



SAVING YOUR Treasures

A Website about what you can do to protect and preserve the things of importance in your life



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Lighting and Illumination Recommendations for Collection Spaces

Exposure to visible and ultraviolet radiation can be a significant factor in the survival of museum objects. All wavelengths of radiation provide energy for deterioration reactions that degrade materials; the more powerful the radiation the faster the deterioration. Damage from visible and ultraviolet radiation is cumulative; it is not reversed or repaired by periods of reduced exposure. (Objects can not be “rested”.) Ultraviolet radiation is not perceived by the human eye, thus is not needed for us to see. It is very strong, aggressive radiation and should be eliminated from the museum environment.

It is important to limit the levels (foot-candles or lux), types (visible or ultraviolet) and length of exposure (minutes to days of illumination) to visible and ultraviolet radiation in order to protect collection objects.

It has been shown that the healthy human eye requires only 2 foot-candles of illumination to discern color. This indicates that we actually require less light to accurately see objects than we might believe. There are many alternative methods that can be used to produce the effect of increased illumination without actually increasing the foot-candles. For example, when entryways are kept more dimly lit than the adjacent gallery areas, the galleries are perceived as being more brightly lit. When objects are illuminated on darker walls or backgrounds they are perceived as being more dramatically lighted, without the need for additional illumination. The levels of illumination in surrounding spaces have an important impact on those areas where objects are exhibited. Using occupant activated light sources can help reduce exposure when there are no visitors.

The generally accepted levels of visible illumination for historic and artistic collections ranges from 2-5 foot-candles for sensitive materials (like watercolors and silk textiles) to 30-50 foot-candles for materials that are not as light sensitive (paintings, furniture). Very few materials should be exposed to levels of illumination above 50-60 foot candles (ceramics, metals).

Illumination in the storage areas should always be occupant activated. Where incandescent light fixtures are used in storage areas they should be of the lowest

wattage possible and should be well ventilated to carry away the excessive heat that incandescent light sources generate. All lighting in storage that produces ultraviolet light (daylight, fluorescent tubes, incandescent bulbs, etc.) should be filtered for ultraviolet emissions. The emission spectrum is available from the manufacturer for each lamp manufactured. The spectrum indicates the amount of light emitted in each wavelength range for the bulb (lamp) in question. Illumination from windows should be blocked out in all storage areas.

In the exhibit spaces, there are a variety of lighting fixtures available to be used. Many produce both visible and ultraviolet radiation, as well as heat and should be filtered for UV emissions, vented for heat dissipation, and used at the lowest visible light levels possible. All natural light in exhibit spaces should be blocked or at the minimum filtered for heat, visible radiation, and ultraviolet radiation, particularly in the bright Nebraska sunshine. (This can help reduce cooling costs, as well, by reducing the heat load on the building.) If light level problems are found, the use of other passive methods or the reduction of light exposure, where possible, is recommended, as well as, the use of moderated light transitions and contrasts to reduce the appearance of dark and light areas.

Sodium vapor lights, like those used in parking lots, are not suitable for museum use. Although these lights emit little ultraviolet radiation, they generate very high levels of visible illumination in the yellow and red regions of the spectrum.

Ultraviolet radiation is more harmful than visible radiation and is not required for human vision. It should be excluded from the museum environment. The ultraviolet light levels recommended for museums should not exceed 75 microwatts per lumen.

Museums need a full spectrum light meter so that the galleries and other object locations can be monitored regularly for light levels. Museums can borrow an Ultraviolet light meter to regularly check UV light levels in collection spaces.

In Summary:

The Overall Level of Visible Radiation.....60 foot-candles max (or less) to prevent fading on the hardest objects...down to 2-5 foot-candles for sensitive materials.

The Overall Level of Ultraviolet Radiation...75 microwatts per lumen is the maximum, below this is better.

The Infrared or Heat Load Produced by the Lamps ...this can be moderated by window filtration, lamp housing design, and the HVAC system.

The "Color" of the illumination.....yellow, red, blue, most art looks best in natural "sunlight color" with the UV filtered out.

The Ease of Access and Flexibility ... to change and adjust lamps when they burn out, the flexibility in moving the fixtures, the ease of focusing and directing the lamps, and the ability to use a variety of lamps in the fixtures.

The Design of the Lighting...avoid sharp contrasts from bright to dark and dark to bright...show objects on dark walls, you will need less light for the object to look as "bright".

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