ISOLED KNOWLEDGE

FLICKER INDEX

ISOLED®

CUSTOMISED LIGHT SOLUTIONS

ISOLED®
CUSTOMISED LIGHT SOLUTIONS

NEW INCLUSION IN ISOLED® PRODUCT SPECIFICATION THE FLICKER INDEX

Photometric flicker describes the rapid modulation of the light output of a lamp or a luminaire and is not synonymous with power-line flicker in light sources, which is caused by voltage fluctuations in the electricity grid or switching/control systems.

Flicker-Perception in Humans and Animals

Over the course of evolution, living things have not developed any ability to compensate for the flickering or shimmering of Light because the natural light of the sun does not flicker. Because of this, the physiological perception of humans and animals must be taken into account in evaluating the light quality of a lamp or luminaire.

The flicker fusion frequency plays an essential role here. It is the flicker-free frequency range. The resulting frame rate value in Hz or fps (= frames per second) can be ascertained from the point when still images or motion phases are perceived as a continuous sequence. The flicker fusion frequency varies and is directly dependent on the following factors:

- Light-dark adaptation
- Position of the incident light on the retina
- Wavelength of the light
- Frequency of the light modulation
- Amplitude of the light modulation
- Average light intensity

Human beings perceive consecutive images at a rate of about 14 to 16 images per second (14 to 16 Hz or fps) as a moving sequence, and from about 18 Hz (it varies with the individual) as „smooth“ or flicker-free. Basically, a human being notices flicker at frequencies up to 100 Hz.

Under certain ambient conditions, the human brain can even, subconsciously, register flicker frequencies up to 500 Hz (in PC monitors or notebooks for example). There is no set limit, especially as it depends on subjective sensitivity.

However, animals are more sensitive because of their different eye structure. Animal research has shown that chickens, for example, can actively detect light flicker up to a frequency of 140Hz.

Biological Effects

Whether perceived consciously or unconsciously, flickering light leads to exceptionally high stresses on the nervous systems of both human beings and animals. The body constantly attempts to adjust to the flicker and this produces

- stress, nervousness,
- headaches and migraines,
- epileptic seizures
- sleep disorders;

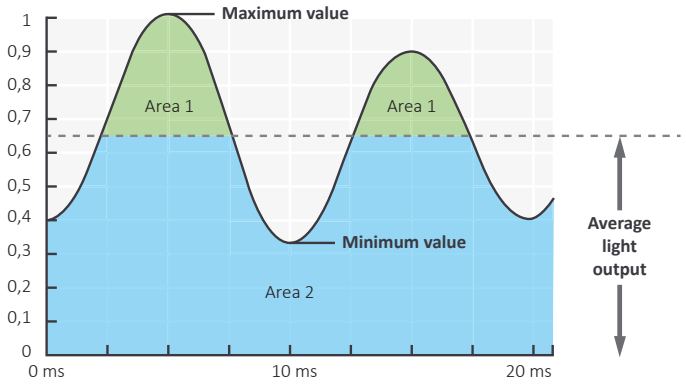
and in animals, additionally,

- disruptions in eating behaviour,
- reproduction, and,
- in chickens, for example, changes in laying behaviour.

Flickering lamps and luminaires are a constant stress for workers, and a significant reason for customers to leave the premises quickly.

No guest will remain seated - flickering light sources are disruptive and counterproductive to a feel-good atmosphere. The use of flicker-free lighting is essential!

Messung und Berechnung des Flicker Index



The flicker index is the total luminousflux that is above the average luminousflux.

$$F_i = \frac{\text{Area 1}}{\text{Area 1} + \text{Area 2}}$$

The result is in the range 0-1 (0 - 100%). The lower the value, the less flicker.

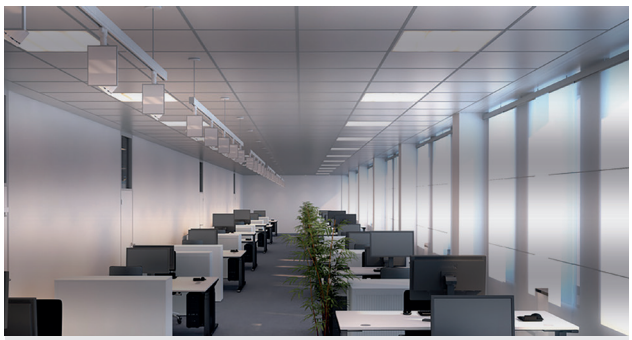
ISOLED® measures the flicker index of all lamps and luminaires with a calibrated flicker meter. As well as measuring the benchmark optical and photometric data, the flicker meter also analyses the percent flicker and frequency, evaluates these data, and provides standardized data for assessing the light quality.

- » Verification according to international standards: IES /ASSIT / ENERGY STAR / VESA
- » Wavelength: 380-780 nm
- » Flicker frequency range: 5 - 2000Hz, resoluti on 5Hz

The flicker index is included in the product specifications as standard.

Hinweis:

ISOLED® designates LED lamps and LED luminaires as FLICKER FREE, provided they fall below the standard limits in the undimmed state.



A working space is a living space- flickering lighting produces an enormous strain on the brain and nervous system and leads to additional symptoms of stress and anxiety, such as headaches and migraines. Employees lose motivation, their performance is impaired, and they are frequently ill.