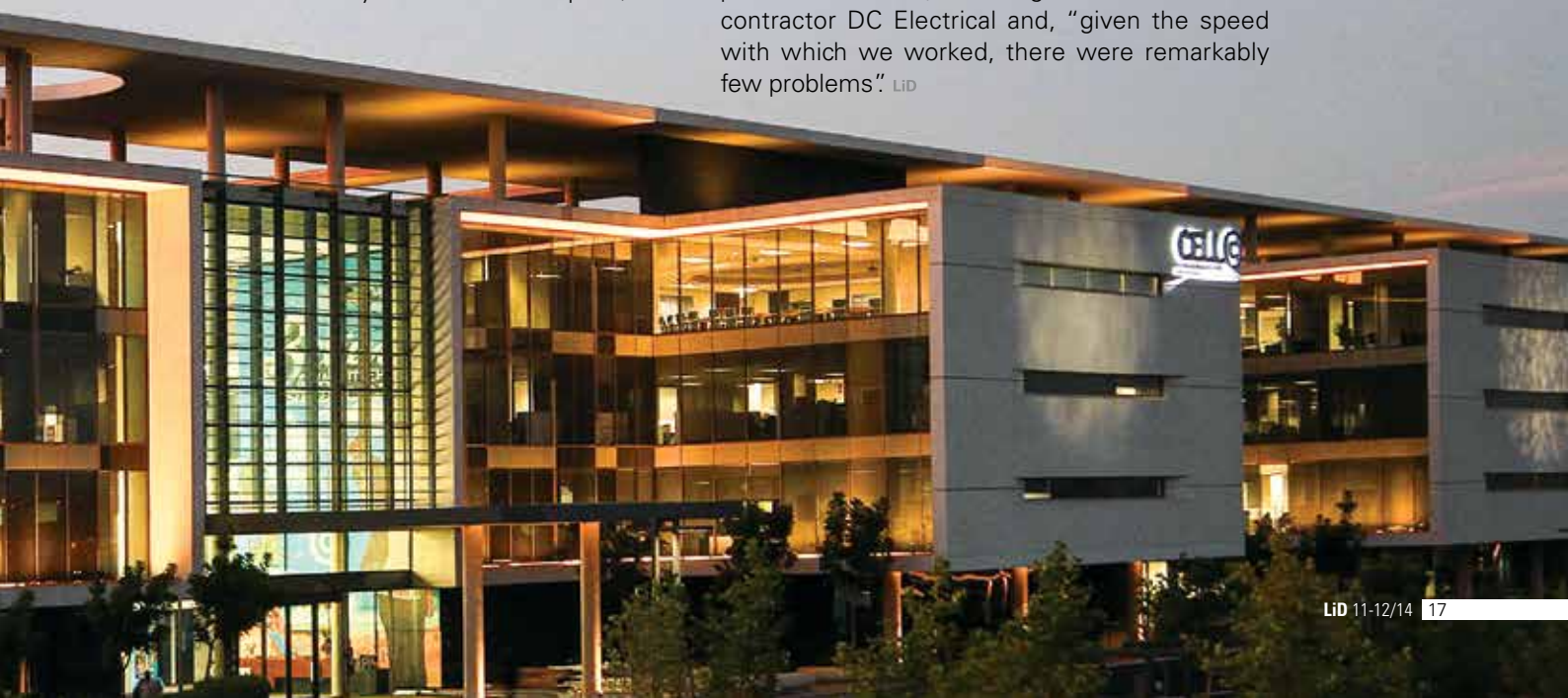
Cell C elected not to install a building management system in the Campus so although there is a fair proportion of natural light in the main office block, which is situated around a courtyard, there is no daylight harvesting. Occupancy sensors have been installed in the common corridors, toilet facilities and offices, except where local switching or dimming was requested in areas such as meeting rooms and board rooms.

In the exterior parking areas and roadways, a purpose-made pole with a mounting height of 6 m and a square luminaire using LED sources was designed to match the simplistic lines of the buildings. The building's external aesthetics are of the campus's most attractive features. Because the 'C' in Cell C embodies the company's brand, the letter is used in creative ways across the campus (the customer care centre incorporates a 'C' skylight for aesthetic purposes) and two C's placed on the warehouse exterior are illuminated at night, making them clearly visible from both the N1 freeway and Old Johannesburg Road.

To further enhance the night time effect, the distinctive lines of the building have been highlighted using LED strip lighting with in-ground fittings lighting up the columns. Deryl Lan of Pamboukian lightdesign was responsible for the striking and effective exterior lighting on the campus. He explains that his general approach was to gain an insight into the architecture and, from there, to develop a lighting proposal within budgetary conditions and bearing in mind energy consumption and environmental considerations. Using LEDs as the primary source (in total 750 m of LED lighting was used externally), the team decided to place in-ground uplighters at the guardhouse and surrounding external columns throughout the campus to highlight and emphasise their verticality. On the rest of the facades on the main campus, linear LED strip lighting was use to highlight the deep reveals. In order to draw attention to the building and the Cell C brand from the highway, the lighting team highlighted the 'flat' facades facing the highway using projectors that project a 'break-up' pattern.

Overall, le Roux is satisfied with the lighting, particularly where LED technology was used, "The general consensus of the developers, tenants and professional team is that our decision to go this route was correct and the effect is what we had envisaged".

Van Rooyen is also delighted with the end result saying that it was a pleasure to work with such a professional team, including the main electrical contractor DC Electrical and, "given the speed with which we worked, there were remarkably few problems". LiD



Eskom honours winners of the 2014 EELDC

Eskom recently honoured the winners of its biennial Energy Efficient Lighting Design Competition (EELDC). Aimed at encouraging efficient lighting design, the competition attracted 506 entries and this year, for the first time, the judges used an on-line scorecard for the initial round of judging.

Most designers in the 2014 competition incorporated LEDs in their designs reflecting, as Eskom's Andrew Etzinger, keynote speaker at the Awards breakfast, noted, "… the importance of featuring cutting-edge technology" and making full use of the versatility offered by the variety of shapes, colour, sizes and warmth of modern light sources.

