

Energy Balance, Inc.

160 White Rock Dr. #1 Montpelier, VT 05602

To: Gordon Clements, Gordon's Window Decor

Subject: EcoSmart Shade Testing

Date: March 3, 2010

I tested three samples of the EcoSmart Shade you provided, on three windows in my home. I used a simplified test method, developed by William Shurcliffe, to estimate the R-value of the shades.

The shade is comprised of a two-cavity cellular material - one cavity has both sides lined with aluminized Mylar, the other has one side lined with aluminized Mylar. The side tracks include a translucent "Z" flexible plastic weatherstrip that bears on edge of shade. The edge of shade is slotted to accept a "leg" of the plastic "T" edge-track. The track is adhered to the wall with a combination of double sided tape and magnetic strips. Double brush weather-stripping on the bottom of the shade bears on the sill below and a single similar weather-stripping on the top edge bears on the top of the opening. One shade was approximately 62" wide X 60" high and one was 32" wide by 44" high. A second of the larger type was installed without side edge tracks for comparison.

Strings operate the shade, opening either at top or bottom. In three weeks of operation of the shades daily, I notice that the tracks inhibit free movement of the shade downward, which occurs by gravity, so that shades require a little encouragement to close fully at the bottom. Also, the two tracks do not resist the downward movement equally, so that in about one out of three closings, one side or the other tends to go down faster, resulting in one side slipping out of the "T" of the track. This is a minor annoyance and easily rectified as the shade is closed. In installing the tracks, I had to make the "Z" fold myself and encountered some difficulty in making this even, and this may be a source of this issue. Also, one of the plastic pieces that join the two cords into one came apart.

The shades were installed in a new house, with very square window openings and very flat sills and head. The high-performance (R-4.5) windows are set in a 12" thick wall, giving a 9" interior sill and head width. Shades were installed with approximately 2 inches between frame and shade, which gives about 3 inches between shade and glass.

Two thermocouples were set up for each test, one inside the room and one in the approximate center of the volume created between shade and glass. An outdoor mercury thermometer was calibrated against the thermocouple, for consistency. Shades were tested on an overcast night with a very light breeze, with temperatures ranging from 26F in the evening to 23F the next morning. See accompanying data and calculation sheet. Since the windows have a known, published R-value,

based on the NFRC accepted calculation method, backed up with testing, their R-value of R-4.5 was taken as a given. (Note that a testing laboratory would use a more standard reference material) The relative temperatures of inside, between and outdoors allow calculation of effective R-value of the shade.

The shade performed remarkably well. I estimate the R-value at R-4 with the edge seals, in place on a window that allows full contact of weather-stripping at the sill and head and full contact with side weather-stripping. This value approaches the theoretical R-value that would be expected from three sealed cavities – one in the shades with two low-emissivity (low-e) surfaces, one in the shades with one low-e surface, and one cavity between shade and window with no low-e surface. ***This is a remarkable result for a shade that is so compact when not deployed*** and constructed with no “bulk” insulation such as foam or quilt batting.

Test of insulating blinds
2/22/2010 9:34

~60" by 60" ~32W X 44"H ~60" by 60"

Date	time	Outside temp	Between blinds and window temp			Inside temp
21-Feb	9:00PM	26	large, with edge seals	small, with edge seals	large, with NO edge seals	65.2
	9:30PM		49.4	49.0		65.8
	% of way from outside to inside		59%			
	R check		3.0			
		OK				
	10:00PM	26	48.0	47.2	58.2	65.8
	R check		55%	53%	81%	
			3.6	3.9	1.1	
		OK				
22-Feb	6:30AM	23.0	44.0	43.9	56.7	64.4
	R check		51%	50%	81%	
			4.4	4.4	1.0	
			OK			

Assumed window R-value
4.5

R-shade/R-total = delta(inside to between)/delta(inside to outside)

R-average overnight 4.0 4.2 1.0



double brush weatherstrip on bottom edge of shade, one similar WS on top edge



bottom of side tracks - note translucent "Z" flexible plastic weatherstrip that bears on edge of shade. Edge of shade slotted to accept "leg" of the plastic "T"



cellular material - one cavity has both sides aluminized mylar, the other has one side aluminized mylar