

LIGHT FOR OFFICES

THE OFFICE IS CHANGING:
THE IMPACT OF COLLABORATION AND COMMUNICATION ON LIGHTING

CONTENTS

Why New Work needs new lighting solutions		6
Transformation with light	Human sustainability	12
	Circular economy	14
	Technologies for people	16
Building blocks of light for New Work		18
	Organised flexibility	22
	Decorative lighting solutions	24
	Acoustic luminaires	26
Single-source supplier for the office		28
A tour of the office	Entrance and reception	30
	Circulation areas and corridors	32
	Collaboration and breakout zones	34
	Traditional workplaces	36
	Meeting rooms	38
	Cafés and canteens	40
	Side rooms	42
	Outdoor lighting	44
Lighting Management		46
Emergency Lighting		48
Digital Services		50
Light as a Service		52
Case studies		54
Research and survey results		66

CREATING LIGHT CREATES INSPIRATION

Ready to discover something new and transform your working environment using light? Explore the exciting world of innovative lighting solutions for the office and be inspired by the latest trends and technological developments.



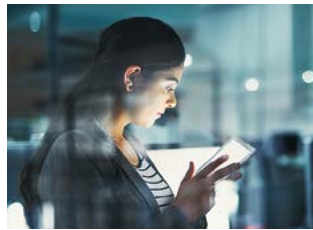
WHY NEW WORK NEEDS NEW LIGHTING SOLUTIONS

From flexible working and open-plan co-working spaces to digital conference systems: the world of work is changing. Office 2.0, hybrid working and work-life balance – these developments reflect three trends currently providing new perspectives on light in the office.



CREATIVITY AND COLLABORATION

The concept of New Work, originally defined by Frithjof Bergmann in the 1970s, focuses on developing the potential of every individual through work and has led to changes in the requirements for office environments. Flexibility and modularity are now more important when it comes to meeting the needs of teams and individuals. Today, welcoming “third places” complement functional workspaces and serve as communal areas for social interaction and chance encounters.



DIGITALISATION AND HEALTH

More recently, the Covid-19 pandemic has further accelerated changes to our working environment. Rapidly advancing digitalisation – in the form of video conferencing, online meetings and digital forms of collaboration – are creating new opportunities for home and mobile working. At the same time, there is a growing demand for products such as ventilation systems and hands-free technologies aimed at supporting health and safety in the office. However, the focus is also shifting to other aspects of a human-centric workplace such as optimal lighting and “healthy” materials and architecture.



SUSTAINABILITY AND FUTURE VIABILITY

Lastly, the EU Green Deal – with its ambitious aim of achieving climate neutrality in all EU member states by 2050 – is also a significant influencing factor on the changing expectations for sustainable office buildings. There is now a demand for energy-efficient and lasting buildings and solutions, recyclable materials free from hazardous substances, as well as products that can be easily dismantled into their individual components and returned to the raw material cycle.

“The world of work has changed more in the past 24 months than in the previous 24 years.”

Jacob Morgan
Futurist & HR thought leader
April 2022

**NEW EXPECTATIONS
FOR TODAY'S
LIGHTING SOLUTIONS**

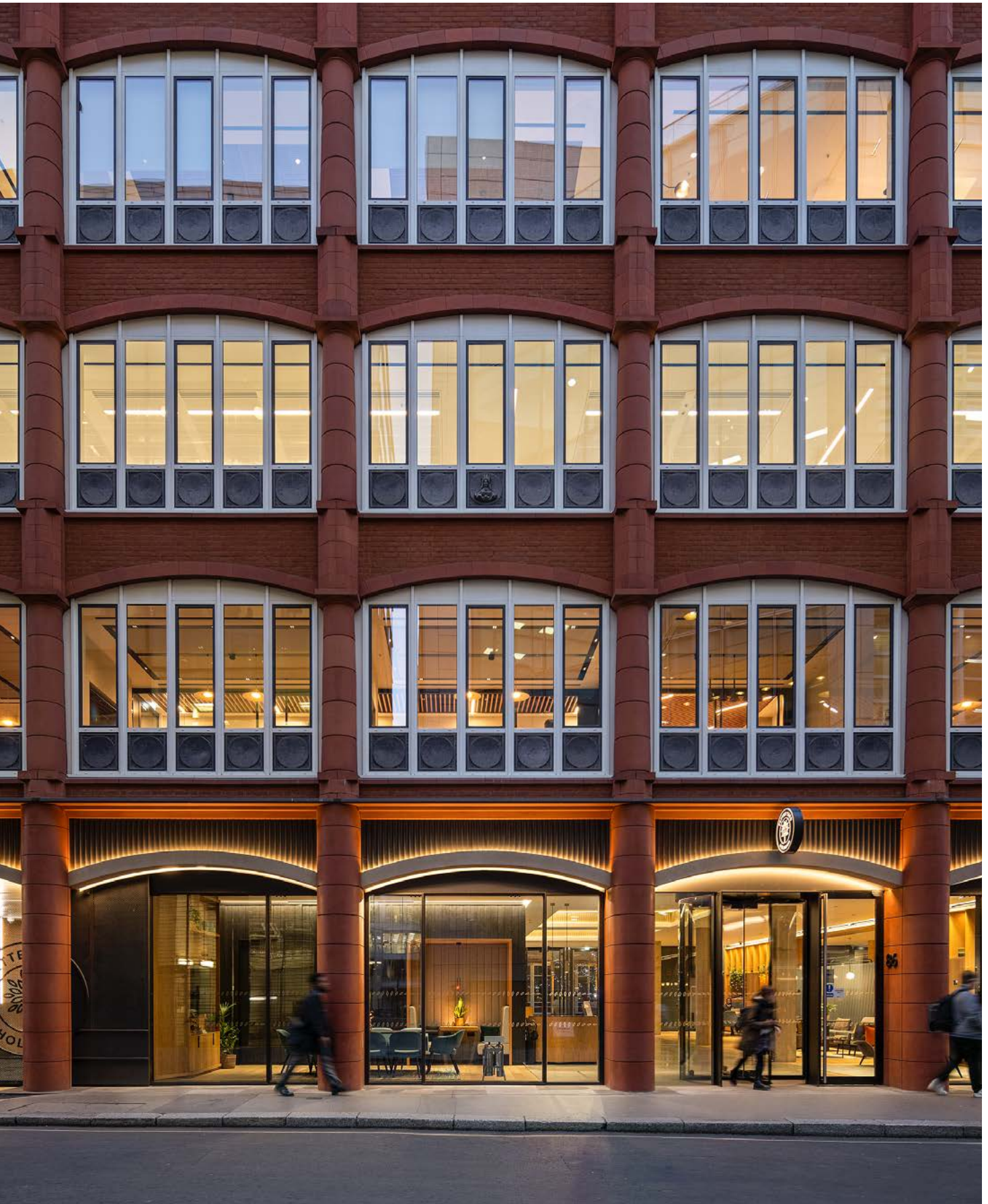
In this dynamic working environment, requirements for state-of-the-art lighting solutions and luminaires are also changing: lighting that can be extremely easily and flexibly adapted to various tasks – and thus accommodate the multifunctionality of new office spaces – is now required. The lighting solutions also need to be future-proof and should ideally be capable of being used and enjoyed for several generations, with optics and electronics that can be easily upgraded.

**DYNAMIC,
HUMAN-CENTRIC,
COMPREHENSIVELY
EFFECTIVE**

Dynamic lighting solutions that can be adapted accordingly depending on their use and on daylight and requirements are also in demand. These not only help ensure the energy-efficient use of light and electricity, but also enable an extremely human-centric use of light, by adapting light colours and intensities to people's natural biorhythms during the course of the day, for example. Today's lighting solutions therefore have an impact on more than one level, as they deliberately incorporate biological and emotional effects on people as well as visual.

**MULTISENSORY AND
CONNECTED**

Lighting solutions are also increasingly expected to meet acoustic spatial requirements and even for sound absorption. Combining light and acoustics not only has a multisensory effect, but also helps reduce costs, material usage and installation work by fulfilling two requirements with one compact solution. Last but not least, digitalisation means that networked lighting solutions are becoming increasingly popular. In an ideal scenario, the lighting infrastructure will network the entire office building, making it a perfect medium for other smart building technologies.



Fetter Yard, 86 Fetter Lane, London | GB

“It is wrong to focus on energy efficiency only during the utilisation phase.”



Source: Thesis 5 of the 17 theses on sustainable building by **Professor Werner Sobek**, a pioneer of sustainable architecture: Zumtobel Group 2019/2020 annual report

OFFICE BUILDINGS FOR FUTURE GENERATIONS

Architecture, (lighting) technology and design retain their best value when they are timeless and durable. Werner Sobek, a pioneer of sustainable engineering and design, provides important food for thought on this topic: “It is wrong to focus on energy efficiency only during the utilisation phase,” he wrote for the Zumtobel Group 2019/2020 annual report, suggesting that the construction phase of a building should also be given greater consideration.

Because, according to Sobek, if we look at a building constructed today, around 50 per cent of its emissions over the next 60 years will occur before it is even occupied. Sustainability therefore also means using resources, raw materials, other materials and components that have already been consumed for as long as possible. Office buildings for future generations are buildings that have been thought through from beginning to end and remain open to new usage scenarios.

75%

of the global labour force in 2025 will be millennials.

Source:
The Deloitte Millennial Survey, 2014

48%

of millennials and postmillennials would leave their job if it prevented them enjoying their lives.

Source:
Randstad Workmonitor, 2023

SUSTAINABLE OFFICE ARCHITECTURE INSPIRES AND HELPS DEVELOP IDENTITY

Light creates zones and targeted accents, combining beautifully with colours, materials and furniture to produce a coherent overall appearance and a space in which employees are given the potential to develop a workplace identity. Architecture is the expression of a company's sustainability strategy, which has a positive effect on employer branding: a sustainable working environment creates a constantly evolving company culture that comes with a new understanding of values and can be experienced on a daily basis, something which is

attractive in times of increasing shortages of skilled workers. In addition, the sensory design of modern office landscapes also stimulates creativity: inspiration, communication, collaboration and co-creation are the focus of New Work environments. The office can only succeed as a central hub of a creative economy that must hold its own against other stimulating spaces, not least the home office and "third places", if room layouts, furniture – and lighting technology – in the workplace are designed with sustainability in mind at all levels.

