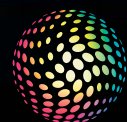


Aren't LED luminaires  
really design playthings?



The only playful thing here is the installation.

The TRILUX Mirona LED.



**TRILUX**  
NEW LIGHT.

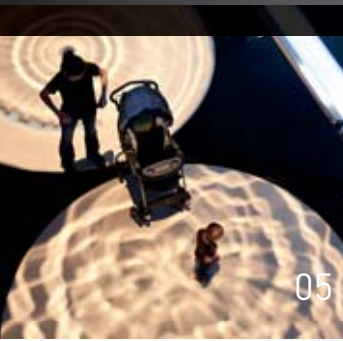
# 3lux:letters

NEW LIGHT | ARCHITECTURE | TECHNOLOGY 2 | 2011 

**lux:** Light in industry  
Sensibly illuminating working areas

**lux:** Light in dark factories  
The history of industrial architecture

**lux:** Light in terms of figures  
Amortisation of LED systems



05



07



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**Cover:** At night, the façade of AMAG Retail Autowelt in Dübendorf is emphasised by light accents in the AMAG colours.

Photo: Boris Golz, Arnsberg



### Dear Reader,

the prosperity of a country is not last determined by a functioning and flourishing economy. The collapse of the world economy in 1929 was probably the worst confirmation of this fact to date. But the financial crisis of 2007 as well, which at the end of 2008 led to trouble in the economy, showed us quite plainly how dependent we are. Reason enough to focus on the subject "Light in industry and commerce" in the current issue of 3lux:letters.

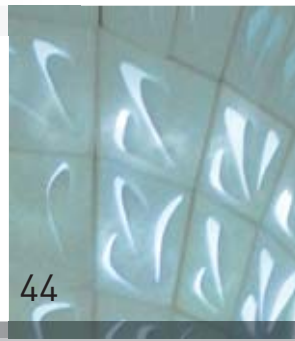
With his article "Light in dark factories", art historian and author Dr. Tilo Richter gives us a survey of the development of industrial architecture and, at the same time, looks more closely at how the use of artificial light changed in the process (page 10). The production halls of the Daimler press plant in Kuppenheim (page 22) and of Rüschenbaum GmbH in Arnsberg (page 26), as well as the Taschinas hydropower plant in Prättigau in Switzerland (page 30) and AMAG Retail Autowelt in Dübendorf (page 34) show how different the construction tasks in industry and commerce can be and the individual (light-) solutions used in the design. In our interview, we ask the question about the necessity and the significance of converting abandoned industrial plants (page 18). In our service section, we show you how quickly a modernised LED installation is amortised, compared with an old HQL installation (page 38) and the planners' question deals with the calculation of the luminous flux in LEDs and traditional lamps (page 39). In addition, we present you the new TRILUX Competence Centre in Stuttgart with its focus on industry (page 40). Look forward to many further topics concerning light!

Have fun reading the current issue of 3lux:letters!

Yours sincerely,  
Thomas Kretzer, CEO TRILUX Vertrieb GmbH



From "light-source" to "light-views", from "light-architecture" to "light-art": the TRILUX architectural magazine "3lux:letters" is now available to download as a free app for iPhone, iPad or iPod touch (from iOS 4) from the app store. But the magazine is not just something for mobile Apple users: an ePaper version is also available to browse through at [keosk.de](http://keosk.de), a platform for digital publications.



# LIGHT IN INDUSTRY

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The two Polish design companies Super Super and Inside Outside planned an extraordinary shop for the Zuo corp clothing brand. For three months it became a magnet, attracting customers in the narrow pedestrian zone of Warsaw: The designers succeeded in fitting into a container measuring just 27 square metres, the display area, the changing rooms and even a storage room. The space was visually expanded with the help of mirrors on the walls and the ceiling, and this was enhanced by bands of LEDs around the edges, which were also the only source of light in the container. The changing rooms were covered in black fabric. A surprising effect was caused by the reflections on the black floor, which created a cave-like impression.

Pop-up shop for Zuo corp  
Bracka 20, Warsaw  
[www.insideoutside.pl](http://www.insideoutside.pl)  
[www.supersuper.pl](http://www.supersuper.pl)

Small miracle of space: on entering the container, the customers became immersed in a seemingly surreal world.



Photos: Jacek Mejewski

## lux: HISTORY

### The batten – the classic industrial luminaire

After the Second World War, neither guaranteed energy- nor dependable light supply existed in workshops and workplaces. Only the sectors of the allied armed forces were quickly reconnected to the power supply. In those years, which were predominantly focused on reconstruction, the newly developing luminaire industry looked for solutions to combine in one product a maximum of brightness with as little cost of material and manufacturing effort as possible. This was the hour of the fluorescent tube which, due to initially being filled with the noble gas neon, was also called "neon tube". Around 1940, the American company General Electric used large quantities of this illuminant for its products. The luminaire industry resorted to developing the batten, which consist-

ed of bundles of fluorescent tubes. A simple metal profile strip kept the sockets together at the end of the tubes. The luminaire was clearly defined as to its function and had an unobtrusive design. Its sole purpose was to illuminate a room. A simple but highly effective solution for the predicament of that time. Also around that time, TRILUX was founded, the company which optimised the luminescent lamp with the help of sophisticated photometrics, reflectors, prismatic diffusers, optics, louvres and metal topsand, and turned it into a more efficient, brighter luminaire. In the TRILUX catalogue of 1954, battens even became respectable as lighting for the interior of festival halls and churches. To this day, the batten still exists and continues to be suitable for one or the other lighting task.



In the 1950s, the batten was not only installed in production plants but also in churches and festival halls.



Photos: TRILUX



Photos: J.B. Spector - Museum of Science and Industry, Chicago

From a height of 18 metres, spotlights project the dynamics of waves through water-filled discs onto the floor.



In the recently opened Science Storms permanent exhibition in the Museum of Science and Industry in Chicago, on an area of almost 8,000 square metres, visitors are able to admire the strongest forces of nature such as fire, lightning, tornados, avalanches or tsunamis as well as the movement of atoms. Impressive light installations by Focus Lighting of New York illustrate these natural phenomena in an exciting way. Various interactive experiments make it possible for visitors of all ages to easily grasp the complex processes. They are, for instance, able to influence a twelve-metre column of whirling vapour to make everyone really grasp what the enormous forces of a tornado are like. Visitors will remember this exhibition for a long time to come.



A tesla coil produces crackling bolts of lightning (top left). The rising vapour column simulates a tornado (top right).

**Science Storms**  
**The Museum of Science and Industry**  
 57<sup>th</sup> Street and Lake Shore Drive  
 Chicago, IL 60637  
 Permanent Exhibition  
[www.msichicago.org](http://www.msichicago.org)

The Science Storms exhibition makes museum visitors easily understand impressive natural phenomena.



Last year, more than a million visitors watched illuminations such as that of Friedrichsfelde Castle.



Photos: Festival of Lights

"Light Seeing" tours for discovering events all over the city also go past the Brandenburg Gate.



**7<sup>th</sup> Festival of Lights in Berlin**  
 12<sup>th</sup> to 23<sup>rd</sup> October 2011  
[www.festival-of-lights.de](http://www.festival-of-lights.de)

This year on 12<sup>th</sup> October, the motto will again be "Lights on", when the Festival of Lights, the largest illumination festival in the world, lights up the city of Berlin. For twelve days, until 23<sup>rd</sup> October, national and international artists and light designers will do their best to stage famous landmarks, squares and buildings in the German capital. Various arts events all over the city will be part of the festival, which takes place for the seventh time. On the occasion of the 125<sup>th</sup> anniversary of the Kurfürstendamm, every evening the magnificent boulevard will display light projections and objects of light art. Visitors can find information on exhibitions of light art and the festival events at the Festival Infopoint under the Potsdamer Arkaden.



Photos: Domagoj Blazevic



### Good ideas glow in the dark

The book  
www.bruketa-zinic.com

The contents of the book remain hidden in daylight. Only in the dark does the lettering begin to shine and reveals the title of the book.

“Good ideas glow in the dark” – the team of the advertising agency Bruketa & Žinić from Zagreb thought when designing this book for the Adris Group. The book title remains hidden in daylight and only becomes legible in the dark, thanks to its fluorescent qualities. To emphasise the book’s particular feature, Bruketa & Žinić chose Japanese flush binding: leafing through the pages of the book, the reader sees the annual business report of the Croatian investment company; but looking between the pages reveals the names of all its 3,000 employees. At the Weekend Media Festival in Croatia, the book was presented in an unusual way: on a large shelf filled with white books, the design by the Adris Group could only be recognised when it shone as the only source of light in the darkened room.

