



A new review of Milan Cathedral

Lighting that functions as well on an urban scale as it does with the finest details of the facade: the cathedral, bathed in new light, confidently assumes its role as the core of the city and is at the same time more analytically readable than ever before.

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Milan Cathedral

New light for Milan Cathedral: a project that makes headlines not only locally but throughout Italy. For the Milanese, their cathedral is the landmark, heart and symbol of their city. Lighting using ERCO LED lighting tools gives residents and visitors a completely new view of their cathedral.

"Now the cathedral can be admired down to its very last detail"

An interview with lighting designer Pietro Palladino

Interview by Kristina Raderschad

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Theory and practice:

planning light for monumental buildings

When illuminating large-area facades, it is important to think on a large scale not only in terms of simulation and visualisation. Creative solutions are also required for the luminaire mounting locations – thus enabling the challenges of the building dimensions to be mastered.

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John Curtin Gallery, Perth

As Australia's largest university art gallery, the John Curtin Gallery is an anchor point in the region's cultural life. LED lighting technology from ERCO opens up new design options for the exhibition organisers – for artworks of any format.

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Axel Vervoordt Gallery, Wijnegem

For almost two decades, an unusual project grew and developed on the Albert Canal just outside Antwerp: the interior designer, collector and gallery owner Axel Vervoordt transformed an old malt factory into inspiring spaces for living, working and presenting art.

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Projects

Polygon Gallery, Vancouver
Museum for Communication, Bern
Museum Yves Saint Laurent, Marrakesh
The Feuerle Collection, Berlin

Foreword

Upgrading existing buildings always sounds very dry and sober. Spectacular new buildings though are sure to attract attention. But let's be realistic: also in view of increasing ecological challenges, the careful, protective handling of existing values and the intelligent reuse of obsolete buildings will gain in importance. The immaterial building material of light plays a decisive role in such concepts because light enables spaces to be continuously reinterpreted. This applies to such important historical heritage sites as Milan Cathedral within its urban space as well as to the industrial ruins from which Axel Vervoordt created spaces for life and art in Belgium, or the gallery in Australia, made fit for many new and exciting cultural encounters thanks to relighting with LED technology. Take

a look with us behind the scenes of such projects, find out all that's possible with ERCO products and services and allow us to inspire you for your future plans and projects! We wish you much enjoyment reading.

The Lichtbericht editors

The shining heart of the city

New light for Milan Cathedral: a project making headlines not only locally but throughout Italy. For the Milanese, the cathedral is more than just a church or a monument. Crowned by the golden "Madonnina", it is the landmark, heart and symbol of their city. Lighting using ERCO LED lighting tools gives residents and visitors a completely new view of their cathedral.



↑ New technologies and new perspectives: the drone photo shows how confidently the cathedral in its new light adopts its role as the heart of the city, even though the brightness of the surroundings steadily increases. Over 400 Lightscan projectors with highly precise Spherolit

lens technology illuminate the facade. Gecko projectors cast accents of light onto the pinnacles and tower spires. Compared to the old installation, ERCO LED technology provides higher illuminances with improved quality of light whilst lowering energy consumption.

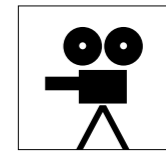
→ The cathedral is large: 158m long, 93m wide and almost 109m high – one of the largest churches in the world. It is constructed entirely of light marble, a material ideal for the filigree high Gothic style of ornamentation. The construction work lasted from 1386 to 1813, but is never finished because weathered building elements are contin-

uously replaced. Installation of the luminaires must not damage the stonework. To meet these special requirements, the "ERCO individual" service developed individual lighting tools from standard luminaires with higher lumen packages, a higher safety class, special mounting brackets and housing colours matched to the building's facade.



Even in daylight, the overwhelming richness of detail on the cathedral facade is not as perceptible as when illuminated by the crisp, modelling light of ERCO LED projectors and floodlights with lens technology. The lighting designers installed luminaires on three mounting levels: on the surrounding roofs of buildings, on the masts of

the existing plaza lighting and on the roof of the cathedral itself.