90%

of respondents said light influences their mood, performance and concentration.

Source:
Repro-Light survey, 2019

55%

of the survey participants said they would like better lighting in their workplace.

Source:
Repro-Light survey, 2019

70%

of respondents would like to have individually adjustable lighting conditions.

Source:
Repro-Light survey, 2019



HUMAN SUSTAINABILITY

Human sustainability exceeds our conventional understanding of sustainability by giving equal consideration to ecology and human needs. At Zumtobel, we aim to design buildings and developments with humans in mind, so that they can be used and enjoyed in the long term. Our goal is to make architecture attractive for many generations to come, using excellent light quality to present it at its best.

ACTIVE LIGHT – FOCUS ON PEOPLE

Our Active Light concept adapts Zumtobel luminaires and solutions to people's needs. Dynamic applications and new technologies allow us to achieve a quality of light that is inspired by natural daylight and therefore also sustainable.

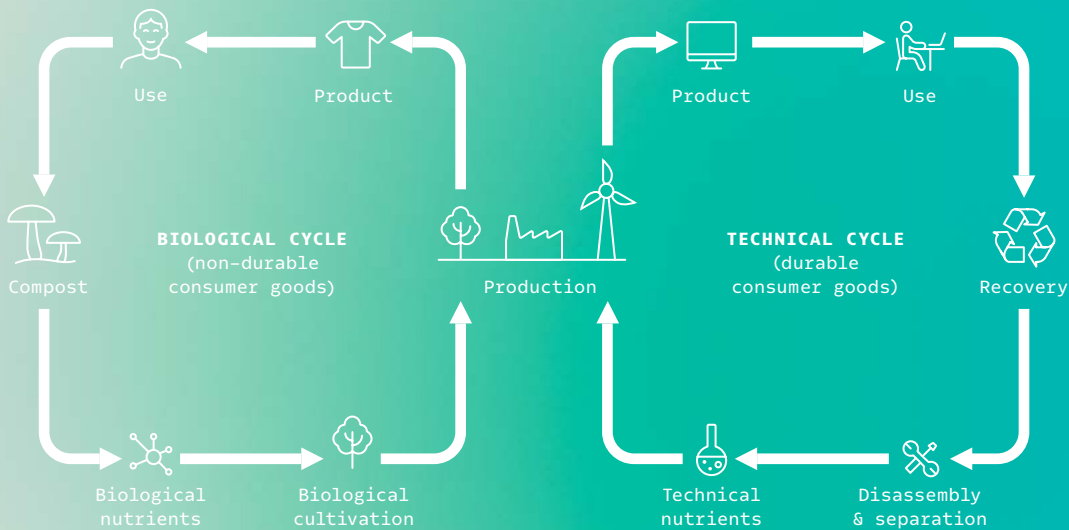
CONNECTED ARCHITECTURE – VALUE CREATION FOR A STRONG FUTURE

Connected architecture enables us to use building technology as a basis with which to transform a building into a learning ecosystem, thereby increasing its value and ensuring its long-term profitable and sustainable operation, but without losing sight of users' needs in the process.



BIOLOGICAL AND TECHNICAL CYCLE

Cradle to Cradle according to Braungart and McDonough



CIRCULAR DESIGN RULES

Sustainable product development

The Zumtobel Circular Design Rules (CDR) define strict and clear recommended actions for product design and services. They were specially developed for the lighting sector by a consultancy firm EPEA Switzerland and design studio E00S led by Harald Gründl. Since 2021, the CDR have stipulated new approaches to purchasing, product design and maintenance, recovery and reuse systems in line with the circular economy. In 2023, free-standing luminaire ARTELEA was launched on the market in accordance with these strict internal specifications. Its sustainable product design has also been independently confirmed by Cradle to Cradle® certification.

CRADLE TO CRADLE CERTIFIED®

Independent standard

The universally recognised Cradle to Cradle® standard allows companies in any sector to have their circular economy products certified. The first Zumtobel product to be certified according to the Products Innovation Institute's new, strict Cradle to Cradle® Standard 4.0 was the ARTELEA free-standing luminaire. The Cradle to Cradle® standard is considered independent proof of an ongoing commitment to sustainability, using two product-related evaluation criteria (material health and product circularity) as well as three related to the company's manufacturing conditions (clean air & climate protection, water & soil stewardship, and social fairness).

REFURBISHMENT

Smart conversion kits

Circular systems form the basis for Zumtobel to develop new, sustainable business models and exploit opportunities for growth: the lighting experts are currently developing innovative products, conversion kits and services in the field of recycling and repair, reuse and remanufacture. Because demand is high: half of all office spaces are inefficient and in need of renovation. The objectives of the circular economy – long-term use of materials, consumption of valuable resources across multiple usage cycles and excellent future-proofing of buildings – are also taken into consideration when replacing office lighting.

CIRCULAR ECONOMY AND SUSTAINABLE PRODUCT DESIGN

Two concepts that help us design lighting that is as sustainable and future-proof as possible are the circular economy and, derived from this, the Zumtobel Circular Design Rules (CDR).

The conceptual model behind this combines economic growth with the lowest possible consumption of natural, non-renewable resources.

The aim of the circular economy is therefore to use raw materials effectively and sustainably. On the one hand, this means avoiding waste and on the other,

making sure that raw materials that have already been used are fed back into the product cycle through recycling, reuse or remanufacturing. The end of a product is therefore not its disposal, but rather the existing product generation serves as “nutrition” for the next new life cycle.



“The ARTELEA free-standing luminaire series adheres strictly to the criteria of circular design.”

Harald Gründl, designer, E00S

“Quality of life contributes to the key performance indicators for social well-being and economic efficiency, and the specific visions of human health and well-being are some of the key criteria in the classification of smart buildings. Particularly in next-generation office buildings, user-oriented, low-carbon and resilient office design solutions should be implemented in future.”

Cobaleda Cordero et al., 2018

TYPICAL OPERATING COSTS

90%

personnel costs

9%

rental costs

1%

energy costs

Source:
World Green Building Council:
Health, Wellbeing & Productivity in Offices
September 2014

TECHNOLOGIES FOR PEOPLE

tunableWhite and Zumtobel SPECTRUM are key technological building blocks for achieving holistic objectives with Active Light. Inspired by the spectrum of natural light and course of the day. For alertness and well-being at the right time.



TUNABLE WHITE

tunableWhite supplements natural daylight. By providing the right colour temperature and light intensity at the right time, it supports people's physiological functions and brain activity. Warm light in the early morning and evening supports well-being and relaxation, while bluish light in the late morning and around midday has a stimulating effect. This supports the circadian rhythm in interior spaces in a positive way, improving fitness and performance during waking phases.



zumtobel.com/tunablewhite

ZUMTOBEL SPECTRUM

Inspired by nature. Zumtobel SPECTRUM technology also facilitates optimal well-being and maximum concentration: azure wavelengths are intensified in order to mimic the spectral distribution of natural daylight. The pupils constrict, and visual acuity is improved. Compared to conventional LEDs, this spectral distribution has a pleasant, neutral white light colour and makes an ideal contribution to the melanopic system and therefore to physiological processes.



z.lighting/spectrum



BUILDING BLOCKS OF LIGHT FOR NEW WORK

Collaboration zones are informal, often cosily designed meeting points in the office where employees can come together, exchange ideas and find inspiration. Particularly in the age of hybrid working, social interaction in a physical office environment takes on a special significance. Because face-to-face contact – whether by chance or planned – helps build a working environment that encourages creativity. The cross-team or cross-departmental exchange of ideas as a starting point for innovations is the underlying principle of collaboration zones.

Superology, Zagreb | HR



Hartung GmbH, Neumünster | DE

CREATE ACCENTS, GUIDE USERS, DESIGN SPACES

Particularly in open spaces, light becomes a key factor. In addition to wide-area, traditional office lighting, accent lighting presents individual objects such as a wall painting or communal coffee bar in an eye-catching way. Light also structures the room or emphasises different zones, becoming an instrument for guiding users through the space. The lighting concept is rounded off by decorative suspended luminaires that create attractive focal points in the room and, as design elements, are part of the interior design themselves.

PERFECT HIGHLIGHTING OF FACES, OBJECTS AND STRUCTURES

At the same time, the lighting creates the backdrop for successful communication in the room. Ensuring employees can see each other and their work properly requires a balanced ratio of diffuse and directional light, as well as semi-cylindrical and cylindrical illuminance and balanced shadowing. Faces, objects and structures are attractively highlighted within the room.



**LIGHT CREATES
ATMOSPHERE**

A combination of luminaires, lighting scenes, luminaire design, furnishings and materiality produces the desired atmosphere for creative teamwork. The colour temperature can be continually re-adjusted to support different activities as required. For example, gentle, warm light creates an atmosphere that encourages creativity, while cool and bright neutral white light has a stimulating effect and provides a backdrop for concentrated, alert collaboration.

**HIGH-QUALITY LIGHT FOR
COLLABORATION ZONES**

Seating areas, lounges, bars: New Work has created new spaces for informal collaboration, which are often designed with a great deal of freedom. Nevertheless, they should still be based on standard-compliant workplace specifications: office providers should not cut any corners when it comes to collaboration and breakout zones. After all, laptops and tablets are also frequently used during more casual interactions to record the results of discussions and perform demanding visual tasks such as reading and writing. Optimal glare control and high illuminances remain key requirements for long periods of alert, efficient and stress-free work – whether at a screen or during face-to-face communication.

**UPDATED STANDARD
FACILITATES PLANNING**

For the first time, the latest version of the EN 12464-1 lighting standard for indoor workplaces (updated October 2021) incorporates the topic of ceiling illumination in specific tables, providing clear guidance to ensure rooms have a friendly and open effect.

