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The Light and Solar Performance of Glass

In addition to admitting light and providing a view out, windows also allow the heat from the sun to enter a building. During the winter this can be considered a benefit – offsetting heating costs by providing 'free' heat on sunny days during the heating season.

During the summer months, however, unless some form of solar control is considered, this heat from the sun could be regarded as a disadvantage, necessitating the use of expensive air conditioning to avoid uncomfortably hot conditions.

Various techniques are available to control the amount of light and solar heat gain (solar heat) coming through windows, including the use of external and internal shading (either fixed or adjustable), solar control glasses, and, or low emissivity glasses.

Solar radiation from the sun is transmitted by three mechanisms, reflection, transmission and absorption, which for light and solar control are defined as follows;

Light

Light Transmittance (Tv)
The light transmittance is the fraction of the incident light that is transmitted by the glass.

Light Reflectance (ρv)
The light reflectance is the fraction of the incident light that is reflected by the glass.

Ultraviolet Transmittance (TUV)
The ultraviolet transmittance is the fraction of the incident UV component of the solar radiation that is transmitted by the glass.

General Colour Rendering Index (Ra)
The general colour rendition index represents the change in colour of an object as a result of the light being transmitted by the glass.

Solar Energy

Solar Direct Reflectance (ρe)
The solar direct reflectance is the fraction of incident solar radiation that is reflected by the glass.

Solar Direct Absorptance (αe)
The solar direct absorptance is the fraction of the incident radiation that is absorbed by the glass.

Solar Direct Transmittance (Te)
The solar direct transmittance is the fraction of incident solar radiation that is directly transmitted by the glass.

Total Solar Energy Transmittance or Solar Factor (g) The total solar energy transmittance is the fraction of the incident solar radiation that is totally transmitted by the glass.

Shading Coefficient (SC):
Ratio of the solar factor of the glass to the solar factor of a reference glass The solar radiant heat admission properties of glasses can be compared by their shading coefficients. The shading coefficient is derived by comparing the properties of any glass with a clear float glass having a total solar heat transmittance of 0.87 such a glass would be between 3 and 4mm.

The Shading Coefficient comprises both a short wavelength and long wavelength shading component. The short wavelength shading coefficient (SWSC) is the direct solar heat transmittance divided by 0.87. The long wavelength shading coefficient (LWSC) is the fraction of the absorptance released inwards, again divided by 0.87.