Light with LEDs 1 | 2010 3lux:letters The Architecture Magazine

3lux:letters

NEW LIGHT | ARCHITECTURE | TECHNOLOGY 1 | 2010 TRILUX

lux: Light with LEDs
Innovative lighting solutions

lux: Light for any space
When LEDs make sense

lux: Light to admire
TRILUX Competence Centre

Title page: At the Light+Building in Frankfurt am Main, TRILUX presents a completely new generation of luminaires. A special highlight is the extremely slender Neximo suspended office luminaire. Photo: Christoph Meinschäfer, Arnsberg

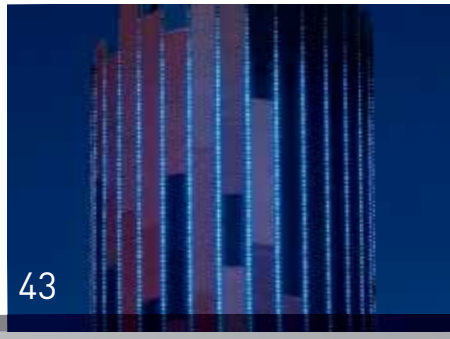
Dear Readers,

"same procedure as last year" – this is what one might say. The Light+Building trade fair in Frankfurt am Main, Europe's largest and most important exhibition in the field of light and lighting, is about to start again. This time, however, no doubt, it is especially interesting for the visitors. The reason being that even though no longer brand-new, a source of light apparently invented anew in the past few years is on a triumphal march: LEDs. In future, no manufacturer of lamps and luminaires will be able to ignore LEDs. It goes without saying that you, dear readers, will find at TRILUX numerous new but also proven luminaires equipped with energy-saving LEDs. Should you have any questions about LEDs, or indeed about the general topic of light, it would be best if you directly contacted our architectural consultants. Please find the addresses in the imprint.

In line with this trend, our light-architecture magazine 3lux:letters you presently hold in your hands also focuses on the topic of LEDs. We are proud to have the renowned light planner Andreas Schulz of Licht Kunst Licht AG to write our leading article. In his contribution, he has a critical look at the reasonable use of LEDs. Our three interview partners in the section lux:reflection will also supply you with very interesting insights and points of view. In the section lux:architecture, among others things – and as a special service for the Light+Building issue of the 3lux:letters – we demonstrate with our LED check within which spatial situation the use of LEDs really makes sense at present. In addition, you may look forward to the many further themes around artificial light and lighting.

Have fun while reading this issue and a successful visit to the trade fair.

Yours sincerely
Dietmar Zembrot, Sales and Marketing Director



LIGHT WITH LED

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The °XXXL(amp)
Bart Lens
www.objetbart.be
www.lensass.be

The XXXL(amp) by Bart Lens lives up to its name: With its 1.6 metres in height and four metres in diameter, it is not suitable for just any room.

When a quarter-XXXL(amp) is suspended in a mirrored room, the latter transforms into a generous space full of giant lanterns.

Photos: LENS°ASS architecten

In the case of the XXXL(amp) that there is an architect hiding behind the design is almost self-explanatory considering its space-structuring function. When developing the flattened cupola consisting of twelve segments, Bart Lens was inspired by the form of a Chinese lantern. At not quite four metres in diameter and 1.6 metres in height, it is probably the largest luminaire in the world. For suspending it, the architect recommends a height of 1.3 metres so that when entering the interior one has to bow, as is only appropriate for an impressive room. As soon as a seating position is taken up at the dining or conference table, the room outside of the luminaire again composes itself into a whole.

lux: STATEMENT

Victoria Coeln
Vienna
www.coeln.at

Photo: Lines of coloured shadows emphasize the façade of the Vienna Concert Hall – the to date largest, permanent chromotope by the artist.

From fire to LED

Lighting designers were the first visionaries. The history of lighting design started in a way which was as simple as it was revolutionary: with a piece of kindling. How much courage and exploratory urge was needed for that first grab into the fire … No doubt the fire makers were the most curious and probably also the most courageous in their community. In the historiography, this third "professional" group – next to the hunters and gatherers – does not even get explicitly mentioned. We should change this. Today, designing with light is no less visionary. Since the supply of electricity, light has been separated from the use for heating with different degrees of success. Emotionally, this is not understandable since we are still always talking about warm or cold light – a major issue in the development of LEDs which has yet to be solved in a satisfactory way. I work with coloured LEDs, these are already "ripe" for my projects. I mix coloured light from various directions to create spaces of light – chromotopes – where white areas with multiple coloured shadows are created. An attractive play which also pleases passers-by in the cities of Vienna and Villach. In future, more and more refined light technologies will make a more and more refined design with light and colour possible. I advise all the young students of lighting design to intensively study painting to complement their technical training. This opens up new ways of thinking and thus an incredible diversity for design. Of course we are today confronted with far more complex challenges than were our protohistoric colleagues, but I do believe we need just as much courage for our visions.

Photo: Victoria Coeln, Vienna

Photo: Sabine Schirdewahn

Light art in an unusual context awaits the visitor at the first Biennale of International Light Art: The works will be shown on over 60 private premises – such as in Mrs. Schmidt's storage cellar.

Biennale of International Light Art
"open light in private spaces"
until 27 May, 2010
in Bergkamen, Bönen, Fröndenberg, Hamm, Lünen and Unna
Tickets: € 15 / € 12
www.biennale-lichtkunst.de
www.ruhr2010.de > Programm > Metropole gestalten > Lichtkunst

This year, the major event RUHR.2010 determines what is happening on the cultural scene – also in the field of light art. Reason enough to initiate from March to April the worldwide first Biennial of International Light Art in the European Capital of Culture: In several cities, works of light art by internationally renowned artists will be shown on more than 60 private premises. The diversified list extends from children's room to party room, from storage room to funeral parlour. Like this, a direct, critical dialogue is to be encouraged between (light) art and society. An unusual exhibition venue also welcomes the visitor for the production of the LichtKunstRaum sanktreinoldi in Dortmund: Three internationally famous artists will focus on the worship space, the tower and the Reinoldiforum of the Stadtkirche St. Reinoldi. At the same time, a LightForum in cooperation with Dortmund University and a dance project will take place. But not only interiors, a complete waterway as well will be shown in a different light thanks to the KulturKanal project: The 70 km Rhine-Herne Canal is to be permanently enlivened with numerous art and culture events. The project "KanalGlühen: NON STOP CITY" organized in this context wants to give those participating in a nocturnal canal tour a new impression of the region. Erik Göngrich and raumlabor berlin developed projections of texts and drawings which will emphasize the scenery and the buildings on the banks, make them fade, comment on them and overlay them.

From the artery of the coal transport to the KulturKanal: This year, the Rhine-Herne Canal is to be subject to a change – for "KanalGlühen: NON STOP CITY", it will be artistically staged.

Illustration: Erik Göngrich

KulturKanal
KanalGlühen: NON STOP CITY
Erik Göngrich, raumlabor berlin
17 April until 12 June, 2010
Tour from Duisburg to Herne
Tickets: ca. € 25
www.ruhr2010.de > Programm > Metropole gestalten > künstlerische Interventionen

The artist Angela Bulloch will stage the tower of the church of St. Reinoldi with her light work. The glass Reinoldiforum attached to the tower will be illuminated by Jun Yang. Andreas Oldörp will concentrate on the Romanesque worship space.

Photo: Sabine Schirdewahn

LichtKunstRaum sanktreinoldi
Angela Bulloch, Andreas Oldörp and Jun Yang
14 May until 27 July, 2010
Church St. Reinoldi
Ostenhellweg 2, Dortmund
www.ruhr2010.de > Programm > Metropole gestalten > Lichtkunst

Photo: Aral

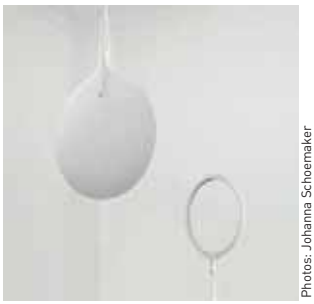
With the worldwide first completely LED illuminated petrol station, according to Aral, the company sets an environmentally-aware example to be followed.

First LED petrol station in the world
Aral
www.aral.de

Light emitting diodes (or LEDs in short) are becoming increasingly more popular. If for a long time they were only known as background lighting for pocket calculators or as illuminants in torches, the small lamps are now even conquering the German petrol stations: at the one on Herner Straße in Bochum, Aral recently converted the complete lighting to modern LED luminaires. From the vacuuming to the air-pressure station to the pump places and the price board all the way to the car wash and the shop lighting including all the refrigeration units and the ovens, the petrol station shines in multi-coloured LED light. According to the operator, this conversion not only saves 40 000 kWh of electricity per year, which adds up to about 20 per cent of the total power consumption of the petrol station, but also 25 tons of CO_2.

The changeable opening angle allows an optimal alignment of the light. In addition, the light intensity and the colour can be adapted to different needs.

Slender and transparent, two characteristics the luminaires owe to the novel OLED technology.



Photos: Johanna Schoemaker

Until 2010, step by step the incandescent lamp will be abolished in Europe. With its discontinuation, the light in private rooms will inevitably change as well. In the context of her diploma thesis "Zukünftige Leuchten" [Future Luminaires], Johanna Shoemaker developed an alternative with the OLED range of luminaires. The crux is the dynamic light effect which, curiously enough, is produced by a disadvantage of OLED technology: In the case of larger OLED areas, the electricity and thus the light has to be conducted through a metal grid in order to produce an even light distribution. If individual areas within the grid are controlled with time delays, a dynamic and constantly changing light effect is created. But not only the extraordinary light is impressive, when switched off, the extremely flat luminaire is amazing due to the transparency of the OLED area.

Range of OLED luminaires
Johanna Schoemaker
Diploma thesis
Winter semester 2008/2009
Bergische Universität Wuppertal
www.johannaschoemaker.com

Luminale 2010
Biennale of Lighting Culture
11 until 16 April 2010
Parallel to the Light+Building trade fair
Frankfurt am Main, Offenbach, Wiesbaden, Mainz and Darmstadt
www.luminale.de
www.luminapolis.de

Collage: Philipp Geist

The accessible video-space installation "Time Shadows" by Philipp Geist in the Dinosauriersaal of the Senckenberg Naturmuseum lets visitors penetrate times long past.

Parallel to the Light+Building fair, this year again the Luminale will take place in Frankfurt and the Rhine-Main region. With a competition, manufacturers, light planners, designers, artists as well as cultural institutions have been invited to create ideas on this year's themes of Light + Sound, Light + Media as well as Light + E-Motion: Approximately 150 projects were chosen – the to date largest number of events. In the focus this year are the Wallanlagen, which so far have led a shadowy existence. With numerous light-art interventions, this park, which surrounds the city of Frankfurt like a green belt, will be given a new life. The festival programme will furthermore be complemented by numerous events such as exhibitions, symposia, lectures and parties.

