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Important information about light damage

UV light is without doubt the most damaging form of light to artwork, but it is important to recognise that other light sources and factors will also have an effect long term.

When light damage is referred to in regards to artwork, damage can be related to colour pigments in the art itself (all paint mediums), thread textile materials (the colour and the material itself), and chemical reactions that occur with UV light and moisture (ever present in the fibres and framing package) that cause a breakdown in the cellulose base in paper fibres and other textile materials.

Damage to artwork is cumulative and permanent.

It is also irreversible.

Light is measured in nanometers (one billionth of a metre) :

Vacuum UV 40nm - 190nm

Far UV 190nm - 220nm

UVC 220nm - 290nm

UVB 290nm - 320nm

UVA 320nm - 400nm

Visible 400nm - 750nm

Infrared over 750nm

(solar heat)

} *These UV ranges*

} *are blocked by the*

} *Earths atmosphere*

- *Blocked by normal glass*

- *Passes through to artwork in presence of any light 20x more abundant than UVb light*

- *Necessary to view the artwork*

- *Increases temperature of an object, can speed up damage from other light sources*

Sunlight (direct and filtered) has by far the highest potential to cause damage to artwork, with ~ 6% of total solar energy in the 320nm to 380nm UV light range. Any direct or filtered sunlight entering a room means a significant amount of UV light is generally present ¹.

Artificial light has potential to add to natural light damage, or be a danger in its own right.

Regular incandescent lamps and fibre optic lighting emit very little UV light, and don't generally require filtering.

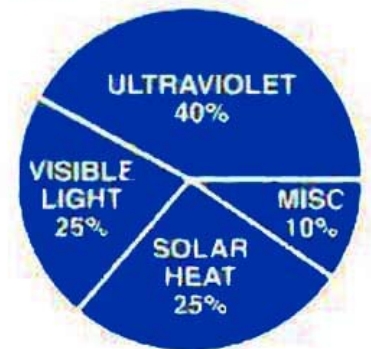
Fluorescent lamps, and particularly tungsten-halogen and HID lamps emit significant amounts of UV light, and do require filtering.

UV radiation is the most energetic and destructive form of light, but we should not assume that if UV light is eliminated, visible light is of minimal concern.

All light wavelengths can do significant damage.

¹ Solar control / security films on window glass and laminated glass in windows can block UV light.

What Causes Fading? "As A Rule Of Thumb"



The goal is to achieve a workable compromise between display of the art (viewing pleasure) and preservation.

UV light can be easily eliminated from 'the picture', our eyes do not perceive or miss it. That, coupled with the fact it is much more damaging than visible light, is enough reason to block it wherever and whenever preservation framing is desired.

Visible light is far more problematic, because we need it to see the art. All we can do is minimise direct light as much as possible, by using non direct light at a level that is enough to pleurably view the art.

In general the Law of Reciprocity means that the same amount of photochemical damage will be produced by a strong light in a short period, as a weaker light over a longer period.

If luminance is measured in foot-candles (fc) and the time in hours, 10fc on a painting for 5 hours gives it an exposure of 50 foot-candles-hours and 5fc for 10 hours would give it the same exposure.

Note that the Law of Reciprocity does not state that twice the exposure will cause twice the amount of fading. Rates of fading commonly decrease with time, until there comes a point when no more fadeable material is left.

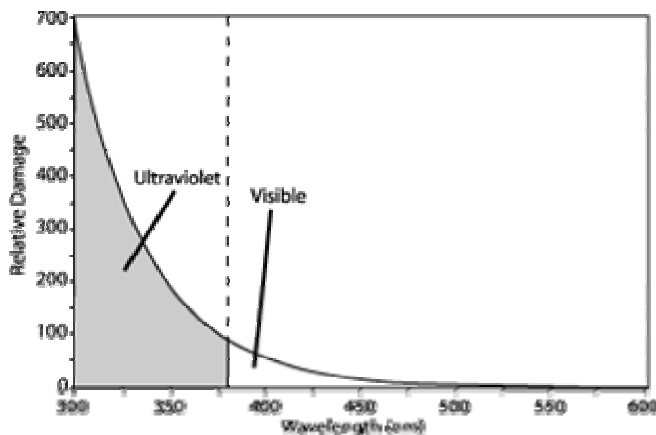
PRD (Probable Relative Damage) is the easiest way to understand potential damage from the different levels of light wavelength.

Visible light at 500nm has a PRD value of ~ 0.03

UV light at 380nm has a PRD value of ~ 1.0

UV light at 300nm has a PRD value of ~ 7.0

So when considering UV light in 300nm to 380nm is between 33 times and 233 times more damaging than good visible light, it becomes easy to see just how much longer artwork can be preserved and enjoyed for generations to come.



Probable Relative Damage chart

In reducing damage by light, the most effective strategy is clearly to block as much UV light as possible, then reduce visible light to an acceptable level and / or limit time of exposure.

Humidity can accelerate damage by UV light, as well as other problems with art (foxing, mould formation, warping), and should be reduced wherever control is possible.

The information in this sheet has been sourced from various leading art gallery and preservation websites, as well as general information from literature on various products. Please feel free to e-mail to obtain links to these.

Because of the many variances that will affect the display of artwork, we can take no responsibility for this information being 100% applicable in *all* circumstances and with *every* framing application, however we believe that the above information can be generally applied to framing of artwork.

The obvious and vastly comparative benefits of controlling UV light in particular cannot be ignored.

As such we feel it is a important to educate the picture framing industry (and consumers in general) about the importance of using the best preservation methods and materials whenever preservation of their clients valuable art and memorabilia is warranted.