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GOOD LIGHTING IN THE BATHROOM

interior essentials.

EMCO



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Dear Planners, Builders and Renovators,

We at emco Bad, from Lingen on the river Ems, have been producing high-quality bathroom fittings for our customers for almost 70 years.

We are proud of our sanitary bathroom furnishings. We hold ourselves to a high design standard while keeping a close eye on our customers' wishes. As a premium manufacturer, the high quality of our products is renowned – we know what is important to you.

We listen carefully to our customers when they are looking for fixtures and products for their bathrooms at home. For decades now, we have been supplying exactly the bathroom furnishings that cost-conscious builders and renovators responsible for selecting products, are looking for.

But we at emco Bad are aiming higher: We would like to make our experience and know-how available to you. On the following pages, you will learn how important light is in the bathroom and what you should know about natural and artificial lighting.

We would like to offer inspiration and focus on a very important, often underestimated topic: **Good lighting in the bathroom**

Of course, you will have some questions regarding this topic: This is when we want to listen to you and offer some advice.

Your emco Bathroom team

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GOOD LIGHTING IN THE BATHROOM

Lighting for well designed bathrooms offering high-quality ambience

It was architects who provided our modern homes with the light our society so desperately needed. Almost 100 years ago, the victorious advance of the Bauhaus idea began, and with it a new approach to light in interior spaces. One of the core ideas of the Bauhaus and the housing reform movement was to bring light, air and sunshine into our homes for everyone, thus revolutionizing the way we live.

How valuable and vital light is, even within the home, was now recognized. Daylight is a hygienically important component for our home interiors because natural light kills germs. Of course, this also applies to the most private rooms in a home - bathrooms are more than just functional spaces for taking care of personal hygiene! The bathroom at home is the room where you are closest to your own body, undisturbed. As one of the most intimate places we know, the private bathroom is therefore of great importance.

In order to do justice to this place of retreat, it is important to equip it in an optimal way in terms of spatial effects, lighting atmosphere, materials, use and functionality. For years, the bathroom has no longer been regarded as a purely functional space, but rightly as a place of wellness, body care and relaxation.

Good light is the prerequisite for good vision

Most of the information about our environment, we absorb through our eyes. Good light is the prerequisite for good vision. The light which we surround ourselves with in buildings, determines how we perceive our surroundings. Too much light can be harmful or unpleasant while too little light can strain our eyes unnecessarily. Daylight influences us, depending on criteria such as the time and duration of light exposure, horizontal and vertical illuminance, and the incident light spectrum.

However, we are not dependent on sunlight at all times, because most of the properties of natural light can be replicated with artificial light. Since light is very important in everyday life, it must be reliably available. How helpless we become in darkness can easily be tested at any time during the night hours when we try to find our way around in the dark, in our own familiar surroundings at home. You simply don't manage well!



Finding the right light for the different rooms in an apartment/home is not a trivial matter. Someone sitting in the living room and browsing the Internet on a tablet, needs completely different lighting to someone sitting in the home office and working on documents. Consequently, it must always be possible to selectively switch the light to various on and off positions. To plan lighting scenarios, it is important to discuss this with all the users of a house or an apartment. Since peoples' interests usually differ, architects should be in dialogue with the residents when planning or renovating buildings to ascertain their interests and usage requirements.

Bathrooms in particular, are used for many different purposes: For short stays, basic lighting that is instantly available and meets simple requirements, is sufficient.

For daily body care in the morning, cooler light is advantageous.

A relaxing bath in the evening or on the weekend is perceived as much more pleasant, thanks to a warmer light. Different light sources can quite individually support different actions, such as brushing teeth, putting on make-up, shaving, checking skin, doing hair and looking at your reflection in the mirror.



Further information about light and the emco lighting system can be found at www.emco-bath.com.



Lamp and luminaire are not the same

To avoid confusion, it is necessary for builders and apartment or home owners to be able to coordinate concepts with architects, electrical and lighting designers on the basis of clarified terminology. The terms lamp and luminaire are used casually in everyday conversation and considered synonymous. If you want competent advice, you should consider the following: A luminaire is the term used to describe the entire unit. This includes the body of the lamp, the lamp shade or lamp glass and the illuminant. The illuminant is the actual lamp. This includes incandescent bulbs, energy-saving bulbs and, of course, LEDs. Thus, the luminaire is the entire wall or ceiling light, while the lamp on the other hand, means only the illuminant as a light-emitting unit. To put it simply: The bulb (or LED bulb) is a lamp that is screwed into a luminaire.