LIGHT LINES AND TRACK SYSTEMS

We can assume that the office landscape will continue to change going forward. It is impossible to predict what the office layout of the future will look like: will there be more spaces with collaboration zones, or will traditional workstations regain their popularity? Light lines and track systems offer a solution that allows users to adjust and adapt light during future changes to layout. Installation is usually quick and easy, while relocation or realignment is simple and possible at any time. Light as flexible as your room usage. Future-proofing included.



Moxon Architects Quarry Studios, Aberdeenshire | GB

SUPERSYSTEM: ARCHITECTONIC AND ULTRA-FLEXIBLE

The SUPERSYSTEM 3-phase track can be combined with spotlights, wallwashers or downlights as required. Whether you choose the SUPERSYSTEM integral collection or SCENO and VIVO II: the combination of tracks and luminaire inserts meets a wide range of lighting requirements in the office. Create precise workplace lighting with the help of horizontal illuminances, designated separate zones for collaboration, breakout and through-traffic or accentuate brand-building elements throughout the building: all possible in a well-thought-out system.



ORGANISED FLEXIBILITY



TECTON: LIGHT, EMERGENCY LIGHTING AND SENSORS IN ONE STURDY TRACK

The TECTON lighting system combines a robust, industrial look with an all-inclusive concept: the power supply, lighting controls and connection to the emergency lighting are seamlessly integrated in the trunking. Different luminaire inserts ensure optimal task lighting, zoning of spaces or the accentuation of furniture and objects, as required. The MIREL, LINCOR, ECOOS II and VIVO II luminaire families for the TECTON trunking have also been designed especially for office applications.

Aerocompact, Satteins | AT



SLOTLIGHT INFINITY II: LIGHT AS A LINE

Improved optics, timeless design, maximum efficiency: SLOTLIGHT infinity II is continuing the success story of the continuous light line and has now been designed for the first time according to Zumtobel's Circular Design Rules, using a modular construction that makes it extremely future-proof. Whether as a continuous line or around corners, in a creative X or T shape: SLOTLIGHT infinity II provides a reliable basis for any number of office applications. Available with tunableWhite if required, SLOTLIGHT infinity II works in tune with the circadian rhythm of office staff.



DECORATIVE LIGHTING SOLUTIONS

For attractive office spaces

Efficient, glare-controlled and standard-compliant: the office lighting of recent decades consisted of functional louvre luminaires or downlights. Today, interior designers are supplementing lighting schemes with spotlights or design luminaires that are used in living spaces, shops or museums. These give the workspaces an individual character and create varied light.

HYBRID WORKING AS A FUTURE SCENARIO

Based on the experience of the past few years, many companies will not return to full-time, face-to-face work in the corporate office even after the end of contact restrictions. Instead, hybrid working models are being used to combine the advantages of working from home, co-working and conventional physical spaces. The competing spaces nevertheless have an effect on the traditional office, exerting a pressure to change that was not felt before.

THE CORPORATE OFFICE UNDER PRESSURE TO CHANGE

The end of the daily commute to the office also means the end of the shared bonding experience and interaction at a central place of business. Where a corporate culture is made visible and tangible through architecture, interior design and lighting, where there is direct, interpersonal interaction between employees, it is also much easier to convey a shared understanding of corporate identity and belonging. There is also greater innovative power in the corporate office, essentially because this is where people meet and exchange ideas – even by chance – in a physical space.

RETHINKING THE TRADITIONAL OFFICE

To make the corporate office more attractive to employees, a new culture of welcome is required. This includes a working environment in a versatile design with new possibilities for collaboration and informal interaction. Examples of these include coffee bars, spacious seating areas and creative/meeting zones that are significantly different from the sterile meeting rooms of the past. The aim is to encourage interpersonal dialogue, because real innovation can come even from spontaneous encounters.



The sound-absorbing luminaire
TRAMAO - the name of this pendant
luminaire refers to the textile nature
of the materials involved. "La trama"
is Italian and represents "texture".

ACOUSTIC LUMINAIRES

Optimal vision and hearing

Exposed concrete and open, high ceilings that reveal the wiring and building infrastructure: many contemporary office lofts are designed in an “industrial” style. The spacious, industrial look is not only on trend, but also saves investment in suspended ceilings or drywall constructions.

Luminaires that cleverly combine light and acoustic elements are problem solvers in rooms with lots of concrete, aluminium and glass. Modern, haptic materials such as fleece are often also used: with its excellent absorption properties, fleece soaks up the sound and prevents noise from travelling. At the same time, the materiality also makes these spaces extremely cosy and adds aesthetic touches.

As a result, our sensory perception is supported on two levels: visual and aural. People in the room can enjoy stress-free communication. In addition, combined lighting and acoustic solutions are extremely cost-effective and sustainable, as they use fewer materials and can be installed together in a single work step – at a predictable cost.

FACTORS THAT INFLUENCE THE ACOUSTICS IN AN OFFICE SPACE:



OPEN CEILINGS

Lack of sound-absorbing materials on a large scale



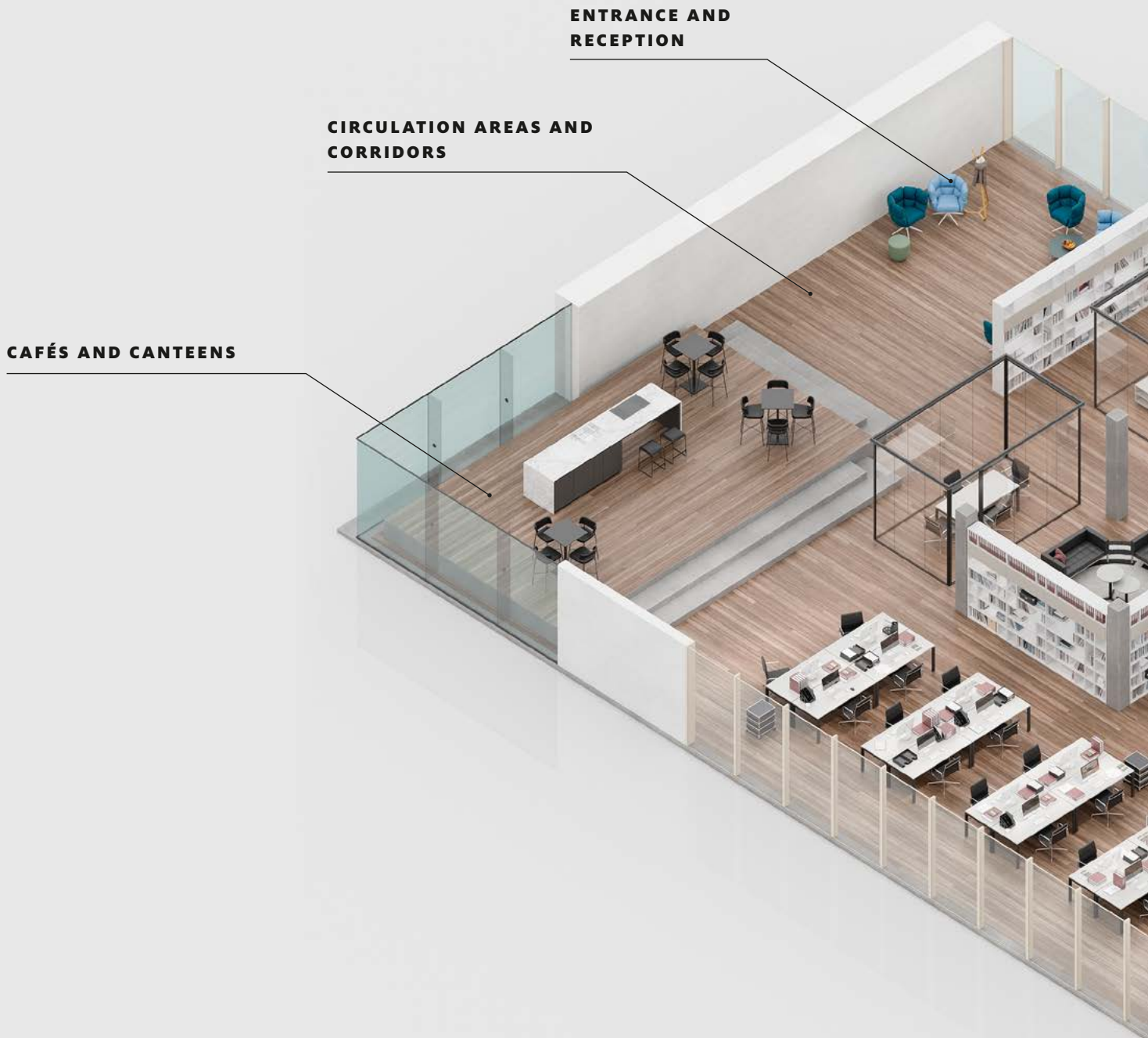
MATERIALITY

Glass, concrete, aluminium, hard floors



SOCIAL INTERACTION

In-person or video conferences (Lombard effect)