Illustration: design faculty, Mainz University of Applied Sciences

One of the projects for the Frankfurt Wallanlagen is the interactive light installation "hive" conceived by students of the design faculty of the Mainz University of Applied Sciences: On the occasion of the Luminale, the swarm of light is to hover above the pond of the Old Opera.

In 2009, "showers of light" thanks to fibre-optic technology enchanted the visitors on the Vestnertor bastion. Celestial sounds accompanied the interactive "Light Drops" installation by Elke Harras.

At nightfall, on 15 May the old town of Nuremberg will once again be immersed in blue light: Now, for the eleventh time, the annual event Blue Night will present art and culture in an extraordinary context. Until late into the night, on the streets, in the courtyards as well as in public squares of the old town of the city, art and light installations, live music and performances will take place. During this night, cultural institutions will also open their doors to visitors. With more than 250 different programmes and over 130 000 visitors last year, the Blue Night has developed into one of the largest nocturnal art and culture events in Germany. With the motto "unterwegs" [On the way], this year it marks the beginning of the Nuremberg programme of events for the 175th anniversary of the German railway.

Blaue Nacht
15 May 2010 starting at 7 p.m.
Old town, Nuremberg
Box office: € 13 / € 11
Advance booking starting 16 April: € 11 / € 9
"Blaue-Nacht-Gutschein" [Blue Night Voucher] until 15 April: € 10
www.blauenacht.nuernberg.de

The highlight of every Blue Night is the production at Nuremberg Castle. Last year, the artist Axel Gercke referred to the then motto "Firmament" and took the spectators on a journey into space.

Photos: Uwe Niklas

Photos: Kristín Birna Bjarnadóttir

The mood in the room can be influenced by the choice of the lamp colour which turns the space, as was the intention of the artist, into a reflection of the inner world of the user.

Illuminant
Kristín Birna Bjarnadóttir
Graduation project at the Iceland Academy of Arts in spring 2008
www.kristinbirna.com

The lampshade lit from below transforms the room into a fairytale world.

People are often confronted with reflections of their own behaviour: You reap what you sow. This notion occurred to product designer Kristín Birna Bjarnadóttir during her experiments with reflecting materials and led her to the idea for her Illuminant luminaire, her graduation project at the Iceland Academy of Arts. A lampshade made of reflecting material hangs from the ceiling on a fishing line. Made of the same material, strings two millimetres wide seem to flow from the shade, while from below everything is illuminated by LEDs housed in a cylinder. The light, strongly refracted and reflected by the floating lampshade, transforms the room into a fairytale world. With exchangeable cover glasses in four different colours, a variety of moods can be created.

From the Arbeitskreis Lichttechnischer Spezialfabriken to Zhaga

The stylised representation of an Ulbricht Sphere was chosen as the logo of the Arbeitskreis Lichttechnischer Spezialfabriken, at the time the ultimate in light measurement in laboratories.

ARBEITSKREIS
LICHTTECHNISCHER SPEZIALFABRIKEN E.V.

Representatives from 22 companies participating in Zhaga were present at the first meeting of the syndicate.

Photo: Philips

In 1957, TRILUX joined the Arbeitskreis Lichttechnischer Spezialfabriken (ALS) as a founding member which succeeded the Technischer Ausschuss Lichttechnischer Spezialfabriken established after the War. At the time, ALS was constituted as a technical-scientific association with the aim of spreading the idea of "good light" and, by exchanging experiences, of promoting technical progress. Over the course of the years, among other things uniform standards for laboratory measurements, light planning and product qualities were worked out and published. As a consequence of the progressing Europeanisation of companies and markets, ALS ceased its activities as an association of German member firms in 2000. However, less than 10 years later, an international group of companies from the lighting industry, among them TRILUX, together formed Zhaga, an industry-wide cooperation for establishing standards for the interfaces of LED modules. In view of the rapid, continuing further development of LED technology, Zhaga will ensure that it is possible that products by various manufacturers can be interchanged. The resulting Zhaga standards are to guarantee the physical dimensions as well as the photometric, electric and thermal behaviour of LED modules. That is why not only suppliers of LED modules and LED luminaires are among the members but also suppliers of components such as cooling elements or optics.

The "Lucellino" luminaire by Ingo Maurer is the flagship of the series. It provided the impetus for the successful DEKs.

Designer Emulation Kits (DEKs)
Mark McKenna
$ 29 each
www.mmckenna.com

Big design in a very small size: The miniature luminaires are supplied with electricity with a 9-volt battery and thus are able to shine for up to 160 hours. The LEDs last even longer: 50 000 hours of emitting light are possible.

Designer Emulation Kits is the name of the small miniature lamps by the American designer Mark McKenna. It was to be a little joke, an amusing homage to McKenna's mentor Ingo Maurer, but it turned into a design object of its own with which some of the most important designers of our time are being honoured. McKenna reduces known luminaire designs to their essential features and from that develops a 10 by 16 centimetre arts-and-crafts sheet so the smart hobby designer can very easily construct his own luminaire. The small design luminaires are equipped with an LED and a connection for a standard 9-volt battery. In addition to Ingo Maurer's "Lucellino", "Arco and Roio" by Achillel Castiglioni, "Tizio" by Richard Sapper and Philippe Starck's "Miss K" are also available as miniatures.

Renderings: mmckenna

Photos: Akademie Licht (www.akademie-licht.de)

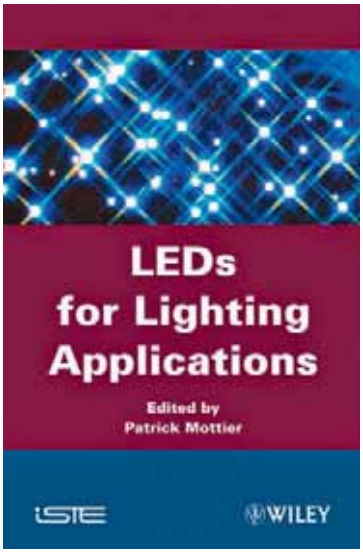
Squares and parks look inviting and like in a fairy-tale once the light installations have been installed for thousands of visitors.

Berchinale 2010
Berching
30 to 31 July 2010
Illumination at nightfall
www.berchinale.de

In the context of the Berchinale 2010, for two days at the end of July, the medieval town of Berching near Nuremberg, with its completely preserved city wall from the 15th century, the 13 towers and the four gates, will be immersed in a sea of light and colours. Light artists, universities and luminaire manufacturers will make the city shine with numerous light-installations and scenarios. Once again, the power of light as a design element and the role it plays in architecture will be emphasized. The major event, organized by the local Akademie Licht and the town of Berching, gives architects and expert planners an opportunity to participate in guided tours of selected lighting projects and start a dialogue with the luminaire manufacturers.

During the Berchinale, exiting light installations can be discovered in unexpected places.

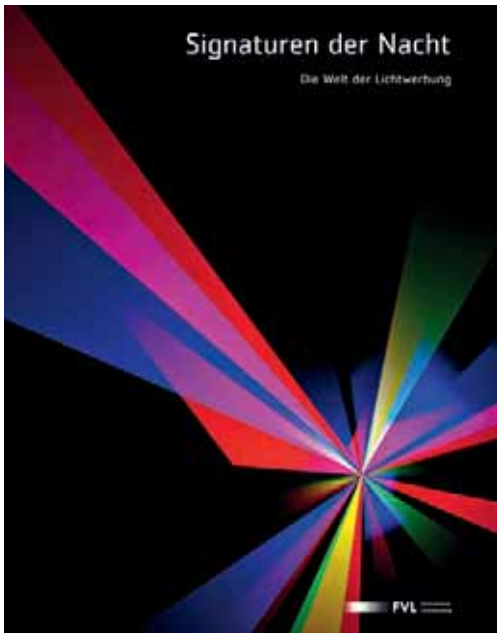
LEDs for Lighting Applications
Patrick Mottier (editor)
Published in 2009 by ISTE Ltd, London, and John Wiley & Sons, Inc., Hoboken
304 pages, s/w graphics, coloured middle part
23,6 x 15,4 cm, hardcover
english
€ 99,90
ISBN 978-1-84821-145-2
www.iste.co.uk
www.wiley.com



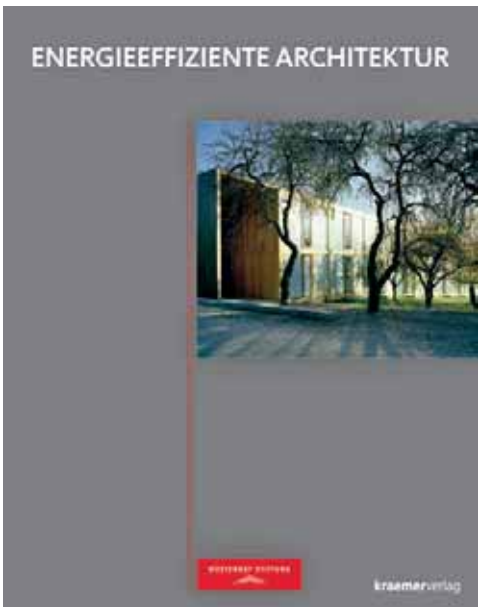
With the development of blue LEDs and thus of white LED light at the latest, the light-emitting diodes are more and more frequently used for lighting and designing the public and the private space. The book "LEDs for Light¬ing Applications" gives an introduction into the history of LEDs and ranges from their development all the way to the present state of the technology. The individual chapters are written by different authors and deal in detail with subjects regarding the manufacturing process as well as the problem of the white light and its qualities. A section on OLED technology complements the informative volume.

