

Analyzing Marketing Claims

“TSER—On Angle” & “IR Rejection”

Summary of Key Points:

1. “TSER—On Angle” is not an industry-accepted measure of a film’s performance and therefore cannot be used to assert the superiority of one film product over another. The NFRC is the only independent agency to rate window performance, and “TSER—On Angle” is not recognized by them as a measure of performance.
2. All film products, indeed all glazing systems, have improved “total solar energy rejection” as the sun climbs higher in the sky and sunlight strikes a vertical glass window less directly. When the sun is directly overhead, all vertical windows (with or without film) have 100% total solar energy rejection.
3. Sunlight (solar radiation) is made up of 3% ultraviolet, 44% visible light, and 53% infrared energy, and ALL of this energy generates heat if it enters a room through a window. Blocking 97% of the infrared would NOT block 97% of the heat, but only 97% of 53%.
4. No window film, in fact, blocks 97% of the sun’s infrared energy. Blocking 97% of the infrared at a single wavelength does not mean that all the other wavelengths of infrared are being blocked at that level. Be skeptical of metering devices that selectively measure at very narrow wavelength bands, for they can falsely represent the whole picture (see the final graph below).

For those who are interested in the explanatory details, they are provided below:

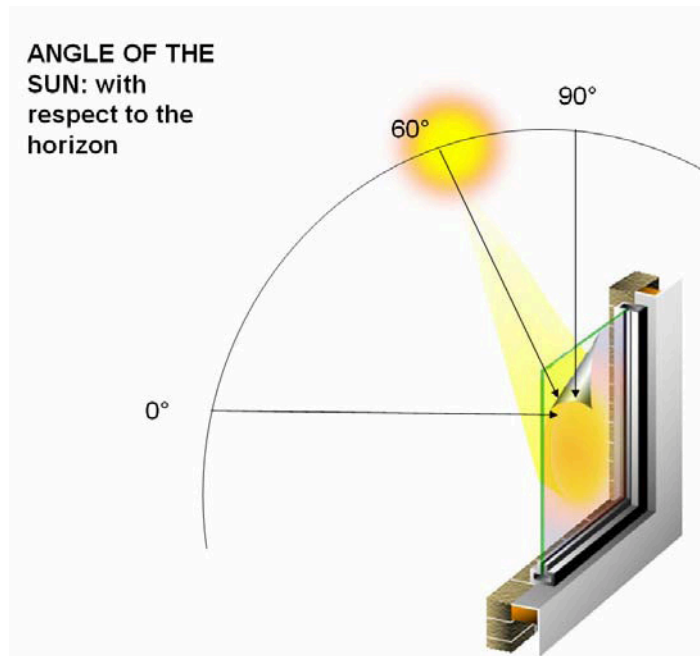
Introduction

Recently, particular makers and sellers of window film products have made significant claims about the performance of their products that allegedly show them to be superior to competing products. As is generally the case, consumers are rarely in a position to rationally evaluate the legitimacy of such claims. Marketing claims are necessarily designed to “sound good” so that they have a positive “sales impact,” but sometimes these claims have no substance and ought not to be persuasive, simply because they are misleading, confusing, trivial, or—sometimes—stunningly false. Here are two examples that need to be examined and shown for what they are: all of the above. We believe that such claims cannot be allowed to go unanswered because of the potential damage that can be done to the credibility of the industry as a whole.

The claims in question are quoted as follows:

1. **To measure just how impressive these films are, we created a more stringent specification for their performance: Total Solar Energy Rejected – On Angle. This specification proves that our films are unsurpassed throughout the day and especially during the hottest times when you need help most. While some films claim similar performance, the fact is that their performance is only similar when tested perpendicular to the sun, which only can happen at the relatively cool times of sunrise and sunset.**
2. **Our spectrally selective films reject up to 97% of the sun’s infrared light.**

We will take up, in turn, an analysis of each of these claims.



“TSER—On Angle”

With regard to the first statement, a great many things need to be said. First, individual window film manufacturers are not in a position, nor are they authorized by any recognized fenestration rating agency, to independently invent or create “more stringent specifications” for their products’ performance. Surely it is no mark of fairness to announce that one’s product is better than a competitor’s based on some personally invented “measure,” especially when competitors do not have the testing and measurement criteria publicly available to evaluate their own products by means of it. The reality is that the [National Fenestration Rating Council](#) (the NFRC) does not recognize any such specifications for glazing performance, neither “Total Solar Energy Rejection—On Angle” *nor* “Infrared Rejection.” It is the NFRC that administers the *only* uniform, independent rating and labeling system for the energy performance of windows, doors, skylights, and attachment products. Their goal is to provide fair, accurate, and reliable energy performance ratings. The NFRC was formed as an independent, industry-wide agency to provide fair and accurate information about window product performance and thus to help stem a naturally rising tide of false, exaggerated, and generally outlandish claims that enrich fabricators while confusing and defrauding the consumer.