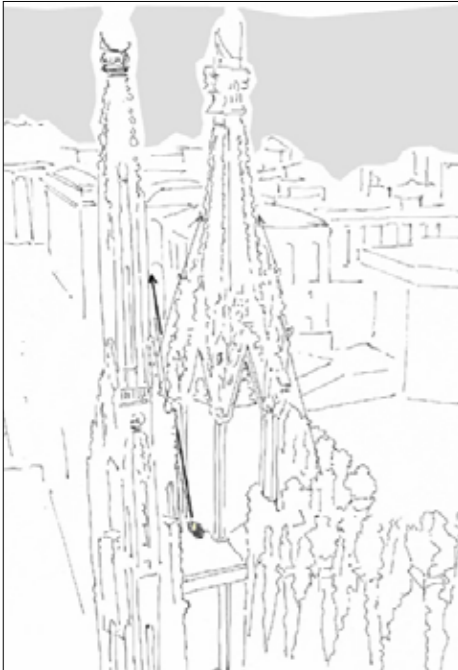


The film about the project:
www.erco.com/stories



"Now you can admire the cathedral down to its last detail"

An interview with lighting designer Pietro Palladino
Interview by Kristina Raderschad



Kristina Raderschad (KR):

Pietro, you've been living and working in Milan for many years (perhaps you're even a native of Milan?). Can you firstly tell us something about the cultural importance of the cathedral and the role it plays in the urban fabric of Milan?

Pietro Palladino (PP):

I'm not in fact a native of Milan, but you might think so because I've now been living and working here for more than 30 years. The cathedral is not only one of the most majestic and impressive specimens of Italian architecture but also represents the very centre of the city of Milan, both geographically and emotionally. Firstly, the city is characterised by its circular structure that forms a centre in the Piazza, developing outwards towards the outskirts. This purely geographic aspect then develops to become a more personal dimension, acquiring a special sentimental value for the Milanese people who all have a place in their hearts for the cathedral. It's the symbol of their city, with the 'Madonnina' above almost acting as a guiding light, a form of reassurance when they glance up to the sky.

KR: What was your general design approach with the new exterior lighting for the Duomo di Milano?

PP: The intention was to present the cathedral in a way that corresponds to its stature and importance. The nominal brightness of general lighting around the Piazza has continuously increased in past years, and for this reason we also need higher illuminances for the cathedral than were produced by the lighting system installed around twenty years ago.

KR: In 2015 you worked with ERCO to redesign the entire interior lighting of the cathedral using a total of approximately 800 LED luminaires from the Parscan range. Is there a connection between your lighting design concept for the interior of the cathedral and the new outdoor lighting?

PP: This wasn't just about replacements but a completely new project. The obsolete system generated sufficient horizontal illuminance levels but left the columns, capitals and side chapels of the church in twilight. The new project instead aims to prioritise the vertical surfaces in accordance with the Gothic style of the church's architecture. In total we installed 860 luminaires in the interior, and primarily with narrow distribution optics – the high levels of precision of the light distributions enable the capitals and several other details of the church interior to be accented with light. The new external lighting also illuminates the large glass windows, the luminosity of which can be admired from within. This creates real visual connections and references, allowing the architecture to be appreciated in its entirety.

KR: The new indoor lighting of the cathedral with ERCO LED technology proved to be exceedingly energy-efficient. To what extent is the new outdoor lighting an improvement in terms of energy efficiency?

PP: The connected load for the indoor lighting, after we upgraded several luminaires for special purposes, is 26.5 kW. For the exterior lighting we installed 35 kW compared to the previous 58 kW, meaning around 40% less. As part of this though, we need to consider that nominal illuminance levels of the complete building structure have increased by approximately 40% – before they were 50-60 lux and now they're 80-90 lux. Seen in total we can say we've achieved comparable energy savings to the indoor lighting. This result is mainly thanks to the high efficiency and high quality lighting technology of the ERCO projectors with their particularly precise light beams and low levels of spill light.