Lighting scenarios in the bathroom

The choice of colours and materials – in conjunction with the lighting – shape the architecture and the spatial impression of a bathroom. Various lighting scenarios with different colour temperatures can be used in the bathroom. Inside bathrooms, in particular, must be defined by different lighting effects, due to the lack of natural daylight. In practice, mixtures of three different lighting scenarios have proven successful:

_ General lighting

Good basic lighting is recommended for the illumination of the entire room. Ideally, this basic lighting is regulated by a dimmer or a lighting control system, such as the **emco light system**, so that the brightness can be adapted to the particular occasion, by day or night. Indirect lighting is also possible: Its advantage as background lighting is the low-contrast appearance, as well as the soft and glare-free light gradient. Good general lighting distributes itself relatively evenly in the room and casts hardly any shadows. This also provides a very bright light for room cleaning, as well as providing useful light in everyday situations.

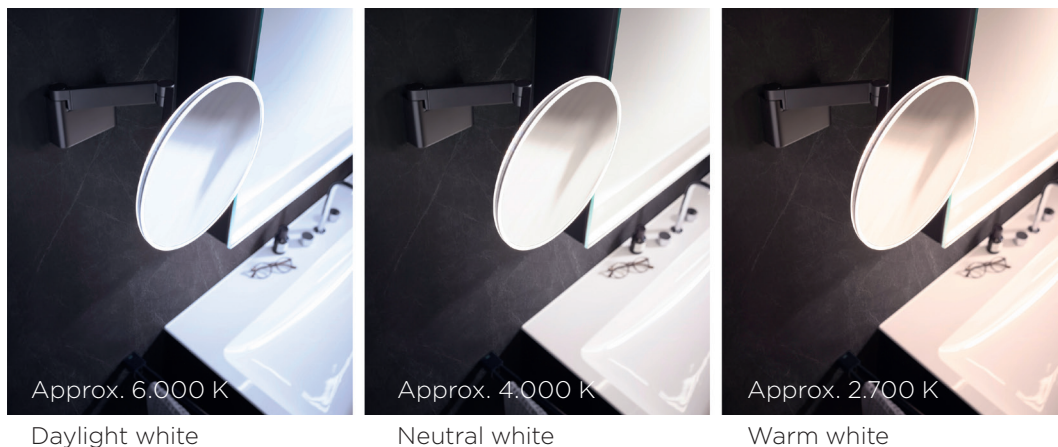
_ Lighting for applying make-up/shaving

The bathroom is not only suitable for taking care of personal hygiene, but also for applying make-up, shaving and to check one's appearance in the large mirror. It is important to pay attention to the right light colour. In many bathrooms, lamps with the light colour neutral white have been installed. This light colour is perfectly suitable for normal daytime use, but the situation is different when looking at a mirror image. Neutral white light in the bathroom changes colours and contrasts. Consequently, one's own face looks different to what it does in daylight. If you apply your make-up in neutral white light and then check it in the daylight, you will notice that the colours and contrasts used, have a completely different effect. For applying make-up, we recommend the colour daytime white. All neutral white lights should be switched off or strongly dimmed. Cosmetic mirrors with LED lighting and a light colour that can be adjusted variably, are helpful. As an example: A special light guide technology is integrated into the emco LED cosmetic mirrors. This optimally illuminates one's face.

_Relaxing light

Rooms only illuminated with background lighting quickly look boring because they lack design accents. With a well thought-out lighting design, even in small rooms, individual areas such as the bathtub can be selectively highlighted.

The discreet, unobtrusive relaxation light does not disturb and allows the rest of the room and bathroom furniture to fade into the background while one is bathing. Relaxing lighting can be used as supplementary lighting for those tranquil moments we enjoy.



Light during daytime

The various effects of light are easily distinguished:

Visually, light supports vision, it influences us emotionally, and ultimately ensures the synchronization of our internal clock with the natural course of the day.