In her second year at Lund School of Architecture in Sweden, Clara Sjödin took a course entitled “The Fantasy Project”. Her task was to invent a fictitious person for whom to design a house as well as all the furniture in it. While she was working on the project, however, a completely autonomous design object originated as well: Size 45 – a luminous pair of shoes where cables also have the function of shoelaces. But there is more to it than simple footwear: shoes tell stories and reveal a part of the wearer’s personality. Furthermore, they are indicative of social status, gender roles and group membership. With Size 45, Clara Sjödin wanted to prompt the viewer to start seeing everyday objects in a different, more all-encompassing light.

### Size 45

Clara Sjödin  
www.csjodin.com



LEDs are integrated in the soles of Size 45 shoes making the whole footwear shine.

Photo: Karl Attemyr

### Deutscher Lichtdesign-Preis 2011

5<sup>th</sup> May 2011  
Hotel Maritim in Cologne  
www.lichtdesign-preis.de



Photos: Deutscher Lichtdesign-Preis

In the category Public Sector/ Interiors, the art – and daylight design in the church of the Munich-Neuried parish centre by luna.lichtarchitektur impressed the jury of experts.

The Licht Kunst Licht office now bears the Title „Light Designer of the Year 2011”. Office founder Andreas Schulz accepted the award.



For the first time last May, the “Deutscher Lichtdesign-Preis” was awarded in Cologne. Eighty offices from Germany, Austria, Switzerland and the Benelux countries submitted close to 130 projects. An independent jury selected the most outstanding projects in ten different categories – from office – and administration buildings to store lighting to light art. Licht Kunst Licht of Bonn/Berlin, represented by Prof. Dipl.-Ing. Andreas Schulz, was awarded by the jury of experts with the title “Light Designer of the Year”. Not least thanks to the good reception in the industry and to the successful gala evening, this competition is to become an annual event. You may submit projects for the Deutscher Lichtdesign-Preis 2012 at: [www.lichtdesign-preis.de](http://www.lichtdesign-preis.de).



**GLOW**

5<sup>th</sup> to 12<sup>th</sup> November 2011  
 Eindhoven, Netherlands  
[www.gloweindhoven.nl](http://www.gloweindhoven.nl)

This year Eindhoven will once again be immersed in a colourful sea of light thanks to extensive illuminations.

Illusion or reality – a puzzling impression for visitors.

In the Dutch city of Eindhoven, in autumn 2011, the GLOW Festival will take place for the sixth time, this time with the motto "Illusion and Reality". From 5<sup>th</sup> to 12<sup>th</sup> November, more than twenty international artists will present their light objects and illuminations in various places all over the city. When darkness falls, the boundaries between illusion and reality are to become blurred – without any doubt an exciting event for the 250,000 spectators who are expected to visit. The contrast between the urban, concrete-heavy spots in the city and the green, romantic sites will be especially emphasised. On the occasion of the combined anniversaries of the Eindhoven Technical University and the Van Abbemuseum, many surprises should be in store.



Photos: CityDynamiek Eindhoven

**lux: STATEMENT**

Norbert Wasserfurth, Studio DL,  
 Hildesheim

Bottom left:  
 The luminance measurement in a VW production plant shows how well brightness can be distributed with the help of targeted light.



**Light for industry and commerce**



Photos: Norbert Wasserfurth

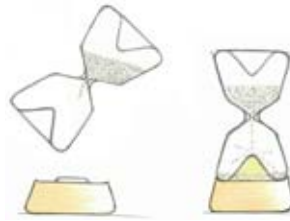
There is no other area of installing lighting where its service role comes as much to the fore as when lighting is used in commercial buildings. It does, however, certainly not have to be restricted to illuminating workspaces alone – as was also impressively proven to visitors of the exhibition "Berlin im Licht" as early as in 1928. Modern research on light also has its origin in the 1920s and 30s: the terms were defined then and the research results are still used to the present day. Since the beginning of professional lighting design, almost 100 years ago, we have been constantly trying to newly define light for people in their workspaces – and have thereby been going beyond the concepts of visual performance and visual comfort. Yet during all this time, not much has really changed when it comes down to the basics.

We are still striving for the kind of light that adapts to our needs, our rhythms and our lifestyle and we are also still fighting vehemently against the "nerve-racking and dulling permanence of artificial lighting" (Weston, 1954) as well as against the lack of daylight (Walter Köhler). The long-term demographic development of the labour force, our growing awareness of health and fitness, increasing expectations concerning our leisure time and the fact that we enjoy an active life until old age intensify the quest for "healthy" light. The era of research on circadian light and of digital lighting technology has really only just begun, while the struggle for suitable light for industry and commerce now enters the next round. This time, we should make sure that the way to get there is not defined as the goal.



**Night Night**  
Vanessa Hordies  
[www.vanessahordies.com](http://www.vanessahordies.com)  
[www.ecal.ch](http://www.ecal.ch)

With a luminous hourglass, designer Vanessa Hordies has created a night light for adults. When the glass body of the Night Night is placed on its wooden base, the luminaire automatically turns on. The sand trickling down increasingly dims the source of light integrated in the base. The user going to sleep does not have to worry about unnecessary energy consumption: after 15 minutes, the luminaire switches off automatically – as studies have shown, this is optimal period of time in which adults usually fall asleep. Should this amount of time not be sufficient to go to sleep, the glass body only has to be turned upside down just once and the light starts to shine again.



The Night Night luminaire modelled after an hourglass facilitates softly falling asleep as the light is dimmed by sand trickling down.



Photos: ECAL

During the pre-Christmas period, light installations such as Urban Jungle (2010) can be seen all over town.



Photos: Muriel Chaulet

Each year, the basilica Notre Dame de Fourvière – the location of the statue of the Blessed Virgin Mary – is one of the main venues of the city.



**Fête des Lumières**  
8<sup>th</sup> to 11<sup>th</sup> December 2011  
Lyon, France  
[www.fetedeslumieres.lyon.fr](http://www.fetedeslumieres.lyon.fr)

The origins of the French festival of light go back as far as the 17<sup>th</sup> century: in gratitude for surviving a plague epidemic in 1643 and in honour of the Blessed Virgin Mary, the citizens of Lyon celebrated a major feast. The custom traditionally observed on 8<sup>th</sup> December, when candles are lit in the windows of all houses, became the Fête des Lumières in 1852, which has since been celebrated every year in various parts of the town. Now famous far beyond the borders of France, the festival showcases national and international artists with their illuminations and light objects. From 8<sup>th</sup> to 11<sup>th</sup> December, visitors will have the chance to marvel at modern light art in combination with traditionally illuminated streets.



**Pier Luigi Nervi:****Architecture as Challenge**Carlo Olmo, Cristiana Chiorino  
(editor)Published in March 2011  
by Silvana Editoriale, Milan  
240 pages, partly in colour  
28 x 23 cm, softcover  
English  
€ 35.00  
ISBN 978-8836617562  
www.silvanaeditoriale.it

The exhibition catalogue documents the extensive research done over the past years on Italy's best-known civil engineer and important architect of the post-war modern style, Pier Luigi Nervi. In addition to detailed texts on his scientific experiments and testing of materials, the catalogue reports on the fruitful cooperation with Marcel Breuer, from which the UNESCO headquarters in Paris resulted in 1953. The classics among Nervi's works, such as the Pirelli multi-storey building in Milan, the Palazzo del Lavoro in Turin or the audience hall of the Pope, are introduced with representations of hand-drawn plans and detail drawings.

**IndustrieZEIT.****Fotografien von 1845-2010**Ulrich Pohlmann, Rudolf Scheutle  
Münchner Stadtmuseum  
(editors)Published 2011 by Wasmuth Verlag,  
Tübingen  
192 pages, 198 illustrations  
24 x 30 cm, hardcover  
German  
€ 45.00  
ISBN 978-3-8030-0738-4  
www.wasmuth-verlag.de

In the book, edited by the Münchner Stadtmuseum, historic photographs of railway bridges, underground tunnels or the construction of the Panama Canal make times long past come alive again. Black-and-white photographs with strong atmospheric density document the industrial development of the past 160 years, with workers also being represented in an impressive way: in various industrial plants, as symbols of strength and progress. On 192 pages with 198 illustrations, Ulrich Pohlmann and Rudolf Scheutle compiled this short history of industrial photography. The IndustrieZEIT catalogue documents the exhibition of the same title, which can still be seen in the Münchner Stadtmuseum until 11<sup>th</sup> September 2011 and in Nuremberg in 2012.

**Container Atlas****Handbuch der Container Architektur**Han Slawik, Julia Bergmann,  
Matthias Buchmeier, Sonja Tinney  
(editors)Published April 2010  
by Die Gestalten Verlag, Berlin  
256 pages, full colour  
24 x 30 cm, hardcover  
German  
€ 49.00  
ISBN 978-3-89955-294-2  
www.gestalten.com

The container has long become a cult object playing with the image of the well-travelled nomad. This trend, and his many years of investigating container architecture, have prompted Professor Han Slawik of Hanover Leibniz University to publish this book on the subject, together with his research associates. By way of introduction, the reader is supplied with technical information on different construction systems and their features. Then ambitious architectural solutions are presented, from a research station in the Antarctic to airport and cruise terminals, stores, offices and apartments, all the way to a mobile museum and a tea house with sea views; the steel box has been globalised long ago.