KR: Milan Cathedral is a landmark in the densely constructed urban space. To what extent is the location a challenge for the lighting concept, taking into account the brightness of the surroundings? How can a building of these dimensions be illuminated without impacting on its immediate surroundings?

PP: In the past 20 years there's been a strong increase in the number of light sources located around the cathedral. This required a slight increase in illuminance on the marble surfaces.

I also decided to use LEDs with a colour temperature of 4000K to increase the contrast to the surroundings and improve the perception of details. On the one hand the cathedral can be seen from afar, but on the other it's an integral component of the plaza and must function as such – it does after all tend to dominate the plaza during the daytime.

KR: To what extent did the issue of heritage protection impose restrictions in terms of installing the new outdoor luminaires? Where exactly were the new luminaires mounted or installed – on adjacent buildings as well? What were the specific challenges in mounting the luminaires?

PP: The projectors are distributed on three mounting levels: firstly on buildings at the edge of the plaza, then on lamp posts around the cathedral and finally on the roof itself. The installation itself tended towards the extreme in many terms – a total of 650 projectors with various light distribution patterns were used, and with some of these the distance to the target plane on the facade was more than 120 metres.



"This project required extremely high quality of light and reliability"

"In many terms the installation tends towards the extreme"

"The new exterior lighting now also illuminates the large glass windows"

The height of the mounting points also varied strongly. For installation of the luminaires on the roof of the cathedral we constructed special support brackets which avoid any permanent intervention into the listed material. We also needed industrial climbers and special tools in some cases to mount the projectors at high heights or tight angles, as demanded by the most critical points of the installation design.

KR: Why did you opt for ERCO Lightscan and Gecko lighting tools?

PP: This project was all about extremely high quality of light and reliability. It's in projects like this one that ERCO products can make the decisive difference.

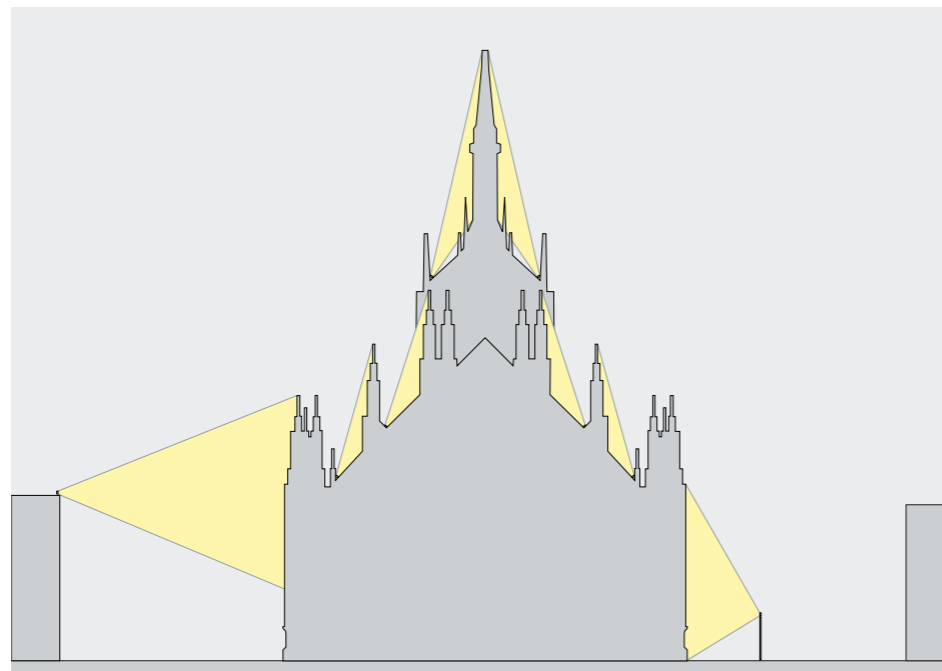
KR: Was there on-site sampling? To what extent did the ERCO tool kit help to find the right lighting solution and achieve the desired lighting effect?