Etzinger went on to emphasise that a saving of just 1 kWh meant that one less kilogram of carbon dioxide was produced by a coal-burning power station. "The proliferation of energy efficient lighting can," he said, "make a significant difference in terms of cost and environmental impact but is only possible if consumers are prepared to make the change". He added that this was where the input of designers became crucial, because through incorporating functional LEDs in aesthetically pleasing designs, they helped to make energy efficient lighting the preferred option of consumers in all market sectors.

In the words of Buckminster Fuller, American neo-futuristic architect, systems theorist, author, designer, and inventor, "The best way to predict the future is to design it".

The Eskom EELDC was open to learners, students and professionals in the fields of architecture, interior design, lighting and engineering, and to anyone with a passion for designing energy efficient lighting. The primary goal of the competition was to demonstrate that efficient lighting technologies, such as fluorescent technology and LEDs, can be used in ultramodern and attractive luminaires for residential lighting. It was also intended to encourage the design of creative and cost-effective luminaires, while promoting the use of compact fluorescent lamps (CFLs) and LEDs in the residential sector.

The theme of this year's competition was *Celebrate 20 years of democracy!* In addition to designing and building the working prototype, entrants had to prepare a budget, submit a sketch and a photograph for each entry, and also comply with strict safety and quality standards.

Entries came from university lecturers and students, as well as professional interior designers, architects, electrical contractors, lighting specialists and engineers across the country and all provinces were represented

The competition is supported by the National Metrology Institute of South Africa (NMiSA), the Illuminating Engineering Society of South Africa (IESSA), the South African National Energy Development Institute (Sanedi), Voltex, Eskom eta Awards and 49M campaign, the SABS, Technology Innovation Agency (TIA), Gauteng Department of Education, Cape Town and KZN Science Centres, Eurolux, the South African Institute of Electrical Engineers, LED Lighting South Africa, Radiant Lighting, ARB Electrical Wholesalers and BEKA Schréder.

It is organised under the auspices of a steering committee consisting of Latetia Venter (Eskom), Barry Bredenkamp and Lauren Smith (Sanedi), Elsie Coetzee (NMiSA), Enock Zikalala (BEKA Schréder) and Robert Henderson (Eskom). The total prize value was R200 000 and entrants competed in three categories.

The winners were …

Category A: Energy Efficient Residential Lighting Design (student)

First prize: Nimbus
by Ashley Adami, 2nd year student in Industrial Design at the Cape Peninsula University of Technology (CPUT).

Second prize: Bamboozled Light
by Minette Maritz, 2nd year student in Industrial Design at Cape Peninsula University of Technology.

Third prize: Eternity Light
by Holly Hamlyn, 2nd year student at Design Time School of Interior Design, Cape Town.

Educational institution winner: Cape Peninsula University of Technology.
The six top finalists each received a Lenovo 7" Android tablet (wifi and 3G enabled).

Category B: Energy Efficient Residential Lighting Design (professional)

First prize *of R 40 000 and the Lighting in Design trophy went to Stephen Pikus of Johannesburg for his design, Bright Spark.*

The six top finalists each received R5 000.

Category C: Promising Young Energy Efficient Lighting Design: learners from secondary schools

First prize: Shredded Lantern
by Megan Laughton,
Gr 12 learner at Stellenberg High School in Bellville.
Educational institution winner of R10 000: Stellenberg High School in Bellville.

The six top finalists each received a Lenovo 7" Android tablet (wifi and 3G enabled).

Category D: Special Award: Most Promising PDI Designer (Individual)

Esther Shaidi from Nelson Mandela Metropolitan University with her entry, Ubuntu Lamp, won the **Most Promising PDI designer** *award of R10 000.*

Images: www.nobelprize.org

The dedicated pursuit of white light

by Gavin Chait

Thomas Edison struggled with invention, trying through a process of elimination to "invent" the carbon filament for incandescent light bulbs.

"I speak without exaggeration when I say that I have constructed 3000 different theories in connection with the electric light, each one of them reasonable and apparently likely to be true. Yet only in two cases did my experiments prove the truth of my theory. My chief difficulty was in constructing the carbon filament. … Every quarter of the globe was ransacked by my agents, and all sorts of the queerest materials used, until finally the shred of bamboo, now utilized by us, was settled upon," he declared.

He has nothing on Isamu Akasaki, Hiroshi Amano and Shuji Nakamura who have just won the 2014 Nobel Prize for Physics "for the invention of efficient blue light-emitting diodes, which has enabled bright and energy-saving white light sources".

Diodes are electrical components with asymmetrical conductance to current; low resistance in one direction and high resistance in the other. Transistors, the essential components of all logic circuits and microprocessors, are a type of diode.

Semiconductors, like silicon, can be doped so that they have different electrical properties. Doping introduces into the material impurity atoms, which then either act as donors or receptors for valence (or outer band) electrons. Such extrinsic semiconductors can have either a higher electron concentration (more valence electrons) or more holes (spaces to accept valence electrons). These are, respectively, n- or p-type semiconductors.