# LIGHT IN DARK FACTORIES

The history of industrial architecture is also a history of light. With the industrialisation of Europe, new construction materials such as concrete and glass as well as the general availability of electricity at the beginning of the 20<sup>th</sup> century, the typology and the technology of construction changed immediately and lastingly. In the process, effective lighting in industrial architecture became a central issue. Today, we see the incunabula of industrial architecture as a valid cross-section of the more recent history of architecture.

By Dr. Tilo Richter

Karl Friedrich Schinkel, born in 1781, was not only one of the most important German architects of his time, but also one of the few master builders aware of the pioneering quality of early functional industrial buildings. Schinkel's study trips took him to classic Italy but also to the London docklands and the factory sites in Manchester. It was there, in 1826, that he encountered spacious warehouses which he recorded as sketches in order to later integrate their functional forms and volumes into his own work. Think of the Neuer Packhof in Berlin, built from 1829 to 1831, or the Bauakademie also realised there in 1836. In England, Schinkel was impressed by the "immense buildings, constructed by just one master builder, without any architecture, of red brick and just to meet the demand alone". This reduction to function characterised the early European and North American industrial architecture for decades. Part of the standard became large-format shed-roof buildings, for instance, where daylight could penetrate evenly from above, or, in most cases, three-aisle assembly halls designed like basilicas for the manufacture of machinery. Such basic forms of

industrial architecture were built around the middle of the 19<sup>th</sup> century and can still be found all over the world.

## Turning night into day

A vivid example of the architectural optimisation of a whole industrial town is the watch centre La Chaux-de-Fonds in western Switzerland. Designed on the drawing board by Charles-Henri Junod in 1841, until today the city centre presents itself as a network of orthogonally arranged streets and narrow factory buildings, into which natural light can penetrate from all sides. It goes without saying that this highly specialised precision-mechanics industry had different needs from heavy engineering, for instance. As a consequence, over the course of just a few years, a sector-specific architecture developed. Completely new opportunities for working opened up with the installation of electric lighting in the production plants. Working was no longer restricted by the presence of natural light, now night could be turned into (working) day in industry as well. With the unprecedented economic expansion after the German-



Factory buildings in Manchester, sketch from the diary of architect Karl Friedrich Schinkel, drawn on the occasion of a trip to England in the year 1826 (left).



Manufacturing buildings of the watch industry in the Swiss Jura, aerial photograph of the centre of La-Chaux-de-Fonds in western Switzerland, from around 1900 (right).

French War of 1870/71, space-consuming industrial plants were constructed in all European industrial regions. They were often referred to as "factory castles" because the master builders of the time used the architectural vocabulary from historic examples to adorn the plain factory halls with opulent embellishments. Despite this, even then, the call for functionality did not go unanswered. Decisive driving forces for a new architecture established themselves around 1900. Some protagonists started to free themselves from the burden of historic models, from Eclecticism and Mannerism, by creating their own language of forms. Especially in the United States of America, where lack of space in the cities such as Chicago and New York necessitated the construction of high-rise buildings, innovations in engineering technology were also integrated into industrial architecture. Three to four decades later, the availability of reinforced concrete in particular, an invention the French entrepreneur Joseph Monier had patented as early as 1867, prepared the ground for a completely new type of construction which would not have been possible with traditional methods. The earliest example of

a factory built of reinforced concrete is the Packard Motor Car Company manufacturing plant in Detroit/Michigan, built in 1904 and designed by Albert Kahn.

**Light as design element**

Many key constructions, of the modern age are industrial buildings, such as for instance Peter Behrens' AEG turbine hall in Berlin-Moabit (1909), the Fagus works by Walter Gropius and Adolf Meyer in Alfeld an der Leine (1911), or Erich Mendelsohn's hat factory of Steinberg, Herrmann & Co in Luckenwalde (1923). The Schocken department stores by Erich Mendelsohn in Stuttgart (built in 1928, demolished in 1960) and Chemnitz (built 1930, to be used as a museum in future) are not industrial buildings in the strict sense of the term. However, it is exactly those and comparable commercial and infrastructure buildings symbolising the modern industrial city that – completely in line with the aesthetics of Fritz Lang's monumental film Metropolis of 1927 – were designed and seen as a symbiotic organism of production and consumption. Mendelsohn's virtuoso, almost sculptural handling of building



Fagus works, Karl Benscheidt footwear lasts manufacturing plant in Alfeld-an-der-Leine, built in 1911 to designs by Walter Gropius and Adolf Meyer, to this day a production location.

volumes also influenced the lighting inside his buildings. With the directed use of daylight and electric lighting, it was possible to present the goods in the Schocken Group department stores in an ideal way. And Mendelsohn added a further dimension to architecture: he brought his buildings alive at night because the artificial light inside gave them new identities in the context of the dark city. In the Chemnitz store, this positive-negative play of bands of light and shade is staged with special sophistication.

Walter Gropius who, as Erich Mendelsohn, Le Corbusier and other master builders too, participated with his own writings in the discourse on contemporary architecture, characterised industrial architecture in the "Jahrbuch des Deutschen Werkbunds" of 1914 as follows: "Exactly defined form, free of any randomness, ordering of the links, sequence of similar parts and unity of form and colour will become the aesthetic tools of the modern architectural artist in accordance with the energy and the economy of our public life [...] Exactly this completely new character of industrial architecture must appeal to the vivid imagination of the artist because no traditional form seizes it by its reins."

#### Efficiency and sustainability

The era after the Second World War was also characterised by new technologies and materials. A power concerning form, and an incredibly strong influence on the subsequent generation of architects, was exuded by the buildings by Mies van der Rohe, for instance – in addition to numerous residential buildings also administration and production buildings for the US industry. At that time as well, daylight continued to be one of the most important resources. For artificial lighting, indispensable for the three-shift operation, high-quality technical systems such as high-pressure discharge lamps, fluorescent or induction lamps were used. As early as the middle of the 19th century, it had become possible to utilise the principle of luminescent lamps – or, more precisely: low-pressure gas-discharge tubes. After the Second World War, they became the standard worldwide and, since then, workplace illumination cannot be imagined without them. Compared with 50 or 100 years ago, today's industrial production has, for a large part, completely different requirements when it comes to lighting technology. Aspects of energy

Main façade of Erich Mendelsohn's Schocken department store in Chemnitz, opened on 15<sup>th</sup> May 1930, currently being converted into the archaeological museum of Saxony.



Photo: Sammlung Tilo Richter, Basel

Light as a functional component and part of staged architecture: the 480-hectare industrial park Frankfurt-Höchst, location of 90 chemical-, pharmaceutical- and processing businesses.



Photo: © 2004, Infraser GmbH & Co. Höchst KG

Photo: Firma Fagus-GreCon

efficiency and sustainability have increasingly come to the fore in recent years. Artificial light is mainly used functionally, but may also serve contemporary industrial architecture in complex architectural settings.

Some of the outstanding historic industrial buildings and sites are now protected heritage sites. The earliest designation was given to the industrial monuments in Ironbridge Valley in England in 1986. The Zollverein mine and coking plant in Essen made it onto the list of UNESCO World Heritage Sites in 2001; the townscapes of La Chaux-de-Fonds and Le Locle in western Switzerland, characterised by the watch-making industry, have been on the list since 2009. The latest newcomer on this honourable as well as obligating list are the afore mentioned Fagus works, added in June 2011 – exactly 100 years after their completion and, then as now, the production facility for wooden footwear lasts.



#### **Dr. Tilo Richter**

born in Karl-Marx-Stadt in 1968, has been living in Basel since 1998. Studied art history, classic archaeology and African sciences at the universities of Leipzig and Basel from 1991 to 1998. 2004 to 2008 graduate studies at ETH Zurich. In 2008/09 assistant at the gta institute of ETH Zurich. Since 1995 working as a freelance author, specialised journalist and book designer. Since 2008 correspondent for the "Frankfurter Allgemeine Zeitung" covering the art market in Switzerland. Since 2011 member of the Stiftung Architektur Dialoge Basel. [www.trichter.de](http://www.trichter.de)



# INDUSTRIAL

Since the Middle Ages, textile production in small workshops and from home was common in Germany. In the course of industrialisation at the end of the 19th century, numerous large cotton-spinning mills were built. Approximately 80 years later, most of the companies had succumbed to Asian competition and closed down. Many of the remaining, historic buildings have since then experienced a comeback as cultural centres and museums. New cotton mills are today being built almost exclusively in countries such as India, South Korea, Taiwan or China, where labour is cheap.