PP: No, there was no mockup or sampling on location. Considering the spatial conditions, it's impossible to gain useful feedback from a mockup: on the contrary, it might even provide us with false impressions that could induce the lighting designer to make serious errors. We

approached the design in another way – using a computer model of the cathedral we simulated the lighting with two different programmes. In terms of implementation ERCO was keen to respond to our requests concerning special modifications to product ranges, for example with support brackets, luminous flux levels, light colours and appropriate control gear.

KR: Italy is a country enriched with historical buildings such as churches. Do you think the Milan Cathedral relighting project will influence the way such monuments are illuminated in the future? In your view, in which direction is the lighting of heritage buildings developing at the present time?

PP: LED technology has changed the discipline of lighting design. Today it's possible to illuminate architectural monuments from much larger distances than previously – we can create higher contrasts and model the forms more efficiently. Our new outdoor lighting of the cathedral confirms our approach of not only illuminating well but definitely better, along with reduced energy consumption. In the past people could look at the cathedral but now they can genuinely observe it, even analyse it. This is, in my opinion, the main difference that will drive the evolution of lighting design in coming years.



Veneranda Fabbrica: the Milan Cathedral workshop

So much tradition is unusual: the "venerable workshop", the literal translation from the Italian of the cathedral workshop in Milan has existed for more than six centuries, or more precisely since 1387. At that time, Gian Galeazzo Visconti, the municipal leader of the city, laid the foundation stone of the cathedral and commissioned a committee of noblemen and clergymen to organise the construction work. As with comparable institutions in other European towns and cities such as Strasbourg, Cologne and Vienna, the workshop also took care of maintenance and restoration following completion of the cathedral in 1813. It maintains not only extensive workshops employing stone masons and other craftsmen, but also the quarry in Candoglia, Piedmont where marble has been extracted for the cathedral since construction began. The cathedral museum in the Palazzo Reale on the cathedral plaza belongs to the Fabbrica, as well as a library and the large archive dedicated to the history of the cathedral. First and foremost though the cathedral workshop supervises the continuous construction sites at the cathedral itself – these range from everyday repairs to the replacement of weathered marble elements, fundamental safety measures and technical replacements – for example upgrading the interior and exterior lighting. For this purpose the Fabbrica has an annual budget of around 30 million euros.

Lighting designer: Pietro Palladino

Electrical engineer and lighting designer Pietro Palladino knows Milan Cathedral like the back of his hand: he designed the exterior lighting for the building in the year 2000, which he recently replaced with superior LED technology; in 2015 he completed the current interior lighting, also with ERCO lighting tools. Palladino, born in 1958, is considered an expert in the illumination of architectural monuments which he effectively reinterprets while preserving the historical substance – for example the former customs building "Punta della Dogana" in Venice now converted into a museum. Lighting master plans for Milan and other cities as well as lighting for new buildings such as Venice Airport are also part of the repertoire of the Ferrara Palladino office, run in Milan for the past 25 years by Palladino together with his partner, the architect Cinzia Ferrara. During the course of his career, Palladino has held several positions in professional associations such as APIL (the Italian Association of Lighting Designers). He teaches lighting design at the renowned Politecnico di Milano and has published a number of specialist books and textbooks on lighting design. He became familiar with and learned to appreciate ERCO products early in his career – for example when in the early 1990s he was commissioned by the energy company ENEL to contribute to the lighting of major projects such as the Pinacoteca Vaticana in Rome and the Church of San Lorenzo in Florence.



www.ferrara-palladino.com

Project data

Client: La Veneranda Fabbrica del Duomo di Milano cathedral workshop, Milan
 Lighting designer: Ferrara Palladino e Associati, Milan
 Photography: Moritz Hillebrand, Zurich / Switzerland
 Website: www.duomomilano.it