**ENTRANCE AND
RECEPTION**

**CIRCULATION AREAS AND
CORRIDORS**

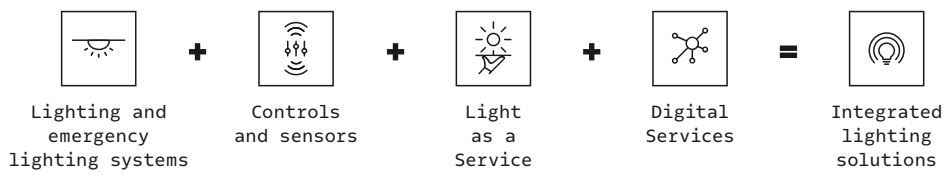
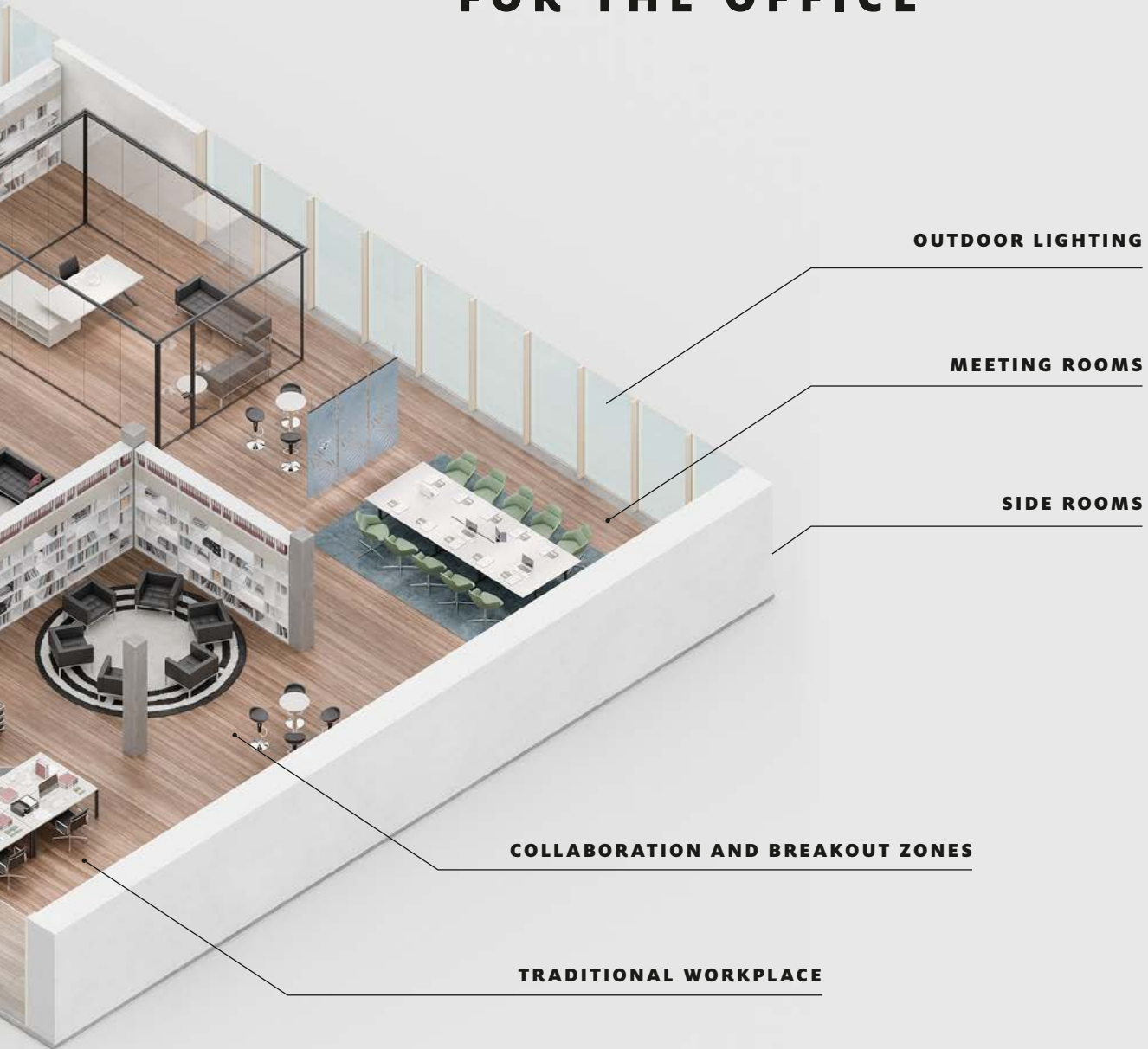
CAFÉS AND CANTEENS

EVERYTHING FROM A SINGLE SOURCE

Sustainable and future-proof lighting concepts for the office need to be extremely flexible and to take into account new visual tasks and room uses. From focussed work at an individual workstation to group work and communication: different usages for light in the office are as varied as Zumtobel's lighting solutions and luminaires.

Zumtobel offers custom solutions tailored to the activities and needs of the people in the room – for the highest standards in installation, lighting technology and design. The goal is to enable employees to perform at their cognitive best and support them not only visually, but also emotionally and biologically. The office lighting of the future is human-centric, demand-oriented, energy-efficient and connected.

SINGLE-SOURCE SUPPLIER FOR THE OFFICE

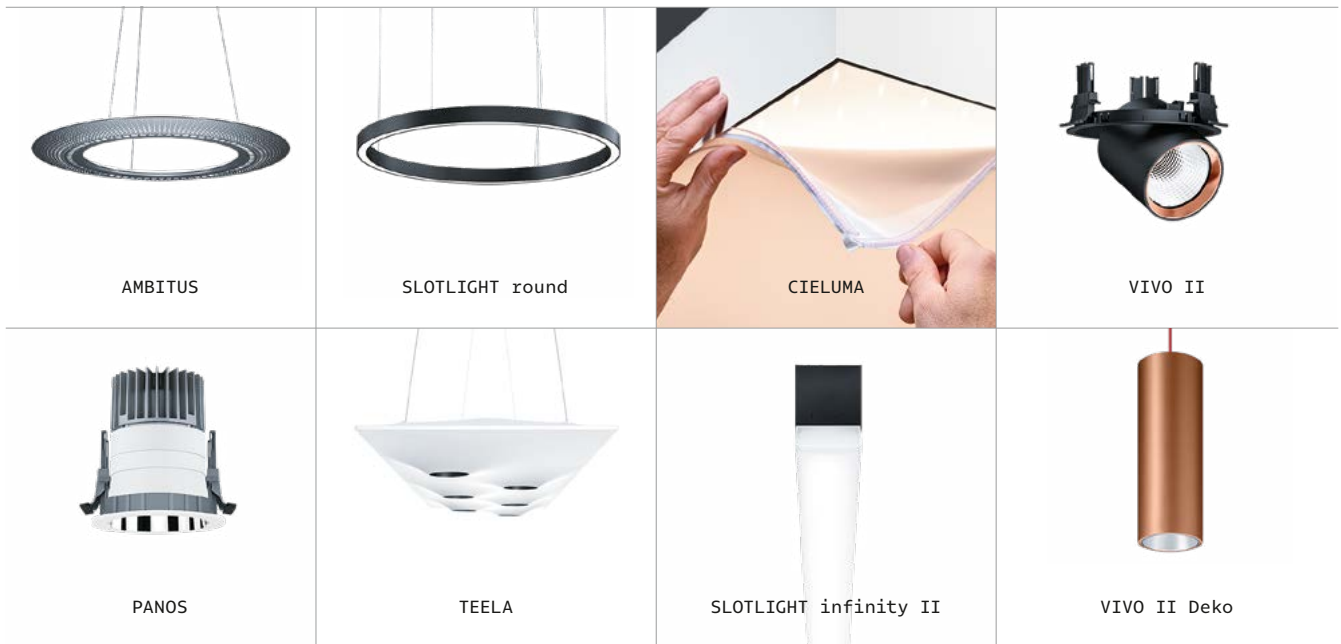




ENTRANCE AND RECEPTION

A friendly reception

The main functions of light in a reception area include providing employees and visitors with a friendly welcome and helping them find their way around the building by supporting the adjustment between the outside and inside lighting conditions. The front desk or reception of an office building is a public-facing area that creates an instant first impression of a company and brand: traditional hierarchical structures or a start-up mentality?



DAYLIGHT LINKING TAKES YOU FROM OUTSIDE TO INSIDE

Lighting with daylight-linked lighting controls helps the eyes quickly adjust to the transition from outside to inside spaces. Marked differences in luminance depending on the weather, time of day and season are thus compensated, improving perception and orientation. In public-facing,

high-ceilinged entrance halls, luminaires with high luminous fluxes create the perfect light conditions, while linear light lines give the room structure and orientation. In addition to surface lighting, accent luminaires with high standards of design and architecture are also used.

They highlight the interior design, define anchor points in the room and visually enhance lounge and waiting areas and reception desks.



CIRCULATION AREAS AND CORRIDORS

Guiding visitors

Well-lit walk-through zones such as hallways, stairwells and corridors support visitor guidance and orientation, transitioning smoothly into collaboration or quiet zones. When cleverly designed to include bar tables or seating, a hallway can be used when needed as an expanded workspace or informal meeting venue, if no other room is free.



CORRIDOR FUNCTION – LIGHT WHEN PRESENCE IS DETECTED

Walk-through zones in offices are only used sporadically. The corridor function means that light is only used at its full illuminance when people are actually in the area. This ensures maximum energy savings and reduced CO₂ emissions, without compromising the comfort or safety of the people in the building. Sensors

detect the presence of people and make sure the light is automatically brightened, including in adjacent areas. Visitors are accompanied through the building by a “cloud of light” – no more walking into a completely dark stairwell. If there is no movement, the lighting is dimmed to a minimum but not switched

off completely. This purely demand-based lighting also has a tangible economic benefit: the resulting reduced operating hours extend the service life of the luminaires. They need to be replaced or repaired less frequently, which reduces operating and maintenance costs.











COLLABORATION AND BREAKOUT ZONES

From a workplace to a place of well-being

Collaboration and breakout zones call for inspiring light to accentuate the architecture and create a pleasant atmosphere.

Cosy lighting solutions can be used to create comfortable spaces that encourage collaboration, creativity and relaxation.

The right light brings the unique character of these zones to life and are so inviting to employees, they enjoy coming into the office.

 <p>ONDARIA</p>	 <p>SLOTLIGHT round</p>	 <p>LANOS</p>	 <p>DIAMO</p>
 <p>VIVO II</p>	 <p>VIVO II PENDANT LUMINAIRE</p>	 <p>SUPERSYSTEM II SUPERSYSTEM INTEGRAL</p>	 <p>PANOS PENDANT LUMINAIRE</p>

LIGHT FOR A PLEASANT ATMOSPHERE

In the collaboration and breakout zones, light plays a central role in creating inspiring office spaces. The right light creates zones and gives the rooms an individual atmosphere of well-being. Warm-white, dimmed light with a colour temperature of 3000K encourages creativity and relaxation. The deliberate use of the interplay of light and shadow creates a unique atmosphere.