Photo: ©iStockphoto.com/-100rehanphoto

**“People today believe that work has to be organised in such a way that it brings in as much return as possible. This is a false belief; work has to be organised in such a way that it makes people happy.”**

Paul Ernst, German writer, 1866-1933



# TRADITIONAL

The Rajasthan region in the north of India is famous for its carpets. Here, in the village of Salawas, dhurries are woven of wool, cotton, jute or silk in traditional craftsmanship. Depending on size, pattern and material, they are used in different ways: the smallest of these carpets, measuring just 30 x 30 centimetres, are used as coasters for telephones and vases. Carpets in the size of 60 x 60 centimetres, are used as meditation mats. Dhurries unrolled at major political or cultural events can be as large as 7.5 x 7.5 metres.





Photo: ©iStockphoto.com/hadyayah

**“What is pleasing about the present is work, about the future it is hope and about the past the memories. The most pleasing and equally the most endearing is being active.”**

Aristotle, Greek philosopher, founder of western philosophy, 384-322 B.C.

## LOOKED INTO

3lux:letters asked three renowned lighting experts three questions on the subject of light in industry.



**Luis Alonso Calleja**  
**Architect**  
**Alonso Balaguer i Arquitectes Associats**

**For a long time now, light has no longer meant just lighting but has established itself as an important architectural design medium. In which way are you using light as a “construction material” in your work?**

**Luis Alonso Calleja:** Architecture gets its form thanks to the play of light and shadow. Spaces are created by light and its shadow being focussed and refined. According to Leonardo da Vinci, shadow is the subtraction of light, the mere contrast of a physical and luminous substance. Shadow has the natural characteristics of darkness and, at the same time, the brilliance of light with the dark being hidden and the bright being made manifest. Both are permanently tied to the substance. Shadow has more power than light, it can completely darken an object while light cannot remove the shadow of the object. In the modern age, less importance is unfortunately attached to shadow. Even though, with the use of large, glazed surfaces, contemporary architects have succeeded in flooding rooms with light, they have lost the magic of shadow in the process.



Photo: Alonso Balaguer i Arquitectes Associats

Leisure and commercial centre Las Arenas, Barcelona



**Jonathan Park**  
Light artist  
Studio Park

**Jonathan Park:** Architectural lighting is not just a temporary decoration, but a permanent and transforming construction material, simultaneously emphasising the form while adding a visual and emotional meaning – giving the building a story and another life at night. Designing large-scale concert stage sets and lighting buildings reverses the two roles – turning the music sets into a fantastic night-time architecture and environment (Voodoo Lounge) and, on the other hand, adding a new emotive setting and performance to a building at night. (Duisburg). Architectural lighting also has an important role in “branding” a building, not only accentuating its attractiveness but also advertising the company owning the property and making it memorable.



**Roope Siirainen**  
Light planner  
Valoa Design

**Roope Siirainen:** Lighting in architecture has reached the level of the performing arts. Light can be used for setting the mood, for creating spaces and illusions, which can be changed like a show. In my opinion, light can be used in ever more versatile ways to affect the emotions of people and to change the look of the object being lit. We can easily create different kinds of worlds, for example for shopping centres, museums or even entire town centres. More than anything, the goal is to make the dark hours of the day and the year more interesting, vibrant and attractive.



Photo: Studio Park

Voodoo Lounge for the Rolling Stones world tour 1994/5



Photo: Valoa design

Old Brewery, Old Doberan

**In the recent past, many former industrial plants have been converted and turned into true works of light art, such as for instance the Zeche Zollverein. What do you views on changing old industrial monuments into cultural tourist attractions?**

**Luis Alonso Calleja:** This building typology has a particular appeal for us. It is a good idea to give new life to our architectural past and to use it in a contemporary way. That is why we have implemented this strategy in many of our projects as well: In the design of the new Las Arenas leisure and commercial centre in Barcelona, for instance, the original façade of an old bullfight arena was preserved, and our own architectural practice is located in an old ceramics factory from the 1940s. We turned an archaeological architectural object into a container where collaboration between the construction-, architectural and engineering companies housed there is promoted. Additional functions such as meeting rooms, an auditorium, a canteen and a ceramics museum complement these uses.



Photo: Alonso Balaguer i Arquitectes Associats

New Wineries Protos, Peñafiel/Spain

**Nowadays, modern industrial plants and production facilities are often characterised by good architecture and, at night, are shown off to their best advantage with the help of accentuated lighting. In your opinion, what is an example where this mixture of functional workplace, modern architecture and selected light scenario is particularly successful and what is the reason why?**

**Luis Alonso Calleja:** The Espai Baronda serves as a good example for us. The lighting combines the effect of the light with the characteristics of the rooms with each getting its individual lighting intended to impress users and satisfy their demands. With transparent and translucent diffusors, we focused on the warmth of the shell's material. The brickwork arches were emphasised with floodlights so that the spatial effect is dramatised. In the atrium, a glass- and steel structure is suspended from the ceiling. The theatrical look of this room is achieved by low and simple linear lighting at ground level.

**Luis Alonso Calleja,**

born in Madrid/Spain in 1955. In 1978, following his architectural studies at the Technical School of Architecture in Barcelona, he founded the joint architectural office Alonso, Balaguer and Architects together with his friend Sergj Balaguer. Its Due international success has led to branches in Barcelona, Madrid, New York and Peru, with currently 50 employees.

[www.alonsobalaguer.com](http://www.alonsobalaguer.com)

**Jonathan Park:** At night, the Zeche Zollverein has a wonderful atmosphere and, like my own lighting of the Duisburg Hüttenwerke, it rehabilitates a formerly polluted manufacturing site into an industrial monument, giving it a new life and emphasising its historic role. This is particularly true when, as at Duisburg Landschaftspark, visitors can walk through and appreciate amazing industrial architecture and processes that had previously only been seen and experienced by a few workers over many years. At Duisburg, I not only wanted to light up and revivify the industrial architecture but also to use colours to reflect the different industrial processes and tell the previously hidden story of its complex and important industrial production.

**Roope Siirainen:** The two projects mentioned are great examples of the power of light. Using light, these kinds of sites can be turned into attractions and works of art for the dark hours without substantial building or alteration costs. Just as good an example could be found in the lighting of an old brewery during the ELDA workshop in Bad Doberan in 1999. This showed very well how, with beautiful lighting, old and sometimes neglected buildings are given new lives, and they can thus even be used for tourism.



Photo: Kay LT

Illumination of the Duisburg-Meiderich Hüttenwerke 1996/2011



Photo: Valoa design

Power station Naistenlahden Voimalaitos, Tampere/Finland

**Jonathan Park:** In an unrealised project in Germany, the concept was to make an unloved building complex more approachable through distinctive lighting and to “rebrand” it as a distinctive night-time landmark. Architectural lighting, using LED and discharge technology, is a good way of investing buildings with an attractive night-time presence while keeping the project environmentally acceptable. The ideas and installation must take into account the need for careful design and long-term maintenance. The extensive South Bank complex by the Thames in London is a good example of the exciting solutions and problems of illuminating a large public complex, having been installed piecemeal over many years and requiring much maintenance.

**Roope Siirainen:** Every illuminated location should take the effect, the functionality and the energy issues into consideration; together they convey a visual message, or function as a sort of sophisticated advertisement. One of our most successful projects, the lighting of the Naistenlahden power plant building, is successful in terms of all the above-mentioned criteria. Thanks to colourful illumination, the dark hours of the day look more cheerful and the surroundings as a whole have become brighter while, at the same time, the energy consumption has dropped 30 per cent a year compared to the former industrial lighting. Modern lighting is a versatile whole, with an experienced and – ideally – professionally qualified lighting designer taking care of the lighting system in a versatile manner.

**Jonathan Park,**

born in Leeds/Great Britain in 1941, studied mechanical science at Clare College in Cambridge. After working in various engineering offices, he has been heading Studio Park in London since 1994. For more than 30 years, he has realised spectacular stage shows, among others for Pink Floyd, U2 and the Rolling Stones. In 1996, he illuminated the Thyssen Eisenhütte in Duisburg and in 2000 designed the large Ferropolis “City of Iron” near Leipzig. [www.studiopark.co.uk](http://www.studiopark.co.uk)

**Roope Siirainen,**

born in Helsinki/Finland in 1967, studied lighting design at the Theatre Academy of Finland, where he gained his Master’s degree in 1995. He is a member of the Professional Lighting Designers’ Association. In addition to giving numerous lectures and seminars, he has published several articles and interviews. For him, the task of the lighting designer consists of understanding architecture and of translating it like a language of darkness, light and shadow. [www.valoa.com](http://www.valoa.com)

# STRIKING HEIGHT CHANGE

In Kuppenheim in Baden, to a design by Kohlbecker | Architekten&Ingenieure a new press plant was built for the Mercedes-Benz cars and trucks body-part manufacturing plant. A nested-looking administration wing was placed in front of the hall, clad with trapezoid sheet metal. The new plant offers workplaces for approximately 280 employees in the Northern Black Forest.