Luminaires used



Lightscan
www.erco.com/lightscan



Gecko
www.erco.com/gecko



Parscan
www.erco.com/parscan

Planning light for monumental buildings

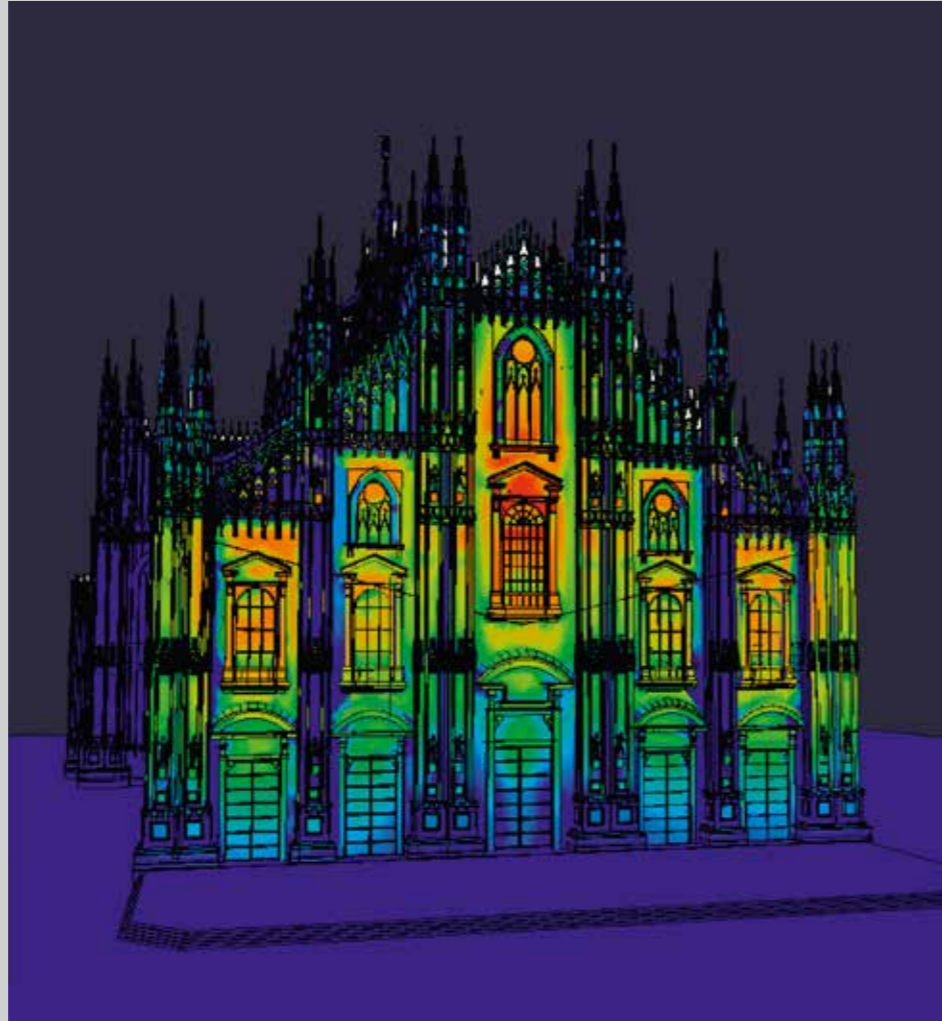
When illuminating large-area facades, it is important to think on a large scale not only in terms of simulation and visualisation. Creative solutions are also required for the luminaire mounting locations - thus enabling the challenges of the building dimensions to be mastered.

Efficiently presenting and showcasing large buildings in urban areas requires special concepts, methods and tools. To externally illuminate monumental landmarks in their entirety would require a disproportionate amount of energy. The alternative is to concentrate on the effective surfaces and architectural features within the urban space - as with illumination of the Milan Cathedral. For pedestrians for example the lighting in the lower area is relevant. The upper floors and an illuminated roof make a building visible on the skyline. Three aspects are relevant for lighting the facade of large buildings:

1. Simulation or mockup: a partial mockup with only a few projectors hardly conveys a representative impression with such dimensions. For this reason, the use of light simulations, enabling a complete view from different perspectives, is particularly useful for large buildings.

