



## SOLAR COMFORT WINDOW COVERING PRODUCTS PRESENTS

### **SEVEN AREAS OF PERFORMANCE**

When evaluating a window-covering product that is designed to control the movement of radiant energy, there are seven significant areas of **Product Performance** that should be considered collectively, in selecting the product that will provide the highest level of total performance, protection and greatest personal comfort.

These areas of product performance include:

1. Reflectivity
2. Surface Heat Retention
3. Visibility
4. Directional Heat Control
5. UV protection
6. Healthful Sun Light
7. Potential Energy Savings

#### **Where to start ?**

- In the evaluation of products that protect you from the radiant heat of the sun, it is important to understand the nature of what happens as the rays of the sun pass through windows and come in contact with any surface inside the home or office. The sun's rays are electromagnetic waves that are without temperature as they travel through space. It is not until they come into contact with something that they are converted into heat energy. For example; when the sun's rays hit your face, you feel the heat on your skin. When the sun's rays contact a window, only a small portion of energy is converted to heat at the window, with the balance of the sun's rays continuing on into the room. As the sun's rays hit the floor and the furniture in the room the radiant energy is converted into heat.
- There are two physical laws of heat energy that are essential to understand in this evaluation.
  1. The movement of heat is always from high temperature to low temperature, or from hot to cold. Thus in the summer the net movement of heat would be into an air-conditioned building. In the winter the net movement of heat would be out of a heated building.
  2. Cold is not a type of energy it is the absence of heat. When a unit of heat energy passes through a window to the outside, the room is left colder. Conversely, when a unit of heat energy passes through a window into a room, the room becomes warmer.

Glass is the greatest source of heat gain or loss in buildings. Radiant energy accounts for 80% of all heat movement. The two other factors in heat movement are convection and conduction. Together they account for the other 20% of heat movement. (See chart below)

- Companies manufacturing window covering products will advertise the features of their products where they believe they excel, leaving the customer to assume that these are the only areas of product performance that need consideration. **Solar Comfort** is the only window-covering manufacturer whose products excel in all seven areas of product performance.

## Reflectivity

- The manufactures of window covering products design their products to block the sun's rays from entering the home or office. The measure of effectiveness is reported as a percentage of reflectivity. Simply stated, if the rays of the sun are reflected out of the room; they do not have the opportunity to turn into heat energy inside of the room.
- **Solar Comfort** products are manufactured using products developed by NASA for the construction of their space suits and for other applications in the space program. Having utilized this space technology, the **Solar Comfort** products have a very high degree of reflectivity.

## Surface Heat Retention

- Most window coverings are not designed with a high degree of reflectivity, but are designed with the idea of creating shade. Unfortunately, as the radiant energy strikes the surface of the shading material, it creates a heat zone on the front and backside of the window covering. The heat created on the surface of the window covering will continue to radiate into the room increasing the room temperature.
- **Solar Comfort** products are designed to reflect radiant energy away from the surface of our window covering products. Because of the high degree of reflectivity of **Solar Comfort** products, the surface of the window coverings remain cool thus eliminating surface heat as a contributor to the temperature of the room.

## Visibility

- There is a critical balance between the shading properties of a product, and the degree of visibility allowed through the product. This property is expressed within the industry as the "openness factor". With most window covering products, the lower the openness of the weave, the greater the degree of shading the product will provide. As you increase the shading factor you greatly reduce the ability to see through the product. Since the window covering products of most companies are not efficient in reflecting heat energy, they elect to increase the shading value of their products and in the process significantly lower the visibility or openness of their products. Most shading materials start with an openness of 3 -5% in order to provide high levels of shading.
- **Solar Comfort** products have a very high degree of reflectivity. Because of this factor we are able to perforate our window covering material with an openness of 38.6%. This provides the highest degree of visibility of any product on the market. With less than a 10% reduction in perceived visibility, the material seems to disappear from view as it reduces the glare of the sun. You will need to see it in action to believe it.