By Christine Schröder

Car parts are produced in the 18-metre-high presses- and coils hall (top right). Industrial robots for the manufacture of components are placed together to form isles in the lower part of the hall (bottom right). Exterior view of the new press plant of Mercedes-Benz in Kuppenheim (below).

**Client:**  
GEWA Kuppenheim GmbH & Co. KG, Esslingen

**Tenant:**  
Daimler AG, Stuttgart

**Architect:**  
Kohlbecker | Architekten & Ingenieure, Gaggenau (Design)  
Wolf Architekten/Ingenieure GmbH, Backnang (Construction management)

**Location:**  
Im Hardrain 1, Kuppenheim

**Luminaire:**  
Highbay  
E-Line

**Photos:**  
Boris Golz, Arnsberg



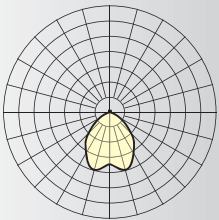




The blue lockers offer storage space in the changing room optimally illuminated by the TRILUX E-line luminaire.

## lux: TECHNOLOGY

### Highbay



Luminous intensity distribution

The Highbay was developed by the TRILUX specialists as a custom-made luminaire for the press plant in Kuppenheim.

The energy-efficient Highbay T5 hall luminaire with a Miro silver surface ensures highest performance for economically illuminating even very high halls. The small number of slots on the top facilitates the self-cleaning effect of the luminaire and directs the luminous flux straight to the workstation without losing a significant amount of indirect light in the process. The luminaire is particularly suitable for surface-mounting on ceilings but can also be suspended with the appropriate accessories. The luminaire body consists of galvanised sheet steel and is powder-coated in white; the formally and force-fittingly integrated heads are also made of galvanised sheet steel. Depending on lighting requirements, the lamp package is available as 4 x 35 W, 49 W or 80 W.







Oversize machines for manufacturing the car parts are arranged on both sides of the way through the press and coil hall.

Not least due to its good transport links, the Northern Black Forest is one of the economically strongest regions of Europe. In the newly developed Hardrain industrial zone, on the periphery of Kuppenheim, GEWA Immobilienmanagement has built a press plant. Daimler AG rents the building as a supplement to the Mercedes-Benz works Gaggenau located eight kilometres away. After a test phase, about 280 employees are to produce body parts for cars and trucks in three-shift operation. Thanks to an optimised method where prefabricated structural elements were delivered right to the construction site, it was possible to build the 40,000-square-metre building within just eleven months. On the narrow east side, towards the parking area, the three-storey administration wing with offices, common rooms and washrooms was placed in front of the production building clad with trapezoid sheet metal and with a rectangular layout. Generous ribbon windows and the application of white and dark grey plaster make

for an interesting façade. All functions are accessed from the main entrance located in the middle. On the ground floor are a kiosk and the measuring room in addition to the offices and the cafeteria with adjacent terrace. On the two upper floors are additional offices, changing and meeting rooms. The production hall behind is divided into two parts with a striking height change. The various functions are arranged in-between the support grid of 16 x 16 metres. In the lower part are 23 isle-like production cells for manufacturing the components. TRILUX continuous line luminaires, running longitudinally through the room along the support grid, ensure sufficient brightness. In the press and coil hall, situated behind this part and with 18 metres twice as high, are the oversize machines for producing car body parts. In both parts of the hall, grey industrial flooring with yellow signage and a ceiling of trapezoid sheet metal with visible installations determine the look.

# DIRECT VIEWS INSIDE

With the new production plant in the Arnsberg industrial area, Rüschenbaum GmbH together with local architects AI Architekten + Ingenieure created a building which responds to the call for sustainability and prudent use of energy. A well-designed lighting concept plays an important role in this.

By Marina Schiemenz

The seven-metre-high production hall is efficiently supplied with light thanks to a combined sensor system depending on daylight and artificial light (right).

The administration wing as well as the ground floor of the hall was designed with generous window areas (bottom).

**Client:**  
Alfons Rüschenbaum GmbH, Arnsberg

**Architect:**  
AI Architekten + Ingenieure, Arnsberg

**Location:**  
Industrial area "Im Ohl", Arnsberg

**Luminaires:**  
Athenik  
Inperla  
Neximo

**Photos:**  
Christoph Meinschäfer, Arnsberg





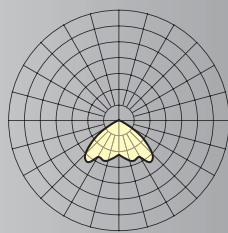


Employees are able to look into the production hall from the lounge on the ground floor which benefits from indirect lighting.

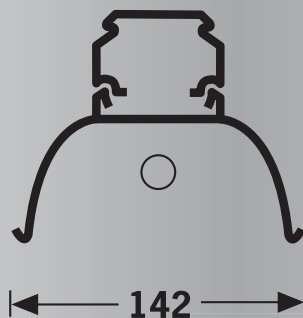
## lux: TECHNOLOGY

### E-Line

Due to its versatility, the modular E-Line T5N system allows for numerous combinations, tailor-made to each individual case. In addition to a gear tray for LED emergency lighting and one for lighting management systems, a support profile as well as further accessories form part of the series. In the new production plant of Rüschenbaum GmbH in Arnsberg, E-Line T5N was installed – a continuous line luminaire with a round reflector with digitally dimmable electronic multi-lamp ballast (DALI). The reflector consists of galvanised steel sheet coated with white polyester resin lacquer. Stainless-steel louvre clips make quick and simple mounting on the gear tray possible without any tools. The E-Line series is particularly suited for use in production halls, workshops or supermarkets.



Luminous intensity distribution



Unobtrusive design: transparent outer casing, luminaire body of die-cast aluminium and adjustable joint form a compact unit.





Neximo suspended luminaires as well as Athenik and Inperly downlights by TRILUX ensure well-balanced general and targeted lighting of the workstations in the open-plan office area of the administration wing.

Founded in 1926 and renamed Alfons Rüschenbaum GmbH in 1949, the Arnberg company has developed into a quality manufacturer of luminaire accessories. With a branch in Arnberg and a second in Dongguan in China, the lighting industry supplier now has a third production plant in the "Im Ohl" industrial park in Arnberg-Neheim. When planning the new plant, special attention was given to sustainability prudent energy use. The new building was designed by the Arnberg architectural office AI Architekten + Ingenieure. In addition to the spacious production hall, it consists of staff lounge for taking breaks, adjacent to the factory hall on the ground floor, and spacious on the upper floor where the production planning, quality control, order entry and purchasing departments are housed. Staff working in these offices are not only able to see the production hall, but also have direct access to it. The seven-metre-high hall is supplied with sufficient daylight through generous window areas and skylights.

The natural daylight is complemented with E-Line continuous line luminaires by TRILUX. A daylight sensor system measures illuminance levels and adjusts the artificial light as needed. Different light zones within the hall allow for individual control and efficient energy use. While, for reasons of cost effectiveness, in the production areas there are still T5 luminaires hanging from the ceiling, the offices and lounge area are equipped with modern LED technology. Together with a heat exchange pump and a solar system on the roof of the building, the lighting concept makes for a positive energy balance. The effectiveness of the heat pump is supplemented by waste heat from the automatic spraying machines for connectors and the compressors of the compressed-air supply in the production plant. The new production plant by Rüschenbaum is thus a successful example of efficient energy use thanks to the intelligent application of the existing technologies.

# THE POWER OF WATER

The new hydropower plant of the Swiss energy company Repower was connected to the grid in May of this year. Built into a mountain, it uses the Taschinasbach flowing down the valley to convert water into electricity. But as simple as the principle of a hydropower plant may be, due to the remote location the construction of the new plant presented quite a challenge.

Von Marina Schiemenz

From the pressure tunnel, the water flows into a pressure line of fibre-glass-reinforced plastic (right). Instead of constructing a building for it, the hydropower plant was built into a mountain (bottom).

**Client:**

Repower AG, CH-Poschiavo

**Planner:**

Marcus Alig, Repower AG, CH-Poschiavo

**Location:**

Kantonsstrasse 75, CH-Seewis-Schmitten

**Luminaires:**

Mirona LED  
E-Line  
Aragon

**Photos:**

Boris Golz, Arnsberg





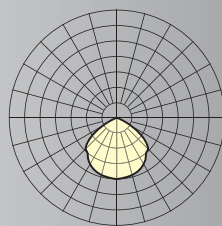


The throttle valve (marked yellow) protects the plant from overflowing in case of a defect in the pressure line.