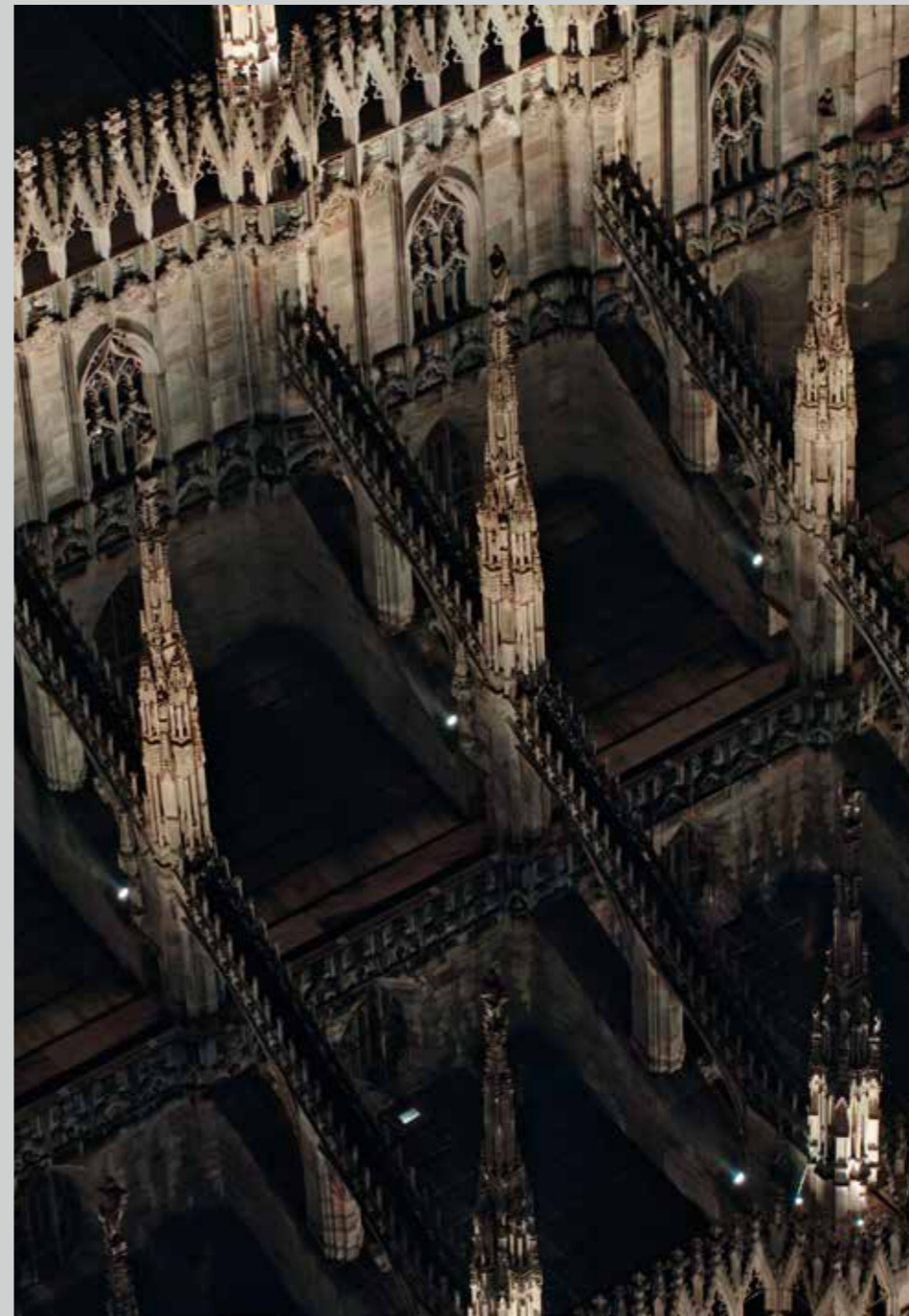
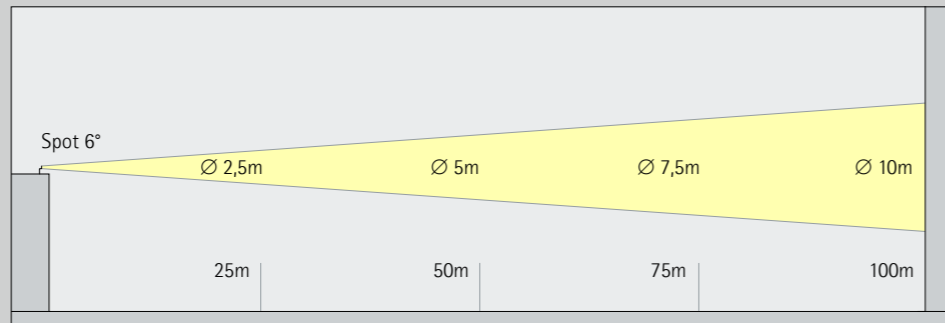
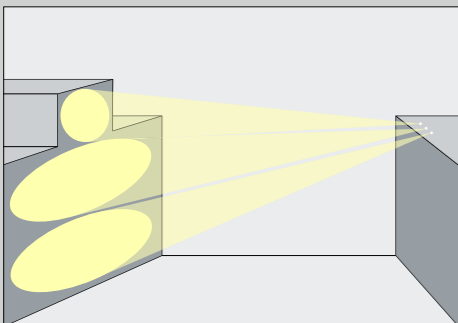
2. Overcoming distance: to illuminate from long distances, projectors with very narrow, precise light beams are needed. In this way, light pollution can also be kept to a minimum. Even a narrow spot with 6° light beam generates a light of 10m diameter at a distance of 100m.

