

Infrared Rejection – Fact or Fiction

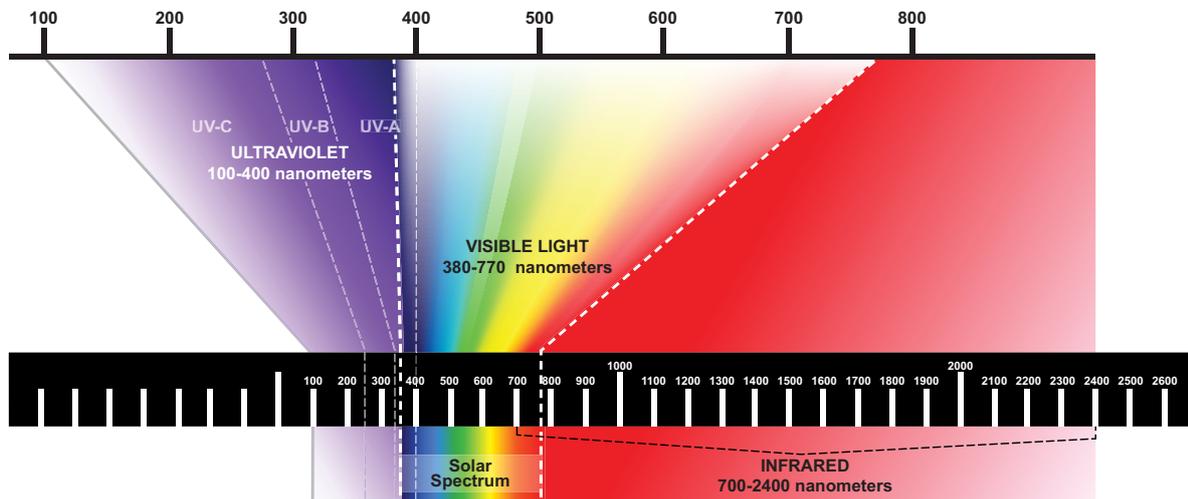
There seems to be a lot of undue attention being paid to IR rejection and it is the result of some manufacturer's publishing data regarding their films' ability to reject infrared light. Unfortunately, the term "infrared radiation" or IR is also referred to as "heat or heat energy". This tends to lead the public to believe that this is the sole source of all heat entering through their windows. This is not the case - IR accounts for only 49%¹ of the energy coming from the sun that strikes the earth. The diagram below indicates these ratios of UV, Visible and IR energy along with their associated energy. Within the total Solar Spectrum, Visible Light represents 49%, UV or Ultraviolet Light accounts for 2% and Infrared (IR) makes up the balance at 49%.

In the solar spectrum, as the wavelengths get longer, the amount of energy associated with them gets smaller. For this reason, it is possible for a film with a very high IR rejection number to have a higher Solar

Heat Gain Coefficient (SHGC) than a film with a lower or non-published IR rejection number. The SHGC measures how well a product (film/glass) blocks heat from the entire solar spectrum range, not just the IR portion. SHGC is expressed as a number between 0 and 1, the lower the number, the less solar heat it transmits!

The near infrared, usually referred to as the IR portion of the solar spectrum is generally agreed to be in the range of 780 nanometers to 2,500 nanometers.

The energy at 780 nanometers is much greater than the energy at 2,500 nanometers. Since there is no industry wide acceptance on a test standard to measure or report these IR rejection values, most window film manufacturers typically do not report these figures, and instead use the SHGC as a true indicator of a films performance.



Electron Volt energy in UV Range = 1,000 to 3 as wavelength increases²

Electron Volt energy in Visible Range = 3 to 1 as wavelength increases²

Electron Volt energy in IR Range = 1 to .01 as wavelength increases²

It is very easy to pick a small portion (900-1000nm) of the total IR Range (780-2500nm) and report values that favor a film's performance in that small range while it may perform average or poorly over the entire IR range. The two major trade associations of which most window film manufacturers are members (AIMCAL and the IWFA) do not support reporting IR values for film since they consider it misleading to the customers if used solely as the determining factor of a film's heat rejection performance. Copies of these statements are available upon request from the Technical Services department.

At some point in the future, the entire industry may decide to publish IR values for film when an accepted, agreed upon method of measurement has been determined. At that time, the IR values will be a portion of the solar energy, but it will not replace the SHGC as the best measure to evaluate the heat reducing capability of window film. **This is the reason that the National Fenestration Rating Council (NFRC) has accepted SHGC as the measurement of solar heat rejection in their rating system and this calculation includes IR Rejection.**

¹ ASTM E 891

² University of Tennessee, Knoxville – Physics Dept.

www.solargard.co.uk

Saint-Gobain Performance Plastics
Unit 13, Ball Mill Top Business Park
Grimley, Worcestershire WR2 6LS
United Kingdom
Tel: +44 (0) 1905 640 400
solargarduk@saint-gobain.com

PDF0250SG24IRINT 03/12
© Copyright 2012, Saint-Gobain Performance Plastics Corporation and/or its affiliates
All Rights Reserved • www.solargard.com

 Please recycle