The bathroom is where our day begins and ends. The bathroom therefore, makes a decisive contribution to our well-being. Light influences us in many ways, depending on criteria such as the time and duration of light exposure, horizontal and vertical illuminance and the light spectrum. The high blue content in morning light, for example, causes the output of the sleep hormone melatonin, to drop. Serotonin release is boosted and we wake up. Cold white light in the evening delays the production of melatonin, which is one reason why we find it hard to fall asleep

The more time we spend indoors, the more we disconnect from our natural inner schedule. Today we know that altering this inner clock increases the risk of getting certain ailments.

As a result, scientists are calling for a human-centered lighting concept (Human Centric Lighting, or HCL) for indoor spaces.

This concept is to take into account not only the visual but also the emotional and non-visual effects of light. Human Centric Lighting is usually understood as the adjustment of lighting according to the natural course of daylight. In Human Centric Lighting, the aim is to change the colour spectrum of the light – following the natural light throughout the day – in a time-dependent manner. This is to achieve high blue components for the morning hours, warmer light at sunrise with increasing blue components towards midday, then decreasing blue components towards evening and high blue components with low illuminance, after sunset.



Advantages of LED lighting

The great success of LEDs probably represents the biggest upheaval in the lighting industry. LEDs (light-emitting diodes) became increasingly affordable in the past and dominate lighting technology. Unlike the old incandescent lamps, light-emitting diodes do not emit heat. The energy-efficient, flexible light sources can be found in powerful LED spotlights for interiors, as well as in modern floor, wall and ceiling lamps. Technically, LEDs are electronic components called diodes and function in a fundamentally different way from conventional incandescent lamps, in which wires are made to glow. Today, if you leaf through a catalogue of luminaires, you'll come across LED luminaires almost exclusively.



OLED Lighting

After the LED revolution, the next lighting revolution is already on the horizon.

The OLED, known by its full name as the Organic Light Emitting Diode, opens up completely new possibilities for lighting design. Organic LEDs (OLEDs) are glare-free, flat light emitting technology.

These light modules produce light without generating heat and save energy.

They are also considered environmentally friendly. OLED modules are extremely thin. Their active layers have a total thickness of less than 500 nanometres (nm). That is 100 times thinner than a human hair.

The organic light-emitting diodes provide good colour quality and full light output immediately after switching on, without a warm-up phase. They are available in many light colours. Organic in this context, does not mean that this lighting technology has anything to do with living systems. Organic simply means any carbon-based material, such as plastic film.

Unlike traditional light sources, OLED panels belong to the cold lighting sources and do not get hot. Therefore, they can be used directly on wood, for example, when used in furniture. Bulky cooling elements are not needed. The big difference between OLED and other technologies, is that the organic light-emitting diode is an area light source – not a point light source like conventional technologies. In a LED, a small, very bright point shines. The OLED is a light source with a large illuminated area, where the light emission is homogeneously distributed and does not cause glare. OLED lights function differently to previous point light sources.

So far, humans have had little experience with light emitted over a wide area. This raises the question of how OLEDs affect vision. Planar light is not very common in nature, at least not in its pure form. The use of OLEDs leads to less shadow casting. If you look at a face in daylight, you will always perceive a shadow there. In planar light, these shadows disappear, and with them the contours. Lighting designers, however, see no problem here.

Light colour and illuminance

The light colour or colour temperature is a measure of the colour impression of a light source and is measured in Kelvin (K). Important light colours for living areas are warm white (less than 3,300 K), neutral white (3,300 - 5,300 K) and daylight white (more than 5,300K). As a rule, light colours in connected rooms, for example in an apartment, should not differ too much to enable reliable colour vision. In the bathroom, however, different light colours are needed. Continuously dimmable light colours help to view one's own appearance in the right brightness and light colour.

Illuminance has a major influence on how well we perform a visual task with our eyes – for example, taking care of personal hygiene or putting on make-up.

In the unit of measurement lux (lx), illuminance indicates the luminous flux, measured in lumens (lm), that falls on a given surface from a light source: It is one lux when the luminous flux of one lumen uniformly illuminates one square metre of surface.

Illuminance is measured with a measuring device called a luxmetre. There are a variety of helpful DIN standards for proper lighting. DIN EN 12464-1 provides orientation.

For private bathrooms, however, there are no DIN recommendations for illuminance and no minimum values. For lighting of a higher standard, an illuminance of 300 lx should be used. A comfortable illuminance is achieved with 500 lx. Less than 200 lx is not suitable and should be avoided.