Signaturen der Nacht – Die Welt der Lichtwerbung
FVL, Fachverband für Lichtwerbung (editor)
Fabian Wurm (text/compilation)
Published in 2009 by avedition GmbH, Ludwigsburg
204 pages, ca. 200 colour illustrations
23 x 29,7 cm, hardcover
german
€ 79,95 | CHF 130,00
ISBN 978-3-89986-120-4
www.avedition.de

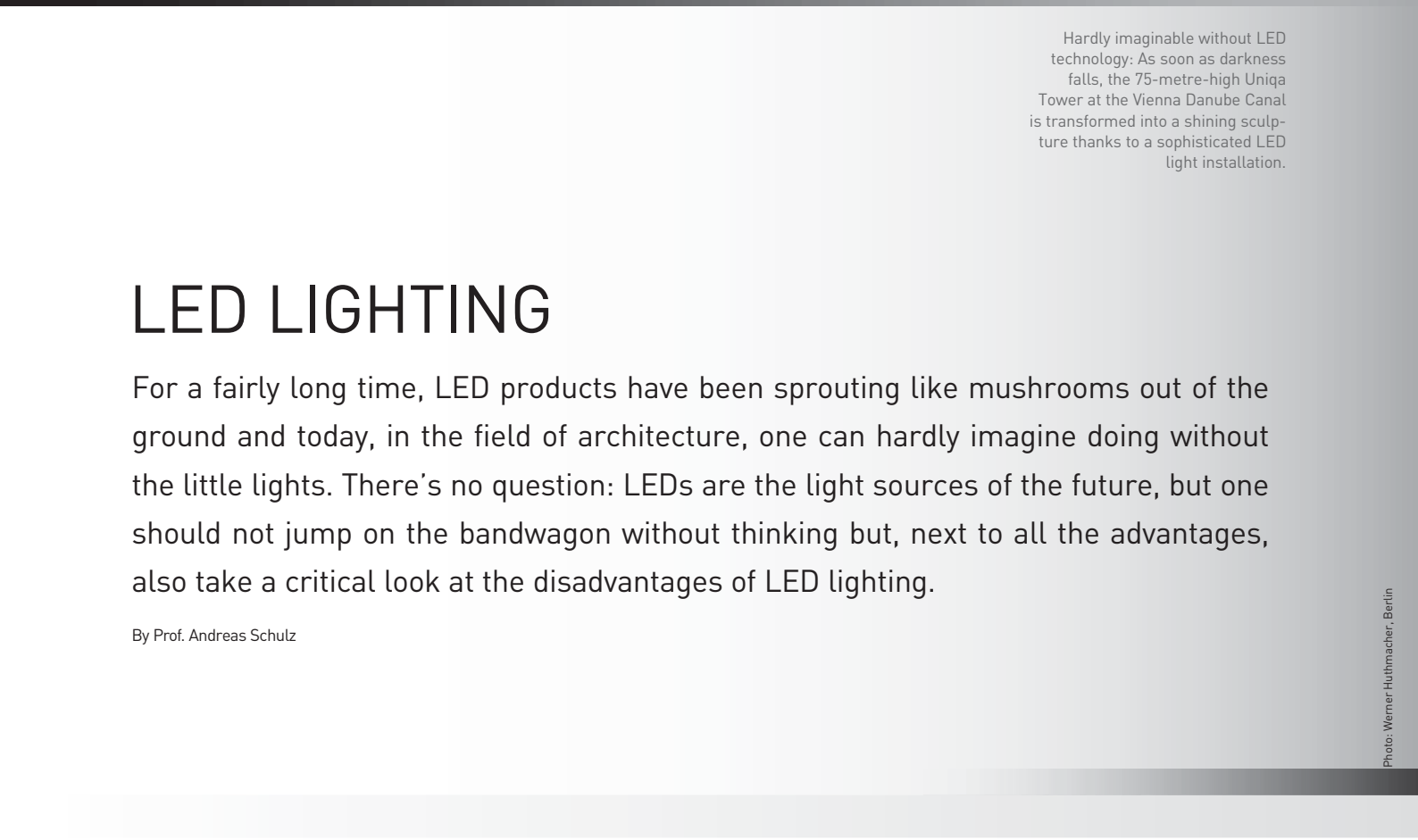
From the gas lighting of the 19th century purely for making use of the night to the electric light of the 1920s and thus the transition to street lighting, all the way to illuminated advertising and to the digital media façade of our time – with this wide historic spectrum, the book "Signaturen der Nacht" [Signatures of the night], illustrated with numerous pictures, introduces the readers to the subject of illuminated advertising. Author Fabian Wurm furthermore shows current trends in illuminated advertising, focuses on subjects such as energy consumption and light pollution, investigates the effect of illuminated advertising and dares to look into the future. The book is complemented by interesting interviews with experts. A successful publication on the 50th anniversary of the Fachverband für Lichtwerbung FVL.



Energieeffiziente Architektur
Wüstenrot Stiftung (editor)
Published in 2009 by Karl Krämer Verlag, Stuttgart
264 pages, ca. 370 illustrations und drawings
22,5 x 28,5 cm, hardcover with book jacket
german
€ 28,50 | CHF 49,80
ISBN 978-3-7828-1535-2
www.kraemerverlag.de



Declining fossil resources and alarmingly high CO_2 emissions make energy efficiency in the construction industry a central topic. Almost 40 per cent of the overall energy consumption is caused by the existing buildings and thus it becomes an issue for all of us. The book "Energieeffiziente Architektur" [Energy-efficient architecture] presents the results of a competition organized by the Stiftung Wüstenrot under the title of "Energy-efficient architecture in Germany" and also contains numerous contributions on this subject written by experts. A historic survey as well as explanations on the perspectives of future-oriented technologies and insight into the international trends complement this very well-structured and clear reference work.



Hardly imaginable without LED technology: As soon as darkness falls, the 75-metre-high Uniqa Tower at the Vienna Danube Canal is transformed into a shining sculpture thanks to a sophisticated LED light installation.

Photo: Werner Huthmacher, Berlin

LED LIGHTING

For a fairly long time, LED products have been sprouting like mushrooms out of the ground and today, in the field of architecture, one can hardly imagine doing without the little lights. There's no question: LEDs are the light sources of the future, but one should not jump on the bandwagon without thinking but, next to all the advantages, also take a critical look at the disadvantages of LED lighting.

By Prof. Andreas Schulz

To be able to understand the enormous hype around the subject of LED light, it is worthwhile analyzing the major international industrial fairs of the lighting sector such as the Light+Building in Frankfurt/Main, the Euroluce in Milan and the Lightfair International in North America taking place in recent years. Six years ago, the subject of LED lighting still played no more than an interesting supporting role, while the first application-oriented products were introduced and attracted strong yet, at the same time, incredulous attention among the experts who had been invited. The highly advertised advantages of this new light source enticed many interested users into not even starting to question possible problems and disadvantages. As the traditional parameterization cannot be used for LED light, it was and still is difficult to make comparisons with the familiar, conventional light sources and thus arrive at a sobering evaluation regarding what are the facts when it comes to this prodigy of light engineering.

LEDs at any price

The Light+Building fair in particular has developed into a forum for many architects in light and users of it who, due to the euphoria of the exhibitors, adopted a totally blinded, positive attitude to LED light. We as planners were early on confronted with the demand to switch from the so far intended, proven light sources to the new LED lighting for projects which had been planned a long time ago in order to realize supposedly up-to-date and, just as supposedly, highly efficient "modern lighting". Even the analysis of the technical parameters – a natural course of action for engineers – which made the new light source look rather problematic and far from particularly efficient and sustained, could not achieve anything against the enthusiasm of many an architect and building client. We often felt we were considered to be horse-and-carriage coachmen while all around us the first vehicles with gas engines were already are already busy with passengers.

Already two years later, the observed development became more dynamic because the manufacturers were at that time no longer showing LEDs as niche products but were presenting complete ranges of luminaires for application in architecture.

The industry with its marketing machinery as well had not been idle in the meantime. In this way, a highly effective lobby in favour of the new light source was established.
The Lightfair International 2009 in New York then made the future direction clear: Two thirds of the exhibitors practically exclusively showed LED products. Thus they climbed on the bandwagon which – due to the economic crises, the discussion about energy consumption and the existing (light) technology backwardness of the North American lighting market – was gaining speed they saw the market of the future exclusively in the application of LEDs.

Luminaires as disposable products?

Enormous changes are pre-programmed: The merging of the light source with the luminaire will turn into a complete new orientation of the whole lighting market since the strict separation between "luminaire" and "lamp" is now abolished and the LED suppliers inevitably also become luminaire manufacturers. And there lies the actual problem: The luminaires have combined with the light source into a unit and are disposable products, which at a later date will for many applications in architecture have considerable consequences, which – and this is the nature of the things – are not even addressed in the euphoria around the subject. The enormously long operating times of LEDs are so far only listed as values and the lamps themselves have not yet had the chance to function for several tens of thousands of hours. But even if we assume that 50 000 hours of operation are possible for LED luminaires, in the extreme case this may mean that already after a few years complete luminaire systems have to be exchanged since a replacement light source can technically not be inserted or will certainly no longer be available since the dynamic development of lamp physics will already after a short time turn a lamp which is modern today into an outdated technology. If we bring our efforts of planning sustained energy systems into the discussion, the problems become even more manifest. The operating electronics amalgamated with the luminaire and the valuable raw materials of the luminaire cas-

Photos: Lukas Roth, Cologne

Even in underground carp arks, such as for instance that of the Novartis Campus in Basel, a friendly design of the interior and a clever lighting concept are able to create a pleasant spatial atmosphere.

In the foyer of the EnBW City in Stuttgart, downlights at the intersections of the roof racks make for representative lighting, with its base of light and the cloud of light hovering above it, the reception counter turns into an eye-catcher.

ings can practically not be used again and this brings back bad memories of the seventies – a time when recycling was not really thought about.

LED as light sources of the future – but right!

All the same, the fundamental performance record of the light source is fascinating. The, in the meantime, high luminous efficiency of the system, comparable to conventional light sources, as well as the by now good colour rendering qualities, the perfect automatic controlling- and dimming action as well as the geometric advantages do not even leave us a choice in the assessment that this will be the light source of the future. In a wealth examples, it has already become quasi irreplaceable, if we only think of the numerous applications in architecture where LED products could be used. This goes especially for applications for the finishings in architecture; today already, it is hard to imagine doing without LEDs in shop construction, in the decorative areas of hotels, restaurants and in sales. Here the application is also totally unproblematic because there is often no direct connection with the architectural structure as such but rather the lamps are used together with the additive architectural elements.

We as planners as well have already designed whole projects exclusively with LED lighting and are highly pleased with the results, even though we have always been foresighted and tried to make a later change of the system possible without additional costs for the finishing or the architecture – and the advantages of LED light prevail. The costs for the facility management are drastically reduced and these are very decisive in the western world in the calculation of the operating costs, after all. Although the still quite low costs of energy in our countries play a role in the saving potential of LED application, they are relatively minor compared to the maintenance costs. Mainly because the degree of the system efficiency of an LED system is (still) no better than that of an efficient conventional lighting unit.

Behind the still reigning euphoria, we hope that very soon a sobering effect will imply the urgently needed systematization

of the LEDs so that, maybe in the near future, it will become possible to install highly efficient LEDs into luminaire casings which, after the end of their working life, can be exchanged and that thus an unbeatably efficient and sustained light system can be made available to the users.