Each of these n- or p-type semiconductors is

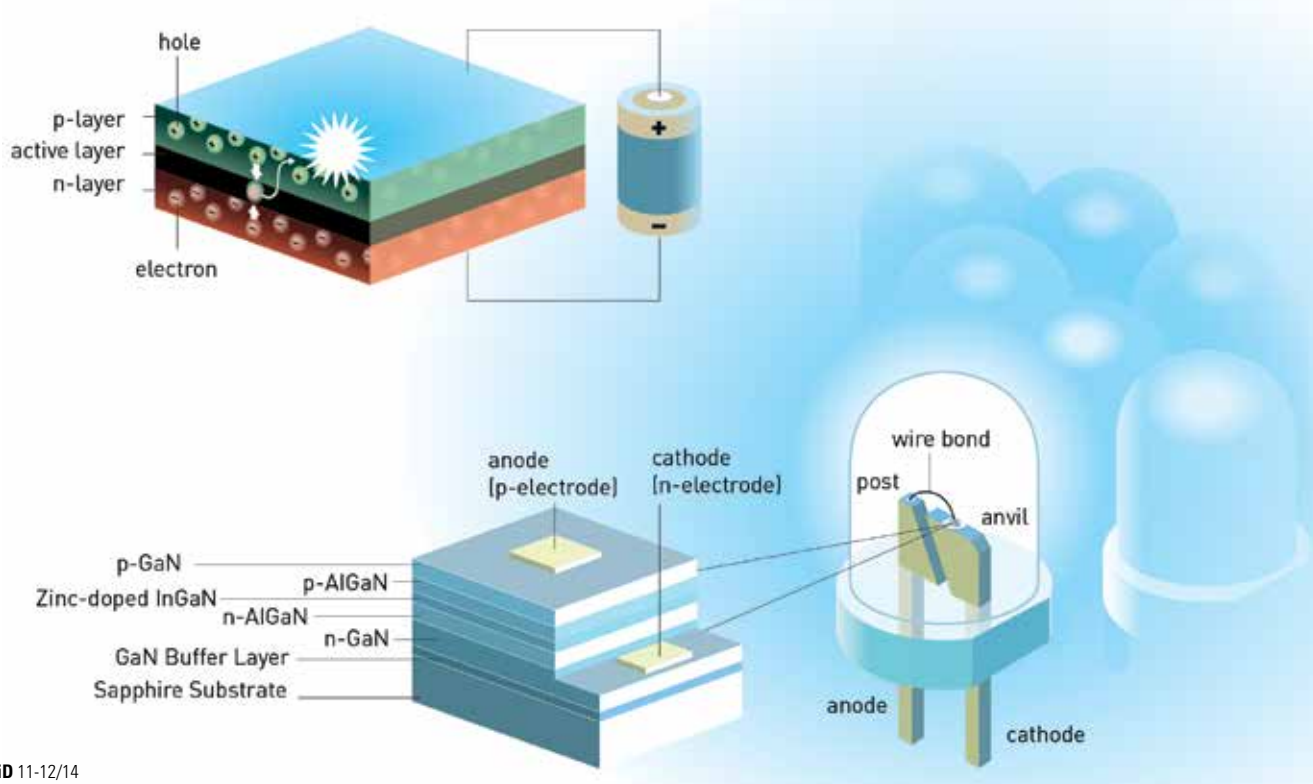
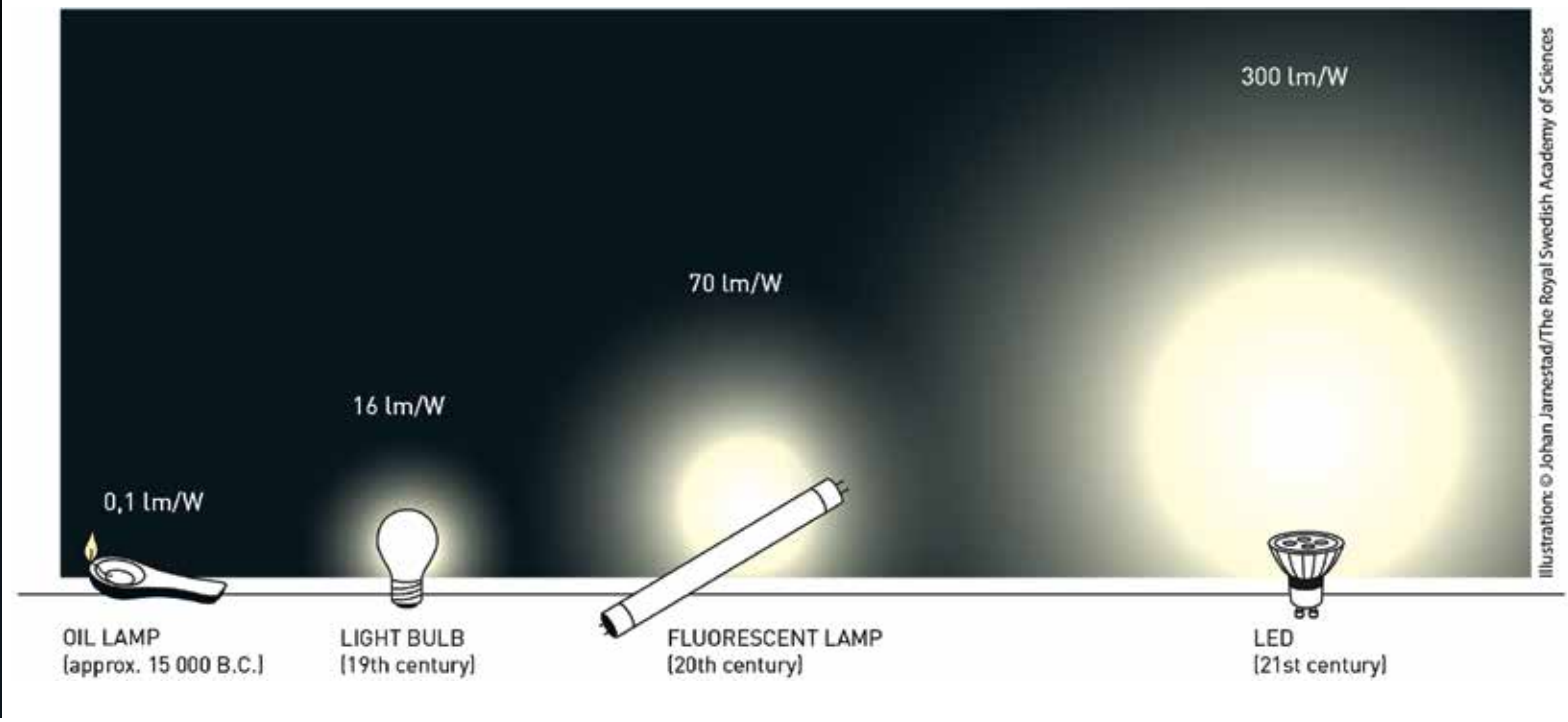


Illustration: © Johan Jarnestad/The Royal Swedish Academy of Sciences



very conductive on its own, but a p-n junction of the two types in a single crystal can become depleted of charge carriers. The junction element will then have either forward bias or reverse bias depending on the direction of an imposed electrical current.

As electrons move from the n-side to the p-side across the junction, holes 'move' in the other direction. As electrons recombine with holes there is spontaneous energy emission. Depending on the type of dopant, this energy can be released as visible light. The pursuit of different frequencies, or colours, of light-emitting diodes becomes, then, the pursuit of the right type of dopant.

As soon as the physics of the interactions were understood back in 1947 with the invention of the transistor, work began on light emission. By the 1960s, companies across the world were making red and green LEDs using Gallium Phosphate (GaP) as the dopant.

