

Protecting property against fading

SUN ATTACK!



THE SUN CAN DESTROY THE COLOUR OF PICTURES, PHOTOS, CURTAINS, CLOTHES AND FURNITURE. IT CAN ALSO CAUSE DAMAGE TO PAINT, WOOD AND OTHER MATERIALS BE IT AT HOME OR IN YOUR SHOP DISPLAY WINDOW.

UV is Not the Only Cause of Damage

Fading is usually thought to be caused by Ultra Violet light in sunlight. In fact, fading is caused by all parts of the solar energy reaching the earth: UV, Visible Light and solar heat all cause fading and damage. Figure 1 gives approximate contributions to fading and damage by the UV (40%), visible light (25%) and solar heat (25%) in sunlight, which mean that approximately 90% of fading and damage is from solar energy.

Miscellaneous factors (10%) include air humidity, indoor lighting and fabric quality.

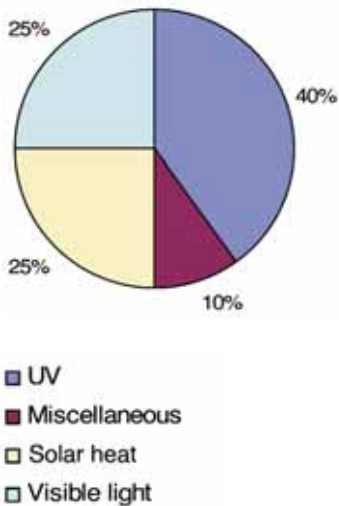


Figure 1: Causes of fading and damage from solar energy (estimated figures)

Who can benefit by protecting goods and materials from fade and damage?

Museums can protect their paintings and other works of art, artefacts, clothing, etc. from damage caused by solar energy – and can provide a good optical environment for conservation work without distortion of colours. Businesses can protect their investments in furniture and office equipment as well as carpets, curtains, etc. Shop and home owners can reduce damage to valuable goods and merchandise.

How much slower will materials fade with UV protection film?

As a guide, specialist UV filtering films often halve the rate of fading, or, in other words, window films double the time taken for the same amount of fade / damage. However, it is essential to remember that different materials react in very different ways. The types of materials, fabrics, dyes and colours used to manufacture your product strongly influence the extent of fading and damage resulting from solar energy; natural fibres (such as silk

and natural colours tend to fade and be damaged quicker than synthetic materials. And fading is no respecter of the cost or value of the goods – some expensive products can fade remarkably quickly.

Key points

- Fading cannot be stopped although in the majority of cases it can be reduced
- UV is the most important part of solar energy to filter, but filtering visible light and/or infra-red energy may also be needed
- Delicate or valuable items require more protection from sunlight than other items.

Therefore it is essential to ensure the best choice of window film is selected.

Specification of window films for fade reduction is relatively easy and advice is available from manufacturers, distributors and authorised dealers.

How to Specify the Correct Film → General

It is important to ensure that the selected film will continue to offer protection from fading and damage over a number of years. Fact Sheet 1 shows the UV transmission of UV filtering windows films after accelerated ageing – the performance of the two types clearly demonstrates the very significant difference in the protection offered. The good durability UV reducing film shows only a small increase in UV transmission after the equivalent of several years' exposure to sunlight, compared to the high UV transmission of the other film.

→ Conservation of Valuable Items: Museums, Art Galleries, etc.

UV: museums and similar institutions require the UV to be reduced to very low levels. A special measure of the quantity of UV in visible light is used, called microwatts per lumen (or $\mu\text{W}/\text{lumen}$). It is usually required for the UV to be $< 75 \mu\text{W}/\text{lumen}$ and sometimes $< 10 \mu\text{W}/\text{lumen}$. Many window films will provide $< 75 \mu\text{W}/\text{lumen}$; specialist films will reduce UV to $< 10 \mu\text{W}/\text{lumen}$ or even $< 5 \mu\text{W}/\text{lumen}$.