Illuminance is measured at a height of 75 cm horizontally above the floor. From the above recommendations, you can see that the specifications for good illuminance do vary considerably. Nevertheless, you can reliably orient yourself using these values, but it may also be good to add a little more.

For comparison: Creatures that are active by day, like humans, are spoiled by the sun with 100,000 lx in summer, and even on cloudy days we still experience 20,000 lx outdoors.

Planning lighting for new buildings and renovations

Bathrooms are generally designed to last for a period of at least ten or twenty years. It is therefore worth investing in expert planning and execution. A good lighting concept makes the bathroom a place you experience in a positive way. In addition to considering light colour and illuminance, lighting design should also emphasize the distinction between diffuse and directional light.

The importance of diffuse light can be seen from the fact that even when the sky is covered in clouds, our surroundings remain clearly visible. This means: We must consider both directional and indirectly directed light when designing lighting settings. The positive biological effect of light is strongest when it comes from a large-area source and from above.

Ceiling and wall surfaces should be used as large secondary reflectors to address the appropriate photoreceptors in the human eye.

Indirect lighting, where a large and bright surface reflects light, has therefore a stronger effect than the focused light of a spotlight, which illuminates only a small area. Good lighting also takes into account the different surfaces found in rooms, to avoid annoying reflections. Good luminaires therefore, either cast light indirectly onto walls and ceiling surfaces or have large reflective surfaces themselves.



Protected areas in the bathroom

DIN standards, such as DIN VDE 0100 for electrical engineering, serve to protect people and should be observed as a matter of priority. In the bathroom, water, and the electricity needed for lights, hairdryers and razors, come very close together, so special safety conditions apply in washrooms. To make matters worse, unclothed, wet skin surfaces lead to a significant reduction in human body resistance, which in turn can increase the risk of life-threatening electrocution.

Only specialists who professionally deal with the planning and installation of electrical systems in bathrooms and washrooms, can ensure the safe functioning of electrical systems, as well as their hazard-free use. Architects, electrical designers and electricians know where to install a child-safe electrical outlet or where to install a light fixture.

The Do-It-Yourself idea is life-threatening when it comes to planning and installing bathrooms and washrooms. The safety of one's family is so precious that advice and assistance from professionals should always be sought in every situation.

Switching lights on/off

There are many ways of switching lights on and off and a variety of devices to do so.

There are switches that respond to sounds and those that respond to movement.

Today, you can also control light with your smart phone – very simply. One example is smart lighting in the bathroom with the **emco light system**. With this lighting control system, lighting units such as illuminated cabinets, shaving and cosmetic mirrors, and wall and ceiling lights can be controlled in a networked fashion, via Bluetooth.

The brightness and colour temperature of the light sources can be continuously adjusted either individually or together. In addition, a wide range of scenarios can be implemented to create an atmosphere of wellbeing in the bathroom, so that the right, optimally coordinated individual lighting is available to capture every mood and purpose of use.

Don't forget: The ergonomics of the simple on/off switch at the entrance to a room, are second to none. The switch needs no instructional manual and no explanatory introduction! Even small children intuitively grasp the great effect of the rocker switch.

Therefore, at least one light source per room, should remain easy, reliable and able to be controlled with a simple hand movement, at all times. Motion detectors forget to switch

when a person in his/her resting position no longer makes a significant movement.
A smartphone with a flat battery can't switch anything!



Protection classes for the bathroom

The bathroom is a wet room and thus different regulations apply to electrical installations in the bathroom. Luminaires installed in the immediate vicinity of a shower, bathtub or washbasin, can be exposed to splashing water and must therefore meet special requirements. So-called protection classes indicate the environmental conditions for which electrical equipment is suitable.

In areas subject to dripping water, protection class IP 21 applies. Protection class IP 44 provides protection against water being splashed from all directions. For the use of luminaires in shower areas, or in direct proximity to bathtubs, the high protection class IP 65 applies. The IP codes are standardized and indicate the type of protection in the different IP classes. The first number indicates the protection against contact and the penetration of foreign bodies. Here "0" stands for no protection and "6" for dustproof. The second number indicates the protection against water. Here "0" stands for no protection and "5" for protected against strong jets of water.

Invitation

If you have any questions for us, we will be happy to provide you with answers. We are available for our customers under the telephone number +49 (0) 591 - 9140 0 and the e-mail bad@emco.de. Feel invited to contact us!

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