The solar performance of windows is measured, as a matter of standard practice, with the sun (or radiation source) at right angles to the glass surface. This makes cross-comparisons of the performance of competitive products straightforward. The claim being made for the products in question is that their performance *increases* as the sun rises higher in the sky, *in a way that other products do not*. It turns out that this is simply not the case, and for a revealing reason: As the sun climbs higher in the sky, the total surface area of pane becomes less directly exposed to sun’s rays. Indeed, as the sun rises to a point directly overhead (as might happen at the earth’s equator), the window’s exposure to solar radiation approaches zero. True, if the windows were laid down flat, horizontally, as a skylight on a roof, noon-time radiation would be far more intense on it than in the morning on a vertical window, but this is not the situation being described. It is technically correct, though quite trivial, to say that there is “100% total solar energy rejection” (or 0% solar heat gain) with the sun at this high angle. But this has absolutely nothing to do with the way any glass or film product uniquely performs. All vertically mounted glazing systems, even clear glass, yield lower solar heat gains as the sun moves higher. It is not all at because they are “working better,” but merely because the solar energy intensity (say, in watts per square meter) diminishes on a vertical window with the rising sun, reflection values increase, and absorption decreases.

It is interesting, too, to find the word “unsurpassed” used in this and so many other advertising claims. The claim that “this specification proves that our films are *unsurpassed* throughout the day” literally does not mean that they are *better* than any other, only that that they are *not worse*. We did our own testing of “total solar energy rejection” of various films, shown in the chart below, including the Brand X product. What we discovered was as expected, namely, that as the radiation striking a vertical pane increases in elevation, the visible light transmission falls to 0% and the TSER climbs to 100%, trivially true of all glazing systems, independently of the “performance” of a product.

Film Type ↓	Angle of Elevation →	0	10	20	30	40	50	60	70	80	90
		VS60	VLT:	58%	57%	57%	56%	55%	53%	48%	39%
	TSER:	58%	58%	58%	59%	60%	61%	63%	67%	78%	100%
VS61	VLT:	63%	63%	62%	61%	60%	58%	53%	43%	26%	0%
	TSER:	46%	46%	46%	47%	48%	49%	53%	60%	74%	100%
VS75	VLT:	74%	74%	74%	73%	72%	70%	65%	55%	33%	0%
	TSER:	40%	40%	40%	41%	42%	43%	47%	54%	71%	100%
VS70	VLT :	70%	69%	67%	65%	64%	62%	57%	46%	28%	0%
	TSER :	55%	55%	56%	56%	56%	57%	59%	64%	77%	100%
“Brand X” 70	VLT :	68%	66%	65%	64%	63%	61%	56%	46%	27%	0%
	TSER :	50%	51%	52%	53%	55%	56%	59%	64%	77%	100%

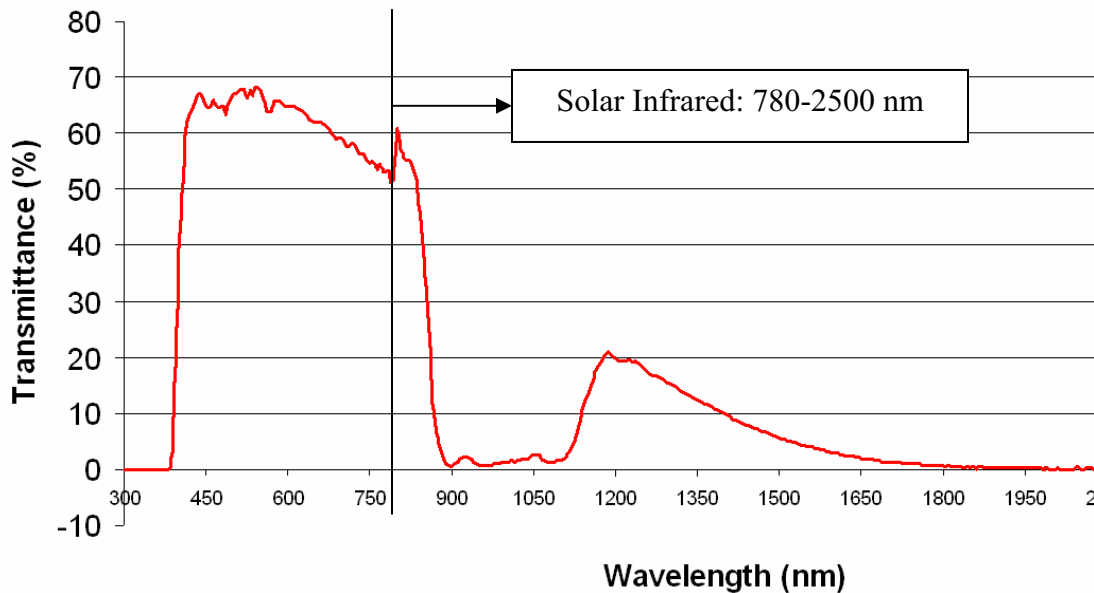
“Infrared Rejection”

