Neues Museum, Berlin
An exchange of glances bridging three millennia. The Egyptian Queen Nefertiti looks surprisingly up-to-date and modern beneath her new lighting. The ancient bust has returned to the long-neglected but now intricately restored building on Berlin’s Museum Island.

For researching and preserving, presenting and scenically displaying, museums are the cultural archive of humanity. Inside, light serves as an indispensable medium for interpreting both architecture and exhibits alike.
Nefertiti has found her place. After an extensive renovation by architect David Chipperfield involving a good ten-year planning and construction period, the Neues Museum in Berlin has now reopened its doors. During this period, the lighting design was under the supervision of Gabriele von Kardorff from Kardoff Ingenieure in Berlin. The result is a highly modern museum of great clarity that also takes its own past and transforms it into an architectural experience. For Berlin and Berlin’s Museum Island, this museum is a cultural enrichment and, after over 3,000 years, it is certainly an appropriate place for Nefertiti.

Over 40 years of experience in ceiling-integrated lighting have been channelled into our new recessed luminaire product range, Quintessence. This is the first downlight series to be designed throughout to meet the criteria of efficient visual comfort. Central to the product range are efficient, future-proof light sources, as can be seen just by the high number of 350 Quintessence articles fitted with LEDs. Spherical lenses and collimating lenses provide the requisite lighting technology, while opto-electronics, taking a holistic approach to lens system, electronics and information technology, creates the innovative environment for being at the cutting edge of LED-based products. In addition, Quintessence’s Light System DALI connectivity allows the power potential of this product range to be fully exploited in lighting installations.

LED technology is also gaining ground in situations were high demands are placed on the quality of lighting design, such as in museums. An impressive example of this can be found on page 24 in the form of the Museum Kunst Palast art gallery in Düsseldorf, where, for conversational and energy-saving reasons, a graphics exhibition was illuminated with Optec LED spotlights. Here, the advantages of dimmability, long service life and high energy-efficiency, combined with UV-free and IR-free light are well received by conservatists.

Tadao Ando has transformed Venice’s former port customs office into a museum for contemporary art, where the art collection of François Pinault can be seen. From the outside, you can hardly tell the building has been renovated, but from the inside the building is replete with the familiar minimalist precision of Tadao Ando and as such, it provides a spacious frame for the collection. With the uniformly floodlit bare concrete surfaces and the brick walls of the original building, it provides prime example of vertical illumination. Combined with a DALI control and the intelligent incorporation of daylight, the result is a highly energy-efficient building concept.

LEDs will also be central to our innovations presented at the Light+Building trade fair in Frankfurt – you can find us at stand A11 in Hall 3.0. We look forward to seeing you there!

### Light & Technology

#### 16 Quintessence
Quintessence recessed luminaires

#### 18 Quintessence recessed luminaires
for vertical illumination

#### 20 Quintessence recessed luminaires
with LEDs

#### 22 Focus
White LEDs: producing light

#### 23 Double focus
White LEDs and RGBW colour mixing in practice

---

### Projects

#### 24 Efficient visual comfort in the museum
Exhibiting and conveying – collecting, preserving and studying: lighting concepts with efficient visual comfort sustainably and economically support the tasks of museums.

#### 26 Punta della Dogana, Venice
Tadao Ando has transformed Venice’s old customs building into a museum for contemporary art, making it fit for the future thanks to sustainable lighting technology.

#### 30 Royal Belgian Institute of Natural Sciences, Brussels
The recently renovated Belgian Institute of Natural Sciences offers visitors, small and large, not only dinosaurs, but also contemporary discoveries and insights, all presented in stunning detail.

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### Background

#### 12 Punta della Dogana Centre for Contemporary Art
A design approach for lighting cultural buildings

A report by Cinzia Ferrara and Pietro Fasaldu, Milan

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### Introduction

1 About this issue

2 Keylights

4 Bright prospects

---

### Report

6 Monumentally consistent: the Neues Museum, Berlin

After lying in ruins for decades, the Neues Museum has now reopened its doors. During this period, the lighting design was under the supervision of Gabriele von Kardorff from Kardoff Ingenieure in Berlin. The result is a highly modern museum of great clarity that also takes its own past and transforms it into an architectural experience. For Berlin and Berlin’s Museum Island, this museum is a cultural enrichment and, after over 3,000 years, it is certainly an appropriate place for Nefertiti.

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Keylights

Hagen  
Emil Schumacher (1912–1999), pioneer of abstract painting in Germany, has been given his own museum. Situated in the direct neighbourhood of the Karl Ernst Osthaus Museum, the new building accommodates, over three levels, the extensive collection and special exhibitions.

Museum of Contemporary Art, Hagen  
Architect: Lindemann Architekten, Mannheim  
Lighting design: Licht Kunst Licht, Bonn/Berlin  
www.eche.de

Essen  
To mark the beginning of “RUHR.2010”, Essen’s year as the European Capital of Culture, the Ruhr Museum was opened in the Zollverein Colliery World Heritage Site – a must visit for friends of industrial culture.

Ruhr Museum, Essen  
Architect: OMA, Rem Koolhaas, Rotterdam; Boll & Kohl, Essen  
Lighting design: Licht Kunst Licht, Bonn/Berlin  
Exhibition design: HÖ Merz, Stuttgart  
www.ruhrmuseum.de

Madrid  
On its campus-like headquarters in Boadilla del Monte near Madrid, Spain’s largest bank maintains an art gallery dedicated to the extensive collection of the bank’s own cultural foundation. Vertical illumination with Optec wallwashers brings out the best of the exhibits such as the splendid tapestries from the 17th century.

Fundación Banco Santander  
Architectures and lighting design: Kevin Roche John Dinkeloo and Associates, Danville  
Exhibition design: Jordi Arinés, Madrid  
www.fundacionbancosantander.com

Piacenza  
The old abattoir with its attractive industrial architecture and natural history collection now accommodates the university of this Italian provincial capital. In addition to spotlight track systems, Pancoop ceiling washlights provide indirect ambient lighting.

Museo di Storia Naturale, Piacenza  
www.piacentamusei.it

Zurich  
Definitely not conservative! The national museum’s permanent exhibition was given a radical makeover in the course of the renovation work, which also included Optec spotlights on Hi-trac track systems.