The wave-length of light emitted depends on the band gap between the n- and p-type elements.

Researchers at Philips tried Gallium Nitride (GaN) to grow crystals in the 1950s. They believed this would offer an appropriate band gap.

GaN is a very hard material with a Wurtzite (a hexagonal crystal system based on binary compounds) structure. Its wide band gap permits high-frequency light emission as well as high-speed field-effect transistors. But first crystals of the stuff had to be produced.

Unfortunately, researchers managed only a powder and were unable to create p-n junctions. Research continued with GaN using different techniques to grow the crystals – Hydride Vapour Phase Epitaxy, for one – but without success.

JI Pankove, a leading scientist working on blue LEDs, in 1973 said, "In spite of much progress in the study of GaN over the last two years, much remains to be done. The major goals in the technology of GaN should be: 1) The synthesis of strain-free single crystals, 2) the incorporation of a shallow acceptor in high concentrations."

Isamu Akasaki began studying GaN in 1974. In 1981, he became a professor at Nagoya University and was joined by Hiroshi Amano. Only in 1986 were they able to grow useable quantities of GaN using the Metalorganic Vapour Phase Epitaxy technique.

As explained in the Nobel Prize review, "The breakthrough was the result of a long series of experiments and observations. A thin layer (30 nm) of polycrystalline AIN was first nucleated on a substrate of sapphire at low temperature (500 °C) and then heated up to the growth temperature of GaN (1000 °C). During the heating process, the layer develops a texture of small crystallites with a preferred orientation on which GaN can be grown. The density of dislocations of the growing GaN crystal is first high, but decreases rapidly after a few µm growth. A high quality surface could be obtained, which was very important to grow thin multilayer structures in the following steps of the LED development."

Separately, Shuji Nakamura at Nichia Chemical Corporation developed a similar method where AIN was replayed with a thin layer of GaN which was grown at low temperature.

This was only the beginning as efficiency needed to be improved if it was to be at all commercially viable. Previous LED developments demonstrated that heterojunctions and quantum wells were necessary to deliver high efficiency. New types of GaN compounds were needed.

Over the next few years, Akasaki focused on AlGaN/GaN and Nakamura worked on InGaN/GaN and InGaN/AlGaN heterojunctions.

By 1996 the fundamental work had been completed and commercialisation began.

Nichia Chemical Corporation, which had forced Nakamura to stop work on his research though he had continued with his own time and resources,

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rewarded him with a bonus of $180. He quit, moved to the University of California, Santa Barbara, and sued them. In 2005, Nichia settled and paid him $9 million.

Nakamura followed up with the development of the blue laser, now used in Blu-Ray discs where the high frequency permits greater information density and higher quality video discs. The combination of red, green and blue produces white light. Work immediately began on developing white LEDs and the first commercial versions were released in about 2005. Consider that 20-30% of our electricity consumption is for lighting, and that white LEDs consume a tenth of the energy of current lighting, and you can appreciate the impact it will have.

However, solid-state lighting can be used in a variety of applications, from full-colour displays to motor vehicles and industrial lighting.

One current area of research is increasing the band gap further to produce ultraviolet light that can be used for low-energy sterilisation for water purification and commercial sterilisation systems. Another is continuing the development of white light production at ever lower cost.

Organic LED developments are based on using a thin film of organic compounds which emit light in response to current. The OLED can be based on polymer layers, or on small molecules. OLED displays work without a backlight and so are able to produce proper black and white colours, as well as being thinner and lighter than LCDs.

These polymer displays have a different origin to LED research and light emission was originally produced by a single layer. More recent developments have created emissive and conductive layers sandwiched between a cathode and an anode, equivalent p-n bilayers, with a band gap between the two organic semiconductors.

While efficient and low-cost white lights have not been produced just yet, colour displays are now widely used in mobile display devices, like phones and tablets.

Research into efficient solid-state lighting continues with the focus on lowering costs of production while improving colour rendering and raising the power output.

One of the more interesting is that of the quantum dot, a nanocrystal made of doped semiconductor which is small enough to exhibit quantum mechanical properties. It is being considered in a wide range of applications, including for medical imaging, solar cells, and qubits in quantum computing.

Besides the higher resolution that quantum dots offer for displays, white light emission is created by using a blue LED as a light-source and converting part of the emitted light into green and red light by placing quantum dots in front of the blue light. This has the potential to produce very efficient displays.

The same approach will produce white light for more traditional applications.

As the technology improves, costs are falling. A US government assessment declares that, since 2008, prices for LED white lights have fallen 85% while the installed base has grown from 400 000 LED lights to over 20 million.

This includes use the motor industry where LEDs are used in everything from headlights and brake lights to internal displays. The same report estimates that this has saved about $675 million a year in energy costs.

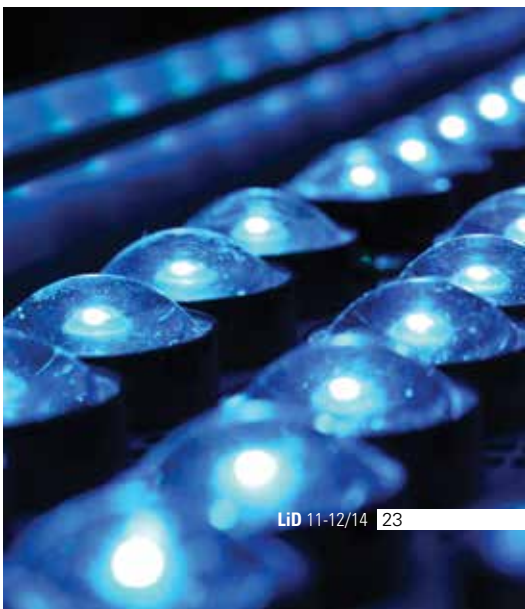
Consider how much lighting is managed by the state – from street lighting to traffic signals to their own office buildings – and you can see that it doesn't need widespread adoption by individuals to kick start the industry. Governments just need to recognise the savings they can make on their energy bills and drive their own change to stimulate the industry.

In South Africa, with the incredible pressure on Eskom's generating capacity, replacing every incandescent lamp would help reduce in the incidence of 'load shedding'.

Consider that the Medupi Power Station is to cost R170 billion while adding 4800 MW of power to our existing supply of 44 000 MW. R170 billion to add only about 12% to our capacity.

