

LightCheck® Technical Information Sheet

Damage to cultural heritage caused by light

Long or regular exposure to artificial or natural light may cause irreversible damage to objects. This damage may manifest itself as discoloration or fading, or result in a change of a mechanical nature (brittleness...). It is accepted that damage increases with length of exposure and intensity of lighting.

Exposure to light

Rather than determining exposure length in weeks or months (which may not be correct in the case of irregular lighting conditions), it is advisable to monitor the luminous exposure, expressed in lux hours, that is to say the quantity of light (called illuminance) multiplied by time of exposure (in hours). This can be achieved using a cumulative data logger, and in the case of natural light, whose characteristics continuously change according to time of day, external weather and location in the exhibition room, a data logger has to be adjacent to each object. Lightcheck® has been introduced as a cost effective and user-friendly alternative.

Risk to artefacts

Depending on their chemical composition, physical structure, history or climatic environment artefacts may exhibit very different reactions to light exposure. It may happen that visually similar objects react differently from each other when exposed under the same conditions. This makes it almost impossible to predict, without performing specific experiments, how long an object can be exposed with the minimum risk of deterioration. Nevertheless, objects may be grouped roughly into three categories according to their supposed vulnerability to light based on empirical experience. For instance, organic materials, synthetic dyes, textile and graphic documents are more fragile than easel paintings.

Accepted annual luminous exposure limits from published data

Category	Examples of artefacts ♦	Recommended maximum luminous exposure of *
<i>high sensitivity</i> ISO 1,2,3	graphic documents, albumen prints colour photographs, parchment, leather, textiles, tapestry, natural history specimens	10 000 lux.hours in a year
<i>moderate sensitivity</i> ISO 4,5,6	oil paintings, tempera, wood, polychrome sculptures, bone, ivory	100 000 lux.hours in a year
<i>low sensitivity</i> ISO 7,8, above	stone, metals, ceramics, B/W photographs	3 000 000 lux.hours in a year

* Luminous exposure values from Appendix 8a, p. 138 of:
J. Tétreault, *Airborne Pollutants in Museums, Galleries and Archives: Risk Assessment, Control Strategies and Preservation Management*, Canadian Conservation Institute, Ottawa, 2003, 168 p.

♦ A more exhaustive list of artefacts and materials belonging to each ISO category can be found in the manual cited above.

What is LightCheck[®]

LightCheck[®] is a new tool that enables evaluation of the quantity of light received by an artefact during exhibition even under dim light such as 50 lux for a few months.

LightCheck[®] is made of a light sensitive coating on a substrate.

The colour of LightCheck[®] changes during exposure.

A calibration has been established between the colour and the luminous exposure. This colour change is proportional to the luminous exposure although other factors such as temperature, pollutants and type of light (spectral distribution) may have a small effect. The luminous exposure given in the colour reference scale corresponds to the colour changes produced with a continuous exposure under a quartz halogen lamp at 500 lux, 23 °C, 55 % RH.

Two LightCheck[®] strips have been introduced, the first to monitor the exhibition of highly sensitive objects (ISO 1,2,3 according to the table above):

LightCheck[®] *Ultra* “**LCU**”

and the second for moderately sensitive objects (Category ISO 4,5,6 according to the table above or for continuous monitoring of sensitive objects):

LightCheck[®] *Sensitive* “**LCS**”

LightCheck[®] is exposed to the light close to the object and its colour will change depending on the cumulative luminous exposure it receives. The LightCheck[®] must be placed in such a position that it will receive the same exposure as the artefact that is under observation/ investigation.

Equivalent luminous exposure can then be determined by comparison with a coloured reference scale.

If you need further advice or assistance on lighting or display recommendations, this is available at cost.

For more information on LightCheck call :

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