National Museum, Zurich  
Architect: Christ & Gantenbein, Zurich  
Exhibition design and scenography: Holzer Kobler Architekturen, Zurich  
Lighting design: d’lite, Zurich  
www.nationalmuseum.ch

Essen  
For his extraordinary collection of contemporary art, factory owner Dr. Friedrich E. Rentschler has set up his own gallery in an industrial loft. The high-quality technical furnishings and fittings include Cantax spotlights mounted on Hi-trac track systems, conveniently controlled by Light System DALI.

ERCO Lighting Tools scenically illuminates the exhibits in the outdoor and indoor areas.

Fundación Francisco Godia, Barcelona  
Architect and lighting design: Jordi Arinés, Barcelona  
www.fundaciongodia.org

Barcelona  
The Casa Garriga Nougues, a city palace in the Barcelona district of Example, was built by Catalan architect Enric Sagnier between 1899 and 1906. It has recently become home to the Fundació Francesc Godia. This foundation administers the estate of Francesc Godia (1921–1980), an enigmatic entrepreneur who enjoyed success both as a racing driver and as an art collector with exquisite taste. The newly designed gallery presents Godia’s collection and offers an attractive setting for touring exhibitions or events. Cantax spotlights mounted on Hi-trac provide flexible lighting. The terrace in the inner courtyard, featuring a walk-around sculpture by artist Cristina Iglesias, is illuminated by Kuhls floor washlights.

Beijing  
The art museum of the China Central Academy of Fine Art (abbreviated as CAAF) has developed in the study gallery of the CAAF art academy, which was founded back in 1958. Its extensive collection not only contains historical and current works of Chinese artists, but also includes European paintings. For permanent and special exhibitions, Japanese architect Arata Isozaki has now created a new building with 4,150m² of exhibition area. The building’s overall sculptured shape is clad with grey natural stone on the outside, while inside visitors are presented with new spatial experiences and perspectives at every turn. To suit the usage, the diffuse lighting through luminous ceiling elements can be combined as necessary with accentuating lighting from track-mounted Stella, Optec and Pancan spotlights.

CASA Art Museum, Beijing  
Architect: Arata Isozaki & Associates, Tokyo  
Lighting design: Fisher Marantz Stone Partners, New York  
www.cafamuseum.org

Granada  
Known as an abstract expressionist painter, José Guerrero (1914–1991) has now been honoured by his native city of Granada with a centre for contemporary art dedicated to him. The centre’s clear, modern architectural make an attractive contrast to the surrounding old town with its Moorish influences. The lighting concept is based on the use of vertical illumination.

Centro José Guerrero, Granada  
Architectures and lighting design: Antonio Jiménez Teruelas, Granada  
www.centroguerro.org

Hamburg  
The conversion of the Zollmuseum in Hamburg’s dockslands has put the German Customs Authority back on the map. The history of the German customs is now presented in a modern setting with over 1,000 exhibits, graphic artworks and items of media. The flexible lighting system is from ERCO, incorporating Hi-trac track systems with Quinta and Pollux spotlights.

Costumes Zollmuseum, Hamburg  
Exhibition design and lighting design: Triad, Berlin  
www.zoll.de

Rome  
The “Palazzo Massimo alle Terme” is part of the “Museo Nazionale Romano.” One of the many exhibits presented in the ground floor’s Augustus Hall is the ancient Altar of Ciusa, semi-illuminated by a clever contrast of the warm-white accent light of Pancan spotlights and cool indirect lighting.

Palazzo Massimo, Rome  
Lighting design: Francesco Stanis, Castello Gandolfo (Rome)
Bright prospects

Church of San Giovanni Evangelista, Parma
Dome fresco: "Visione di San Giovanni" by Correggio, circa 1520
Lighting Design: Francesca Storaro, Castel Gandolfo (Rome)
Photographer: Thomas Mayer, Neuss
When the Berlin Wall fell a good 20 years ago, the Neues Museum, built by Friedrich August Stüler between 1841 and 1855, seemed like a lost cause. Bombed and burned out, the magnificent building had been in ruins since the end of the war, standing as a darkly beautiful memorial. For many years, both the will and the means were lacking in the then GDR to restore it. Grass and trees sprung up in the ravaged Staircase Hall. It was only in 1985 when safety work was undertaken on the foundations that the groundwork was laid for restoration. This job was put out to tender in 1993/94 and the British architect David Chipperfield submitted his bid to transform the ruin into a modern, functional museum, promising to take the greatest care in working with the original fabric of the building. Having been awarded the contract in 1997, Chipperfield, working with the preservation expert Julian Harrap, kept his promise with unparalleled consistency, simultaneously creating an intellectual challenge for all those who think that preservation primarily means retaining a cosy ambience and any bull’s-eye glasswork.

The museum mainly focuses on prehistory, early history and ancient Egypt. In this spirit, Chipperfield practised architectural archaeology. A painstaking inventory and preservation of the existing building took up a large portion of the ten-year planning and construction period. Chipperfield integrated the preserved fragments of Stüler’s technical and highly complex architectural design into a framework of structural enhancements which exude an almost Prussian austerity. Instead of speculating on achieving the maximum contrast between old and new, Copperfield preferred to develop Stüler’s concepts further in an abstract manner. The result is a structure that does not deny its history but presents it demonstratively, a building that is not afraid of complexity, but makes it tangible to our senses.

Many superb specialist designers accompanied this mammoth project over the years, including lighting designer Gabriele von Kardorff from Kardorff Ingenieure in Berlin (interview on pages 10–11). On concluding the commission, despite the enormously elaborate process involved, Chipperfield succeeded in undercutting the forecast construction costs by several million euros, assisting the financing of further projects on Museum Island.
An interview with the lighting designer of the Neues Museum, Gabriele von Kardorff, speaking to Martin Krautter, editor-in-chief of Lichtbericht.

Martin Krautter (MK): Ms. von Kardorff, the Neues Museum in Berlin is an architectural and lighting project of extraordinary magnitude and impact, but the designers also needed a great deal of stamina. How long did you spend on this project overall?

Gabriele von Kardorff (GvK): Ten years – going through all the project phases to lighting the exhibits on the day before the official opening.

MK: What was actually known about the museum’s original lighting, and what role did it play in your design?

GvK: In the mid-19th century August Stüler designed the building for daytime use, in other words, with large windows and additional light coming from inner courtyards. So for us, the particular challenge lay in developing a concept for a historic building that originally had no artificial lighting. We therefore started our lighting design with an intensive analysis of the quality of daylight in the building. On the basis of our 3D model, we then also produced a simulation film which moved through the museum and allowed us to see exactly where the sunlight entered the building at any given time of the day or year.