Prof. Andreas Schulz

born in 1959, studied electrical engineering in Cologne and Light Design in Ilmenau. After his studies and practical work as a light planner, in 1991 he founded the office Licht Kunst Licht based in Berlin and Bonn. In addition to renowned museum projects, such as the Louvre in Paris and the Old National Gallery in Berlin, Licht Kunst Licht also illuminated the Federal Chancellor's Office as well as some of the government buildings surrounding it. Since 2001, Andreas Schulz has been a professor; with the summer term of 2003, he took over the founding professorship for Lighting Design at the HAWK Hildesheim. **www.lichtkunstlicht.com**

LOUD

In 1858, when in the South Platte River at the eastern foot of the Rocky Mountains, gold was found, gold seekers from everywhere flocked into the area. Several smaller settlements were established which, in 1869, merged into a town of about 6000 inhabitants: Denver City. Since 1876, Denver has been the capital of the US State of Colorado. The city is located exactly one mile above sea level which earned it the name of "Mile High City". At Christmas, the City and County Building – the city hall – is immersed in a multi-coloured sea of light.

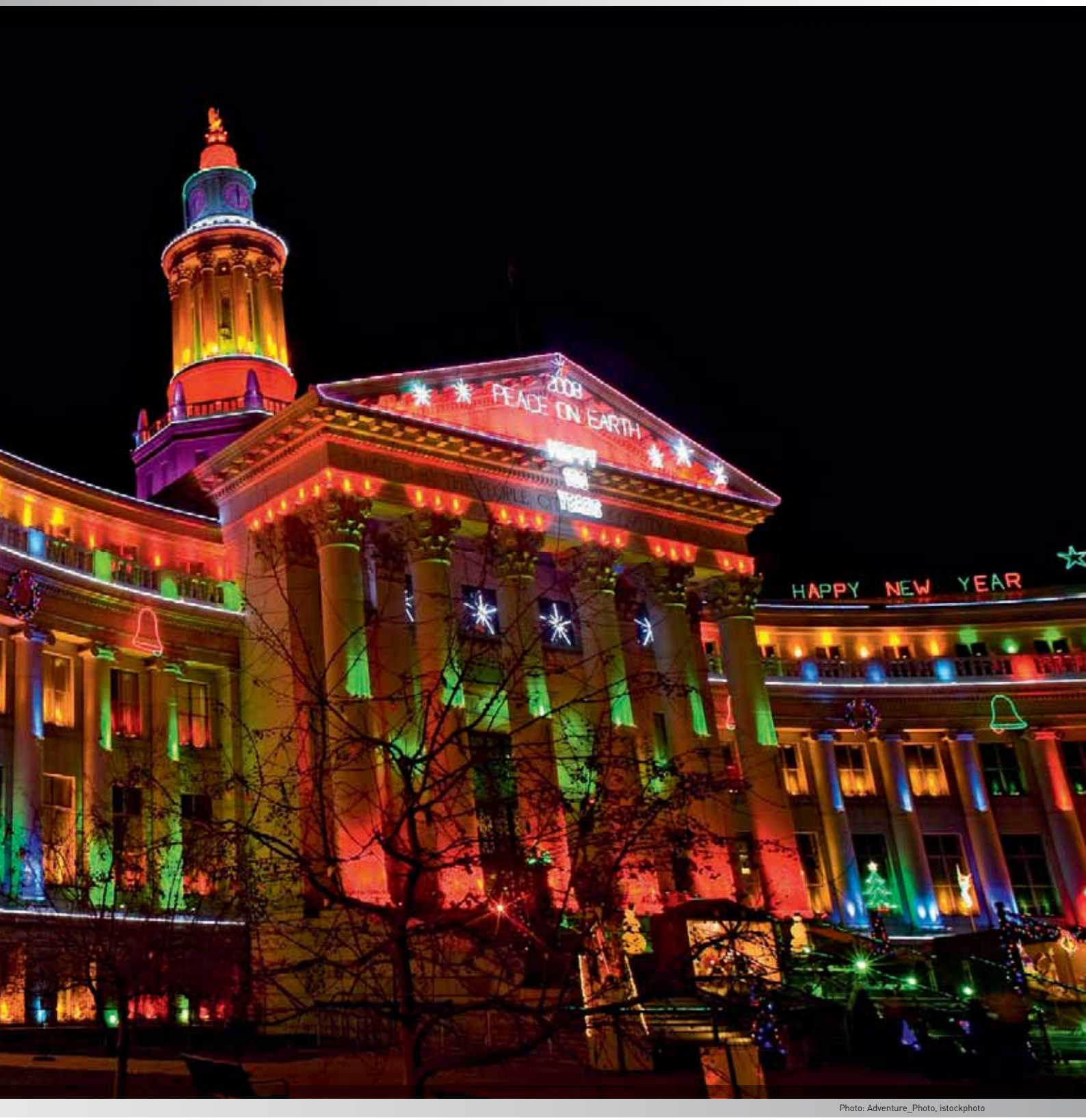


Photo: Adventure_Photo, istockphoto

“Man is like salmon, he likes to follow the light. What do the fishermen do? They hold out a light to the salmon and it ends up in their net.”

Moritz Gottlieb Saphir (1795–1858), Austrian writer and journalist

QUIET

Since 1979, Dubrovnik in the south of Croatia has been on the UNESCO World Heritage list. The city on the Adriatic Sea was established under Byzantine influence in the middle of the 7th century; however, archaeological finds prove the existence of the settlement already since the 3rd century B.C. The city experienced its strongest economic boom in the 15th and 16th centuries thanks to the flourishing trade with the Ottoman Empire. Since 1809, it belonged to the Illyric Provinces of France, to Austria, to the first Yugoslavia and to Croatia and afterwards was first occupied by Italy and then by Germany until 1944.

Photo: jasminam, istockphoto

“You cannot see any darkness in the light. But you can see light in the darkness.”

A. Michael Bussek (b. 1966), “German-Catholic atheist in Israel, the de-mised land”, writer, satirist and poet

LOOKED INTO

3lux:letters has asked four renowned light experts three questions on the topic of "Light with LEDs".

Photos: Johanna Diehl, Berlin

Martin Ostermann and Lena Kleinheinz
Architects
magma architecture, Berlin

Not last because of their high luminous efficiency compared with normal incandescent lamps but also because of their small form and their long working life, over the past years LEDs have increasingly become bestsellers. Which are the advantages of LEDs for your work and where do you personally use LEDs?

Martin Ostermann and Lena Kleinheinz: magma architecture works with unusual and complex spatial geometries. We use light to make a space discernible for the viewer and to stage it atmospherically. In the fittings of the Nexus Productions Ltd. film-animation agency in London, for instance, the light moulds the facetted spatial envelope. Where events are being staged, light is the means for structuring and controlling a temporal sequence. In the case of the Martini Club Munich, the lighting corresponds in colour and rhythm with the large projection of a film. For projects with complex geometries, the small LED lamps make it possible to integrate them under often restricted spatial circumstances. The number and size of the revision openings can also be reduced.

Photo: magma architecture, Berlin

Martini Club, Munich (Light planner: Star Tender AG, Vilmos Czibula)

Ansgar Haking
Light planner
agn Niederberghaus & Partner GmbH, Ibbenbüren

Ansgar Haking: Due to their compact design, LEDs can be used for almost any form of lighting. They are increasingly suitable for illuminating an object, a scene as well as an area. These advantages together with high energy efficiency and an enormously long service life give LEDs limitless application possibilities. In the field of safety engineering as well, such as for systems of signage and escape-route lighting, LEDs have successfully been introduced due to their durability and their low energy consumption.

Photo: agn Niederberghaus & Partner, Ibbenbüren

Swimming zone in the Badepark Bentheim, Bad Bentheim

Makoto Tojiki
Light artist
Makoto Tojiki Design, Japan

Makoto Tojiki: Initially, I thought the small light of the LEDs problematic because it is difficult to produce a flat light. However, I found LEDs as such impressive since nothing else creates such small points of light. I was convinced that it would be possible to find new ways of expression: Like computer graphics consist of small dots and living beings are made up of cells, a hologram consists of many points of light. A further advantage is that LEDs can be wired into fine nets so I can create light sculptures which only take on their form due to numerous tiny points of light.

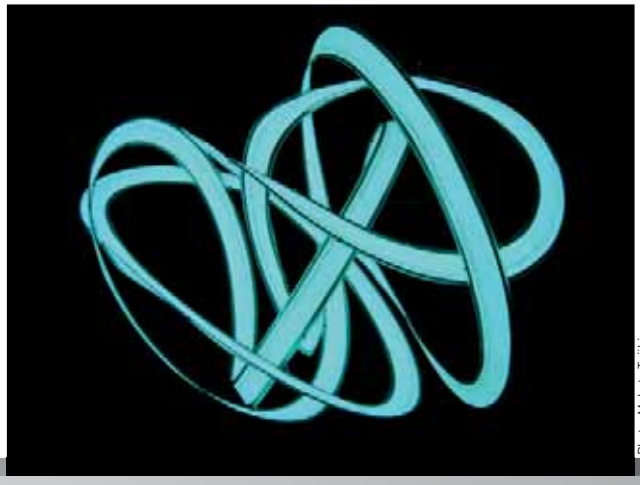


Photo: Makoto Tojiki

Archimedes' dream

In the wake of the growing number of new developments in LED technology, the new possibilities opening up know almost no limits when it comes to design. Due to the increasingly smaller luminaires, the luminaire designer is able to concentrate more on what is essential in lighting: the light. In your opinion, will light planning change in future?

Martin Ostermann and Lena Kleinheinz: The light planning of the future will more and more individually react to the needs of a person or the requirements of the situation. Empirical research will not only be geared to the functional demands of visibility but also analyze the psychological and physiological effects of light. The light switch is history. Instead of a prefabricated light situation, there will be various possibilities of exerting an influence on the light. Light will not merely illuminate a space but communicate information, react to moods, register changes in the room and adjust accordingly, make something invisible like sound visible and stimulate processes.

Photo: magma architecture, Berlin

Nexus Productions Offices, London (Light planning: magma architecture)

Whether for Christmas illuminations, vehicle headlamps or displays: LEDs have for a long time already been part of our illuminated society. Please describe your very personal experience with the little lamps: Which lighting planning with LEDs has most lastingly impressed you?

Martin Ostermann and Lena Kleinheinz: What particularly impressed us was the LED street lighting of whole cities such as Ann Arbor in the USA. The city was forced to save costs and, at the same time, found a sustainable solution. The only problem which had to be solved was how to remove ice and snow since these do no longer melt since LED luminaires develop little heat.

Martin Ostermann and Lena Kleinheinz

born in the USA in 1968 and in Denmark in 1969. Ostermann studied architecture at the Architectural Association London, RWTH Aachen and the Bartlett School of Architecture in London. From 1995 to 2002, he worked in the Studio Daniel Libeskind. Kleinheinz studied Fine Arts at the art academies of Münster and Düsseldorf as well as architecture at UdK Berlin and history of architecture at the Bartlett School of Architecture in London. As project director, she was responsible for the planning of international exhibitions. In 2003, together they founded the office magma architecture. **www.magmaarchitecture.com**

Ansgar Haking: I am quite convinced that light planning will be further intensified through LED technology and that the creativity of architects and light planners will know no limits. The benefit for customers and building clients is that lighting solutions can be individually designed and project specific. There is reason to look forward to the development of LED technology because the application possibilities are almost unlimited and, in my opinion, far from completed.