LIGHT FOR COLLABORATION

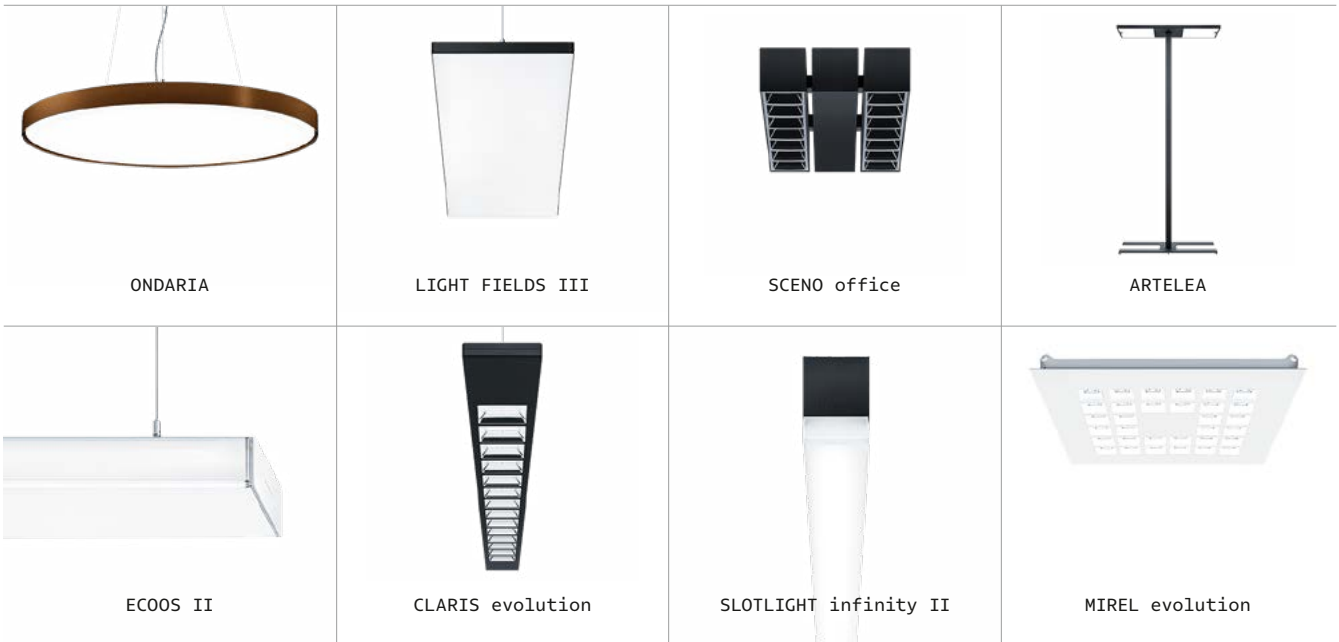
Decorative round luminaires define the central point of social interaction, as fireplaces did in the past. This deliberate zoning contrasts with a design of monotone uniformity. Thanks to these design initiatives, the office is increasingly evolving into a meeting place. Creativity complements productivity.



TRADITIONAL WORKPLACES

Cognitive and emotional support

In the traditional workplace, many tasks are carried out at a desk. The right illuminance and glare control support effective office work and the perception of contrasts on different screens. Uniform distribution of luminance on ceilings and walls improves spatial perception, while zoning and accent lighting provide variety and visual highlights.



LIGHTING CONTROLS FOR CUSTOMISATION

Employees of different ages, different activities and the accommodation of personal preferences all require customised light. Adjustable light scenes ensure a high level of self-efficacy – and thus satisfaction and motivation. Adaptable luminaires on a light track direct the light exactly where it is needed.

FUTURE-PROOF FREE-STANDING LUMINAIRES

Another option for making full use of individual design scope are free-standing luminaires. They function according to the Plug&Play principle, can be used wherever required in the room, repositioned at any time or used in a different layout, without any time-consuming or cost-intensive wiring work. Whether it's a relocation or change of tenant: free-standing luminaires offer maximum flexibility and customisation.

DDL STUDY: CREATING SHADOWS









Zumtobel is using Double Dynamic Lighting (DDL) to create exciting lighting for traditional workplaces based on the latest scientific findings (Aalborg University, Copenhagen). A characteristic of DDL is the combination of directional light with spotlights (sun) and diffuse light (clouds).



MEETING ROOMS

Optimal facial recognition

Meeting rooms are designed to ensure communication and excellent interpersonal interaction. This requires uniform, glare-free lighting for the people in the room as well as the presentation spaces. Quality features for light in meeting rooms include the composition and layout of the luminaires, a balanced ratio of diffuse and directional light, and cylindrical and semi-cylindrical illuminances, which ensure good facial recognition in hybrid video meetings.

 <p>ONDARIA</p>	 <p>LIGHT FIELDS III</p>	 <p>AMBITUS</p>	 <p>PANOS infinity</p>
 <p>ECOOS II</p>	 <p>CLARIS evolution</p>	 <p>SLOTLIGHT infinity II</p>	 <p>TRAMAO</p>

LIGHTING SCENES TO SUIT USERS' NEEDS

Using lighting controls and pre-set lighting scenarios, the lighting in the meeting room can be easily adapted to the respective use: dimming the light in the room for presentations is recommended to create a better

contrast for the presentation area. For group work on the other hand, involving the entire space, a homogeneously illuminated, stimulating and bright environment is more suitable.



CAFÉS AND CANTEENS

Cuisine meets communication

A helpful discussion over lunch, meeting for a coffee at the espresso bar: cafés and canteens in office buildings are particularly important in New Work environments, as they encourage informal interpersonal interaction. Anywhere cuisine meets communication, light must therefore fulfil a wide range of requirements.

			
ONDARIA	AMBITUS	LANOS	PERLUCE
			
PANOS infinity	SLOTLIGHT infinity slim	VIVO II	VIVO II PENDANT LUMINAIRE

LIGHTING SCENES TO SUIT USERS' NEEDS

Food and drink should always look fresh and appetising, this is ensured by Zumtobel luminaires with a high colour rendering index (CRI). In addition, variable colour temperatures enable the creation of different room atmospheres – from cosy warm white to functional neutral white.

Decorative luminaires emphasise the desired architectural effect of canteens. On the other hand, high illuminances and excellent glare control are just as essential as they are in formal workplaces. As so-called “third places”, cafés and canteens are becoming more and more popular as







spaces for informal networking meetings, creative collaboration or focussed quiet work. Lighting solutions with at least 500 lux and UGR < 19 are therefore also increasingly being used in canteen areas.



SIDE ROOMS

Great lighting even “behind the scenes”

Functional side rooms in the office – from the car park to washrooms and the warehouse – need great lighting, too. After all, even “behind the scenes” there should be no break in the prevailing room and light atmosphere of an office building. Zumtobel’s extensive portfolio offers lighting solutions for the entire office building, all from a single source.

 <p>AMPHIBIA</p>	 <p>LANOS</p>	 <p>PERLUCE</p>
 <p>LINARIA</p>	 <p>PANOS infinity</p>	 <p>TECTON basic</p>

CAR PARK

Safety plays a key role in car parks and parking garages: homogeneous light with appropriate illuminances ensures users feel safe even in secluded areas with no natural light and are effective in preventing accidents. Fears are reduced by brightly lit room boundaries.

WASHROOMS AND TOILETS

A lighting solution with illuminances of at least 200 lux ensures optimal visual support, making washrooms safe and pleasant to use. Natural facial perception in the mirror benefits from a high colour rendering index (CRI).

WAREHOUSES

From printer cartridges to extra office chairs: light in storage areas is primarily intended to ensure safety. Uniform shelf lighting supports fast, visual orientation at any storage location, while continuous room illumination ensures dark corners and glare are avoided.



OUTDOOR LIGHTING

Part of corporate identity

Attractive façade and ambient lighting creates a good first impression of an office building and makes it inviting to employees and visitors alike. It is part of the company's corporate identity and ensures the brand is represented effectively to the outside world. The emotional aspects of lighting include targeted accent lighting that highlights special features of the building architecture, façade details or design elements.



Haus der Wirtschaft, Pratteln | CH

PUBLIC-FACING AND SAFE

The functional quality features of successful outdoor lighting are the result of the appropriate and uniform illuminance, which guarantees safety and well-being in the office's immediate surroundings,

while at the same time avoiding light pollution. As a single-source supplier, we draw on the expertise of Thorn, our affiliate brand in the Zumtobel Group.

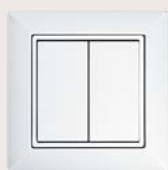
	CIRCLE KIT	CIRCLE KIT tune	DIMLITE	DIMLITE pro	LITECOM	basicDIM Wireless
Dimming/brightening and grouping	● (2)*	●	● (4)*	● (16)*	●	●
Presence control			●	●	●	●
Daylight linking regulation			●	●	●	●
tunableWhite		●		●	●	●
Circadian rhythm					●	●
Automation					●	●
Venetian blind control					●	
Building monitoring					●	
Energy monitoring					● lightingGO	● to a limited extent

* maximum number of groups



CIRCLE KIT (TUNE)

An intelligent and compact control package that enables the smart management of multiple luminaires and displays predefined lighting scenes at the touch of a button. CIRCLE Kit meets the requirements of a modern office environment: the individual light settings support employees emotionally and promote well-being in the room. CIRCLE Kit (tune) is the perfect room control system with wall switches for meeting rooms or collaboration zones.



DIMLITE

From dimming/brightening and switching lights on/off centrally to creating a specific lighting scene, DIMLITE is the perfect introduction to the world of smart lighting management, with a basis module and a variety of connection options for control points, PIR or light sensors. And thanks to the dedicated DIMLITE app, electricians and electrical consultants can easily create wiring diagrams with the desired functions and products.



DIMLITE PRO

Small but perfectly formed: DIMLITE pro enables the lighting controls in traditional workplaces to be planned and commissioned on a graphic interface. It takes just a few clicks to create a powerful system from individually assembled components. Sensors, conventional switches and remote controls make DIMLITE pro simple and smart to operate. DIMLITE pro is also the perfect control system for reducing energy costs and CO₂ emissions and improving lighting comfort.

LIGHTING MANAGEMENT

Smart lighting controls for efficiency, comfort and safety

Use less energy, reduce CO₂ emissions, cut costs and meet sustainability requirements: anyone who wants to successfully operate a property or rent it at attractive conditions needs smart building infrastructure.