We can move now to a second important marketing claim made—with increasing frequency—in the industry, the claim about “infrared heat rejection.” The claim has been made, for example, that “Our spectrally selective films reject up to 97% of the sun’s infrared light...” What exactly is this supposed to mean, and what conclusion is the consumer supposed to draw from it? Clearly, the intention is to persuade the reader that this product blocks or “rejects” an absolutely huge amount of infrared energy, better than any competitor. The reader, generally unschooled in the fineries of the composition of solar radiation, is left to “fill in the blanks” for himself. He is supposed to think: “Infrared is the part of the sun’s light that contains the heat. Blocking 97% of the heat is fantastic. Almost 70% of the visible light is allowed to come through. Wow! Great. I’ll buy it.” But there is fatal problem with the argument. The facts are wrong.

Mistake #1: Infrared radiation from the sun does contain energy, but only 53% of it. The sun’s energy is made up of UV (3%), Visible Light (44%), and Infrared (the remaining 53%). All of these components of sunlight, when they strike and are absorbed by physical objects (furniture, carpet, etc.) convert to heat and make up the sun’s “energy load” coming through a window. Blocking all and only 100% of the infrared would only amount to blocking 53% of the sun’s “heat.”

Mistake #2: The claim that 97% of the infrared is “rejected” is a wholesale misrepresentation of the facts.

We obtained a sample of the product in question and subjected it to a standard analysis with a photospectrometer. Here is its transmission curve:



Infrared radiation from the sun extends from 780-2500 nanometers in wavelength. Notice in the curve that transmission from 780-900 nm exceeds 60%. It is only in the region from about 900-1100 nm that transmission drops to the neighborhood of 3%. The transmission increases dramatically again from 1100, dropping off past 1600 nm. Therefore, there simply is no way this product can be “rejecting” 97% of *all* the sun’s infrared. Clearly, a claim is being made about a very narrow *part* of the sun’s infrared radiation. We find that the product has approximately a 50% total solar energy rejection (TSER), as measured according to industry standards.

Summary

With the foregoing in mind, these are the important facts we would like consumers to be aware of:

There are no recognized quantitative specifications for “IR rejection” and “TSER On Angle” in the glazing industry, and are not likely to ever be in the foreseeable future. The former term is not informative of the total energy performance of the window, and the latter term is misleading, falsely implying that windows, and window films, perform better in some meaningful way as the radiation striking them falls in intensity (as the sun climbs in the sky).

If claims are being made about the energy performance of window films (and glazing systems in general), TSER or its complement, the Solar Heat Gain Coefficient (SHGC), should be used. SHGC is already the NFRC standard in the glazing industry, and is simply the term designating the percentage of *total* solar energy (UV, visible, *and* IR) that strikes a glazing system that is allowed to pass through that system (measured, incidentally, when the incident radiation is at right angles to the glass). This number tells you just how much energy, or “heat,” overall, is being allowed to come through the pane as a percentage of the total amount striking it.

Claims about IR rejection must be understood in the context of visible light transmission and overall solar heat gain (SHGC). Many spectrally selective films do a good job of blocking more of the IR energy while allowing a higher percentage of the visible light to pass through. But there is a tradeoff: higher light transmission also means higher *heat* transmission. One must be alert to what is happening to the overall heat gain values, and make film selections based on how much visible light transmission you need, balanced against how much total solar heat gain is permitted, the aesthetic appearance of the product, its price, warranty, the manufacturer and installer’s quality & reputation, and, of course, the legitimacy of the various marketing claims made on the products’ behalf.

Joseph Richard
Technical Marketing Engineer
CPFilms Inc.

February 10, 2006
Updated: March 29, 2006 (summary statements added)
Updated: June 2, 2006 (added data for VS61)

For inquiries outside the US and Canada:

CPFilms Inc.
International Division
P.O. Box 5068
Martinsville, VA 24115 USA
Phone: 276-627-3324
Fax: 276-627-3008
www.llumar.com

For inquiries inside the US and Canada:

CPFilms Inc.
P.O. Box 5068
Martinsville, VA 24115 USA
Phone: 1-800-2LLUMAR
Fax: 276-627-3032
www.llumar.com