Makoto Tojiki: Regardless of their size, luminaires generally have a reflector. However, this will become unnecessary in the future. Today, in most cases liquid crystal displays in PC monitors and TVs are back-lit. But this will become unnecessary once OLEDs are used, since each point of light of the OLED itself emits light in RGB. I may in future be able to use a tiny source of light everywhere, even in large works. For example, a panel which emits light uses a solar battery with no power supply. I believe that technology will be used increasingly in architecture. In other words: The structure itself will shine.

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Photo: agn Niederberghaus & Partner, Ibbenbüren

Wellness zone in the Badepark Bentheim, Bad Bentheim

Photo: Makoto Tojiki

Horse with no shadow

Ansgar Haking: What has made the strongest impression on me is the luminous efficiency of LEDs. But wherever there's light, there's also shadow. Thus as a planning office we notice that a multitude of LEDs are being sold which have no quality mark and therefore represent a threat to life and limb. To get back to the implied Christmas illumination, I had to notice that in the LED systems available, either the bluish or the yellowish proportion of light is far too much in the foreground and that they look artificial so that so far I've not used LEDs as Christmas lights.

Makoto Tojiki: Please allow me to deviate from the content of the question a little. I have bad eyesight. When I do not wear glasses or contact lenses, every light in the downtown area changes the overall look. This creates a world only I can see and it seems to be always Christmas for me who lives in the city. In particular, the scenes watched from a car are wonderful. The reason why I use light as a means of expression is that I am so impressed by that unique scene..

Ansgar Haking

born in Bad Iburg in 1965, trained as a telecommunication technician at Siemens in Osnabrück and, in 1990, began his studies of electrotechnology and communication engineer at the Aachen University of Applied Sciences. After his graduation in 1995, he worked until 1997 at Siemens in Aachen and afterwards at Imtech Deutschland in Münster until, in 2007, he went to agn Niederberghaus & Partner GmbH as project director. Since 2008, he has been working there as head of department for the sector of electro-engineering. **www.agn.de**

Makoto Tojiki

born in Miyazaki/Japan in 1975, studied industrial design at the Kyushu School of Engineering of Kinki University in Higashi-Osaka City/Japan, where he graduated in 1998. In the following years, he was employed as an industrial designer and his leisure time experimented with light. In 2003, he finally dedicated himself to art and established Makoto Tojiki Design. His works, in which he creates artistic images from light, were presented among other places in Tokyo, Paris, Copenhagen and Milan and became an international success. **www.makototojiki.com**

Shiny white interiors and the clear, reduced architecture of the Customer Center communicate to the visitors the important values of Bühler AG such as purity, innovation and perfection.

PURE WHITE

A customer centre is the showpiece of a firm and reflects its company philosophy. It goes without saying that such a representative space should not be missing in an internationally successful group such as Bühler AG. The architects of the Bühler Group together with Carlos Martinez Architects succeeded in realising a showpiece for the company headquarters in Uzwil.

By Julia Zürn

Client:
Bühler Immo AG, Uzwil

Architect:
Bühler Immo AG, Uzwil
www.buhler-immo.ch

Interior architect:
Carlos Martinez Architekten, Widnau
www.carlosmartinez.ch

Light planner:
DELUX AG / Habegger AG
Kaori Kuwabara

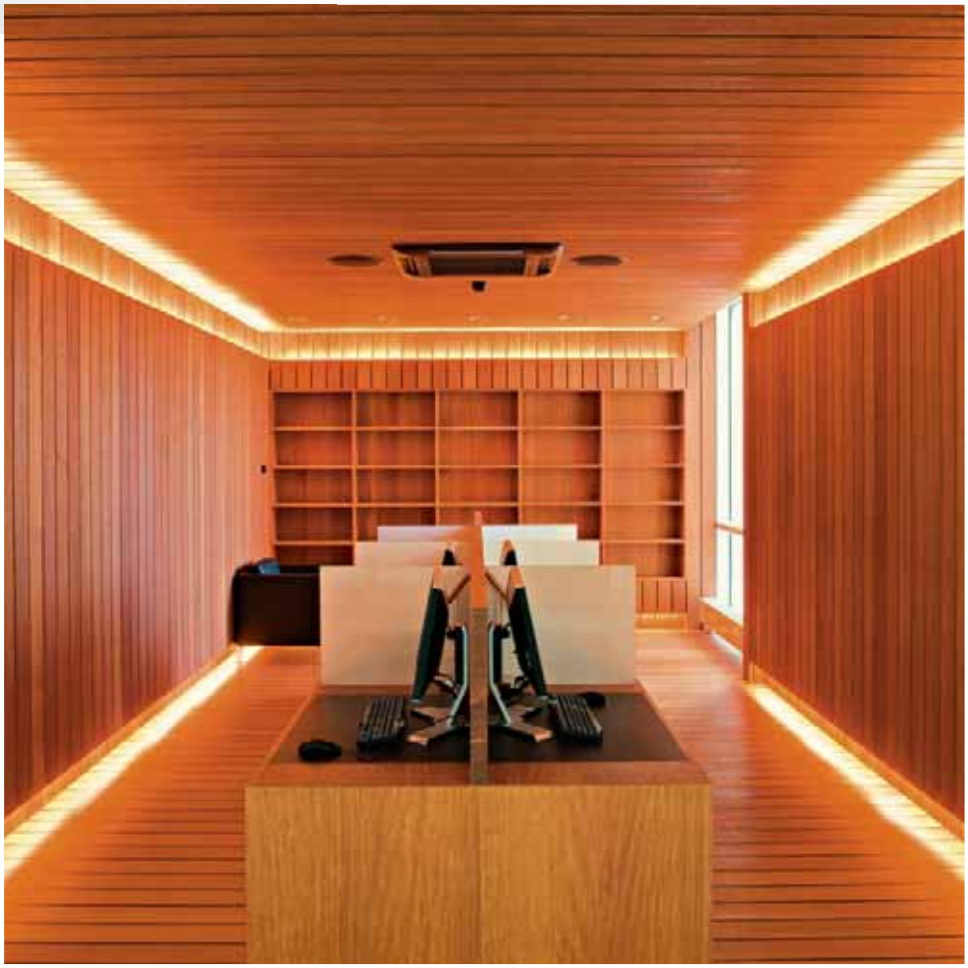
Location:
Gupfenstraße 5
Uzwil, Switzerland

Luminaires:
Polaron, Inperla, Enterio, 390···, 614···, 769···

Photos:
Bühler AG, Uzwil; Boris Golz, Arnsberg;
Roger Frei, Zürich

The large, two-storey exhibition area opposite the café can also be used for customer presentations.

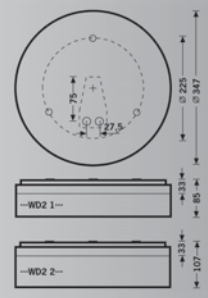
Architecture and light form a whole: Islands of light subdivide the open space of the café, while in the meeting rooms on the upper floor narrow light lines add accents.



The inserted wooden cube serves the visitor as a place for retreating. PC workspaces as well as a small library are available to them here.

Polaron LED-RGB

The Polaron series of luminaires stands out due to its reduced, red-dot awarded design. Its characteristic indirect light effect and the wide variety of models made the conventional TRILUX Polaron also the first choice for the Bühler Customer Center. Depending on the spatial effect, Polaron can be installed as a recessed, semi-recessed, mounted or even suspended luminaire. The surface of the diffuser consists of finely structured Plexiglas and is shielded towards the room with a white primary blend. The recess case also acts as circular surrounding secondary reflectors. The new TRILUX Polaron LED-RGB offers even more possibilities for variation: The use of modern LED technology with RGB colour control, in addition to the classic circular luminaire, makes an individual coloured light design of the interiors possible.



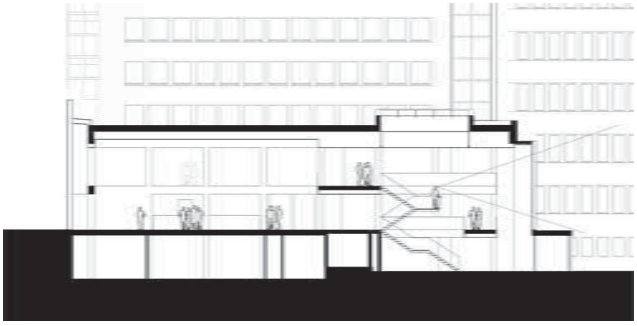
Distribution of luminous intensity

reddot design award winner 2007

Polaron by TRILUX is reduced to what is essential – light. The LED version shines in the colours of the RGB spectrum.

The open, light-flooded gallery of the upper level offers space for individual meeting islands. Here Polaron by TRILUX creates a suitable light atmosphere.

In the old building, walls and ceilings of the hallway were covered ceiling-high with partly back-lit frosted glass.



Section

Ground floor plan

First floor plan

Swiss Bühler AG is known worldwide as the specialist for plant construction, especially in manufacturing technology for the production of food. Over the course of 150 years, a small iron foundry developed into the internationally active group with its headquarters in Uzwil in the Canton of St. Gallen. To suitably present itself as a company, new rooms had become necessary. Bühler Immo AG was commissioned with the design of the Customer Center on the Uzwil company premises. Close to the main entrance, a three-storey glass annex was added to an existing high-rise building as well as a glass conference room on the roof linked with a panorama elevator running along the façade. The unity of new architectural additions can thus be clearly seen thanks to the uniform choice of material. The Customer Center with its light-weight, partially attached glass façade contrasts with the existing, solid high-rise façade from the seventies and, with its clear, reduced language of forms, emphasises the departure of the Group into a new era. On the ground floor of the annex, there is a café, an exhibition area and a conference room in addition to the reception. Further rooms for talks with customers and a spacious, open gallery are on the upper floor. When designing the interiors, Carlos Martinez Architects took into consideration the proximity of Bühler AG to the food industry and selected pure white as the dominant stylistic means, which is a reminder of hygiene and cleanliness. This cool atmosphere is balanced by wooden fittings in warm shades of brown such as the counter of the café and the inserted Internet and library cube on the ground floor. In the café as well as on the gallery, the multi-variant TRILUX Polaron luminaire was installed. Behind its seemingly accidental arrangement is a sophisticated light concept: The luminaires are denser in areas serving for communication thus promoting it due to the changed light atmosphere.

Above the central piazza floats the characteristic nest of light which guides the visitors to the TRILUX stand.