We decided to preserve the basic concept of using daylight. Naturally, it is easier and easier to exclude all effects of natural light on the exhibits and only permit fixed, controllable lighting conditions. However, this would have been out of keeping with the building itself. We were also of the opinion that the exhibits in the three collections would benefit from a changing atmosphere of light. We also wanted to demonstrate that daylight and artificial light can be wonderfully combined in a museum. However, this could only succeed if, during every phase of the project, the artificial lighting design took the daylight aspects into account and vice versa. We therefore also needed a smart solar protection and anti-glare concept. This would allow adequate daylight and views looking outside, while ensuring that the exhibits were still protected and the artificial lighting components could still define the contours and accents.

The route through the building now offers a variety of naturally lit museum rooms atmospheres. Artificial light is also a major element of the building’s lighting, used for optimally preventing the exhibits and allowing the building to be used independently of daylight.

We started working on our lighting concept in 2000 without any real idea of how the rooms would look once they were completed. Many parts of the building were still in ruins. The difference in surfaces, the coexistence of historic and new elements and the future solar protection and anti-glare protection in front of the windows would lend the building a new character.

MK: The Neues Museum represents an extremely consistent approach to dealing with historic fabric. What effect did the preservation objectives have on your design work?

GvK: The artificial lighting concept required very careful and customised detailed solutions, drawn up in conjunction with the architect. No one historic room is like another. The preserved and restored elements were largely taboo for installations, so that many compromises had to be sought with regard to the positioning of modern luminaires and lighting effects. Because of the great spatial diversity and the restrictions imposed by the preservation order, more than one hundred individual lamp types had to be developed, all of which, however, still formed part of an overall concept.

MK: The monumental Staircase Hall is surely a key room for the entire museum. What criteria did you apply here for the various lighting elements and, in particular, for the vertical lighting of the wall surfaces?

GvK: The 6-metre-high windows at both ends provide the Staircase Hall with intensive daylight. This impressive room, which now contains a new staircase designed by David Chipperfield, has a highly representative character. At the same time, it displays the Sawyer’s red, laying its wounds bare in the retained historic brick walls. Because the Staircase Hall is shown to best effect in daylight, we therefore saw the task of the artificial light as being to enhance the daylight. All the artificial light comes from the 25-metre-high roof construction. There are no wall installations. We wanted to bathe the staircase and the walls in a uniform light, without shadows or beams of light. As a daylight enhancer, this solution has the most natural effect and underlines the room’s spacious dimensions. To match this solution, we chose metal halide lamps with neutral white light.

MK: What were your guiding principles in lighting the various galleries and what lighting elements did you use?

GvK: All the exhibition rooms contain the two elements of object lighting and general lighting. Security and guard lights are also an integral part of the general lighting, enabling us to dispense with additional luminaires. Since the luminaires serve a technical and functional purpose, their design is kept deliberately discreet. The special luminaires in the historic rooms for example, have a clear, box-shaped form in bronze. In all the new ceilings the luminaires are integrated into the precast ceiling slabs. In many cases technical equipment such as a loudspeaker is also built into the housing slabs for the luminaires. The exhibits, ranging from large sculptures to the tiniest gold objects, are mainly lit by ambient lighting with hardly any additional lighting from the showcase spotlights. The result is a generous lighting atmosphere that blends in harmoniously with the changing daylight conditions.

MK: The star of the museum is, without doubt, Nefertiti. How did you approach this lighting challenge, and how would you describe the result?

GvK: Nefertiti is indeed the crowning glory of the Egyptian collection. First we had to establish how sensitively her beauty reacted to light. Fortunately, we were able to study the bust close up over an extensive period of time in several different locations and we also benefited from the experience of the then museum director, Professor Wildung. We discovered for example, that we could influence Nefertiti’s age through the direction and intensity of light alone. In previous locations she had been placed in a flat light, thus appearing more youthful. Today, the deeper lighting shows that she is a mature woman whose wrinkles and life experience are clearly visible, with a lively gaze that only becomes apparent when the reflection in her pupils is lit.

MK: Against the background of cultural protection considerations, what role did energy saving play? How did you make allowance for it?

GvK: If you consider that our planning started 10 years ago, our maximum energy consumption of 20W/m² for operating the museum is very good. We mainly achieved this through the consistent optimisation of the lamps used. As such, the ambient lighting is almost entirely produced by energy efficient metal halide and fluorescent lamps. In the Staircase Hall and the two great courtyards, energy consumption is 100W/m². All the lamps are in the best energy class for their type. The intensive use of natural daylight also contributes to a more efficient use of energy. Luckily, many of the exhibits are not sensitive to daylight. Where

The Neues Museum is an internationally active firm with outstanding references in all areas of artificial and daylight lighting design. “First understand, then illuminate” is the firm’s guiding philosophy, leading to an intensive engagement with the environment, the architecture and the respective use. Founded in 1987, Kardorff Ingenieure Lichtplanung is run by Gabriele and Volker von Kardorff. These experienced teams is made up of 16 architects and engineers from a variety of disciplines and from eight different countries. The firm is represented in Berlin, Dubai and Jeddah. www.kardorff.de
The project to convert the old warehouses of Venice’s customs building into the largest exhibition centre of the Pnall collection was initiated in 2005 with the restoration of the Palazzo Grassi. This relationship has made it possible to develop a particularly effective approach to defining and attaining project objectives within the shortest of timesframes. This has been achieved as standard practice, the Ferrara Palladino e Associati design studio for all work on cultural buildings. The method is based on a long, introductory dialogue between the main players of any given project, i.e., the architect, the artist and the building owner.

Harmony with the architect’s ideas is reached when the complex yet equally fundamentally important investigations have overcome the technical obstacles and a clear idea is obtained of how the light will fit in with the architecture and be integrated into the entire building technology. The lighting designer must always be able to position lighting both on the technical issues and as an advisor on moods and impressions. The aim is that of harmonising the building’s character with the contents of the exhibitions. It is thus essential to create a neutral container with subdued hues. “White box” concept that tends to homogenise the content of the exhibitions and project the artworks from the mounting location point of view and from the perspective of the different light distributions of the luminaries. As already mentioned, the concept for the artificial lighting is based on natural light with its two main constituent components: sunlight (direct and targeted) and normal daylight (softer and diffused). By varying the ratio of the two components direct and diffuse, an infinite number of graduations in the mood can be created. These may range from dramatic with highlights on the artworks to a wide, spacious impression using soft light for the entire ambience, all conveniently controlled with electronic lighting management.