3. Appropriate brightness: lighting levels usual in interiors are too high for outdoor applications. At night, illuminances below 100lx are often sufficient in an urban context, especially on bright surfaces.



Since partial mockups for large buildings can hardly provide a representative overall impression, light simulations are indispensable for checking suitable light distributions and illuminances.

Luminaires with very narrow beam angles are suitable for the precise illumination of facades from long distances. Different light distributions make it possible to respond individually to the form of the facade.



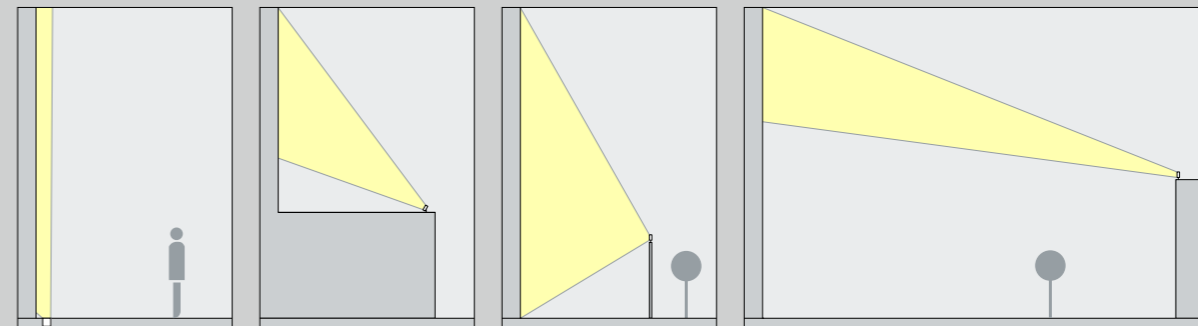
Correct positioning of luminaires

When looking for suitable locations for luminaires, there are generally three possible positions with large buildings: on the building itself, on masts in the street space and on neighbouring buildings.

Lighting mounted directly on the facade is suitable for grazing light which emphasises the texture of the surface. With terraced buildings the luminaires can be arranged on the recesses. In this way the facade is illuminated segmentally and more uniformly.

Existing masts in the street space are particularly suitable for illuminating the lower part of the building with wide light distributions. For the upper areas of the building, however, high mounting points are advantageous. These are usually only possible on neighbouring buildings and therefore usually have long distances to the facade.