A STAND FOR NEW LIGHT

From 11th to 16th April, approximately 1500 manufacturers will present the whole current spectrum of light technology under one roof: The Light+Building will once again open its doors in Frankfurt am Main. At the newly designed stand, TRILUX this year will once more present innovative luminaire systems as well as new but also proven technologies.

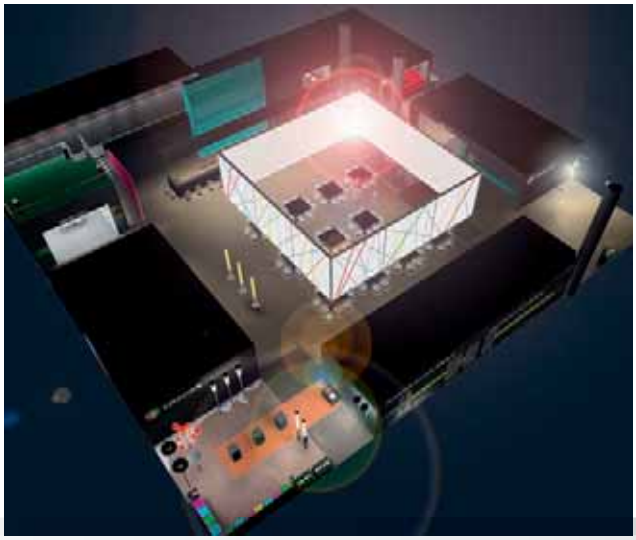
By Marina Schiemenz and Thomas Geuder

Client:
TRILUX
www.trilux.de

Location:
Fair Light+Building
Exhibition site
Frankfurt am Main
Hall 3.0, D11/E11

Design and idea:
Norbert Jansen
Dipl.-Ing. Architekt Jansen Architekten
und Innenarchitekten
Düsseldorf

Renderings:
TRILUX, Arnsberg



Next to the lounge and the bistro, the Zen Garden functions as a place of rest. Here visitors are able to get information on the latest TRILUX exterior luminaires.

In the bistro area, visitors of the fair can exchange their experiences in a relaxed atmosphere far from the afar from the hustle and bustle.

In addition to the office world, the sectors education, industry and exterior lighting show the visitors various possibilities of using the innovative luminaires.

It is the "leading trade fair of the world for architecture and technology" and thus one of the most important events for the luminaire business: Every two years, at Light+Building many novelties from the sectors of light, electric engineering as well as house- and building automation are presented. From 11th to 16th April, the top dogs of the luminaire business meet together in one place. For TRILUX as the largest manufacturer of luminaires in Germany, this is of course one of the most important forums where many new products are shown and introduced. On about 1300 square metres, the Arnsberg company once again presents itself with an exhibition stand which is really something: the core is a gigantic luminous cube, the so-called nest of light, which floats as a space-creating element above the central piazza and shows the visitors to the fair the way to the New Light. The cube is deliberately illuminated with conventional light technology, the active rays of light, however, which define structures on the outside of the cube's skin, are produced with coloured LED light. Thus already in the handling of the stand lighting it is demonstrated what the TRILUX lighting philosophy is all about: The focus is on efficiency, which in many areas is given a new value through the use of innovative LED technology and proven technology. Around the piazza, various pavilions are arranged where innovative lighting solutions for different situations are presented. For the sectors of office, education, industry and exterior lighting, architecture, interior architecture, luminaires and light are shown as a holistic design solution. The stand architecture is on purpose reduced to the essential in order to focus even more on the superior lighting solutions. The subject of efficiency is given its own role in the presentation of each of the products. That is because, at TRILUX, efficiency means more than simply saving energy. At the core it is always the best solution for the customer who gets individually adapted light solutions at TRILUX. The TRILUX consultants and light planners are glad to assist with help and advice for the subject of light and efficiency after analysing the requirements. You are most welcome at the exhibition stand!

LED-CHECK

Due to their durability and low energy consumption, LEDs are popular illuminants but they are not always the best choice. Depending on the field of application, the demands on lighting vary. For different uses, TRILUX has analysed the energy consumption, maintenance, life cycle cost, design as well as sustainability and shows where, from the present point of view, LEDs really make sense.

lux: LED-CHECK

EXTERIOR

Demands	
Energy consumption	●●●
Installation/Maintenance	●●●
Life cycle cost	●●○
Design/Interior design	●●●

lux: LED-CHECK

LIVING AREA

Demands	
Energy consumption	●●○
Installation/Maintenance	●○○
Life cycle cost	●●○
Design/Interior design	●●○

lux: LED-CHECK

FOYER

Demands	
Energy consumption	●●●
Installation/Maintenance	●●●
Life cycle cost	●●○
Design/Interior design	●●●

lux: LED-CHECK

OFFICE

Demands	
Energy consumption	●●○
Installation/Maintenance	●●○
Life cycle cost	●●○
Design/Interior design	●●●

lux: LED-CHECK

CLASSROOM

Demands	
Energy consumption	●○○
Installation/Maintenance	●○○
Life cycle cost	●○○
Design/Interior design	●○○

lux: LED-CHECK

PATIENT'S ROOM

Demands	
Energy consumption	●●○
Installation/Maintenance	●●○
Life cycle cost	●●○
Design/Interior design	●●○

lux: LED-CHECK

SALESROOM

Demands	
Energy consumption	●●○
Installation/Maintenance	●●○
Life cycle cost	●●○
Design/Interior design	●●●

lux: LED-CHECK

PRODUCTION

Demands	
Energy consumption	●○○
Installation/Maintenance	●●○
Life cycle cost	●●○
Design/Interior design	●○○

lux: LED-CHECK

HALLWAY/STAIRS

Demands	
Energy consumption	●●●
Installation/Maintenance	●●●
Life cycle cost	●●●
Design/Interior design	●●○

lux: LED-CHECK

GASTRONOMY

Demands	
Energy consumption	●●○
Installation/Maintenance	●●○
Life cycle cost	●●○
Design/Interior design	●●●

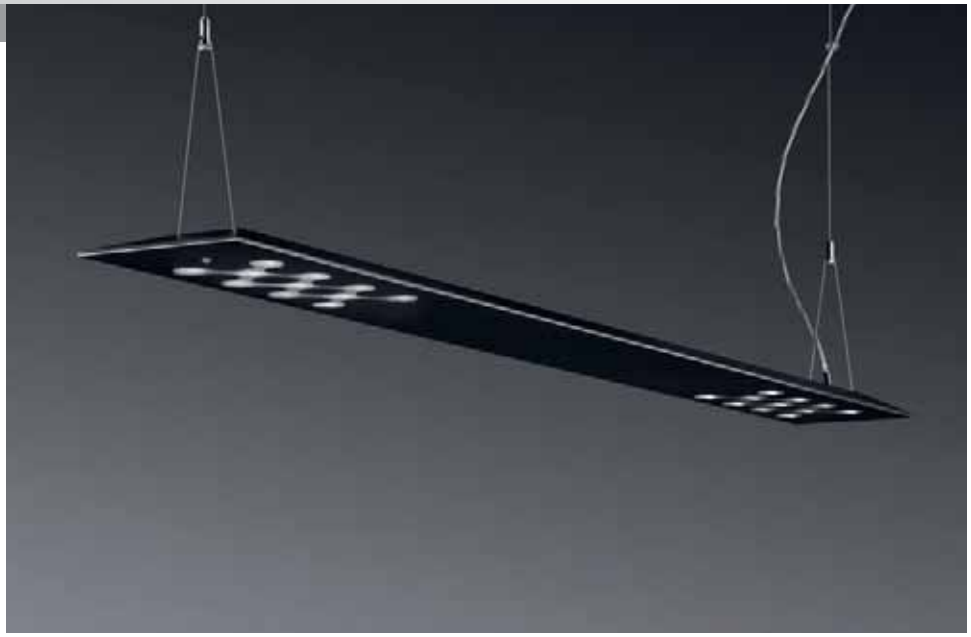
MIRONA, NEXIMO AND CONVIA

At the Light+Building 2010 trade fair, TRILUX presents three new LED innovations: Mirona, an industrial luminaire with an integrated sensor system, Neximo, a high-quality suspended luminaire for the office, and Convia, a highly efficient street- and pathway luminaire. They are examples of the next generation of LED luminaires at TRILUX.

Illumination conforming to standards and high energy efficiency are two features which are particularly apparent in the **Mirona** industrial luminaire. With an integrated sensor system, it ensures intelligent and energy-saving light management because whenever 100 per cent illumination is not necessary the luminaire automatically dims down to 30 per cent of the light output. Thanks to its long working life of more than 50 000 operating hours and the extremely small maintenance effort, costs in operation are furthermore reduced. An additional plus is the luminous efficiency of 70 lm/W. The robust construction of the Mirona makes it possible to install in moist rooms as well as the exterior for instance at petrol filling stations.

What is typical of **Neximo** is its slender shape: The tapering cross-section of the body measuring a mere 25 millimetres gives the suspended office luminaire an elegant and unobtrusive look. Despite this, it is hard to overlook: On the underside of the luminaire, 22 high-power LEDs shine through an organic-looking grid of light directly and without glare onto the desk. 36 integrated, widely radiating high-power LEDs also make it possible to indirectly illuminate the room. A further aspect is the cost effectiveness of the suspended luminaire: The long, maintenance-free working life of LEDs of more than 50 000 hours and Neximo's low energy consumption despite its high luminous efficiency (approximately 60 lm/W) both contribute.

With the **Convia** LED street- and pathway luminaire, TRILUX has developed an exterior luminaire which, compared with traditional products, convinces with its quality of illumination and its efficiency. With about 32 Watt of overall rated input, 24 LEDs guarantee optimal lighting while conforming to street- and pathway lighting standards. Little heat generation and thus a longer working life are further advantages of the low input. Depending on the location, the sophisticated optics of Convia makes a spacing interval of up to 40 metres possible with a mounting height of four to six metres. Already the basic model has a circuit for lowered night-time lighting, an effective approach to help communities with energy savings.



reddot design award
winner 2010

Neximo
Connection performance: 112 W
Luminous flux: 6200 lm
Colour temperature: 4000 K

Besides the standard model, the variant with an integral light management system additionally saves lighting energy.

Mirona
At 100 per cent light output
Connection performance: 141 W
Luminous flux: 10300 lm
Colour temperature: 5000 – 6000 K

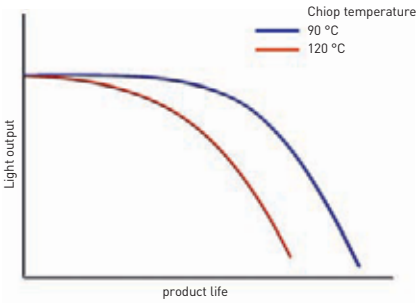
With a presence detector, reduction down to 30 per cent is possible (3400 lm at 49 W).

