AGGA TECHNICAL FACT SHEET

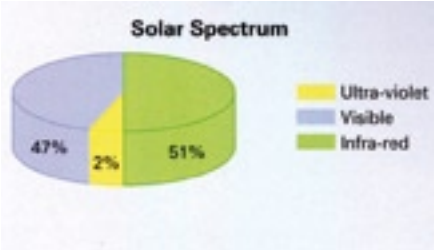
SOLAR SPECTRUM

The sun radiates solar energy or sunlight by electromagnetic waves over a range of wavelengths known as the Solar Spectrum (290–2500 nanometres, where 1 nanometre = 1/1,000,000,000 of a metre).

The solar spectrum is divided into three bands. These are

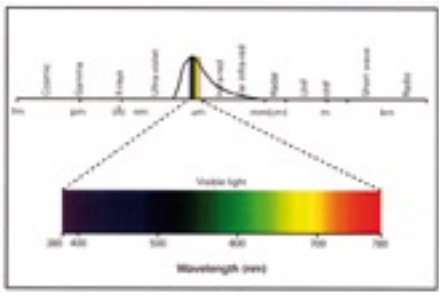
- **Ultra-violet light (UV) –** 290nm–380nm
- **Visible light –** 380nm–780nm
- **Infra-red light –** 780nm–2500nm

The energy distribution within the solar spectrum is approximately 2% UV, 47% visible and 51% infra-red. Only the visible light band is seen by the human eye.



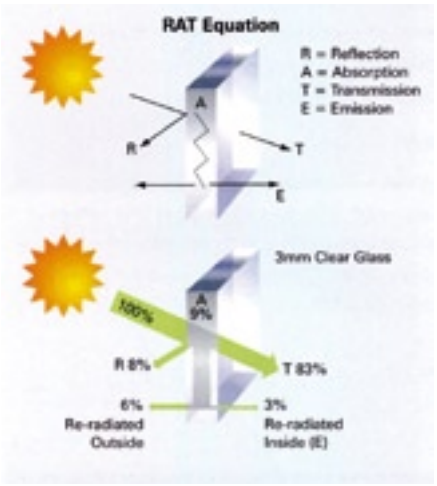
It is important to understand that the shorter the wavelength (i.e. the lower the nanometres), the higher the energy associated with the radiation. This is highlighted by the fact that it is the shorter-wavelength, high-energy UV light which causes humans to sunburn, fabrics to fade and plastics to deteriorate. The longer-wavelength, low-energy radiation produced by the visible and infra-red light bands are less damaging.

ELECTROMAGNETIC SPECTRUM



RAT EQUATION

When the combined UV light, visible light and infra-red light (solar energy) strikes glass, it is reflected (R), absorbed (A) and transmitted (T)

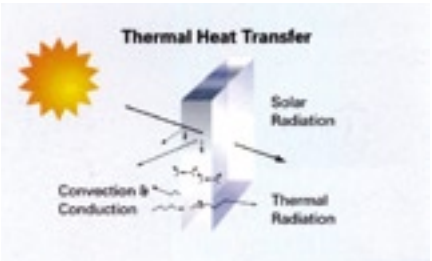


in different proportions, depending on the type of glass involved.

This gives us the RAT Equation which accounts for 100% of solar energy. For example, 3mm clear float glass Reflects 8% of solar energy, Absorbs 9% and Transmits (directly) 83%.

THERMAL HEAT TRANSFER

Heat is transferred either by convection (upward warm air currents), conduction (passing from one object to another) or radiation (passes



through space to an object where it is reflected, absorbed or transmitted). The absorbed portion of the energy is subsequently dissipated by re-radiation (or emission) to both the outside and inside, in varying proportions, depending on the type of glass and external weather conditions.

SOLAR CONTROL

As visible and infra-red light account for 98% of solar energy, they are extremely important considerations when selecting the glass. Solar control glasses are either body tinted and/or coated or surface modified to absorb or reflect the sun's energy and reduce the solar heat gain transmitted through the glass.

PERFORMANCE TERMS

Visible Light Transmittance: Expressed as the percentage of visible light (380–780nm) that is transmitted through a glass type.

Visible Light Reflectance: The percentage of visible light (380–780nm) that is reflected from the glass surface(s).

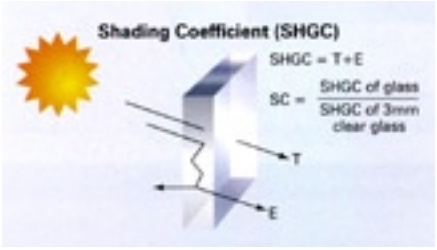
Solar Energy Transmittance: The percentage of ultra-violet, visible and infra-red energy (290–2500nm) that is directly transmitted through a glass type.

Solar Energy Reflectance: The percentage of solar energy that is reflected from the glass surface(s).

Solar Heat Gain Coefficient (SHGC) or Total Solar Energy Transmittance: The proportion of directly transmitted and absorbed solar energy that enters into the building's interior. The lower the number, the better the glass is able to exclude solar radiation.

U-Value (expressed in W/m²K): The measure of air-to-air heat transfer (either loss or gain) due to thermal conductance and difference between indoor and outdoor temperatures. The lower the number, the better the insulating qualities of the glass.

Shading Coefficient (SC): The ratio of total solar radiation through a particular glass type, relative to the total solar radiation through 3mm clear float glass. The lower the number, the better the glass performs in reducing heat gain.



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