Digital lighting control is a subject particularly close to the building owner’s heart, especially since he is also responsible for the management of the exhibition galleries. Because, apart from offering flexibility for the lighting installation and a simpler power supply, digitalisation also makes it possible to integrate technical systems. The scope of the project often goes beyond pure lighting technology and includes, in addition to the lighting tools but increasingly also involves electronics, video surveillance or smoke detectors. The new technologies offer numerous advantages from the building management perspective. This primarily includes greater security and control of the galleries, energy saving by opting to integrate natural light, constant monitoring of the installation with possible effects for the maintenance work or, quite simply, shorter dismantling and set-up times between exhibitions.

In the Punta della Dogana, the long preparatory phase between the architect, building sponsor, curator, and lighting designer has allowed the on-site implementation to be tackled within a very short timeframe, with decisions having already been taken collectively.

Energy is even saved in the museum. The selection-making phase when the technical engineers and the curators responsible for the Pnall collection jointly set the objectives for the exhibition centre for the technical equipment of a museum. This led to the proposal to use metal halide lamps with good colour rendition and a colour temperature of about 4,200K throughout the entire exhibition area. These can augment the colour of natural light for a large part of the day. It is interesting to note that during the product sampling in an appropriately equipped test gallery, the building owner and the entire design team were virtually unanimous in tending towards the new light sources. This resulted in considerably lower energy consumption than is usual for museums. For illuminances of up to 300lx, a connected load of 25W/m² can be taken as the norm, but at the inaugural exhibition the load never exceeded 10 W/m². The entire exhibition area measured 3,000 square metres. Another factor that contributed to attaining this target is the use of a DALI lighting control linked to the building management system.

Coloured light and the use of metal halide lamps
Museum galleries and exhibitions are illuminated using techniques that have been handed down over decades and successfully exported all around the world. The parameters that lay down the basic constraints for museum lighting were based on the conviction that every artwork should be presented in an appropriately equipped test gallery, the lighting must also offer the greatest possible protection of the materials from which the artwork is made, provide optimum rendition of the colours and restrict direct or indirect glare.

Regardless of its architectural character and geometry, every museum location dictates its own profile of requirements, which is why different museums have different lighting typologies. Yet even though the type and method of lighting varies from one museum to the next, especially for permanent exhibitions, the most common type of light source to date still remains the incandescent lamp. These lamps have set the tone for the lighting of artworks, especially for Old Masters, for such a long time now that we have become used to seeing them in diffused surroundings, in atmospheres that evoke feelings of intimacy. These are characterised by a pleasant, elegant ambiance with a warm light typical for interiors and offering optimal colour rendition.

However, with modern art and in particular with contemporary art everything is different, from the visual, sensual experience...
The Punta della Dogana museum takes these principles and makes them its own. It is from this point of departure that the project and its implementation were tackled. Only fluorescent lamps and metal halide lamps are used in this museum today.

The Tuula della Dogana is designed and built according to the B1S principle, whereby the power supply is separate from the control or data line. Every luminaire is connected directly or indirectly to a control central unit, which is the point of reference for those who want their works put on a pedestal (which is not even possible with many contemporary pieces due to their size), but instead expect an interaction with the artwork or an involvement in the actual creative activity. The room and the walls surrounding the contemporary artists do not separate the artworks from the surroundings and between the artworks equivalent to daylight. The result is a departure from the contemplative, individual viewing of each artwork from the great Old Masters, towards a kind of job sharing along side the contemporary artists, who do not exchange their livery for the rawness of newtural natural light over the course of the day and year can be precisely investigated in advance and visualised in a 3D model, providing a big-pain in terms of design safety.

To calculate the illuminance and simulate the interplay of daylight and artificial light, the designers used computer programs for lighting simulation. Suitable photometric data in various formats is available on the Internet. The photometric data for the lighting tools can be controlled either individually or in groups. In the transitional phases setting up for new exhibitions, the lighting system can be reconfigured to meet the photometric requirements of the new artworks.

The spotlights are fitted with the highly efficient, though not dimmable, metal halide lamps. They feature a standard adapter for track and are mounted on singlets to connect to the power supply. The DALI interfaces are not integral to the luminaires but are implemented using switching actuators permanently installed in the room. This enables a central digital control for the system and also ensures flexibility when selecting the lighting tools for the 3-circuit track. The spotlights do not therefore have any DALI control gear and, when rearranging the exhibitions, can therefore be moved from one gallery to another without having to be readressed. Each switching actuator has two 16-channel outputs that control up to 12 metres of track or groups of 15 singlets. The maximum number of luminaires per circuit is dictated by the maximum power rating of the switching actuator. Each switching actuator is represented in the DALI system by its own address, using which the software can control the switching actuator’s circuit and all connected devices. The switching actuator can switch its circuit on or off. The spotlights are connected without the use of tools – apart from the ladders and scaffolds needed to get up to the mounting height, which in the exhibition galleries with double room height is about 7-metres high.

The construction of the lighting system
The system is designed and built according to the B1S principle, whereby the supply power is separate from the control or data line. Every luminaire is connected directly or indirectly to a control central unit, which, for its part, can be reconfigured and expanded. DALI (Digital Addressable Lighting Interface) is the name given to the interface for the electronic control gear and switching actuators. The DALI control gear has an internal memory for storing light scene data and group allocations. When a light scene is recalled, all the participating control gear will receive the same dimmer setting at the same moment.

The lighting installation in the Punta della Dogana principally follows the same system in all the galleries, both in terms of its physical construction and regarding the lighting control. This means that the parameters for one gallery can be transferred to another where, assuming compatibility with the lighting equipment, they can produce an analogous lighting effect. Every exhibition gallery features two components of light: direct, diffuse light and direct, targeted light. Whether one lighting type dominates or what combination of the two is used will depend on the requirements placed on the presentation of the individual artwork, which is why the lighting installation is designed as a system that can be reconfigured and expanded at any time. The flexibility of the installation is based on two different concepts which relate to the components of light and their respective lighting tools. The targeted lighting using spotlights with 3-circuit adapters gives its flexibility to the fact that a spot of light and therefore its lighting effect, can be physically added to or removed from, a lighting scene. With the diffusely lighting using recessed luminaires, the flexibility is given by the ability to switch each individual light source on or off, or if the light source permits, to dim it.