Convia
Connection performance: 32 W
Luminous flux: 2400 lm
Colour temperature: 4000 K

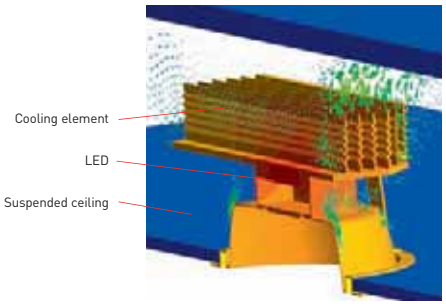
Luminaire body of cast aluminium with moulded pole attachment, luminaire cover of planar tempered safety glass.

MATERIALS: THERMAL MANAGEMENT

LEDs are extremely durable – but only if the basic conditions are correctly adjusted. One of the most important factors with a decisive effect on the durability of the LED is dealing with the heat. This must be dissipated with as little friction as possible to protect the crystal inside from overload.



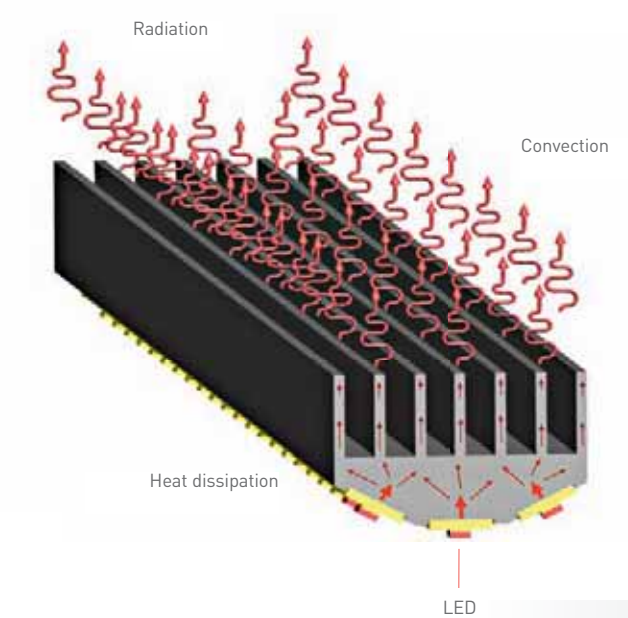
The working life of an LED crucially depends on the temperature with which the chip is operated.



Simulation of the heat flow through the cooling element: The TRILUX specialists calculate the shape of the cooling element with the help of Computation Fluid Dynamics Simulation (CFD).

In recessed LED luminaires as well as the new Inperla, the TRILUX thermal management ensures optimal heat dissipation.

Schematic model of the heat flow from the LED to the cooling element (heat conduction) and the following heat dissipation to the ambient air through convection and radiation



The topic of thermal management is known above all from luminaires with conventional heat radiators such as the incandescent lamp where high heat loads are generated. LEDs, on the other hand, are generally thought to be "cold" light sources which, however, is mainly due to the very low proportion of infrared in the light. All the same, in an LED high temperatures are generated as well, which have to be dissipated via sophisticated cooling systems. What is important in this is that the punctiformly produced heat is evenly distributed. The processor of a computer works in a similar manner: The board, on which the LED is mounted, is pressed together with a cooling element to ensure a reasonable heat transition. The form of this cooling element depends on the one hand on the luminaire geometry and the installation site, on the other hand, the material used (for example: aluminium, ceramics, plastic). Since 2004, TRILUX has been conducting long-term experiments of now more than 30 000 hours. The result: Only with the correct thermal management can the LED durability promised by the manufacturer be achieved.

PLANNERS AKS, MANUFACTURERS ANSWER

In the everyday work of a planner, many a question comes up which cannot be found in any handbook. Answers to such questions are given here by the experts from TRILUX who also tell you one or more tricks.

The light of LEDs is much clearer and more precise than that of conventional lamps. What is the cause?

Thomas Kretzer
General Manager
TRILUX Vertrieb GmbH

This phenomenon can be explained with various features of the light-emitting diodes: An important point is the spectral composition of the light emitted by LEDs. The light of an LED is monochrome and restricted to only a small spectral area. In comparison: The light of a traditional heat radiator such as the incandescent lamp contains almost the whole visible spectral area, above all a large proportion of infrared light. In LEDs, the colour is furthermore produced directly in the crystal in a highly satiated form so that colour filters, which have to be used for traditional incandescent lamps to produce colour, are no longer necessary. Thus colour temperature and colour rendering can be precisely adjusted to the specific lighting task and kept constant in the long run. A further aspect is the size of the LEDs: With only about one millimetre edge length, they are almost point-shaped light sources. Their light can therefore be much more precisely directed to where it is needed. Unwanted scattered light is thereby avoided which in the end leads to a higher efficiency.

The difference between LED light (top) and conventional light (bottom) becomes especially manifest in car tail lamps.

Photos: Volkswagen

ISMANING COMPETENCE CENTRE

In a total of five competence centres all over Germany, the latest TRILUX products are presented. Since the conversion of the Munich location, the centre of the Region Süd plays a special role. True to the "total service" idea, it now unites under one roof all the sectors such as exterior and interior luminaires, medical technology and Oktalite shop lighting. As part of the metropolis policy, the location also serves as the headquarters for the international key-account management.

At first glance upon entering the TRILUX Ismaning Competence Centre, the shiny red reception counter catches the eye, which forms the heart of the centre. Birgit Mörl-Richter, the architectural consultant for the Region Süd, greets her visitors with a friendly smile. It is now almost 1 1/2 years ago that, in October 2008, the interior architect together with the team of the Region Süd took on the re-design of the premises at Carl-Zeiss-Ring. Despite the tight budget, the result is a true showpiece: The exhibition and the work areas are not separated, on the contrary. Where the employees of the Metropol Team München + (MTM +) are working, the luminaires can be seen right in operation. Thus the impressive technical range and the proven know-how of TRILUX are found not only in a small exhibition corner but in the whole office. Architects and planners are able to get information and advice directly on site in a kind of living exhibition. The interior architecture does not have to hide either: Wall panels and ceiling-high glass sliding doors create open spaces yet, if necessary, also enable a more private atmosphere for meetings. As the dominating colour, the red typical of TRILUX from the Arnsberg plant, rules on the walls. On the dark-grey floor is a special feature: Numerous stripes in red, orange, pink and light grey are running, radiating from a central column in the entrance area, through the whole centre. Originally the column just stood in the way, yet instead of concealing it, the Ismaning TRILUX employees decided to deliberately emphasize it. Further eye-catchers are the figurative drawings by the Nuremberg artist Stephanie Loew which decorate various walls and doors. They relate to the different areas of utilization: When opening the door to a meeting room, for example, one sees a businessman with a briefcase; upon leaving the room at the end of the meeting through a second door, he has already casually thrown his jacket over his shoulder. With its harmonious overall concept, the Competence Centre in the north of Munich is always worth visiting!

She consults architects and planners: the TRILUX architectural consultant of the Region Süd, Birgit Mörl-Richter.

Photos: Stefan Schumacher, Munich

Radiating from a central column, colourful rays run through the centre in Ismaning while on the walls shades of red and grey dominate. The drawings specifically created by an artist reflect what is happening in the various rooms.

A red roof and a red back wall frame the red reception counter in the entrance area.

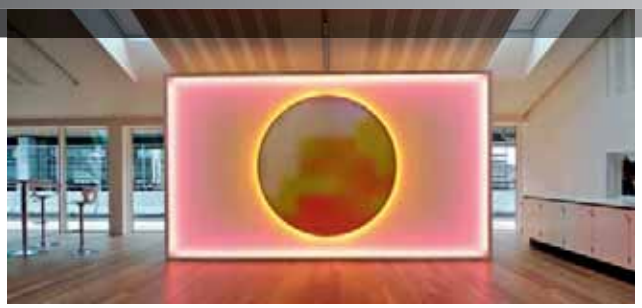
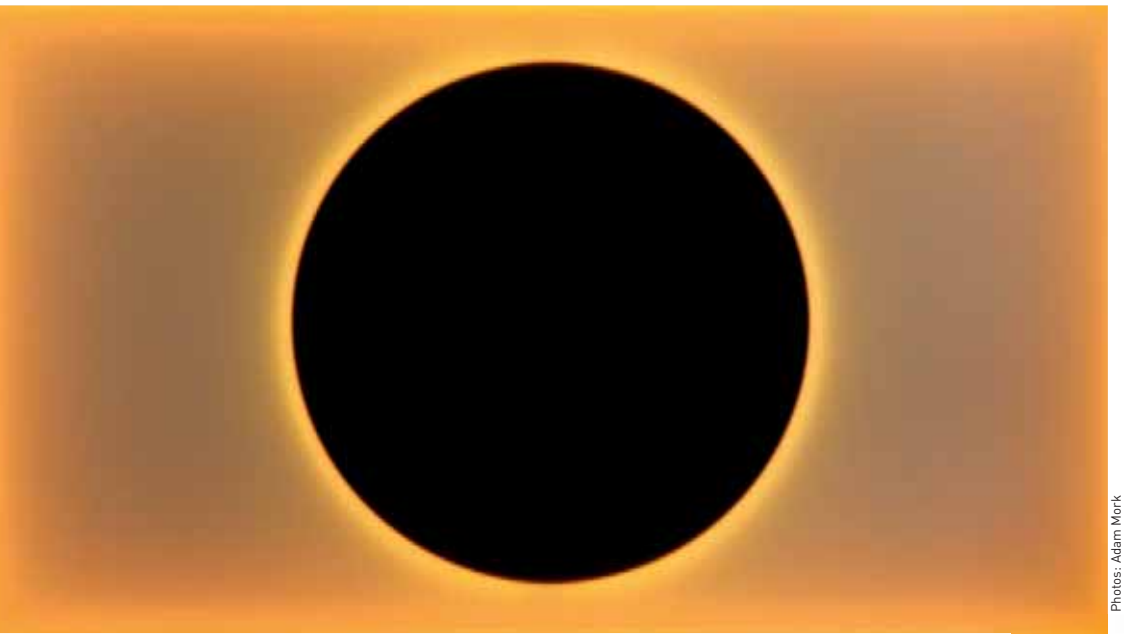


Photo: Torben Eskerod

The work of art, 4.5 metres wide, 2.24 metres high and weighing a ton, accompanied each delegate at the exit with slowly changing, always different colours.



Photos: Adam Mork

Three different components give "Digital Sun" its face: The outer surface of white glass, the sun of black, transparent acrylic glass in the middle, and the corona around the sun.