R170 billion would buy over 10 million street lights and put LEDs into every home in the country. That would save at least 20% of our energy demand. The equivalent of two Medupis.

The dedication of Isamu Akasaki, Hiroshi Amano and Shuji Nakamura has granted us a tremendous opportunity and has the potential to improve our lives in almost infinite ways. LiD



The Opton retail spotlight with warm white LED light in 38W and 28W versions and 6-degree narrow spot with up to 3105 lm covers the full bandwidth of lighting requirements of this Italian menswear fashion label. Despite a significant distance between ceiling and products, the spotlight with its unusually narrow beam for LED lighting and its high lumen packages illuminates the products with high-contrast accent. Black lacquered and mounted on tracks, the system's design becomes a stylish architectural feature.

Kiton Showroom

Interior designers face special challenges with the complex requirements behind the effective illumination of fashion, so what is it that defines a good clothing shop concept, which see clients return time and time again?

The appeal and quality of the products and their value must be projected optimally so the importance of the right lighting concept is clear: lighting tools should respond to frequently changing collections and decorations, accurately render the colours of fabric, and draw the attention of the customer to where it is wanted. Modern LED technology provides a great solution and the latest generation of lighting tools delivers a quality of light that matches the standard of conventional light sources, yet is significantly longer lasting and more efficient.

The language of light

Around 80 percent of the information we receive about the world around us comes through our eyes. Careful thought therefore must be given to a sophisticated lighting solution for use in fashion stores. Our visual perception is influenced not so much by the quantity of the lighting, as by its quality. One of the great pioneers of qualitative lighting design, Richard Kelly (1910 -1977), developed a perception-orientated lighting concept in the 1950s which, to this day, provides the basis for good lighting design. Kelly broke away from the rigid constraints of using uniform illuminance as the central criterion of lighting design. He replaced the question of lighting quantity with the question of individual qualities of light.

Kelly made a distinction here between three basic functions:

- *Ambient luminescence* is the element of light that provides general illumination of the surroundings.
- *Focal glow* typifies directed lighting used to attract attention, accentuate and create hierarchies of perception.
- *Play of brilliants* is light as an aesthetic end in itself and adds light effects for a special ambience in the room.

Designing with light

Though Kelly's concept of the three lighting functions dates back more than half a century, it has lost none of its relevance despite the ongoing evolution of lighting technology away from the incandescent lamp and towards LED technology. Simple perception-orientated differentiation translates into a complex lighting concept that meets the current requirements of shop lighting.

The ideal lighting concept combines all three light categories in a well-balanced relationship. Ambient luminescence delivering pleasant brightness to the room is provided by lighting tools such as downlights and wallwashers. This light forms the basis for a shop concept as it facilitates general orientation and creates good visual comfort. The choice of colour temperature sets the tone for more scenic illumination: Neutral white light creates a fresher, dynamic atmosphere suitable, for instance, for the presentation of sports fashion. Warm white light, on the other hand, produces a more formal, distinguished ambience frequently favoured in the

EYE CATCHERS AT THE POINT OF SALE:

Exquisite colour rendering, strong contrast and accent lighting bring out the materials and details of the products vividly – Kiton Showroom in Milan, by lighting designers Gruppo C14.

Antonia Store, Milan: Optec LED spotlights and Quintessence downlights underline the textures of the materials (Lighting designers: Black Out).

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high-end fashion segment. Many brands in the retail sector give emphasis to focal glow as a central component of their lighting concepts.

This is the domain of compact LED lamps with directed light that delivers the key parameters required for the presentation of textiles: brilliance and modelling are best achieved using positionable and rotatable spotlights flexibly mounted on track systems.

The repertoire of LED lighting tools available offers many diverse application possibilities: spotlights and floodlights scenically illuminate walls, product shelving or small decorative islands, and optimally emphasise materials, textures and colours. LED technology is advanced enough for the lighting tools to produce brilliant light without spill light, thereby ensuring precision with projected accentuation lighting.

By using different lens systems such as Sphérolit technology, LEDs can emit light ranging from wide to very narrowly focused beams – with the added benefit of a highly efficient energy footprint. Compared to low-voltage halogen lamps, LEDs can easily reduce the connected load in a store by up to 80 percent.

As a decorative lighting component, the play of brilliants adds scenic effect in a variety of ways. Coloured light may serve as a background for the white light illuminating the products to create a magnetic atmosphere. Light and fashion, as a result, merge into a brilliant focal point.

LED lighting design – the more efficient option in fashion retail

High-quality colour rendering is a vital criterion for the illumination of textiles and LEDs excel in this area. With colour rendering indices in excess of Ra 90, their light simulates natural light, thereby satisfying the prerequisites for illuminating fashion with light that precisely brings out true colours. In addition, LEDs are a highly energy-efficient light source and offer an attractive alternative in the retail sector. With an exceptionally long service life of at least 50 000 hours, LEDs save up to 80 percent in energy costs when compared to halogen lamps. Weighed against lighting systems with high-pressure discharge lamps, LED luminaires radiate significantly less heat leading to cost savings as a result of more energy-efficient air-conditioning in the store. LiD

All photographs by ERCO.

Concept store Lanificio di Tollegno & Ragno: The lighting concept creates a symbiotic coexistence using different light temperatures for the two room sections: Tollegno products are sharply accentuated and consistently illuminated with warm white light at 3000 K for a cosily traditional atmosphere. The Ragno range, in contrast, is bathed in diffuse and cool light at 4000 K for a younger, flamboyant ambience.

Catering equipment showroom turned into a magical space

Food service industry giant, Mac Brothers Catering Equipment, recently remodelled its manufacturing plant in Epping, Cape Town. The company designs and manufactures an extensive range of catering and refrigeration equipment and is considered the leader in innovative product design and service excellence for the South African food service industry. Mac Brothers, which counts restaurant giants such as Burger King amongst its clientele, is perhaps best known for supplying the catering equipment used on popular TV shows Masterchef SA and Kokkedoor.

"For years we had a 10 000 m² manufacturing plant where we manufactured catering products from scratch or imported and assembled them. Our clients would visit us and observe the production process first hand, something they really enjoyed," says Derek McMahon, MD of Mac Brothers. "But the image of cooking has evolved and we realised that our approach to marketing our products also had to be realigned, so we took the decision to give our plant a face lift to include a dedicated showroom space."