Controlling the lighting system
Once positioned, the luminaires are controlled by the user via a digital system. The central control unit is located in the control room in the first gallery, but data network access ports in every gallery facilitate connection with the control unit to illuminate the artworks. The software programming is performed either in the control room or in the exhibition galleries using a portable terminal. Using terminal and software, the lighting tools can be controlled either individually or in groups. In the transitional phases setting up for new exhibitions, the lighting system can be reconfigured to meet the photometric requirements of the new artworks.

The lighting tools for the 3-circuit track. The targeted light is separate from the control or data line. Every luminaire is connected directly or indirectly to a control central unit, which, for its part, can be reconfigured and expanded. DALI (Digital Addressable Lighting Interface) is the name given to the interface for the electronic control gear and switching actuators. The DALI control gear has an internal memory for storing light scene data and group allocations. When a light scene is recalled, all the participating control gear will receive the same dimmer setting at the same moment.

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Quintessence recessed luminaires

1000 new lighting tools for efficient visual comfort
The philosophers of the ancient world referred to the omnipresent energy of life as the fifth element or “quinta essentia”. Today, the term “quintessence” is understood as the synopsis of the essential; the end result. ERCO’s new Quintessence product range is literally the quintessence of 40 years of experience in ceiling-integrated lighting; yet, at the same time, it also looks forward, formulating a future-proof system framework for the further development of recessed luminaires. The vigorous requirements of the architecture of tomorrow were a primary factor in determining the development of Quintessence, the first recessed luminaire product range to be uncompromisingly designed around the aspect of efficient visual comfort. The result is that Quintessence includes a particularly large variety of differentiated tools for vertical illuminance, the crucial factor for the impression of brightness in a room. The emphasis of this product range is placed on efficient, future-proof light sources. This is also apparent from the high proportion of articles with LEDs – around 300 in total. Innovative lighting engineering elements developed by ERCO such as Spherolit lenses and reflectors direct the luminous flux of the modern light sources effectively to the target surface. Thermally optimised components help ensure that well-established and newly developed light sources all work to their optimum – for maximum efficiency and functional life. Electronic control gear contribute to energy-efficiency and allow for other digital interfaces. This option enables Quintessence luminaires to be connected, via plug and play, to intelligent control systems, providing additional potential for even greater efficiency. Ceiling-integrated lighting concepts, in which the light sources are simply inconspicuous details in the ceiling, are the epitome of ERCO’s philosophy of “Light, not luminaires”. The Quintessence product range is able to cover all the essential sub-tasks of a lighting concept – from vertical illuminance and ambient lighting to highlighting and scenographic effects. The consistent system design and the logical structure of the product range simplify planning and designing with Quintessence. Consequently, installation and maintenance of the luminaires are easier and more logical than ever before.

System design for lighting tasks both general and specific; the differentiated toolbox of Quintessence enables convincing lighting solutions providing efficient visual comfort to both user and operator alike.

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16 ERCO Lichtbericht 90

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Design and inherent quality
Consistent system design is a characteristic feature of Quintessence. Modular design allows many different variations to be made with identical mounting details. Similarly, accessories such as lenses and filters are common and digitally controllable Light Clients can be connected to Light System DALI. All Quintessence recessed luminaires use the same design principle for mounting rings, meaning that the different lamp types and characteristics are not only easy to combine but also to interchange.
Quintessence recessed luminaires for vertical illumination

Through Quintessence, ERCO offers a versatile range of luminaires for vertical illumination. The spectrum extends from luminaires for highly homogeneous wallwashing as required for museums or exhibitions, through functional washlights to wallwashing with a focal emphasis. The latter is used to provide an additional accent for applications such as retail displays. Vertical illumination is far more important for the subjective impression of brightness than light on horizontal surfaces. For this reason ERCO offers a wide range of lighting solutions for wall illumination, all of which are designed to save energy.

Washlights and double wallwashers

Quintessence wallwashes combine horizontal and vertical illumination for the peripheral area of rooms. The lighting technology is based on three components: the Spherolit upper reflector, the diffuser and the darklight reflector. The Spherolit-technology ensures good visual comfort. As a result, this product range features a particularly wide selection of articles for vertical illumination. The false colour diagram depicts the uniformity of vertical lighting. The efficiency and quality of uniformity depend on the design of the wallwashers, their offset from the wall and their spacing.

Lens wallwashers

Lens wallwashers provide exclusively vertical illumination. The combination of two different Spherolit reflectors and the wallwasher lens has enabled the development of two efficient lighting tools for vertical illumination: a lens wallwasher for the uniform illumination of walls and, as an alternative, a lens wallwasher for a focal emphasis. The mirror-finish Spherolit reflector, which directs the beam exclusively towards the wall, creates an asymmetric light intensity distribution. Depending on the distribution and curvature of the spherolites, it is possible to obtain a very homogenous wallwashing, e.g. for lighting pictures in museums. The alternative is to produce focal emphasis on the upper third of the wall, as with lens wallwashers. This would be used, for instance, to illuminate displays above shelves in retail outlets. The specially designed wallwasher lens spreads the beam so that a high uniformity is visible over the breadth of the wall from lens wallwashers arranged in a row. The darklight reflector beneath the wallwasher lens inhibits glare provided the lens is not visible through the reflector aperture. This detail makes an important contribution to visual comfort. ERCO's lighting engineers have calculated the Spherolit reflector so that the upper part of the beam meets the wall just beneath the ceiling and the beam extends all the way down to the floor. For optimum light distribution on the vertical surface, it is recommended that the distance between the wall and the luminaire is set at one third of the room height. This distance can generally also be used for the spacing between the individual Quintessence lens wallwashers.

Washlights

Washlights combine horizontal and vertical illumination for the peripheral area of rooms. Looking at the way down to the floor, for optimum light distribution extending up to the ceiling.

Efficient visual comfort

ERCO developed the Quintessence recessed luminaires especially for efficient visual comfort. As a result, this product range features a particularly wide selection of articles for vertical illumination. The false colour diagram depicts the uniformity of vertical lighting. The efficiency and quality of uniformity depend on the design of the wallwashers, their offset from the wall and their spacing.

Washlight

Washlights combine horizontal and vertical illumination for the peripheral area of rooms. Looking into the room, a classic downlight effect can be seen, while the wall itself is given a uniform light distribution extending up to the ceiling.

Double washlight

In double washlights, there are two opposing Spherolit reflector segments to produce uniform light on the walls of corridors.