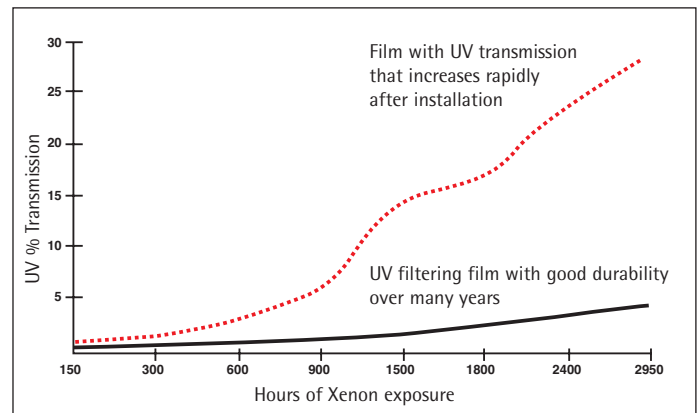


Figure 2: UV Transmission % of UV filtering window films with accelerated ageing

Clear films:	
UV Transmission (UVT)	$\leq 0,5 \%$, preferably $\leq 0,1 \%$ $< 75 \mu\text{W}/\text{lumen}$ or $< 10 \mu\text{W}/\text{lumen}$ as required
Visible Light Transmission (VLT)	$\leq 85 \%$
Direct Solar Energy Transmission (SET)	$< 90 \%$
Additional requirements:	UV transmission at low level for ≥ 7 years Colour Rendering Index* ≥ 90 , preferably $\geq 95^*$
Metallised, sputtered and tinted films:	
UV Transmission (UVT)	$\leq 0,5 \%$, preferably $\leq 0,1 \%$ $< 75 \mu\text{W}/\text{lumen}$ or $< 10 \mu\text{W}/\text{lumen}$ as required
Visible Light Transmission (VLT)	$\leq 40 \%$, as required for the specified lux levels
Direct Solar Energy Transmission (SET)	$\leq 55 \%$, preferably $\leq 35 \%$
Additional requirements:	UV transmission at low level for ≥ 7 years Colour Rendering Index* ≥ 80 , preferably ≥ 90 No large colour change in the film after 7 years

Fact Sheet 1

Visible Light: the amount of visible light allowed in the museum depends upon the sensitivity of objects to visible light. A Scottish Museum gives recommendations for maximum light levels (Fact Sheet 1):

- 50 lux for sensitive items
- 200 lux for moderately sensitive items, and
- 300 lux for insensitive items

These recommendations mean that some areas may need little reduction in the amount of visible light transmitted by the glazing while other areas need a very high reduction in visible light transmission. The 50 lux value may require visible light transmission to be reduced to much less than 5%.

Infra-red energy: The requirement for filtering Infra-Red (IR) energy also depends upon the type of object being protected. Objects that are subject to thermal stress damage or to drying out (which then causes damage) will obviously require better protection than non-IR sensitive items.

Specification for UV, Visible and IR: All three aspects, UV, Visible Light and IR, need to be considered according to the objects being protected. A simple method of selecting the appropriate film is to choose between specifying a clear film or a solar control film.

→ Offices and Other Workplaces

Many offices suffer from solar gain and glare related problems. By using solar control window films, you can resolve these issues and reduce UV and infra-red transmissions that can cause damage to property and health.

→ Shops and Homes

Many shops and homes require maximum light transmissions through their glass; a slight tint is acceptable, but often no more. It is essential to reduce UV light to very low levels while reducing a little of the visible light and direct infra-red energy transmission can provide extra protection.



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Pjece over solbeskyttelsesfilm

Sol- og energiløsninger med beskyttelsesfilm til vinduesruder



Værdier for ydelse	4mm enkeltrude	4mm dobbeltrude
Solenergi		
% Transmittans	36	32
% Absorption	30	40
% Reflektans	34	28
Synligt lys		
% Transmittans	72	65
% Reflektans udendørs	9	16
% Reflektans indendørs	9	13
Strålingsværdi	.77	.77
U-faktor om vinteren (W/m ² °C)	5.79	2.82
Afskygningsfaktor	.54	.58
Værdi for solvarmevinding	.47	.50
Indeks for selektivitet af sol – luminøs virkningsgrad (VLT/SC)	1.33	1.12
Faktor for synligt lys til solvarmevinding (VLT/SHGC)	1.53	1.30
% Blokeret ultraviolet lys (@ 300 til 380 nm)	>99	>99
% Total afvisning af solenergi	53	50
% Reduktion af solvarmevinding om sommeren	45	33
% Reduktion af lysskær	20	20

Nominelle fysiske værdier

Måling	75 microns
Elastisk styrke	2,100 kg/cm ²
Smeltepunkt	260–265°C

Information om hvordan de specificerede resultater bearbejdes, samt en ordliste over tekniske udtryk, kan findes på de sidste sider af denne pjece.