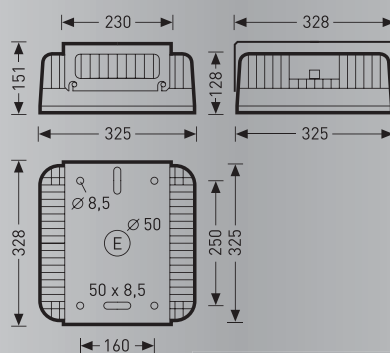
## lux: TECHNOLOGY

### Mirona LED

The highbay reflector luminaire consists of a robust, anthracite-lacquered, dye-cast casing with integrated cooling fins. In the aluminium reflector louvre, 120 high-power LEDs are installed which ensure symmetrical light as well as constant colour stability and colour rendering. The silver surface makes a reflection value of more than 98 per cent possible. The colour temperature of the Mirona LED is 4,000 K for an overall luminous flux of 11,500 lm and a connection performance of 125 W. The luminaire can be installed as a ceiling, wall or suspended luminaire. Integrated dual safety electronics as well as active LED default management guarantee high operation safety. The limited surface temperature of the luminaire makes it safe to use in operating areas with increased risk of fire.



Luminous intensity distribution



The Mirona LED is not only suitable for high halls, warehouses and production plants but also for damp rooms and areas with outdoor weathering.







The concrete supports and foundations in the underground central station were cast in-situ. TRILUX Mirona LED luminaires ensure good illumination.

Constructing power plant is in itself an extraordinary construction task; a hydropower plant in the middle of a mountain, however, is a particular challenge. In November 2008, planning began for such a power plant at the foot of the Schesaplana region in the Vorderprättigau in Switzerland. Just gaining access to the construction site turned out to be the first hurdle. With only a cableway for transport, larger deliveries of material had to be taken to the construction site by helicopter. A tunnel-boring machine created the 3.2-kilometre-long and 3.8-kilometre-wide pressure tunnel, the side tunnels were blasted free. A cladding of shot concrete ensures the required stability. The excavation spoil of approximately 70,000 cubic metres was distributed over a specifically assigned site, which was then greened and landscaped. The new hydropower plant uses the Taschinas stream to generate energy. Its water flows through the pressure tunnel from where it gets into the pressure line, a fibreglass-reinforced plastic pipe in the transition

area and, further down, steel pipe. The transition from pressure tunnel to pressure line is secured by a throttle valve which is open for normal operation. Should, however, a defect be measured in the pressure line, the throttle valve closes immediately to prevent the water from overflowing. From the pressure line, the water flows into the underground power house blasted out of the mountain underneath the Solavers castle ruins, where a turbine drives a generator with approximately 11.5 MW. Altogether, 41 million kWh of electricity can thus be generated annually – enough to supply about 10,000 households. A plastic foil on the ceiling of the underground power house protects against dripping water and prevents damage to the plant. Despite this, the humidity in the tunnels of the power plant is extreme, which is why specific demands were placed on the resistance of the luminaires. In the end, the planners decided in favour of the Mirona LED luminaires by TRILUX because of their robust construction and low maintenance costs.

# FAÇADE WITH LONG-RANGE EFFECT

At its new location in Dübendorf in Switzerland, AMAG, the largest car trader in Switzerland, offers numerous services around cars. The different sections of brand presentation and trade are united by a uniformly designed façade which at night is staged according to a sophisticated lighting concept.

By Christine Schröder

The façade of AMAG Retail  
Autowelt Zurich by day (below)  
and by night (right).

**Client:**  
AMAG Automobil- und Motoren AG, CH-Dübendorf

**Architect:**  
Fischer Architekten AG, CH-Zurich

**Engineer:**  
Thomas Lüem Partner AG, CH-Dietikon

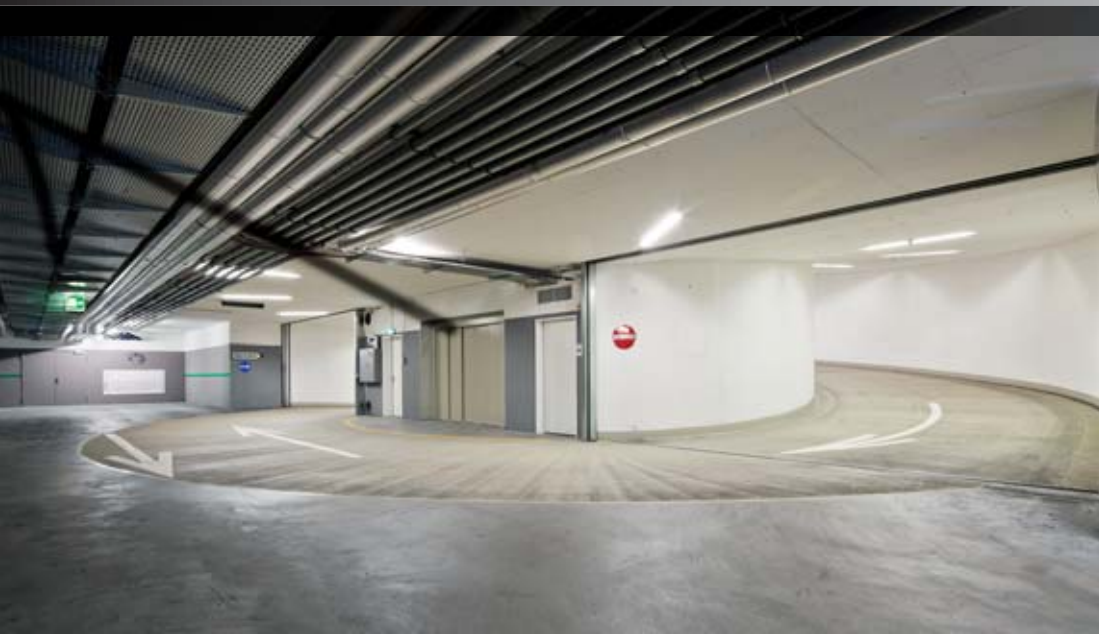
**Location:**  
Giessenstrasse 4, CH-Dübendorf

**Luminaire:**  
E-Line  
Ridos  
Offset  
Neximo  
Luceo

**Photos:**  
Boris Golz, Arnsberg





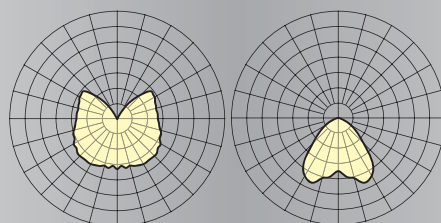


Two spiral ramps make the vertical allocation of the vehicles possible.

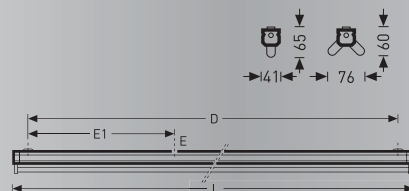
## lux: TECHNOLOGY

### Ridos

The white, 40-millimetre-wide luminaire body of the batten consists of steel metal, the head of polycarbonate. The integrated multi-lamp technology makes it possible to operate T5 lamps with different performance levels (35 W, 49 W or 80 W). The dimmable, electronic multi-lamp ballast has a 1-10 V interface. Ridos is mainly used in production plants, workshops and in assembly and storage halls. The version without reflector, however, is particularly suitable for areas which are not primarily classified as work places, such as for instance, depots, rooms for building technology as well as secondary room without permanently occupied workstations. The luminaire is directly mounted on solid, low-vibration ceilings.



Luminous intensity distribution



Wherever it makes sense, even in the era of LEDs the T5 luminaires are still used – for example the Ridos by TRILUX.





Continuous-line luminaires suspended from the ceiling illuminate the modern repair areas.

In April this year, AMAG Retail Autowelt Zurich opened in Dübendorf in Switzerland as the largest vehicle service centre in the country. In addition to presenting the brands of Volkswagen, Škoda, Audi, SEAT and VW commercial vehicles, on an area of 25,000 square metres, AMAG (Automobil- und Motoren AG) offers numerous services around cars. The long building is part of a major new structure planned on Überlandstrasse. With a length of 200 metres, the building also acts as a noise barrier for the residential buildings situated behind it. From the ground floor, a showroom extends over two levels. On the four storeys above are offices, a canteen, a training centre for 200 apprentices as well as workshops such as a body shop, a paint shop and a spare-parts depot. The workshop, equipped throughout with E-Line luminaires, serves both brand customers and other motorists. Two spiral ramps provide vehicle access to the workshops on the different

levels – just as in a large multi-storey car park. Cars dominate the spacious work areas, which, of course, feature all the latest technology. For the showroom façade, a transparent mullion-transom system was chosen, while semi-translucent cladding was used to screen the upper floors. This visually unifies the building's numerous functions with their range of different window shapes and sizes. Vertically mounted aluminium louvres provide glare protection while also directing daylight deep into the workspaces. Small LED lights are arranged in random patterns throughout the façade and light up in AMAG colours at night, emphasising the bold façade design. The lighting concept was developed by Zurich-based architects FischerArchitekten AG in collaboration with lighting designers mosersidler AG. The specialists at TRILUX AG took care of the technical implementation with 170 bespoke LED lights, custom-made especially for the purpose.