Lens wallwashers

With its uniform brightness gradient, the lens wallwasher achieves a very high degree of uniformity on the vertical plane. This makes it ideal for applications where the wall is to be presented as an entity, e.g. in retail areas, or where good homogeneity is demanded, e.g. for pictures in an exhibition.

Focal lens wallwashers

In contrast to the lens wallwashers with their continuous brightness gradient, these wallwashers with focal emphasis produce a highlight in the upper third. This focal highlight can be used very effectively to emphasise displays above shelves in retail outlets, for instance. - this is a valuable detail of vertical illumination.
The Quintessence product range naturally includes both conventional lamps and LEDs, thus offering the latter’s specific benefits such as extremely long functional life, maximum luminous efficacy, and flexibility through dimmability. The high-performance optoelectronic systems of LED modules, lenses and reflectors are exclusive ERCO in-house developments for efficient visual comfort. The Quintessence LED product range comprises both round and square luminaires with varying light characteristics from lens wallwashers, washlights, double washlights, downlights and directional luminaires to recessed spotlights. All other features such as the diverse variants of luminaire edging and the mounting details, the availability of Light Client with factory-encoded DALI control gear, or the rational and simple mounting all correspond with the prevailing standard of the Quintessence product range as a whole. In this way the future-proof LED lamp fits seamlessly into ERCO system design.

**Characteristics**

- The spectrum of light distributions for Quintessence recessed luminaires with LED includes downlights, washlights, double washlights, lens wallwashers, and directional luminaires. Furthermore, the LED-fitted Quintessence recessed spotlights are also part of the Quintessence system.

**Heat management**

Good heat management in the luminaire is crucial for continuous operation, allowing the lamps to emit their full power throughout their entire life. It is the design, construction and material of the housing that all contribute to optimal heat management. Extensive simulations and tests during the development phase ensure the success of all the products in the range.

Two aspects make a major contribution to the performance of Quintessence LED luminaires: the contact surfaces between the LED’s printed circuit board and the housing ensure good heat dissipation. The cooling fins on the housing further disperse the heat to achieve optimum conditions for continuous operation.

**Colour temperature and colour rendition**

Quintessence recessed luminaires are available in daylight white and warm white and also as 4-channel varychrome with RGBW colour mixing technology. The warm white version produces a higher colour rendition quality than the daylight white model.

**LED light mixer**

For the different downlight characteristics and the lens wallwashers, the light is directed by an 8-segment, mirror-finish reflector. The interreflections within the light mixer, especially in the RGBW LED modules, result in the best possible colour mixing beginning directly beneath the luminaire.

**Spherolit lenses and collimating lenses**

Lighting technology is one of ERCO’s key competences which include LED light sources. The Quintessence directional luminaires and recessed luminaires with LEDs feature lens systems designed and built by ERCO. The collimating lens creates a parallel beam, while a Spherolit lens produces the precise beam angle required.

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White LEDs: producing light
There are two prerequisites for the use of LEDs for ambient lighting. Firstly, the availability of white, high-power LEDs with sufficiently high luminous flux and secondly, the improvement of colour rendition. LEDs can produce white light in different ways: by RGB colour mixing, by luminescence conversion or even by a combination of both these processes in the form of RGBW mixing.

With RGB colour mixing, three light emitting diodes in the colours red, green and blue (RGB) produce a wide range of saturated colours of light but, if required can also produce white light. This is done by driving the brightness of the individual coloured LEDs to the required level with the control electronics. The price for this high variability, however, is a white light with poor colour rendition, due to the very small spectra of each of the three colour components. This method of producing white light is therefore unsuitable for applications where high demands are placed on colour rendition.

With luminescence conversion, the light of a single-colour LED is converted wholly or partially into other spectral ranges by fluorescent coatings so that the resulting spectrum will achieve better luminous efficacy and a better colour rendition than with RGB-LEDs. The combination of blue LEDs with yellow phosphors is standard today; more seldom, because more complicated to manufacture, are UV-LEDs with RGB phosphors. This process is inherently fixed at a constant colour of light, such as warm white with approx. 3200K or daylight white with approx. 5500K. Warm white LEDs currently produce better colour rendition (about 80 CRI) than daylight white LEDs (Ra 85), although the luminous efficacy of the latter is slightly higher.

One possibility for unifying the advantages of both these processes for producing white light with LEDs is to use RGBW colour mixing systems that combine white LEDs of a constant light colour with digitally controllable LEDs in red, green and blue. Such systems retain the high colour rendition index of Ra 85 in the white range while simultaneously allowing an infinite variation of colour rendition and if needed, also coloured accents for scenographic lighting.

White LEDs and RGBW colour mixing in practice
In architectural lighting practice, LEDs are increasingly taking over coloured scenic lighting and also replace conventional lamps in general lighting. White high-power LEDs based on luminescence conversion combine advantages such as the ability to dim and the availability of different colour temperatures with extremely long life. In addition, their light is restricted to the visible spectrum without ultra-violet and infrared radiation, which is especially important for avoiding damage to exhibits in museums for instance.

Their optimised colour rendition also makes such white LEDs suitable for other lighting situations where high demands are placed on colour quality, such as in restaurants, offices, conference rooms or in the retail trade. With luminous flux values of 1740lm (warm white) or 2160lm (daylight white), the current 28W LED modules are ideal for similar applications to 100W low-voltage halogen lamps or 20W metal halide lamps, ranging from wall washing in rooms with ceiling heights of up to 4m and general ambient lighting to accent lighting over medium distances.

The combination of luminescence conversion and RGB mixing with RGBW-LED modules opens up additional design possibilities. Correctly controlled, such a luminaire can produce both white light with infinitely variable colour temperature with good colour rendition and also highly saturated coloured light. The full potential of RGBW luminaires for lighting design is released when combined with the appropriate lighting control systems and control gear or with PC software such as ERCO Light Studio. This software includes various control panels such as the RGBW colour circle or a slider control for adjusting the colour temperature along the Planckian locus. All designed to allow quick and simple integration on RGBW luminaires include multi-functional rooms, galleries, conference halls or foyers. Depending on the room usage, light can be set up so that a wall surface or a spatial zone can be lit in white and with good rendition to present an object or alternatively, can be styled with coloured light for an atmospheric effect.

Thomas Schielke

Today’s white high-power LED modules produce sufficient luminous flux for architectural lighting, whether for vertical illuminance, for horizontal, ambient lighting or for accent lighting.

