GOOD PRACTICES IN SME

Selecting lighting parameters

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Ministry of Climate
and Environment

European Union

KAPE
Krajowa Agencja
Poszanowania Energii S.A.

Which parameters must be kept in mind to ensure appropriate lighting at the workplace?

To ensure appropriate lighting conditions the following 4 parameters must be considered:

- Light intensity,
- Colour temperature,
- Colour rendering index,
- light diffusion angle.

What is light intensity and how to define it?

Light intensity affects how strongly a given surface is illuminated.

Light intensity is expressed in lux (lx in short form). On a sunny summer day, the intensity of natural light can be as hight as 100 000 lx, while on a cloudy autumn day the light intensity will be about 1 000 – 2 000 lx.

Recommendations for light intensity in a workplace are defined by appropriate norms. In the case of physical labour (workshops) light intensity should be 200 - 300 lx, and in the case of offices (computer work) 500 lx. For labour requiring high precision (e.g. precision assembly, jewellery work) light intensity should be at least 1 000 lx.

The packaging of the lamp contains information on the amount of light flux emitted over a period of time (the unit of light flux is the lumen – lm).

$$light\ intensity\ [lx] = \frac{light\ flux\ [lm]}{surface\ area\ [m^2]}$$

A 1 lumen light falling on a 1 m^2 surface will provide the surface with 1 lux of light intensity.

What is colour temperature and what does it affect?

Colour temperature is a quality of visible light which tells us about the colour of the light emitted by a give light source. The shade of the light can be warm, neutral or cold. The unit of colour temperature is the Kelvin (in short K).

The most common colour temperature of light sources:

- 3000 K: warm yellow light,
- 4000 K: neutral light,
- 5000 K: cool white light,
- 6000 K: cold blue light.

Warm colour temperatures optically enlarge spaces and create a cosy atmosphere. Cold temperatures are conducive to waking up and is promotes concentration. The recommended colour temperatures for different spaces:

- 3000 K: restaurants and hotels,
- 4000 K: offices, warehouses, public use buildings, shiop,
- 5000 – 6000 K: paint shops, dental practices, production lines, shopping malls.

Pic. 1 ledbecool

What is the colour rendering index?

The colour rendering index (CRI, sometimes Ra) uses a 0 – 100 scale to describe the effect of the light source on the accuracy of the colours of the lighted object. The CRI of natural light is 100. The higher the CRI, the more faithfully the light source reveals colours. A light source with a CRI of at least 80 should be used. In places where colour is important (clothing stores and artist studios) light sources with a CRI of at least 90 should be used.

Pic. 2 philips

How to use the appropriate lighting fixtures?

When choosing lighting fixtures, we choose high quality optical systems, which, depending on the needs, will provide focused or diffused light. We use high diffusion angle lightbulbs (180° - 360°) to light entire rooms and ensure even lighting. At workstations we install additional lamps with narrower diffusion angles, which provide focussed light in a chose spot. Focused light sources also function well for exposing a given element – e.g. in shop windows and art galleries.
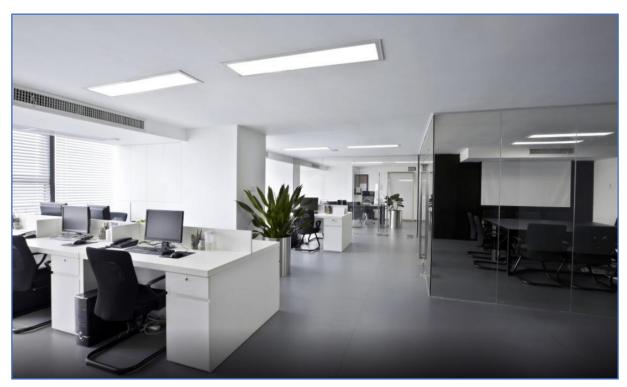
The lighting installation should be matched with the right wall and ceiling colours to create optimal work conditions. Choose light colours characterised by a high refraction index. This will make the room brighter

Source: KAPE

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Pic. 3 GTV

Pic. 4 pexels