THE RIGHT LIGHTING SCENE FOR EVERY REQUIREMENT

Dimmed, warm, communicative – lighting can act like a fireplace around which employees gather for creative brainstorming session, or it can be stimulating with bright room boundaries, for social interaction in open-plan zones. Cylindrical illuminance that is perfectly adapted to the space makes it easier to recognise faces during video conferences. A variety of lighting scenes with an extensive range of smart control options for a variety of work uses.

LIGHTING CONTROLS: FROM THE INDIVIDUAL ROOM TO THE ENTIRE BUILDING

Always the right solution for adjusting light: LITECOM is suitable for central lighting controls in the whole building with presence and daylight sensors, emergency lighting integration or integration in the building management system via BACnet. CIRCLE Kit (tune) can be used for room control via wall switches in canteens, meeting rooms or collaboration zones, DIMLITE pro for presence and daylight linking in the traditional workplace. basicDIM Wireless is a renovation solution for upgrading switchable old installations. The wireless room solution can be integrated via a DALI gateway in LITECOM.



LITECOM & LITECOM INFINITY

LITECOM is a central lighting controls system for the whole building with presence and daylight sensors, emergency lighting integration or integration in the building management system via BACnet: clear and self-explanatory, for convenient commissioning, intuitive everyday use, simple installation and tailor-made expansion, division or redesign options. Additional functions can be adapted at any time with the help of user-friendly apps.



BASICDIM WIRELESS

Wireless, slimline, easy to install: basicDIM Wireless is a perfect lighting control system for individual rooms but can also be used throughout the building. Whether in offices, reception areas or showrooms, thanks to wireless remote control, basicDIM Wireless is extremely quick and easy to commission and is a problem solver in renovation projects without DALI wiring – for smart lighting control via app, wireless wall switch or sensor. The wireless room solution can be integrated via a BDW DALI gateway in LITECOM.



EMERGENCY LIGHTING









Integrate emergency lighting, focus on safety

Zumtobel's state-of-the-art lighting control systems also enable easy integration of emergency lighting.

Employers are legally obliged to protect their employees, after all. Even if light or power in the office fails, employees must be able to leave the workplace safely. An emergency lighting system ensures a minimum level of lighting and well-signposted traffic and escape routes.

Linking emergency lighting and lighting controls makes it easy to monitor emergency lighting systems. For example, the lighting management system can carry out regular, automated test runs, which are logged centrally in a test book. If a safety luminaire or escape-sign luminaire ever fails, the system will raise the alarm accordingly. This ensures maximum protection, especially in times in which we increasingly have to deal with scenarios such as power failures.

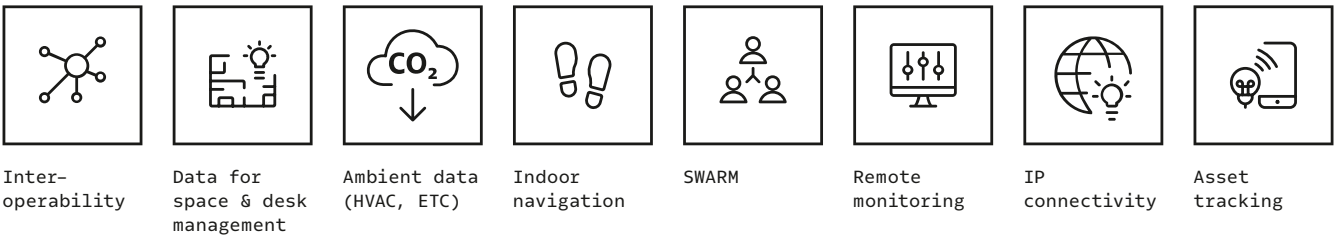
An integrated management system for general lighting and emergency lighting also offers financial benefits: the purchasing, commissioning and maintenance costs are lower for a joint system than for two separate ones. The amount of wiring can also be effectively reduced – without sacrificing comfort or safety.

 <p>RESCLITE</p>	 <p>PURESIGN</p>	 <p>COMSIGN</p>	 <p>ARTSIGN</p>
 <p>Emergency escape lighting with self-contained power supply</p>	 <p>ONLITE local self-contained system</p>	 <p>nBOX group battery system</p>	 <p>ONLITE central CPS central battery system</p>



THE SMART OFFICE OF THE FUTURE

Lighting infrastructure is the medium for digital future-proof technologies in the office building. Networked IoT solutions use sensors with building management software to further improve room usage. This networking of building services enables monitoring of desk and meeting room utilisation as well as air quality trends and other environmental parameters in the room.



OPTIMISE SPACE REQUIREMENTS AND USE ENERGY EFFICIENTLY

In the era of working from home, many zones in the office remain unoccupied. Sensors in the lighting infrastructure or in the luminaires themselves detect presence and automatically adapt the light. They also provide information on how frequently rooms are used. Employees can use an app to find a free workplace. Data analysis helps to precisely plan space requirements in the office and increase the profitability of the premises.

ENSURE ENVIRONMENT QUALITY

Air quality in the office has been extremely important since long before the pandemic. Well-ventilated rooms also make sense from an employer’s perspective, because when employees are happy, they are also extremely productive. Air quality sensors can be used to measure values such as CO₂ content, air humidity and temperature as well as VOC values. The system sends an alert when certain limits are exceeded or not reached, and action is required.

DIGITAL SERVICES FOR DATA-BASED USAGE MODELS

Zumtobel’s Digital Services allow data that has already been collected from the office to be used to create added value. Across all sectors, big data can be transformed into concrete business and usage models – always tailored to the use cases in question. Office architecture thus transforms into a learning ecosystem and, thanks to digitalisation and data analysis, continues to better adapt to humans and their environment. Light becomes a starting point for networked buildings and value-creating applications.



LIGHT AS A SERVICE

Everything from a single source

When you opt for this Zumtobel service package, you place light and all the work associated with it in reputable, expert hands. It starts with the planning of a modern and efficient LED-based lighting system, but also includes the professional dismantling and recycling of the existing lighting along with turnkey delivery and installation of the new lighting system, not to mention the financial incentive to obtain light at a fixed monthly fee rather than purchasing it outright.

MONTHLY RATE. PERFECT LIGHT.



SUSTAINABLE

Save on electricity costs, resources and CO₂ emissions thanks to efficient lighting technology that takes circular economy goals into consideration



DIGITAL

An uncomplicated path to modern infrastructure and digital services as the basic framework of a smart building



SECURE

Guaranteed certainty even in volatile times thanks to plannable costs and the individual adaptation of solutions with low capital commitment



INDIVIDUAL

Tailor-made worlds of light with the focus on people's needs



HARTUNG GMBH & CO. KG

Neumünster | DE

Cosy seating areas, open-plan collaboration zones and quiet rooms where inspiration can be found: Hartung GmbH's headquarters in Neumünster, Schleswig-Holstein, is an incredibly modern "open space" in line with New Work criteria, spread over 1500 m². A site specifically aimed at "people with ideas and passion" that represents a company's headquarters, co-working space and showroom, all rolled into one.

Zumtobel's lighting solution contributes to this by presenting the modern office architecture in its best light, establishing an intuitive layout and creating a harmonious room atmosphere.

Instead of self-contained individual offices, Hartung GmbH employees can now enjoy an open, spacious room layout. Zones for focussed individual work, communication and breaks for refreshments merge into one another. Open lines and a continuous exposed concrete ceiling give the space a contemporary "industrial" style. Lighting by Zumtobel

helps to open up the space in a user-friendly way and create the best conditions for a versatile, inspiring work environment. "Our employees are delighted and are enjoying the different lighting scenarios," summarises Olaf Reiner, Managing Director of Hartung GmbH.



**THE COSINESS OF HOME,
THE COMMUNICATIVE
ATMOSPHERE OF A
MARKETPLACE**

Two contrasting lighting instruments from Zumtobel's portfolio lay the foundations for the state-of-the-art LED lighting solution: ONDARIA provides harmonious, homogeneous surface light from an organically shaped light body. As a decorative pendant luminaire, it enhances the airspace above the free-standing staircase on the first floor, while also providing pleasant basic lighting on the ground floor and upper floor.

**LIGHT GUIDES THE
WAY AND STRUCTURES
THE ROOM**

SUPERSYSTEM spotlights on a 3-phase track provide directional lighting and lively accents, with the uniform linearity of the track creating an intuitive layout. At the same time, SUPERSYSTEM also helps to delineate individual work zones – whether it's a kitchen or meeting space, quiet room or public-facing lounge area. Additional designer and decorative luminaires are also installed on the track to catch the eye.

Zumtobel's lighting solutions equip attractive workspaces with human-centric light, signalling personal appreciation towards each individual colleague. Office lighting for maximum performance, motivation and visual comfort.



FETTER YARD

London | GB

The goal of a comprehensive modernisation of the Fetter Yard office building was to create a contemporary look and update the building infrastructure. Between 2019 and 2022, an attractive building in the London district of Holborn emerged from the plans of ORMS Designers + Architects. Zumtobel's LED lighting solution not only ensures a uniform look and significantly reduced energy consumption, it also enables extremely flexible use of the space – thanks to high-quality light that reaches right into the furthest corners of the office.

Where fluorescent tubes previously emitted diffuse light, state-of-the-art LEDs now provide efficient and human-centric office lighting. Where the old luminaires created a rather functional impression, today streamlined light lines create a contemporary,

appealing aesthetic. Lighting by Zumtobel played a decisive role in bringing more brightness into the Fetter Yard building to give the rooms a uniform look and contemporary feel.



RECESSED, SURFACE-MOUNTED, PENDANT: SLOTLIGHT IN ALL ITS VARIANTS

The basis of the aesthetically pleasing lighting solution is the strict linearity of the Zumtobel SLOTLIGHT light line and the multifunctional SUPERSYSTEM LED lighting tool. SLOTLIGHT infinity is installed in all office areas and passageways of the building – both as a recessed and surface-mounted luminaire. The suspended SLOTLIGHT infinity DI variant of this slim light line is used in the basement and on the ground floor. The dust- and spray water-protected variant of the SLOTLIGHT light line with an IP54 rating was chosen for external facilities such as the communal inner courtyard.

