LIGHTPOINT.

An ETAP publication | 2005-1



University Library, Utrecht - The Netherlands: Lighting in Harmony with Architecture

Our Experience to Your Benefit

⊳ ergonomic

▷ energy-saving

▷ installation-friendly

▷ special dimensions

 \triangleright integrated

⊳ reliable



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Comparing alternatives from a financial point of view

Comparing different illumination studies in terms of ergonomics, luminaire arrangement and lighting level is quite a task. In addition, there is the economic aspect! ETAP offers you not only personal technical advice but also a financial comparison. This comparison can be included in the form of an extra page in the lighting study. The comparison takes the following items into account: luminaire price, installation cost per luminaire, lamp price and life, burning hours per year, kWh price, ballast failure and ballast price. This provides the basis for a well-informed choice.



Innovation award for UM1 with MesoOptics[™]

From 14 to 15 February ETAP participated in ARC 05, an English lighting show for architects, held in London. UM1 with MesoOptics[™] was the showpiece at the ETAP stand. To cap it all, it also received the award for "Most innovative lighting product". The innovative technology MesoOptics[™] consists of an exceptionally precise microstructure that is applied to a thin film, thereby reducing light loss to a minimum. As a result, the efficiency of MesoOptics[™] UM1 luminaires is 30 % higher than that of traditional diffusers. UM1 with MesoOptics[™] owes its status of most innovative lighting product to its low energy requirements, technical innovation and design.

Introduction

For over fifty years, ETAP has been developing professional lighting solutions for a wide range of projects. This experience has provided us with a wealth of knowledge, which we use to devise the most ergonomic, cost-effective and visually attractive solutions. In this article, we will be focusing on five areas in which we have built up expertise. Each case will be illustrated with a practical example.

Harmony between lighting and architecture

A room's atmosphere is largely determined by lighting. To create a perfect balance between the lighting scheme and the architecture, we endeavour to consult with the architect, engineering consultant and client from the outset.

UNIVERSITY LIBRARY, UTRECHT – THE NETHERLANDS



The new university library in Utrecht is an architectural tour de force. The façade design – alternating strips of black concrete and wide window sections – allows the light to enter in broad strips, which extend right across the building. The architect wanted the artificial lighting to expand these lines of daylight without the actual light sources being visible.

ETAP's answer was a custom-made luminaire based on Thalia® UT31 with a concealed light source. This recessed luminaire provides a perfect balance between task lighting and ambient lighting. At the top of the recessed luminaire, a secondary aluminium reflector directs the light downwards without generating a disturbing glare. The ingenious use of longitudinal and transverse reflectors prevents reflection and hence eliminates glare.

To suspend the unit, ETAP developed, in consultation with the electrical contractor a suspension system for quick and rigid mounting into the concrete ceiling structure.



ETAP supplied

- 2600 custom-made luminaires with concealed light source
- 2600 custom-made intermediate plates
- simple suspension system



The most energy-saving solutions

Energy: a little less will do nicely

ETAP lighting solutions consume less energy than any other comparable system. For our aluminium reflectors we optimise the reflector form and use only top quality aluminium. Thanks to the judicious use of light control systems and a well thought-out siting of the luminaires we reduce energy consumption to a minimum.

How to save energy - undetected by users



ETAP has developed different light control systems that control the light on a per luminaire basis. This allows you both to save energy and to guarantee light comfort for your employees.

ELS, the ETAP Light control System, dims the artificial light in relation to the amount of daylight without the user noticing. How much energy is saved, depends on daylight ingress and the orientation of the building.

ELS enables you to benefit from daylight and save on artificial light.

ELS sensor

MDD, the ETAP Movement Dependent Dimmer, dims the light in places where no one is present. MDD works with a sensor that is sensitive to movement. If there is no longer anyone present, MDD will start dimming the lights until a preset level is reached. The lights are dimmed gradually so as not to cause any inconvenience to anyone in the room. As a result, a significant amount of





energy is saved, especially in large areas where workstations are left unattended for prolonged periods of time.