The make-over meant the installation of a dropped ceiling in the existing space and that called for a new lighting design. "We soon realised that more than the carpets, paint or furniture, it was lighting that would make the space 'pop'. That is why we got in touch with Eurolux, who in turn partnered with Blair Hammond and Associates, to deliver a truly professional end result," says McMahon.

Blair Hammond and Eurolux presented three designs to Mac Brothers, each featuring different technologies. The selected lighting design allowed the company to create the desired look and feel within the space, without exceeding its budget. The showroom is divided into an area that showcases the kitchen equipment, a working kitchen fitted with the Mac Brothers product line, sales desks and a coffee shop and lounge area, as well as a reception. Different lighting solutions had to be designed for each of the spaces.

Eurolux P3AL pendants with a brushed aluminium finish were selected for the sales area and were positioned just above each of the sales desks. The entire Mac Brother range features a stainless steel or highly polished metal finish and the P3AL pendant extends this decorative theme throughout the sales area. "We chose this pendant as it provides sufficient targeted task lighting at desk level and minimises glare, which in a highly reflective area is vital," explains Daniel Hammond from Blair Hammond and Associates. "These were fitted with maxi globes, which provide good light output and were in line with the specified budget."

Eurolux P150AL pendants with adjustable cord suspension were selected for the coffee shop and reception areas. These fittings feature the same brushed aluminium finish as those used in the sales area, but have a slightly different shape. "They have a modern, minimalist feel, which complements the look of the showroom, while creating the welcoming ambience necessary for these areas," says Hammond. The pendants are also fitted with maxi globes; however, owing to the shape of the pendant, the lamp is visible, adding a touch of drama to the space.

The Eurolux PR111 three light double parabolic Louvre fitting was selected for use in the main showroom area. This product was fitted with 3 x 28 W T5 fluorescent lamps to guarantee the high light levels required.

A ceiling grid was used and the fittings recessed into the 2.85 m suspended ceiling, as Mac Brothers did not want to have any light fittings surface mounted onto the ceiling. "The benefit of using this product at this mounting height is that it distributes its light evenly over the reference plane that needs to be illuminated," says Shaun Bouchier, director at Eurolux.

The rest of the showroom and the working kitchen have Eurolux downlights installed to provide light for the general areas where low light levels are required.

Mac Brothers is delighted with the finished product. Says McMahon, "Epping is an industrial area so when you drive in here, you do not expect to find a high end catering showroom. But as you walk through our doors you feel as though you are being transported to a movie set, and this is mostly due to the lighting. It turns the showroom into a magical space. Eurolux and Blair Hammond truly managed to create an upmarket space that enhances Mac Brothers' image and improves its brand value." LiD


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LED post top luminaire

BEKA Schréder has launched the Zela post top luminaire. Designed and manufactured in South Africa, it offers a cost-effective, contemporary design that uses state-of-the-art LED technology.

The Zela is characterised by its distinct flat, conical diffuser, with carefully designed cooling fins that add elegance by continuing the flow of the line of the pole.

The versatile luminaire is suitable for Group B road lighting, general area lighting, parks and gardens, and security lighting. It is designed to replace HID post top luminaires (up to 100 W HPS) with an energy saving of up to 70%.

The luminaire emits a pleasant, glare-free light owing to the indirect lighting and the highly efficient white reflector (symmetrical light distribution). It is also available in an asymmetrical version for effective street lighting applications, or where lighting control and low glare are important. The correlated colour temperature (CCT) of the LEDs is neutral white (3000 K or 4000 K). The Zela is designed for LED light sources between 19 W and 55 W at an ambient temperature of up to 35 ºC.

The complete luminaire is sealed to IP 66 for long lasting performance. A daylight switch is available as an option.

BEKA Schréder: +27 11 238 0078

Left: The new cost-effective Zela LED post top.
Below: The Zela emits a pleasant, glare-free light.

The Zela is the perfect luminaire for architectural spaces.

Simple, intelligent light

Osram's Lightify system brings smartphone-controlled lamps and luminaires into homes and offices. The system is suitable for end users and professionals and for indoor and outdoor applications. It can be connected to products from other manufacturers thanks to open interfaces. "Lightify lets consumers exploit the wide-ranging possibilities of light – combining safety, well-being and fun," says Timon Rupp, who is responsible for Lightify at Osram.