# MATERIALS: AMORTISATION TEST

Many lighting systems are completely out dated and should be upgraded with modern (LED) technology. However, many operators shy away from the often high acquisition costs. That refitting is still worthwhile was shown by TRILUX with a test where old high-pressure mercury vapour lamps (HQL) were exchanged for the innovative TRILUX Mirona LED luminaire.

The Mirona LED proved in the practical test what it can achieve.

In a production hall, the old HQL system was replaced with modern LED luminaires which, in the long run, not only save energy but also costs.



Photos: TRILUX

With its resistant construction and compact structural shape as well as durable high-performance LEDs, perfectly matched thermal management and intelligent sensors, the Mirona LED is particularly suited for areas requiring robust, flexible and maintenance-free lighting. Do these advantages, however, justify the higher acquisition costs of LED luminaires? With a test, TRILUX pursued this matter by comparing an old HQL with a modernised system. A total of 45 luminaires were in operation around the clock for a whole year. It became clear that the acquisition costs of more than 30,000 euros for the LED version would amortise after approximately 2.8 years. In addition, it was possible to reduce energy consumption by about 68 per cent thanks to the modernised system – in the actual test this meant 111,378 kWh. At energy costs of 0.08 euros per kWh, 9,578.48 euros could thus be saved per year. After five years, thanks to the accrued savings, a profit of 25,204.81 euros could even be achieved. The test proves: modernising pays off!

# PLANNERS ASK, 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.

## Is it possible to compare the luminous flux of traditional illuminants with that of LEDs directly?



**Thomas Kretzer**  
Managing director  
TRILUX Vertrieb GmbH

Although with the Raptor high bay downlight (photo below), the luminous flux is slightly higher than with the MIRONA LED (photo on left page), thanks to LEDs an almost identical illuminance can be achieved.

When comparing the technical characteristics of LED luminaires with those equipped with traditional illuminants, frequently the luminous flux is also taken into consideration. Nominally alone, a strong imbalance appears to exist between our Raptor high bay downlight with 250 W (19,000 lm) metal halide lamps and the MIRONA (12,000 lm) LED high bay downlight. The reason is that, in LED luminaires, the luminous flux is always indicated as the effective net value, while for traditional illuminants, the indicated efficiency of the luminaire (in this case 75 per cent) has to be considered – the actual luminous flux would then be 14,250 lm for the discharge lamp. Calculations based on light technology showed that the LED high bay downlight – despite the lower luminous flux – is able to achieve identical illuminance compared with spotlights with the metal halide lamp thanks to the more precise light control. We therefore recommend always performing an object-specific comparative calculation because only then will the resulting illuminance make real comparison possible.



Photo: TRILUX

# COMPETENCE CENTRE STUTTGART

With its new TRILUX Competence Centre in the Leinfelden-Echterdingen industrial park, the luminaire manufacturer has created a new, efficient contact point for architects and planners. Because Stuttgart is a strong economic region, the Competence Centre focuses on industry and has reserved a whole room for industrial luminaires in use.

Initially, there was just a TRILUX commercial agency in the Stuttgart city district Fasanenhof. Later, TRILUX marketing moved into the premises and, in 2007, into a 100-square-metre office in Leinfelden-Echterdingen. Until that time, the Stuttgart office was still part of the Mannheim location which, however, did not meet the requirements of the metropolitan region. That was why, in 2010, TRILUX decided to build its own competence centre in the Stuttgart economic region. Günter Fertl, director of the Competence Centre, and his team are now able to introduce customers to the vast variety of lighting options and demonstrate the products' features at the same time. In April 2011, the new TRILUX Competence Centre opened: 580 square metres dedicated to industrial lighting. In addition to offices for desk and field sales staff, a training and seminar room, lounge and tea kitchen, the centre

also accommodates the TRILUX subsidiary Oktalite, which focuses on lighting for retail spaces. A special feature of the Stuttgart Competence Centre will be the "industry room", showing the different TRILUX industrial luminaires in use. But the Competence Centre is not just a showroom for TRILUX luminaires. It also offers customer support and advice on specific projects. From designs for a new building to upgrading of existing installations, the TRILUX experts can calculate energy consumption, analyse the results and propose optimisations with a view to achieving the best possible energy balance and quick amortisation of the lighting system. For unusual or bespoke projects too, the TRILUX experts are at hand to work out the best solution together with the client or lighting designer. The Stuttgart Competence Centre offers complete support from initial idea to delivery of the luminaires.





Together with his team, Günter Fertl, head of the Stuttgart Competence Centre, offers advice and assistance to customers.



Photos: David Franek, Ostfildern

Throughout the Competence Centre, visitors are able to see the TRILUX luminaires in use. Power strips on the ceiling make it easy to exchange the luminaires.

The training room is available for seminars and lectures to pass on lighting expertise to staff and customers alike.



In front of the hospital, five large bronze sculptures symbolise innocent enjoyment of life. The 19 umbrellas in the staircase continue the concept inside.



Photos: Placzek Studios, Inc. / Thomas Grady



## COLOURFUL JOIE DE VIVRE

Flying away with the help of an umbrella and being carefree is what artist Matthew Placzek wishes for the young patients at the Children's Hospital in Omaha. With his colourful "Imagine" sculpture, he wants to take the children's minds off their fears.

By Patricia Sahm

With the installation "Imagine", the American Matthew Placzek has created a luminous work of art, to bring colour into the everyday hospital life of the young patients. Five oversize sculptures of children, cast in bronze by the artist himself in his studio, appear to be happily playing on the lawn in front of the building. The theme is then continued inside with 19 multi-coloured luminous umbrellas arranged throughout the glass-fronted stairwell of the children's clinic. For the artist, the brightly coloured umbrellas not only symbolise the hope and innocence of youth, but also the chance to fly away from worries and fears. 3,500 integrated LEDs light up the copper- and silver-coloured umbrellas in a multitude of different colours. A stainless-steel construction more than 25 metres high, supports the load of the umbrellas while hiding the technology necessary for the shimmering display of colours. As a result, the umbrellas made of aluminium and polycarbonate appear to fly despite their weight of more than 65 kilogrammes each.

[www.matthewplaczek.com](http://www.matthewplaczek.com)

The light installation took over the whole building.

The focus of habitando was the main room of the house, which had been destroyed by fire and decay, where the transformed furniture was exhibited.



Photos: Tania Vegazo



## TEMPUS FUGIT

With habitando, for one night, Spanish lighting designer Luisa Alvarez turned an abandoned house into a vibrant microcosm, which demonstrated that decay in the end always also contains the joy in what is present.

By Stefan Staehle

The artist juxtaposes the darkness of the abandoned house with multi-coloured light objects distributed all over the building. The objects are back-lit negatives which, thanks to the changing light of countless LED tubes are turned into live scenes visible on the walls of the building. The interplay of the phenomenon of time, the loss on the one hand and the pleasure of the moment on the other, becomes manifest here. The temporary character of the whole intervention was intensified by the fact that the artists entered the building for the first time on the day the presentation took place. Thus the artists' reaction was also the result of the time they did not have. Time therefore plays an important role on three different levels: it determines the state of the house, limits the duration of the installation and hastens the work of the artists. This overlapping makes clear that seemingly opposite events interact and are important for a positive experience. Luisa Alvarez plans to also present habitando at the coming Luminale in Frankfurt/Rhein-Main.

[www.random-international.com](http://www.random-international.com)



Photo: Atsushi Takahashi



Photo: 24°studio

Depending on the humidity, the paper leaves roll up or unfold reminiscent of leaves in the wind.

The hope tree consists of a back-lit paper structure creating a play of light with profound contents.

## UPCYCLING

With hope tree, the Japanese design practice 24°studio focuses on the tension between claim and reality of the current debate on sustainability. The tree stands for the studio's responsible interaction with nature.

By Stefan Staehle

In the global flow of goods, containers ensure the intactness of their cargo. This also applied to the ISO container providing the space for Fumio Hirakawa's and Marina Topunova's "hope tree" during the Tokyo Design Week 2010. The artists transformed the sense of being under a tree into a structure which grew out of the centre of the container and enclosed its interior. Modelled on the natural features of a tree, the leaves of the hope tree consisted of a uniform structure of perforated paper sheets – symbolising of the transformation of natural resources into products of daily use. The leaves gave the installation its poetic character. Once a visitor entered the container, the humidity of the interior increased and as a result the drop-shaped paper cut-outs started to deform. Together with the LEDs installed behind, they created an effect reminiscent of the play sun-lit leaves – a convincing way of reflecting on how to deal responsibly with nature. [www.24d-studio.com](http://www.24d-studio.com)

LED and fibre optic illumination let the Gothic arches of the monastery shine in a magical light.