When MDD and ELS are used in combination, ELS determines the normal light level when users are present and MDD dims the light in their absence, again resulting in a hefty saving.

MDD: easily adjustable with simple switches







| | BEFORE | AFTER |
|---|-------------------|-------------------|
| Number and type of luminaires Installed power (kW) | 435 2x58W 62.5 | 203 2x35W 15.6 |
| Average illuminance (lx) | 380 | 480 |
| Specific power (W/m²/100 lx) | 8.9 | 1.7 |
| Annual hours of use (h) | 3750 | 3750 |
| Theoretical annual consumption (kWh) | 234.375 | 58.500 |
| Saving due to ELS and MDD | | -30 % |
| Actual annual consumption (kWh) | 234.375 | 40.950 |
| Annual energy saving | | 83 % |

CARREFOUR, PARIS – FRANCE

MDD gradually dims the lamps to the lower set level.

Carrefour wanted "a high-efficiency energy-saving lighting system" for its Paris-based head offices, as well as an ergonomic solution suitable for VDU work.

Flexible use of available space

The backbone of the office lighting system is formed by 480 Thalia® RT2 suspended luminaires. Most of their light shines directly down and ensures efficient illumination. 20 to 30 % of the light is distributed indirectly via the ceiling and creates an attractive atmosphere. The excellent design of the EQUILUM® reflectors ensures high lighting comfort and uniform shielding. The luminance remains extremely low in all directions around the luminaires, which makes flexible workstation arrangement possible within the office. The circulation areas are efficiently lighted with Luxial® downlights.

Energy-saving solution

All Thalia® luminaires are fitted with ELSs and MDDs (Movement Dependent Dimmers). These two systems limit energy consumption according to the amount of daylight (ELS) and the presence or absence of persons (MDD). The result: a total energy saving of 83 % without the user noticing.

ETAP supplied

- 480 Thalia® RT2 Iuminaires
- 60 square Luxial[®] downlights
- movement-dependent dimming
- daylight-dependent light control



Custom-made

When standard luminaires do not provide the optimum solution, custom-made solutions are required: specific dimensions, colours, materials, or shapes, an optimised reflector for a specific viewing task, etc. ETAP devises custom-made solutions with the client. We take care of the entire project, from prototype to finished luminaires, rapidly and efficiently.

DEUTSCHE POST, ALZENAU/BAD ORB/WÖRTH – GERMANY

Customer house style

Deutsche Post wanted to improve the lighting of the sorting stations at its sorting centres. The requirements were: a higher illumination level on the envelopes, no disability glare, individual switchability and mounting on the existing sorting furniture. ETAP developed a luminaire with an asymmetric reflector to achieve the illumination required on both the work surface and the vertically arranged sorting bins. Neither the sorters not their environment are exposed to glare. The luminaires are fitted with support arms so that they can be fastened to the sorting cabinets, which come in various types and sizes. The sorter can operate the lamp with a small switch located on the support arm. And as a finishing touch the luminaire is painted in the Deutsche Post colour.







Attention was also paid to the general lighting. The E34 line-system provides a good shielding thanks to the sophisticated reflector. The E34 line system provides excellent shielding thanks to its well-designed reflector. Each E34 line is equipped with an MDD (Movement Dependent Dimmer). This motion-sensitive sensor dims the lamps to the lower set level when no one is present in the area. A smart investment, which has already generated savings of more then 50 %.

ETAP supplied:

- 187 customised asymmetric beam light distribution for task lighting
- 147 E34 line luminaires
- customised mounting brackets
- movement-dependent switching





THE ROYALS, LONDON - UK

A special luminaire for a special ceiling

The Royals Business Park is a brand-new 22,000 m² office complex in London. The huge glass sections allow a great deal of daylight to enter the building. The artificial lighting called for a special approach; the luminaire was adapted to fit a 500 by 500 mm modulated ceiling tile. The ceiling height also varies between 2.7 to 4.6 m and an illumination level of 400 lux was required for the landscape office using as few luminaires as possible. ETAP rose to the challenge by providing a custom-made solution that was seamlessly integrated into the Burgess ceiling system. With their high efficiency and uniform luminance with no distracting reflections on the computer screens, the ISOLUM® reflectors enabled the luminaires to be hung at 2.5 m intervals in one direction and at no less than 3 m intervals in the other direction. The solution represented a 27 % on the original design.

