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LIGHTING DESIGN CONSIDERATIONS

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INTRODUCTION

In this knowledge base document, we will cover the considerations when creating lighting designs. In this document, we will explore the key factors, techniques, and principles that architects, designers, and lighting professionals must consider when planning and implementing effective lighting solutions. **Customer Requirement:** Every Lighting designer must receive a specific set of requirements to ensure that the lighting design not only delivers ample illumination but also creates the ideal ambience within the designated space. The requirements can include the following:

- Lighting Application
- Luminaire Type
- Lighting Colour
- Energy Saving

The requirements dictate several key factors, including the choice of lighting type (direct or indirect), the luminaire type (linear, panel, downlights, etc.) luminaire beam angles, luminaire colour and the LED correlated colour temperature (CCT).

Regulations: The Lighting design also needs to be adapted so that adherence to regulations for light level, glare and energy management is maintained. Lighting regulations can be found in the following documents:

- **SANS 10114** This section covers the lighting requirements for interior lighting design, and it covers a wide variety of topics for lighting design considerations.
- **OSHACT** This set of regulations focuses on the workplace safety and health standards needed for a working space and lighting requirements are addressed indirectly as part of general safety and health requirements.
- **Green Building** These regulations provide considerations for lighting design to promote energy efficiency and sustainability.
- **LEED standards** These regulations provide comprehensive guidelines for sustainable building design and construction. Lighting design plays a significant role in achieving higher energy efficiency and sustainability standards.
- **WELL standards** These standards promote human health and well-being, visual comfort and productivity in the built environment.

Uniformity: It any lighting design it is important to maintain a uniform level of lighting in a lighting design. Even light distribution helps maintains visibility and ensures a clear view of various work areas. If the uniformity or level of consistency is not achieved, dark spots will appear in your work area, which will create an unpleasant atmosphere. Each area has its own requirements, and you can find them in the SANS 10114 document



Unified Glare Rating (UGR): Is a measurement of glare experienced within an area. The intensity of light is compared with the intensity of light in the surrounding area, as perceived by a viewer. UGR can only be calculated for indoor lighting. This can be calculated through formula, as well as through simulation programs such as Dialux and Relux. All working areas have their own UGR limit that must not be exceeded to ensure the people can work efficiently, these values can be found in the SANS 10114–1:2005 "Interior Lighting" document.

Light Application: In lighting design it is important to be able to identify what type of lighting you need in a space. A lighting designer can implement one or multiple types to achieve the desired outcome. The lighting applications are as follows:

- **Ambient Lighting** This application provides overall illumination in open spaces, offices and general areas. A noticeable trait is that it should appear natural and does not draw your attention to the light source.
- **Task Lighting** This is a more focused application, with clear visibility and brighter light levels on specific working areas. The light source is more noticeable, but it serves an important purpose.
- Accent Lighting This application highlights unique features, objects and architectural designs. It is an essential tool in stimulating mood and atmosphere for personalised spaces.
- **Decorative Lighting** With this type of light, there is no set requirement for functionality, with its stylish design the luminaire is also known to affect mood and appearance of spaces.

Lighting Types: Effective lighting design requires careful consideration of the type of lighting used to achieve desired outcomes. Three of the many lighting types include direct, indirect and diffused lighting. They play crucial roles in creating well-lit and visually appealing spaces.

- **Direct Lighting:** Illumination where the greater part of the light goes directly from the source onto a desired object or area.
- **Indirect Light:** Illumination where the luminaire housing or reflective material reflects light in a reflective or diffusing manner, creating a wider spread of light.
- **Diffused Light:** Light that is scattered in all directions by either a reflective surface or through a medium.



Luminaire Mounting: The various ways that luminaires can be securely installed and directed to fulfil their designated task. The most common options are:

- Surface Mounted
- Recessed Mount
- T-bar Mounting
- Suspension Mount
- Track Mounted
- Wall Mounted

Room Surface Maintenance Factor (RSMF): The reduction in luminous flux due to the deterioration of the room environment.

Daylight Control: The use of daylight control focuses on harnessing natural daylight to reduce energy consumption, improve visual comfort and enhance the overall quality of the indoor environment. By effectively managing daylight, designers can create spaces that are both energy-efficient and occupant-friendly.

In conclusion, effective lighting design is a multi-faceted process that involves considering various factors to achieve desired outcomes. These key aspects ensure that the designer adheres to customer requirements, lighting regulations, understands light applications and chooses appropriate lighting types. By addressing these considerations, lighting designers can create environments that meet functional, aesthetic, and regulatory standards.