The special optoelectronic modules ensure the LED luminaires attain maximum efficiency and consequently, high luminous efficacy.

Operating devices allow the user to set and recall light scenes with different colour temperatures quickly and simply.
Efficient visual comfort in the museum

Exhibiting and communicating on the one hand, collecting, preserving and exploring on the other: these are the tasks of a museum. Lighting concepts with efficient visual comfort support a museum in these tasks both effectively and economically.

While issue 89 of the Lichtbericht looked at the concept of efficient visual comfort relating to the retail sector, this article will highlight how the five factors of efficient visual comfort, namely vertical illumination, qualitative lighting design, effective lighting technology, intelligent lighting control and efficient lamps, can be applied just as effectively to the broad field of museum lighting. Each individual factor holds potentials that help save resources and lower costs; but it is only in their combination that they develop additional synergy effects and reinforce each other.

Criteria for museum lighting

The diversity of the museum landscape makes it difficult to specify uniform characteristics for its lighting: museums deal with a vast range of different themes, from archaeology to contemporary art, from architecture to museum landscapes. Irrespective of this, however, most of all the way to huge cultural and museum complexes. Irrespective of this, however, most of the exhibits and their protection from harmful rays such as UV or IR-free light. ERCO’s standards applied to light in view of the cost of investment and operation are primary factors. Efficient visual comfort provides approaches and technologies that combine what initially seem to be incompatible requests in a synergistic manner. For example: where maximum visual comfort and excellent glare protection are key aspects in the choice of lighting tools, visitors are provided with optimum conditions for perception; their eyes can easily adapt to different lighting situations. Illuminances can generally be kept at a lower level, which not only protects the exhibits, but also reduces the operating costs.

In many types of museum, such as local picture galleries, vertical illumination is already a factor simply because the visual task involves observing objects on walls. Using wallwashing instead of, or to supplement, zenithal lighting, where museums feature luminous ceilings, uniform illuminances on vertical presentation surfaces can be achieved with low levels of energy. Foyers and passages are further examples of wallwashing as the right means to efficiently produce the impression of pleasant levels of brightness.

Advance of LED technology

When working out a lighting concept for a museum based on qualitative aspects, Kelly’s principles of perception-oriented lighting design prove helpful: once lighting situations are structured into ambient luminescence, focal glow and play of brilliants, the hierarchies of perception often arise automatically. This answers the question as to which areas actually need a high level of lighting. Manufacturers such as ERCO, which draw on many years of experience in museum lighting, are faced with the responsibility of providing the right tools to enable such qualitative, perception-oriented design. LED technology is of particular interest here among museum lighting designers as it combines the qualities of the already widely used low-voltage halogen lamps, such as dimmability and excellent colour rendition, with an energy efficiency previously only known from fluorescent lamps or high-pressure lamps. But it also outperforms these in terms of life and serves the conservators’ wishes of UV and IR-free light. ERCO’s standards applied to lighting tools such as spotlights or recessed ceiling luminaires with LEDs are high as their system design must make the planning and use of the new technologies as easy as possible, while also ensuring additional efficiency through proprietary lighting technology.

Many museums today are faced with a cut in public funding and need to budget rather cost-effectively. Within the context of energy improvements, a one-off investment in lighting ensuring efficient visual comfort makes it possible to reduce operating costs in the long run. This creates additional scope to concentrate on the actual tasks of the museum: to preserve and communicate the store of knowledge of a culture.
Acqua alta, high water – in winter this is all but daily news for residents and visitors in Venice. Every year, the city on stilts built on a lagoon sinks several millimetres deeper into the water, while climate changes threaten a rise in sea levels. The Venetians anyway agree: high water days are increasingly frequent. Anyone keen to build in this city is bound to face the issue of high water protection, not only for foundation and sealing, but also in a global sense with regard to sustainability and energy efficiency of the building and its technical equipment.

Exposed at the tip of the spit of land right opposite San Marco, the Punta della Dogana, the former port customs authority of Venice, is situated right next to the church Santa Maria della Salute. Originally built in 1677 by Giuseppe Benoni, the customs authority underwent several transformations until it eventually lost its function during the course of the 20th century and consequently sunk into oblivion. For over 30 years the building was closed to the public until, during a search for a second site for his art foundation, the art collector François Pinault joined with the Mayor of Venice, Massimo Cacciari and devised plans to use the early industrial architecture for a different purpose this time.

At the first site of the François Pinault Foundation in Venice, the Palazzo Grassi, Tadao Ando had realised a remarkable museum architecture as early as 2005 through interventions that proved as precise as they were unobtrusive. On the outside, the Punta della Dogana barely shows any trace of structural alterations. Inside, Ando accentuated the original structure of the building with its division into five halls. Marked by history, their rough brick walls and imposing trusses made of larch wood were carefully preserved. Right in the centre of the building, where parts of the hall’s partition walls had already been replaced by pillars in earlier alterations, Ando implanted a concrete cube in a manner typical of him: minimalist, clear lines and polished surfaces, structured by the pattern of the formwork panels in the format of the architect: Tadao Ando, Tokyo
Lighting design: Ferrara Palladino e Associati, Milan
Photos: Thomas Mayer, Neuss
www.puntadelladogana.it

For centuries, the warehouses at the Canal Grande have stored dutiable goods. Past, present and future: Tadao Ando has transformed the historic building into a museum for contemporary art, making it fit for tomorrow thanks to sustainable lighting technology.

What a site! The new museum on a spit of land at the Canal Grande consolidates the reputation of Venice as a centre for both modern and contemporary art. This reputation has been quelled primarily by the biannual art festival, the Peggy Guggenheim Collection and not least, the Palazzo Grassi, the sister site of the François Pinault Foundation.

Unmistakably Tadao Ando: It is only after entering the building that the identity of the designer becomes clear. A concrete cube with the typical pattern of the formwork panels positioned in the centre of the old warehouses and a spacious room is filled with daylight as the most efficient light source of all. The work of art is discreetly emphasised by accent lighting (Rudolf Stingel, “Untitled”, 2008).

Architect: Tadao Ando
Lighting design: Ferrara Palladino e Associati, Milan
Photos: Thomas Mayer, Neuss
Japanese tatamis. This “building in a building” is connected to patios, galleries and stairs which provide access and structure to two levels of exhibition space.