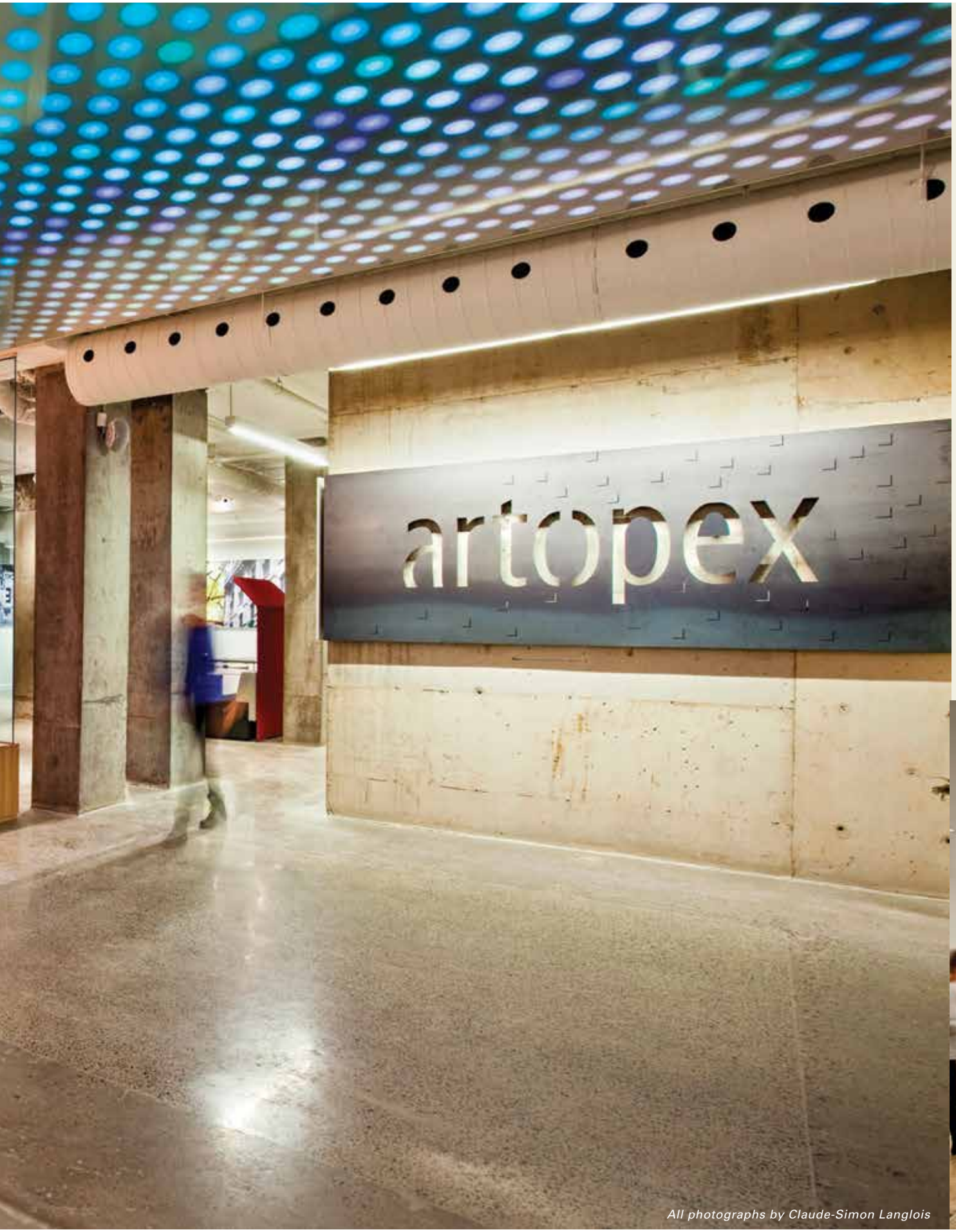
The starter package enables customers to begin with a system that consists of a single lamp and a gateway. The gateway serves as the control unit for all connected Lightify devices and, in contrast to other products available on the market, merely requires a WLAN connection but no cabling to the internet. The light itself is controlled via an app for smartphones, downloaded free of charge from various app stores. Millions of possible colours are available and several light sources can be combined and commonly controlled.

In addition to the Lightify version for private users, a Pro version is available for professionals, with the gateway enabling 100 light sources to be integrated into the system. A push-button coupler allows existing light switches in buildings to be used – simply remove the switch, install the push-button coupler and attach the switch again.

Connection to the DALI standard is especially interesting for professional users. This standard, common in Europe, can be complicated to set up and, until now, has not been controllable by end users via smartphones. Lightify Pro changes this. An app is available for the installer and another for the user, enabling DALI networks to be intuitively set up and operated.

Lightify supports the ZigBee standard and all products in the portfolio are ZigBee Light Link certified, meaning that products can be combined with products from other manufacturers, to make them future proof and comprehensively connectable. A partnership has been established with the Qivicon system from Deutsche Telekom.

Osram: +27 11 207 5600



All photographs by Claude-Simon Langlois

Lighting up a new showroom

Artopex, one of the biggest office furniture manufacturers in Quebec, recently unveiled its new showroom in the heart of Old Montreal. In collaboration with Lemay, the multidisciplinary firm responsible for the interior design, LumiGroup created the lighting for the space, which had been vacant for 25 years. Located in the basement of the former Royal Bank of Canada, the showroom was presented with a formidable lighting challenge - the almost total absence of natural light.

The objective was to create various lighting moods – while highlighting subtle, tailored intensity variations and contrasts – rather than the general diffuse lighting commonly used in showrooms. The showcased products benefit from a high source of light while adjacent spaces are treated with softer lighting.

A continuous ribbon, showing images of Quebec's territory, guides clients through each section of the showroom, illustrating the story and history of Artopex. LumiGroup, supporting this narrative and graphic frame, opted for fluorescent lighting, of asymmetrical type using linear devices arranged on the ceiling to bathe the walls in light from top to bottom. The brightness of the wall lighting makes up for the lack of windows.

The sample room and the adjacent conference room are equipped with Petal pendant lights from Luce Plan, designed by the French architect Odile Decq. These large white fabric-coated rings soften the glass and concrete space with their acoustic properties. The stone foundations of the original building were stripped and then enhanced by a system of LED lighting, hidden on the ceiling for a theatrical and dramatic effect.

Lemay's staging and LumiGroup's lighting have created a beautiful refined effect, consisting of games of shadows and lights and contrasting atmospheres.

'Solid' packaged with Bluetooth-controlled LED light

Terence Woodgate's collection of LED pendants and surface downlights will be packaged with the option of lighting manufacturer Megaman's new Ingenium Bluetooth LED lamp – the first decorative lighting collection to be sold with Bluetooth.

The new Smart version of the lamp with integral Bluetooth control allows the lights to be controlled in a real world setting from a phone or tablet. An app communicates directly with a chip inside the lamp, allowing the user to group, dim or turn lights on/off without any need for rewiring.

"The attraction of the Bluetooth-enabled LED is that it allows us to integrate cutting-edge technology within our Solid collection. The technology that allows the user to control, dim and group lights is hidden within the light, leaving the design pure," says Terence Woodgate of eponymous brand.

Woodgate's lighting brand launched in February 2014 with the aim of producing design-led lighting collections that maximise the benefits of LED technology. Woodgate has previously designed lighting for companies such as Concord Lighting, but this is the first time that products will be designed, produced and distributed under his own brand.

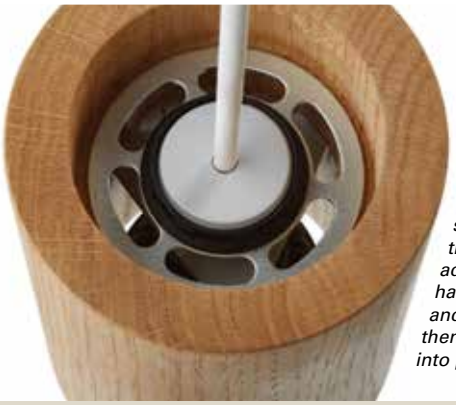
The brand's first collection is Solid. The collection features 16 pendants and surface-mounted downlights in natural materials, such as Carrara and Nero Marquina, Oak and Walnut, designed around a LED reflector lamp.