EXCELLENT LIGHT, NO MATTER WHERE THE DESK IS PLACED

SLOTLIGHT's consistent linearity creates a great sense of calm for the design of this architecturally unique building and enables flexible room design: tenants benefit from excellent light quality, regardless of where in the room the work desk is placed.

The SUPERSYSTEM track system is also linear. Zumtobel's multifunctional LED lighting tool is used mainly in the reception area and – in the IP-protected variant – in the inner courtyard.

In addition to the atmospheric upgrade, Zumtobel's lighting solutions also impresses from an economic perspective: "Compared with fluorescent tubes, modern LED luminaires can save up to 70 per cent on lighting energy," says Zumtobel Project Manager Matt House.



UPTOWNBASEL AG

Arlesheim | CH

Floor-to-ceiling glass fronts. Green interior spaces. An environment befitting agile work. uptownBasel is a pioneer – in more ways than one. In the past, electric motors and locomotives were assembled on the historic Schorenareal site. Today, the innovation campus in Arlesheim not only offers attractive workspaces for knowledge transfer and Industry 4.0, it is also Switzerland's first industrial project to receive the coveted Standard Nachhaltiges Bauen Schweiz (Swiss Sustainable Building Standard or SNBS) sustainability certification.



**Project report
and interview**



GREEN BUILDING PAR EXCELLENCE

A place where space is used flexibly with an eye on the future. Buildings that can be disassembled easily to support the circular economy. A 20 000-square-metre photovoltaic system plus heating that doesn't rely on gas. Old, regional timber. And last but not least: a Zumtobel continuous-row lighting system that allows flexible, future-proof room usage. Not to mention state-of-the-art lighting controls for on-demand, energy-efficient lighting. These are just a few of the many different aspects that make the 70 000-square-metre uptownBasel a Swiss flagship project for green building. Until now, SNBS certification has only been given to residential and office buildings.

FUTURE-PROOF AND FLEXIBLE

"The builders for uptownBasel are a Basel family that are not building for their own benefit, but for their children and children's children," explains Hans-Jörg Fankhauser, the site developer for uptownBasel. "Sustainability was a focus right from the first moment." Zumtobel not only supplied the entire lighting solution for the futuristic site, it was also responsible for the lighting design. With its incredible flexibility, readiness for future needs and compatibility with all types of luminaires and sensors, the TECTON continuous-row lighting system was the perfect fit for the dynamic, forward-thinking workplace.

LIGHT FOR PEOPLE AND THE ENVIRONMENT

While workshops and production halls are fitted with functional, robust TECTON continuous-row luminaires, TECTON MIREL office lighting prevents disruptive glare on screens. The lighting controls give staff the perfect amount of light at any time of day, ensuring focussed work, creative exchanges and restorative breaks. "The settings work so well that users can't tell the difference between artificial light and daylight. The feedback has been overwhelmingly positive," concludes Philipp Bienz from electrical installation company Etavis Kriegel + Schaffner AG.



EUROPEAN PATENT OFFICE

Munich | DE

Energy-efficient, tailor-made, user-friendly: Zumtobel's lighting solution fulfils three requirements of the European Patent Office in Munich at the same time. The lighting in the administrative building at the central Pschorr-Höfe site (BT1-6) needed to be modernised after almost 30 years in operation, particularly in light of the 2023 fluorescent lamp ban. With its state-of-the-art LED lighting solution, Zumtobel can save at least 78 per cent of the primary energy demand for lighting in the property's offices.

Zumtobel is currently providing 20 000 luminaires for the European Patent Office's administrative campus in Munich. The goal: improved lighting comfort and optimal lighting performance that supports employee concentration and performance and helps create a pleasant ambience.

Users themselves were allowed to rate in advance which lighting scenario they liked. Zumtobel's MIREL evolution recessed luminaire entered the race as a clear favourite for the offices.



1:1 REPLACEMENT DURING BUSINESS OPERATIONS

Currently the refurbishment measures are taking place section by section using 1:1 luminaire replacement. This is possible during day-to-day business operations, as the European Patent Office has many individual offices that are being modernised step by step. Four to six custom-made versions of the MIREL evolution are installed in each individual office, around 13 000 pieces in total. The loss-free light direction with optimal glare control (UGR < 19) ensures reduced strain on employees' optic nerves. They are more efficient and focussed in the workplace – and go home feeling more physically relaxed at the end of the working day.

LEDS INSTEAD OF FLUORESCENT LAMPS

In the corridors of the European Patent Office, Zumtobel replaced the existing compact fluorescent lamps with Cetus downlights from the portfolio of its affiliate brand, Thorn. In order to save additional energy, Zumtobel preprogrammed the recessed luminaires to the desired luminous flux value at the manufacturing stage. This is another ten per cent below the level that was previously used.

ENERGY DEMAND FOR OFFICE LIGHTING REDUCED BY 78 PER CENT

The European Patent Office's comprehensive lighting refurbishment is making an impact: "Based on an effective operating time of 1500 hours per year for each luminaire, we will be able to save at least 78 per cent of the primary energy demand for lighting in the offices once the upgrade is complete," summarises Zumtobel Project Manager Kay-Uwe Dingeldein. This paves the way for the European Patent Office's ambitious climate goal: by 2030, all of the organisation's buildings should be CO₂ neutral.

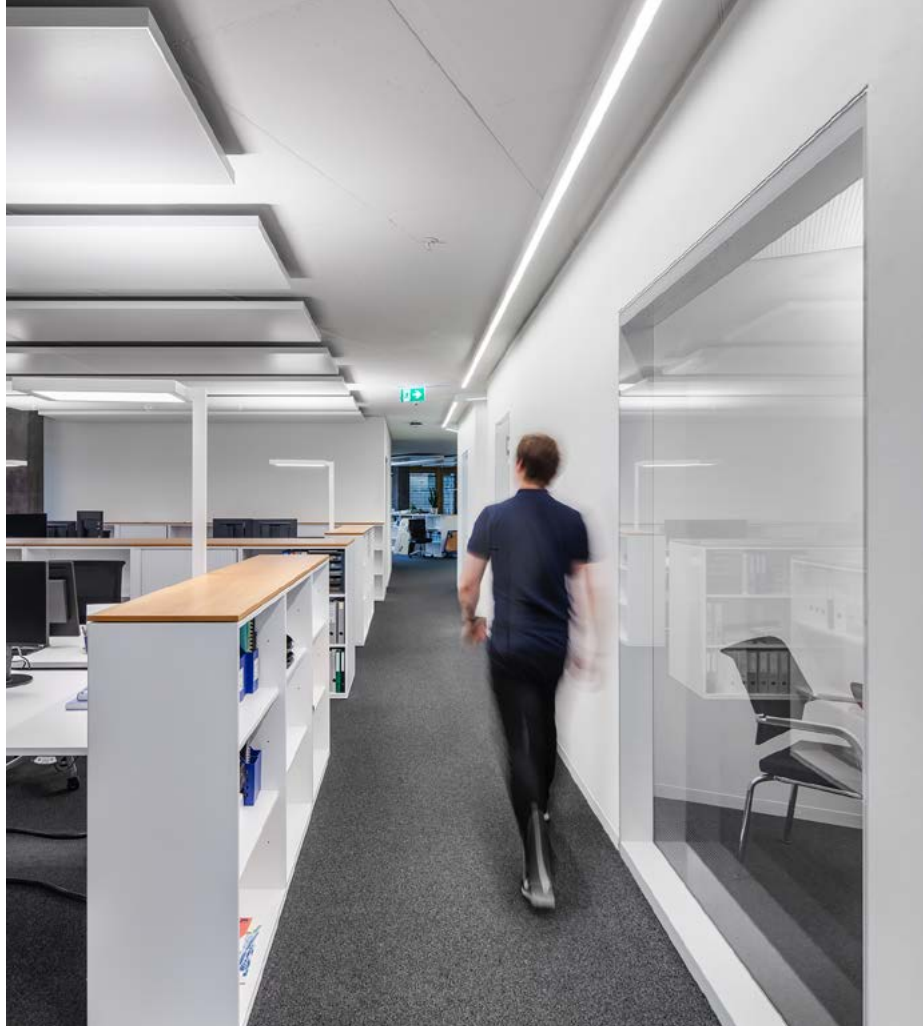


AMSTEIN + WALTHERT AG **Zurich | CH**

Do we still really need so much office space? Can power consumption be optimised? And what does the perfect working environment look like? In collaboration with Amstein + Walthert, one of Switzerland's largest engineering and consulting firms, Zumtobel wanted to find out more about digitalisation, home working and changing work models. Together the partners have set up a smart building environment at the Andresturm in Zurich in which to test the digital office applications of the future – using the lighting infrastructure as a basis.

The showcase rooms created by Amstein + Walthert bring together the expertise of both companies: from the surveying of existing building data and the planning and implementation of the lighting and technical infrastructure to the continuous analysis and improvement of processes using

smart building management. To this end, Zumtobel provided 19 high-quality EPURIA free-standing LED luminaires – all equipped with an integrated presence and brightness sensor, together with six air quality sensors. Research is being carried out on two specific topics.



TOPIC #1: IMPROVING THE QUALITY OF INDOOR SPACES

Air quality in the office has been extremely important since long before the pandemic. In well-ventilated rooms, employees feel both well and perform at their best. With the help of air quality sensors, Amstein + Walthert can now measure CO₂ content, air humidity and temperature as well as VOC values. The system sends an alert when certain limits are exceeded.

TOPIC #2: GETTING THE BEST USE OUT OF WORKPLACES

As a result of home working regulations, employees are no longer all in the office at all times by default. The EPURIA luminaires from Zumtobel serve as sensors and data points. They automatically detect presence and ambient light – and dynamically adapt their light output accordingly. This not only saves energy, but also provides Amstein + Walthert with information about future space requirements.