Approximately 15,000 water-filled PET bottles formed the basic structure for the towers of light arranged like a labyrinth in the passageways of Salisbury Cathedral.



Photos: Mark Pickthall

## DANCING WATER

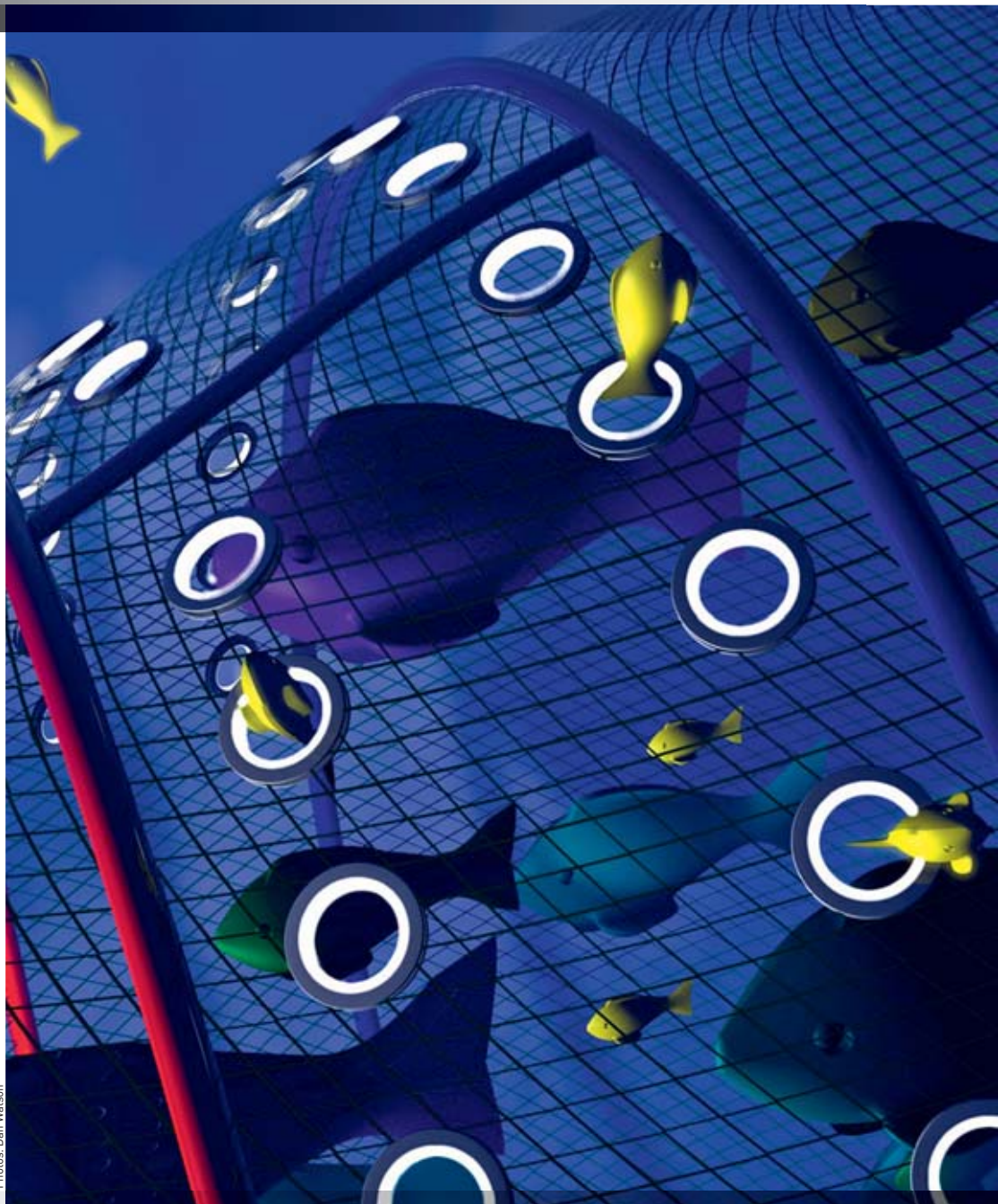
The illuminated Water Towers by British light artist Bruce Munro almost had a mystical effect in the cloisters of Salisbury Cathedral in the south of England. An experience for the senses.

By Patricia Sahn

In his book "Gifts of Unknown Things", Lyall Watson tells the story of an Indonesian girl able to see colours when hearing melodies. Inspired by this story, Bruce Munro created his installation "Water Towers" shown in Salisbury Cathedral earlier this year: 69 man-sized towers, each consisting of 216 water-filled bottles, were back-lit in colour creating a colourful labyrinth in the cathedral's majestic cloisters. Depending on the music being played, the towers changed their colour whereby each tower reacted to the sounds differently. Thus a colourful dance of light and music resulted. Seen from afar, the luminous towers behind the Gothic stone arches were reminiscent of stained-glass church windows. For this impressive installation, a total of 69,000 metres of fibre-optic cable was connected to 69 LED projectors with one each installed inside the towers. Thus it was possible to individually control the colours and to have visitors enjoy an unforgettable experience. [www.water-towers.co.uk](http://www.water-towers.co.uk)



Photos: Dan Watson



## ESCAPE ROUTES

By Dagmar Jung

English designer Dan Watson not only develops sustainable products but also cares about the future of the oceans and their endangered inhabitants. Seven million tons of juvenile fishes are thrown back dead as by-catch into the sea every year. To put an end to these senseless activities, Watson developed his The SafetyNet. The idea seems to be as simple as it is brilliant: round openings in the form of illuminated plastic rings are integrated into the trawl nets and make it possible for baby fish to escape. In line with their species-specific behaviour, young haddock and whiting can get away at the upper end of the net, while small cod can escape through extra-large meshes at the bottom end of the nets. Watson is currently working on making the integration of these "loop-holes" even cheaper. The fish will thank him!

[www.dan-watson.co.uk](http://www.dan-watson.co.uk)

# LASER

In 2010, the laser celebrated its 50th birthday, although today it is hardly possible to imagine our everyday life without it. All the same, when hearing the word "laser" most people have the warning in mind that it can damage the eyes. In fact, a laser is an extremely versatile tool and even able to repair a detaching retina or serve as a precise scalpel for operations. In many other fields as well, lasers enormously facilitate our work: they join massive body parts in car production and fuse life-saving airbags. They drill holes into tiny, crystalline watch jewels but also into the elastic rubber teats on baby bottles. They make it possible to play CDs or DVDs and are used for the unpopular police speed cameras. And all this thanks to a highly focused beam of light. But what exactly is behind the laser?

The word itself is an acronym for "Light Amplification by Stimulated Emission of Radiation". A laser essentially consists of an external source of energy, a "gain medium" such as a crystal, a gas or a liquid and of a resonator. When energy is

supplied to the laser, it is possible to bring the electrons up to a higher energetic level, the so-called "excited state". But because electrons always strive towards the lower energy level, they quickly return to their original state and thereby release energy. This happens in the form of electro-magnetic radiation whereby photons light particles are released ("spontaneous emission"). The photons spread in the gain medium inside the resonator, i.e. between two plane or curved mirrors. Here they encounter a large number of electrons in an excited state and absorb them. This releases a premature discharge and two photons are released ("induced or stimulated emission"). Because the emitted photons have wavelength and the same phase and permanently bounce back and forth between the mirrors, the bundled light in the medium is continuously being amplified. When they escape through one of the mirrors, a laser beam is produced.

Albert Einstein described the stimulated emission as the reversal of absorption as early as in 1916. Twelve



Photo: © 2004 David Monniaux

years later, Rudolf Ladenburg succeeded in proving this in an experiment. But it was not until 16th May 1960 that Theodore Maiman was able to produce a functioning ruby laser. Following the gas laser, the dye laser and the ultra-short pulse laser, it became possible, in the late 1980s, to produce ever more durable, highly effective semiconductor laser diodes with the help of semiconductor technology. To this day, the operation of the laser is being further improved and its versatility makes it an important tool in industry, science, communication and entertainment electronics.

With a laser used for demonstration, the glow of the gas discharge in the middle as well as the escaping laser beam can be seen as a red dot on a white screen.

As a speed measurement device or a supermarket scanner, in dental treatments or in industry – the laser can be found almost everywhere in our daily life.



Photos: Fotolia (1), iStockphoto (2,3,4)

# IMPRINT

## Issued by:

TRILUX GmbH + Co. KG  
Heidestraße  
D-59759 Arnsberg  
www.trilux.eu

## Editorial Staff:

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## Publisher:

Gesellschaft für Knowhow-Transfer  
in Architektur und Bauwesen mbH  
Fasanenweg 18  
D-70771 Leinfelden-Echterdingen  
www.ait-online.de  
www.gkt-publishing.de

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Printed in Germany

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