Although LEDs produce far less heat than incandescent lamps, the little heat they do produce needs to be effectively dispersed to maximise the LED lifespan and performance. To address this issue, Terence designed an electro-mechanical support system (now patented) which serves as a cord grip, insulating cap and locking adjustable support, as well as providing a surface for lamp information.

Each shade body is a solid cylindrical or conical form with the central core removed. The lamp holder slots into the void once the ceiling wiring is complete, allowing the shade to rest on the triangular support. The shade can then be locked securely in

The patented LED pendant lampholder assembly functions as a cord grip, insulting cap, locking adjustable support and as a surface for lamp information.

*The triangular lampholder assembly is fitted into the **Solid** shade after ceiling wiring has been completed.*



*The **Solid** shade can then be adjusted to hang vertical and true, then locked into position.*

place, after adjusting its position to hang straight and true. The venting in the locking support disc allows for cooling air flow. The lamp holder is entirely contained within the shade, invisible within the pure form of the design, with the LED lamp also recessed deep in the shade to avoid glare, without restricting the beam or wasting any emitted light.

"Lighting is now digital. The new super-efficient LED light source is amazing and as 20% of the world's energy is used in lighting, LEDs can really make a difference. For me it's important not to waste any of this new efficient light. To marry this solid state technology with solid natural materials is emotive," says Woodgate.

The product packaging was created by Charlie Smith Design, who also created the brand identity. The box system Smith created was designed to work across all products within the Solid collection and avoids the use of plastics and polystyrene. Woodgate felt strongly that the accompanying instruction manual should offer an opportunity to engage with the customer with the brand, and not be an afterthought. The manual, with illustrations by John See, is the first item visible when a customer opens the box.

Woodgate has also made use of the marble that is removed from the central column of the marble shades, designing a small, conical pendant light that houses a 3 W LED.

This will be available as a single pendant, or for bespoke projects as a cluster or cascade.

Fred Bass, managing director of Neonlite International Ltd, the brand owner of MEGAMAN®, says: "LED lamp technology brings so many advantages to the end user. As well as a long lamp life and excellent quality of light, our Ingenium® Blu LED lamps can be controlled via a smart device app, for the ultimate in user flexibility. Working with such an influential designer as Terence Woodgate has been a real privilege and Solid is testament to what can happen when the ultimate in style meets the latest in LED lamp technology."

LED lamp is set back to avoid glare, without compromising beam angle.

***Solid** with 6 W LED reflector lamp fitted. A 6 W LED Bluetooth enabled lamp is available as an option.*

*The **Solid** shade rests on the triangular support without restricting cooling air flow.*

New tool for retailers

MEGAMAN® has announced the launch of a new LED technology, Perfect White, which enhances textiles, bringing the whites to life while offering efficacy and energy efficiency.

The Perfect White range produces a high quality and vibrant light. The technology behind the effect modifies the spectrum in the near visible range to make the object appear, with increased contrast, to stand out from its background and adds a clean, cool feel to the object itself.

To meet retailers' requirements for high quality light sources on goods, especially fabrics, Perfect White is developed to deliver light that makes the white in fabrics stand out while rendering the true colours of other hues. Retail shops, particularly fashion stores, will find their merchandise more attractive and convincing when exposed to Perfect White's light source. The Perfect White range includes:

Vito LED Downlight, an energy saving solution for shop and general lighting with 35° accent and 60° medium beam optics, which provide the necessary control to maximise quality of light, while minimising loss of light.

The Vito LED also delivers lighting performance of up to 5600 lm with a 66 W system power consumption, making it an ideal 70 W metal halide replacement. Its high cut-off angle of 46° ensures maximum comfort.

The gimbal construction - a pivoted support that allows the rotation about a single axis - provides multi-directional tilting for a high degree of flexibility.

Carlo LED Adjustable Downlight, a perfect 50 W metal halide replacement that offers excellent lighting performance up to 3600 lm with only 39 W system power consumption. Its cut-off angle at 39° ensures visual comfort and it is ultra flexible with a 45° tilting angle and a 355° rotation angle.

Modena LED Tracklight which has an aluminium reflector that delivers clean and precise beams. Its powerful lighting performance of up to 4500 lm makes it an ideal 70 W and 35 W metal halide replacement solution. The adjustable arm allows for multi-directional lighting: 355° horizontal rotation and ±90 vertical tilting angle.

Designed to replace halogen AR111, the Megaman LED AR111 reflector saves up to 78% of energy use over its counterpart while delivering excellent light output. Its long lasting nature reduces maintenance time and the glass cover design simplifies maintenance.

The future lighting solution is here. This innovation highlights MEGAMAN's® capability and capacity to apply new technology. It brings together lamps, applications and systems to provide a total energy saving solution for shops and general lighting.

www.megamanlighting.com

Perfect White LED series brings whites to life.

EUROLUX PROJECT SOLUTIONS

Enhance your commercial and industrial environments

Eurolux Project Solutions recently supplied a variety of energy efficient lighting solutions at the renowned Hotel Verde: The greenest hotel in Africa, having just been awarded the prestigious LEED Platinum award (Leadership in Energy & Environmental Design) - 1 of only 10 in the world.

Eurolux offers a comprehensive lighting design and specification solution to its customers – all completed by a qualified lighting engineer.

- A project begins with the initial site inspection and customer briefings.
- A detailed lighting design, with full 3D simulation and energy efficiency report, to comply with SANS and OHS, is then presented to the client.
- Detailed cost-of-ownership and lifecycle cost analysis is presented to the client, thus allowing for informed easy decision making.

Cape Town:
9 Racecourse Road
Milnerton
7441
South Africa
Tel: +27 (0)21 528 8400

Johannesburg:
10 Milkyway Avenue
Linbro Business Park
Sandton 2065
South Africa
Tel: +27 (0)11 608 2970

Email: admin@eurolux.co.za
Web: www.eurolux.co.za

www.eurolux.co.za

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Lights By **Linea**

48 Marine Drive . Parden Eiland . Cape Town
Telephone: 021 511 6116 . Facsimile: 021 511 7662
email: info@lightsbylinea.com . www.lightsbylinea.co.za