



# Artificially created daylight for indoors

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Artificially created daylight is also known by the terms “human centric lighting” or “biodynamic light”. These new lighting technologies generate an indoor artificial light, whose light colour is continuously matched to the light colour of sunlight according to the time of day. According to manufacturers of these lighting technologies, people indoors can be provided with artificial light that is similar to daylight, such that they can profit from the advantageous effects that would be offered by natural sunlight.



These effects include for example alertness, power of concentration or performance. Such effects are controlled by nerve impulses that the light generates in the retina and are subsequently transmitted to the brain. The brain uses them in order to control a broad range of bodily functions that depend on the time of day.

As these new lighting technologies, due to their claimed effects, are increasingly advertised and employed in the work place or in the private home, the State Secretariat for Economic Affairs (SECO) and the Federal Office of Public Health (FOPH) commissioned the Institute for Chronobiology of the University of Basel to review the scientific literature on artificial light that is similar to daylight. The study focused on whether this light may influence a person in a physiological, cognitive or subjective manner, i.e. the effects as perceived by the persons themselves.

The Basel study showed that only a few studies had investigated whether these effects may be influenced by artificial light that is similar to daylight. Consequently, the University of Basel broadened the assessment to include additional studies on the physiological, cognitive, and subjective effects of artificial light on people during daily office hours (from 7:00 to 17:00), but which did not continuously match the characteristics of daylight. A total of 45 studies met the inclusion criteria. These studies enabled us to check 33 different effect variables in order to determine whether they depend on the light intensity and the light colour of the artificial light to which people are exposed during the day.

The Basel study showed that during typical office hours neither the light intensity nor the type of light colour significantly influence physiological measurement variables such as pulse rate and brain signals. In contrast, however, in regard to cognitive effects, the light intensity and the light colour apparently had an influence on peoples' reaction times. In addition, the light colour influenced people's response accuracy for various tasks. In regard to subjective effects, the light intensity and light colour were shown to influence a person's own perception of concentration, tiredness and sleepiness. Overall, however, the observed effect sizes of the light exposure in office hours were rather small. Nevertheless, the authors of the study concluded that brighter and cooler lights during daytime are advantageous for daylight-similar and artificially lighted interiors, even if these advantages apply only to cognitive and subjective effects but not to physiological measurement variables.