LEVERAGING POTENTIAL WITH SMART BUILDING INFRASTRUCTURE

To be able to evaluate and analyse the acquired building data at a glance, Zumtobel sends it to a dashboard: the system displays and analyses light and environmental data. “Today’s state-of-the-art lighting solutions are digital and IoT-ready,” sums up Ian Abegglen from Zumtobel. “They make the lighting and surroundings of a property measurable and qualifiable, and thus offer enormous potential for improvements.”



IZD TOWER

Vienna | AT

With LEED certification in both Gold and Platinum as well as Gold ÖGNI/DGNB certification, the IZD Tower is one of Vienna's sustainable office buildings. Inside, a foyer that was redesigned in 2022 welcomes visitors into the glass-covered atrium. The redesign incorporates the organic design language of the surrounding areas, including the waters of the Old and New Danube as well as the large Donaupark, which are depicted in the form of waves. The open-plan lounge/waiting area also contributes to the atmosphere of well-being and is equipped with a CIELUMA light ceiling from the portfolio of Zumtobel and its project partner, Typico.

Relax and feel good. The IZD Tower's new foyer and the adjoining atrium provide a particularly appealing atmosphere for visitors – with an organically shaped seating area, a number of spherical

luminaires in a wave-like installation, vertical wooden slats and the CIELUMA light ceiling. Visitors are now greeted by an open, inviting room instead of an extremely impersonal, empty floor space.

LIGHT AS IF IN THE OPEN AIR

The large CIELUMA light ceiling contributes to the optimal combination of lighting, acoustics and space: "With its sound-absorbing effect, its dynamic, stimulating light and its individual print design, CIELUMA emphasises the most important features of the new room ambience," says Bernhard Schopper, Project Manager at Zumtobel.

Translucent circles in different sizes are applied in a loosely staggered way across the entire surface of the CIELUMA. They are based on the idea of a perforated metal ceiling. The perforated pattern is concentrated in the middle of the light ceiling and decreases at the edges. The darker part of CIELUMA is manufactured with a lower transmittance. The interplay between different levels of brightness gives the light a vivid, natural appearance – almost as if in the open air.



OPTIMAL VISION, HEARING AND VENTILATION

As well as its illuminating elements, CIELUMA is also characterised by its sound-absorbing properties. Visitors can concentrate fully on the people they are meeting without being distracted by background noise in the atrium. CIELUMA's all-round shadow gap that draws outgoing air from the foyer further contributes to the inviting ambience it creates. Light, acoustics, air quality: three advantages in one multifunctional light ceiling.

OFFICE LIGHTING STUDIES

DOUBLE DYNAMIC LIGHTING

The aim of the study was to develop an innovative planning strategy. Research was focussed on the complex interaction between the dynamics of daylight and artificial light ("Double Dynamic Lighting") in an office. An additional directional light source modelled on the incident daylight was installed as work lighting. The lighting concept included a variation of direct and diffuse light. The colour temperature was also adapted in line with the weather conditions and incident daylight.

Hansen, E. K., Bjørner, T., Xylakis, E. & Pajuste, M. (2021, 16 February). An experiment of double dynamic lighting in an office responding to sky and daylight: Perceived effects on comfort, atmosphere and work engagement. Indoor and Built Environment; SAGE Publishing. <https://doi.org/10.1177/1420326x21991198>

THE EFFECT OF WALL LUMINANCE ON ROOM APPRAISAL

The spatial environment has an influence on collaboration, concentration and creativity in the office. This study looks at how wall luminance impacts room appraisal, emotions, alertness and performance when solving problems. Higher luminances improved room appraisal. No significant impact on emotions or performance could be determined, however, but, surprisingly, brighter spatial perception improved subjective alertness, which may be explained by non-visual (biological) effects. In the planning approach for office lighting, wall luminance and room aesthetics should also be considered alongside the light quantity in order to provide the best possible support for office work through light.

De Vries, A., Souman, J. L., De Ruyter, B., Heynderickx, I. & De Kort, Y. A. (2018). Lighting up the office: The effect of wall luminance on room appraisal, office workers' performance, and subjective alertness. Building and Environment, 142, 534 – 543. <https://doi.org/10.1016/j.buildenv.2018.06.046>

EUROPE-WIDE SURVEY SHOWS NEED FOR ACTION ON LIGHTING

In order to identify at an early stage which factors play a role in luminaire development, a Europe-wide survey was launched in collaboration with Mondragon University. Approx. 90% of the study participants stated that light influences their mood, attention and performance. In addition, 55% of the respondents felt that their workplace lighting could be improved. Older workers in particular agreed with this. Furthermore, 70% of the study participants wanted to have individual control of their lighting environment and 80% of respondents wanted lighting conditions that automatically adapt to their requirements. On the one hand, the survey highlights the need for action to improve light quality in the office, on the other, it points to opportunities for harnessing the positive impact potential of light on performance, well-being and health in the workplace. (Source: Bartenbach, Aldrans)

STUDIES ON DEVELOPMENTS AND TRENDS IN THE OFFICE

OFFICE DESIGN AND ITS IMPACT ON HEALTH

The results showed that employees all perceive their environment differently. The study also showed the correlations (and contradictions) between the three dimensions of the sense of coherence (comprehensibility, manageability, meaningfulness). Design aspects play a more central role in the office layout in strengthening psychological resilience. The design should be continuously modified, with employee input, during the usage phase. The study concludes that an "ideal" office environment should not be the goal. Instead, office design should create an environment that employees perceive as comprehensible, manageable and meaningful. This also applies to lighting design.

Forooroghi M., Miedema E., Ryd N., Wallbaum H. (2021). *How Does Office Design Support Employees' Health? A Case Study on the Relationships among Employees' Perceptions of the Office Environment, Their Sense of Coherence and Office Design.* *Int J Environ Res Public Health.*

RANDSTAD WORKMONITOR, 2023

- 1) Attitude: 72% of respondents describe their job as a key element of their lives. 48% would leave their job if it affected their quality of life.
- 2) Expectations: Almost half of the employees are receiving some kind of support from their employers, such as extraordinary salary increases to compensate for the increased cost of living.
- 3) Security: 52% are concerned about their jobs due to global economic developments.
- 4) Retirement: Only 51% of respondents still believe that they will be able to retire at the age of 65 (previous year 61%) due to global economic developments.
- 5) Loyalty: 54% would leave their job if they felt they were not part of the company or the team. 42% would not accept a job if the company's values did not align with their personal values.

Wright, M. (2023): *Randstad Workmonitor, 2023*

The aim of the study was to evaluate the expectations of 35 000 interviewees from 34 countries regarding their employers. The questions related to the five areas mentioned above.

DREES & SOMMER WORKSPACE BENCHMARK REPORT

230 IT, real estate and HR managers from around 20 different sectors were surveyed on the requirements of office workplaces. Although the traditional office space is no longer the sole centre of work due to mobile working, it remains important for networking and chance encounters or as a "flagship store" for recruitment. Office spaces must adapt to users' changing requirements, both with regard to their design and their space requirements. Companies should develop a clear strategy to enable them to keep pace with the ever-changing world of work.

<https://www.dreso.com/de/workspace-benchmark-report>

DELOITTE GLOBAL HUMAN CAPITAL TRENDS REPORT 2023

Old assumptions about work are losing their relevance. Work is no longer only organised in clearly defined processes. Jobs are no longer categorised and restricted within the organisation. People no longer work exclusively within the four walls of the workplace. Organisations no longer base their decision-making solely on economic interests. For companies, this means that they must operate in a new landscape, without traditional boundaries. The focus is on the possibility of experimenting, testing and innovating. New rules open the door to deeper and more meaningful collaboration and co-determination in cooperation with employees.

<https://www2.deloitte.com/de/de/pages/human-capital/articles/human-capital-trends-deutschland.html>

CREATIVE LEARNING ENVIRONMENTS – LEARNING IN THE WORLD OF WORK

WORKING ENVIRONMENTS BECOME LEARNING ENVIRONMENTS. In the economy of ideas, the human working environment will no longer be geared towards process efficiency but instead towards problem-solving expertise. And when the complexity of the spectrum of tasks can only be mastered together, across disciplines and with the support of a variety of communication tools and learning techniques, it is no longer enough to demand flexibility and encourage informal communication. The aim is to support creativity, collaboration and mutual learning in a more versatile and individual way. The office environment has to adjust to the activities still carried out by people and take into account the agile and human way of working both functionally and emotionally. Human work will become learning: communicative, collaborative, interactive, experimental and creative. The following notes on room design are taken from the New Work Order Report: "Mindsets are shaped by spaces. The room is never just a shell, it also always defines the culture of an organisation. There are specific models that support associative thinking and multisensory perception. These include high ceilings and a particular way of controlling lighting that finds expression in the choice of selected colour tones and combinations, for example." (Dr Anja Osswald, Business Development TRIAD, DIE DENKBANK)

Gehardt, B.: *Trend Consulting. New Work Order. Kreative Lernwelten.*

THE EVOLUTION OF THE OFFICE SPACE

The evolution of office design from Ancient Rome to office landscapes to Workplace 3.0 shows that the layout and design of workplaces is no longer determined by the real estate industry's objectives. Increasingly, an approach to interior design that is closely adapted to human needs is emerging. The main objective is to recruit and retain the best employees, and, above all, to provide the optimal environment for perfect working conditions and results. The fundamental elements of corporate success lie in a sensitive approach to employees – and this starts with the planning and development of the office space.

Lovell, M.: *The Evolution of Office Design*

THE FLEXIBLE OFFICE SPACE

The report shows that the number of flexible office spaces has significantly increased in recent years. Companies use flexible office solutions so they can respond quickly to changes without having to make long-term commitments. Flexible offices are popular with start-ups, freelancers and established companies who need workplaces for project teams or are planning a short-term expansion. The future of the market for flexible office spaces depends on the providers' ability to develop innovative, smart solutions and a wider range of services. "Flexibility begins with flexible contract terms, options and services, but requires smart buildings with a digital infrastructure, systems and data in order to manage this flexibility efficiently and effectively." (Uwe Hörmann, Senior Partner Berlin)

Hörmann, U.: *The flexible office space. Roland Berger. July 2021*

T H E L I G H T