James Marsh (Faber Maunsell, consulting engineers)

"The underlying reason we approached ETAP to develop the office lighting scheme for the Royals Business Park was the high level of technical expertise and attention to detail in the manufacture of the luminaires. As a result of the efficient luminaire solution proposed, we were able to reduce the quantities of luminaires on each of the office floors. Thus providing a cost and energy saving solution to the project. The trip to the manufacturing facility was very beneficial to the design team in demonstrating the lengths that ETAP go to to achieve a high quality product."

James Marsh



ETAP supplied:

- 3610 recessed custom-made luminaires made to fit the ceiling tiles
- perfect finish
- 400 lux with minimum number of luminaires





Lighting is 400 lux throughout, independent of ceiling height.

Air extraction without light loss



Lighting is often located in the immediate vicinity of other building utilities such as ventilation. The challenge is to combine the techniques so as to obtain a rigid ceiling.



The luminaires are seamlessly integrated into the ceiling. ►

Air handling

Extracting air via luminaires is a specialty in its own right. Each lamp has a temperature at which it generates its maximum light output. Especially compact fluorescent lamps and T5 – ø16 mm fluorescent lamps are more sensitive to temperature changes and draught.

ETAP is a specialist in this matter. We have designed various methods to integrate air processing into our luminaires. We patented specific solutions for air extraction without light loss. We can demonstrate and test specific situations in our simulation laboratories.







BANCO SANTANDER CENTRAL HISPANO, MADRID – SPAIN

For its offices, Spanish bank Banco Santander Central Hispano needed 15,500 luminaires suitable for air extraction via the luminaire. Additional requirements included perfect integration with the ceiling, high light comfort, ease of installation and a DALI electronic ballast (Digital Addressable Lighting Interface) in the luminaires. In close cooperation with the ceiling manufacturer, ETAP developed recessed luminaires that blended in with the ceiling. Needless to say, the ceiling looks stunning, as if the reflectors were seamlessly incorporated into the 'ordinary' ceiling planks.

T5 - Ø16 mm lamps are highly temperature sensitive. Cooling by air extraction via the lamp can reduce efficiency by 30 %. That is why, for this project, we opted for an EQUILUM® reflector with air extraction outside the lamp compartment. This bypass system is a patented ETAP invention.





ETAP supplied:

- 15,500 customised luminaires
- 15,500 ceiling tiles as housing
- EQUILUM® reflectors
- DALI ballast

Emergency lighting and architecture

Advanced photometry

Our specialist knowledge of photometry also finds applications in emergency lighting. The resulting optimised light treatment makes it possible to light escape routes with a minimum number of luminaires and ensure uniform pictogram illumination.





BOTEC, WOMMELGEM – BELGIUM

For the emergency lighting of its offices in Wommelgem, engineering consultancy firm Botec wanted an attractive and efficient solution that also had to be maintenance-friendly.

Their choice was our K6 luminaire for escape route lighting in the staircase hall and the K9 luminaire for the workspaces. The minimalist design of these luminaires perfectly satisfied their requirement that the lighting blend in with the architecture.

All details of K6 point to high quality. In the case of K9, the Conix Architecture designers and Enthoven Associates helped reduce the design to its essence. ETAP engineers ensured that its essential function was not compromised, maximum recognition through perfectly uniform illumination of the pictogram. This requirement is amply met by the clear pictogram illumination. Along with the rigid design, the long life of the LEDs (up to 10 years of continuous use) was the decisive factor in their choice of K9.