The optimum illumination of large buildings requires the intelligent use of luminaires with very different light distributions. At medium distances, asymmetric wallwasher light distribution is useful for uniform illumination. Oval light distribution is also suitable for vertical architectural details.



Luminaires installed on the facade create grazing light and thus intense contrasts between light and shadow. Even small projections in the facade can generate extremely long shadows. Surfaces to a height of approximately 6m can be easily emphasised with grazing light.

Large recesses make it possible to accentuate the facade in gradations. Due to the greater distance to the facade, the shadow effect of relief-like surface structures is not as extreme as with grazing light.

To illuminate high facades uniformly it is advisable to increase the distance between the facade and the luminaires. Wallwashers on masts can thus illuminate a facade with a height of about 30m at a distance of 10m from the building.

To illuminate the upper areas of very high buildings the luminaires must be positioned at long distances. The facade can be precisely illuminated with very narrow light distributions, thus also avoiding light pollution.



Polygon Gallery, Vancouver

In a spacious new building, the Polygon Gallery continues its forty-year tradition as an exhibition venue for contemporary photography and media art in Vancouver. Located directly on the waterfront, the building itself is a kind of camera and offers a panoramic view of the opposite skyline. The art is presented on floor space of around 2,300m², a large part being in the naturally illuminated main gallery. ERCO Lightboard spotlights and floodlights on track complement the soft northern light with lighting accents precisely matched to the works of art.

Project data

Architecture: Patkau Architects, Vancouver
 Lighting design: Render Light & Planning Inc., Vancouver. CDM2 Lightworks, Vancouver
 Photography: Moritz Hillebrand, Zurich
 Website: thepolygon.ca



Museum Yves Saint Laurent, Marrakesh

"Yves Saint Laurent discovered light and colour in Marrakesh," wrote "Spiegel Online" about this museum, dedicated to the fashion designer who died in 2008 and his relationship to the area that became his second home. On the outside, the museum building with a facade of Moroccan brickwork is a successful fusion of modernity and local influences - inside, the life and work of Yves Saint Laurent are presented as a festival of colour and light. ERCO lighting technology

breathes life into the exhibits: Optec contour spotlights set precise, sculptural accents of light with high colour fidelity. With low spill light and designed completely in black, the luminaires recede into the background of the "black box" to leave the stage entirely to fashion.

Project data

Architecture: Studio KO, Paris / France
 Lighting design: I.C.O.N. - Akari-Lisa Ishii, Paris / France (lighting design); Christophe Martin, Paris / France (scenography & exhibition design); Sébastien Debant (scenography lighting technician)
 Photography: Christian Schaulin, Hamburg / Germany
 Website: www.museeyslmarakech.com



Museum for Communication, Bern

Winner of the European Museum Award 2019: the museum, which originally emerged from the Swiss Postal Museum, has successfully reinvented itself. Interactive, multisensory, open and playful - descriptions used by the jurors to praise the exhibition concept, which also critically examines new technologies and methods of communication. The lighting concept, working with focused, high-contrast lighting to suit the media, is just as contemporary: for example with this media installation combining Optec spotlights with high glare control and uniform vertical illumination by Pantrac.

Project data

Architecture: Patrick Thurston Architects, Bern
 Exhibition design: Kossmann.dejong, Amsterdam
 Lighting design: mati Lichtgestaltung, Adliswil
 Photography: Moritz Hillebrand, Zurich
 Website: https://www.mfk.ch



The Feuerle Collection, Berlin

Art in a bunker: John Pawson, renowned for his minimalist architecture, designed the spaces of this private museum in Berlin-Kreuzberg. The gallery owner Désiré Feuerle brings contemporary art into dialogue with artefacts from his collection of Asian antiques. Focused light intensifies the atmosphere - the art expert Feuerle selected Pollux spotlights with various light distributions matched to the respective exhibits.

Project data

Architecture: John Pawson, London
 Lighting design: Désiré Feuerle, Berlin
 Photography: Sebastian Mayer, Berlin
 Website: http://thefeuerlecollection.org