AN APPEAL TO SHOW RESPONSIBILITY

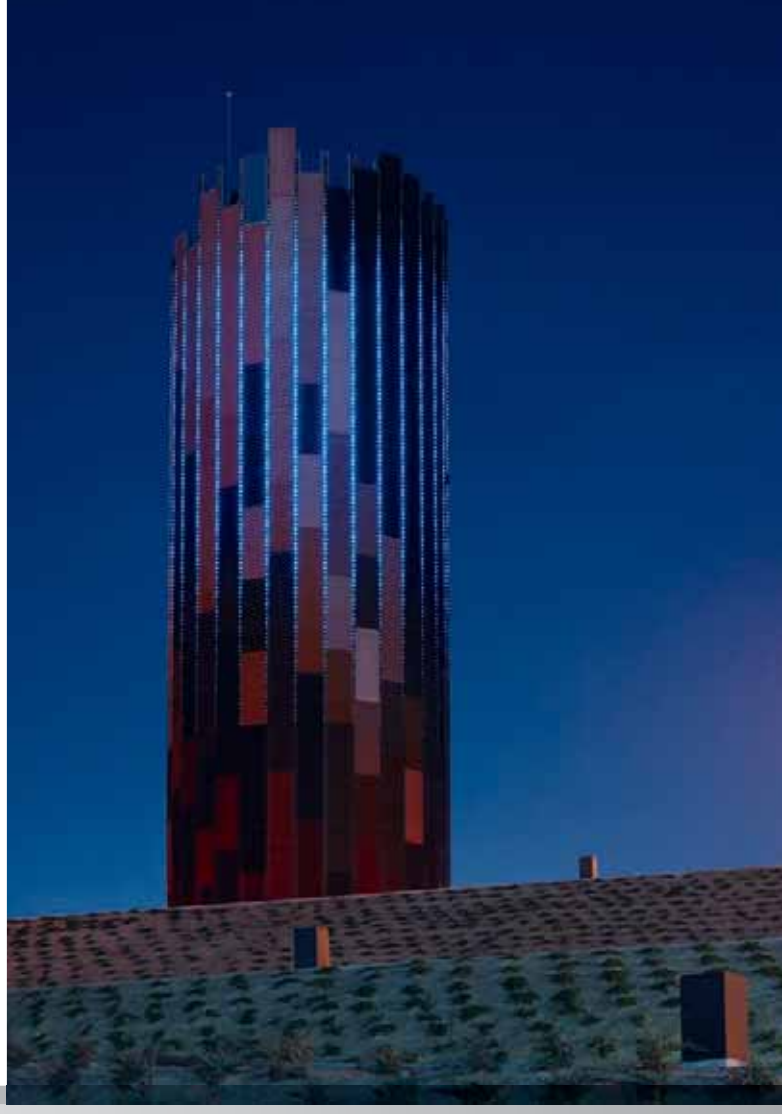
Flop or not – Steven Scott's light installation "Digital Sun" at the UN Climate Conference in Copenhagen attracted attention and reminds all of us of our responsibility for the world climate.

By Thomas Geuder

It took place just four months ago, yet the UN Climate Conference in Copenhagen has already disappeared from the media. Many observers are disappointed of the seeming inability of the world community to agree on a common ground concerning this global theme. An important insight remains: This political paralysis requires of every one of us to take a closer look at our behaviour towards the environment. When all is said and done, everyone is responsible – this is what light artist Steven Scott must also have thought when he created the work "Digital Sun". Strategically well placed in the exit pavilion of the conference, he installed a work of light art which was to remind every single delegate of his or her responsibility for the world climate. His idea: An installation alternating in different colours and sequences and thus drawing attention to the transitoriness of our universe. Different speeds in the individual sequences and moments of quiet had the effect that, each day, the delegates set eyes on a different picture. One can only hope that the mesmerizing colours will continue to have an effect also after the conference.

www.scotialight.com

The abstract light animations thematize aspects of the natural water cycle such as dripping, flowing or evaporating.



The new, light-weight building envelope of the water tower in Fontsana Park in Barcelona was to keep the functional concrete cylinder underneath it discernible.

Photos: Eugeni Pons

VEILING WITHOUT CONCEALING

Thanks to its new (media) façade, during the day the water tower in Barcelona's Fontsana Park becomes a landmark visible from afar. At night, however, the tower really comes to life with stylized plays of light.

By Christina Dragoi

Turning a functionally designed water tower into advertising space for the water supplier – this was the task given to the office of ruisanchez arquitectes from Barcelona. Their solution was a semi-transparent building envelope of perforated aluminium sheets through which, depending on the light conditions and the angle of vision, the concrete core can still be discerned. The vertically arranged metal sheets are staggered so that the upper edges end irregularly. Shimmering tones of bronze, gold and aluminium determine a hierarchy from dark earth- to almost transparent sky colours. In addition, photovoltaic modules set into its south side enliven the façade and ensure the power supply of the 18 000 LEDs mounted between the aluminium panels. The minimalist animations of the light choreographies – specifically designed for the tower by ag4 media facades from Cologne – show in merging sequences aspects of the natural water cycle such as flowing rivulets or concentric wavy movements in the water. **www.medienfassade.com**

In the "Overture" installation, the future of lighting first takes on an existing form we are familiar with in order to then be accept by us in our everyday lives.

Photos: Ano Daichi

The water in the glass bodies acts as a sensor which, when touched, starts the interactive sequence of light.

Because of the wall mirrors, the borders of the room almost seem to dissolve and the impression of an endless sea of light is created.

AT THE PULSE OF THE LIGHT

The new LED technology often meets with criticism claiming the light is cold, mechanical and lifeless. During the Milan Design Week 2009, however, "Overture" breathed pulsating life into LEDs.

By Julia Zürn

To remind of the incandescent lamp and, at the same time, promote the future of LEDs, Ryo Matsui Architects from Japan together with the Toshiba Corporation and takram design created the production "Overture". Numerous luminaires hang from the ceiling of the Milan exhibition space at different heights and cast small circles of light onto the floor. Arch-shaped mirrors on the walls multiply the number of the luminaires into infinity. For the architects, the arch symbolizes the transition from the past into the future, from the incandescent lamp to the LED. The mirrors in turn reflect the present of lighting which is at a watershed: Glass bodies in the shape of familiar light bulbs are made to shine with the help of LEDs – new technology inside a familiar shape. The closer the visitors get to these illuminants, the brighter the cool light shines. When touched, it starts to pulsate softly, the "light bulbs" seem to come to life and shine in a warm light as soon as they are let go. An invitation to keep the light bulb as the pulse of our culture of light and to give the new technology a chance at the same time.

www.matsui-architects.com

On Lake St.-Jørgens in front of the planetarium in Copenhagen, a metric tonne of CO_2 was constructed as a multi-media cube on the occasion of the UN Convention on Climate Change.

For two weeks, the CO_2 cubed served as a novel advertising board in the urban landscape: It does not promote global consumption but public commitment.

Photos: Joshua Brott

THE TRANSFORMATION OF THE INVISIBLE

On average, every person in Europe produces a ton of CO_2 per month. But how much is a ton of CO_2 in actual fact? The exhibition "Visualize a Tonne of Change" answers this question.

By Christina Dragoi

On schedule for the 15th UN Convention on Climate Change in Copenhagen in December 2009, project artist Alfio Bonanno and architect Christophe Cornubert in cooperation with the press- and information department of the UN Secretary, Oscura Digital, YouTube and Google developed the CO_2 cube, a sculptural, site-specific installation at the interface of art, science and technology. Out of nine jointly stacked shipping containers, the volume equal to a metric tonne of CO_2 was constructed. The giant structure with sides measuring more than eight metres in length was built on a specifically manufactured platform on Lake St.-Jørgens. Two sides of the cube were covered with a metal web and served as a projection surface for a new kind of multimedia exhibition: In cooperation, YouTube and Google, Obscura Digital assembled international art streams on the subject of climate change which were shown together with live pictures via YouTube at the framework conference of the parties of the Convention on Climate Change. For those container surfaces not used for projections, The Do Lab created an LED light design.

www.millenniumart.org/co2_cubes

Frames : www.YouTube.de, Baaa-Studs

SHEEP IN LED SKIN

By Julia Zürn

Evidence of the versatile possibilities of application for LEDs is supplied on the Internet by creative Welsh shepherds. Sheep can do more than stand in a pasture and baa. No, equipped with a mesh cape of LEDs and with the help of sheepdogs, it is possible to play the classic Pong computer game with them in the dark. Or imitate fireworks. Even a portrait of the Mona Lisa consisting of sheep pixels is possible. Sounds unbelievable? On YouTube, "Extreme Sheep LED Art" has already had several millions of viewers. Since its appearance, the question "fake or not fake" has caused a stir in the net, additionally fed by the fact that at the end of the clip advertising is faded in. The BBC has already reported on location to follow up on the sheep phenomenon. However, the shepherd declared that not computer animations but "good dogs and very sensitive sheep" had made the spectacle of light possible – true or not true?

GOOD THINGS COME TO THOSE WHO WAIT ...

Almost simultaneously with the first successful attempts to make a light bulb shine, Ferdinand Braun in 1876 noticed a special quality in the power transfer of crystals: When pressing a metal tip onto a sulphide crystal, he discovered direction-dependent conductivity which increased the more electricity was passing through. Over 30 years later, Henry Joseph Round observed in 1907 that inorganic materials are able to emit light when electric voltage is added (Round Effect). When experimenting with a siliciumcarbide crystal he could make it glow in yellow, orange or also in blue. Since no heating was noticeable in the crystal, he called the light cold. In 1927, the Russian physicist Oleg Losev discovered electroluminescence when electricity was running through a carborundum crystal and thereupon dedicated all his time up to his death in 1942 to the investigation of the Round Effect. In the 1950s, with the development of the transistor a further scientific step could be achieved in the physics of semiconductors. All the same, experiments with zinc sulphide were at first continued until, in 1957, one concentrated exclusively on research on semiconductors for producing light. The first noteworthy LEDs were manufactured at the beginning of the 1960s while it is not altogether uncontested whether Round or the American scientists Nick Holonyak, who in 1962 developed the first visible LEDs, is the actual inventor of the light-emitting diode. But no matter to who we owe the little lamps, during the past years the development in LED technology rapidly progressed and it more and more replaces the conventional lamps. This suggests the question of what would have happened if semiconductor technology had met with less scepticism at the end of the 19th century. Would the incandescent lamp then perhaps not have become the most popular illuminant of the 20th century? Or would there not even be luminaires as we know them and would ceilings and walls shine instead? Maybe the time was just not right then for such a lamp innovation.

Ferdinand Braun (1850–1918), German Nobel Prize winner, physicist and electrical engineering technician

Henry Joseph Round (1881–1966), English researcher

Oleg Vladimirovich Losev (1903–1942), Russian high-frequency engineer and physicist

Nick Holonyak Jr (b. 1928), US-American scientist

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