The lighting concept ensures efficiency and visual comfort on several levels: it comprises the components daylight, artificial ambient lighting and accent lighting. Automated shading curtains close the daylight coming through the skylights and the side windows. A DALI system controls downlights and wallwashers with fluorescent lamps. Spotlights with highly efficient metal halide lamps accentuate individual exhibits. They are included in the control system by means of DALI actuators. The lighting and air conditioning technology, integrated by Ando within dark-painted, square-section installation ducts, are all blended discreetly into the historic trusses.

Along with the halls where the original ceiling height was kept, Ando also created additional exhibition space on a second level in the wider part of the museum. This enables the curators to use galleries with a more intimate character.

The colour of the artificial light provided by the Lightcast downlights with compact fluorescent lamps for ambient lighting and the Parscan spotlights with metal halide lamps for accent lighting matches the daylight. A DALI control system dims the downlights and switches the spotlights as groups using DALI switching actuators.

Architecture as an exhibit: opting for Quadra wallwashers, the lighting designers used uniform vertical illumination to emphasise the uniformity and aesthetics of the wall surface as a structural element.
Dinosaurs are always a big attraction for taking kids on a museum visit as an alternative to computer games. The recently renovated Belgian Institute of Natural Sciences offers visitors, small and large, not only dinosaurs, but also contemporary discoveries and insights, all presented in stunning detail.

Back in the 90’s, following the release of Spielberg’s blockbuster movie, “Jurassic Park”, the dinosaur craze swept through both media and children’s bedrooms alike. Natural science museums, often only dignified by the dust and dryness of the decades, found themselves in the public limelight once again. This time, however, they are confronted with the changed requirements and viewing habits of a new generation of visitors. Which is good if a museum happens to have a collection of significant and spectacular artefacts, as is the case with the “Royal Belgian Institute of Natural Sciences”. Founded in 1846 and showing spectacular 19th century finds such as its iguanodons of Bernissart, this Belgian museum also has the added attraction of striking historic architecture, for too long hidden away behind disjointed extensions and concealing facades. After years of renovation work, this architecture now provides a fitting backdrop for presentations that, in terms of their scientific content and media technology, have well and truly arrived in the 21st century.

The conversion of the Janet Wing, named after its builder Charles-Émile Janlet (1839–1919), was delivered in two phases, culminating respectively in the opening of the new dinosaur gallery in 2007 and the “Gallery of Evolution” in 2009. The architects of the Brussels-based design office SumProject re-established the building’s opulent dimensions and completely re-organised layout and visitor routing, laying bare the technological details of the attractive, yet previously concealed, steelwork. The result is that the historic character of the new rooms makes an interesting contrast to the emphatically progressive design of the furnishings, fittings, exhibits and glass display cabinets now complete with upgraded media. Consequently, no-one feels short-changed, neither kids of the PlayStation generation nor their parents who appreciate the aesthetics of the Early Industrial Age.

The daylight situation in the Gallery of Evolution: diffuse natural light streams in through the glass sections in the roof, while track-mounted Optec spotlights accentuate the exhibits. Parscoop ceiling washlights can be switched on to provide supplementary lighting.

When science is fun! Striking a pose in front of the reconstructed dinosaur skeleton to dramatic scenic lighting.

The lure of colour: Optec spotlights, fitted with the appropriate filters make it possible to change from the neutral lighting of the re-constructed dinosaur skeleton to dramatic scenic lighting.

The beauty of our ecosystems is presented by scenic lighting solutions: metal halide lamps play their part in conserving the fragile, endangered resources. Spherolit reflectors ensure that the lighting quality is always optimum.

Unique fossilised dinosaur skeletons as exhibits, presented in a gallery within an Early Industrial Age steel-skeleton construction: a highlight for dinosaur fans and architecture lovers alike.

Architect (renovation) and lighting design: SumProject, Brussels

Gallery of Evolution – Scenography: Atelier de l’ile, Paris

Exhibition lighting: Cosmos, Paris

Photos: Dirk Vogel, Dortmund

www.naturalsciences.be
Consultant training with new products

In 2010 ERCO launched the biggest product offensive in its corporate history, with over 1,600 new Quintessence recessed luminaires and recessed spotlights. In light of this broad spectrum of products, to ensure that all existing and potential clients can be provided with the best possible customer care, lighting consultants from across ERCO’s worldwide sales network completed intensive product training at the beginning of the year. The ERCO lighting experts now look forward to sharing their knowledge with you. You will find your regional ERCO contact at:

www.erco.com/contact

International Furnishing Show, Cologne

19 – 24 January 2010

The imm cologne successfully launched a new presentation format this year with Pure Village in Hall 3.2. As part of an integrated architectural concept, illustrious brands from the furniture, textile, lighting and bathroom branches presented both individual exclusive designer objects and complete creative furnishing concepts. ERCO was there too, both on a presentation surface for scenographic effects with highly efficient lighting tools and as the decorator of the special area, “The Stage”, where visitors were able to participate in an interesting lecture programme.

www.purevillage.de

Exhibition: Bauhaus. A Conceptual Model

Martin-Gropius-Bau, Berlin

22 July – 4 October 2009

A series of exhibitions and events were held in 2009 to mark the foundation of the Bauhaus in Weimar 90 years before. During the 14 years of its existence, the Bauhaus became one of the most important schools of the Modern movement. Today, it is internationally considered to be Germany’s most successful contribution to Modern art and culture in the early 20th century. The exhibition, “Bauhaus. A Conceptual Model” focused on the huge influence of the Bauhaus on the development and internationalisation of the Modern movement. Working from this basis, the exhibition also thematically explored the global and lasting effect of Bauhaus on architecture and design.

www.modell-bauhaus.de

Development

Because the pictogram design is based on a systemic system, the pictogram programme can be continuously expanded. An ERCO team of experienced and creative experts is developing new pictograms precisely in accordance with the original specifications.

Memorabilia and merchandising

On textiles, accessories and fan memorabilia from the sport and leisure branches, Aicher pictograms serve as a striking eye-catching feature. Documents and models are given a prestigious appearance with the sports symbols.
As a special economic area near to Hong Kong, the Southern Chinese city of Shenzhen has enjoyed enormous growth in recent years. On a floor area of 12,500m², the city’s new history museum presents 6,000 years of regional history. The lighting tools used include Optec spotlights, with Quinta wallwashers providing vertical illumination on the dioramas that are so popular in Chinese museums. Seen here is a display showing Party Leader Deng Xiaoping (1904–1997) planting a tree, symbolic of his policy of reform and openness, the foundation of Shenzhen’s economic boom.