A patented ETAP solution indicates when the lamp needs replacing as soon as the light output of the LEDs has dropped beneath a minimum level.





→ LIGHT & SCIENCE

Look into the mirror to see the eyes of a predator



Have you ever thought of man as a predator? According to the position of our eyes, we actually are hunters, not game!

Predator versus prey

In human beings, apes, feline predators and birds of prey, the eyes are pointed forward. As a result, our field of vision is limited but we have sharp image and strong depth perception, which enables us to accurately estimate the distance between our prey and us. This is known as a *stereoscopic field of vision*. By contrast, prey (mice, rabbits, small birds, etc.), have eyes on either side of their head and consequently a wide *peripheral field of vision*. Ducks, which nibble their food with their beaks, do not need depth perception, but can see foxes approaching behind their backs.

Overlap

The *light blue* fields in the images represent the total field of vision. The *dark blue* areas are the overlaps, i.e., the area that is seen by both eyes. A large visual overlap produces a better stereoscopic image. Although human beings have given up hunting, our strong depth sight still helps us when driving a car and in many precision tasks. Therefore, there is no reason why evolution should cause our eyes to migrate gradually in the direction of our ears ...

Light sensitive area

Although our peripheral vision is not sharp, we are sensitive to movement and light in that area, e.g. the disturbing reflections from all kinds of light sources. ETAP has already performed a lot of research on the prevention of these reflections. The result: reflectors, which direct light to where it is needed and block it where it is inconvenient. One example is the EQUILUM® reflectors, which prevent peak luminances and uniformly shield the light source in all directions.

The peripheral area may also contain useful information, e.g. the pictograms of emergency lighting in an emergency situation. That is why our emergency lighting includes well-illuminated and clearly visible pictograms. The cheetah's field of vision extends along a horizontal line..

TEST: determine your field of vision

Peripheral field of vision

- 1. Raise your arms sideways to shoulder height.
- 2. Look straight ahead and move your arms slowly towards the centre.
- 3. Your peripheral field of vision begins when you see both hands appear.

Stereoscopic field of vision

- 4. Start from the position in point 3, then close your right eye, keep your arms at shoulder height and move your right arm to the centre; repeat with left eye and left arm.
- 5. Your stereoscopic field of vision extends between both hands.



total field of vision field of vision in which stereoscopic observation

is possible.

Kemble Street an all round success

Kemble Street is an unusual project in the heart of Holburn.

The circular building needed a special lighting solution as part of a major renovation; the lines of luminaires had to follow concentric rings around the central circular building core and there were ceiling depth restrictions. The light fitting had to offer an LG3 compliant solution, as well as meeting the standard target illuminance and energy levels for this type of commercial project. To this end the fittings were spaced at up to 3m centres on a checkerboard pattern.

The need for the checkerboard grid proved to be very useful in securing the specification. ETAP

rose to the challenge by providing a custommade solution that was seamlessly integrated into the aperture of an SAS tile for an architecturally sympathetic solution. The luminaire was based upon an ISOLUM® reflector with the option of a Spatial 360[™]. The excellent design of the reflector ensures high lighting comfort and uniform light distribution. The luminance remains highly uniform in all directions around the fitting, which makes flexible workstation arrangement possible within the office. Spatial 360[™]'s unique capacity to redistribute existing light provides, together with wall washers, an LG3 compliant scheme without the need for uplights. The solution achieved 450 lux at an energy loading of less than 8W/m².



When the building is leased the occupier can install the Spatial optic in the enabled luminaire.

ETAP developed a solution which matched expectations and aspirations of the client, whilst respecting the budgetary constraints.

| | PROJECT DETAILS Special body incorp | JECT DETAILS cial body incorporating U9 reflector | | |
|-----|--|--|--|--|
| | Architects | Sturgis and company | | |
| | Electrical and Mechanical | Graham Powell Consultants | | |
| | Main Contractors | Overbury PLC | | |
| | Installers | CEL Building Services Ltd | | |
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