## Directional Heat Control

- Radiant heat doesn't just come from the sun. There is an enormous amount of radiant heat created within the home or office. The same principles of radiant heat movement through a window apply when it is colder outside than inside. Unfortunately, nearly all window-covering products are uni-directional. This means they are designed to shade the home or office from the heat of summer. They are not designed to address of the problem of heat loss in the winter. For example: one window-covering product advertises a reflectivity rate of 70%. The rate at which this particular product reflects radiant heat back into the room is only 6%.
- **Solar Comfort** products are bi-directional. The highly reflective performance of the product works in both directions. Heat flow through the glass is effectively restricted in both the summer

and winter. The cold drafts in a home or office are created as heat leaves unrestricted through the window. Reducing this heat loss reduces the drafts. With **Solar Comfort** products, what have been the least comfortable rooms can now be the most comfortable rooms in the home or office.

## UV Protection

- The Ultra-Violet rays of the sun can be very destructive to most any surface. If a window-covering product is effective in preventing radiant energy from entering the home or office, it will also be effective in eliminating the harmful UV rays. It will also reduce the production of off gases in your homes and offices.
- **Solar Comfort** products have a very high degree of reflectivity and shading co-efficiency, thus, providing an appropriate level of protection without blocking all of the UV-A which we need.

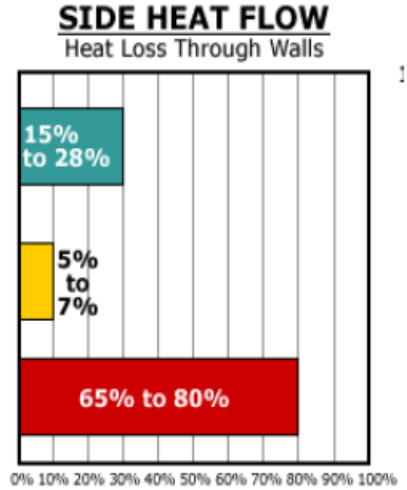
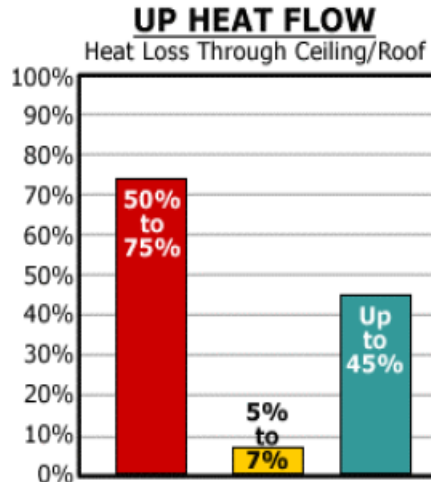
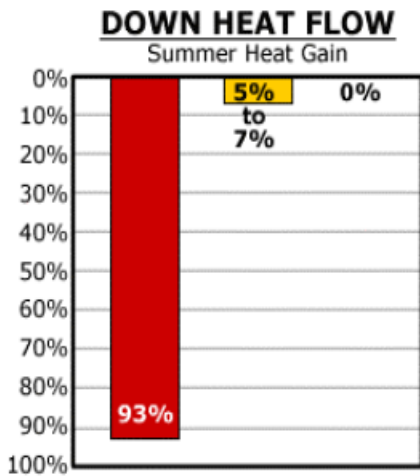
## Healthful Sun Light

- Studies have shown that we are healthier and happier if we live and work in a sun lit environment. Most window-covering products have very little openness because of the requirement to provide a higher level of shading. When the openness is restricted, the amount of healthful light entering the room is also restricted.
- **Solar Comfort** products have a very high degree of reflectivity, which allows a higher degree of openness or visibility. With this openness also comes a greater volume of “healthy and happy light” that is allowed to enter the home or office. **Solar Comfort** products provide a much better environment for work and study.

## Potential Energy Savings

- The induction of radiant heat energy through a window can pose an enormous energy problem in a home or office. During the summer or winter, temperatures in a building can vary as much as 12 to 15 F degrees throughout the day or even from one room to another. Large HVAC systems are installed to handle the huge variations in temperature demands. The purchase price and operating costs of these systems can be significant.
- The physical laws of heat energy transfer will always apply. For every unit of heat passing through a window a building will be left warmer or colder depending on whether the heat came in or went out. The result is HVAC systems that are working overtime to either replace heat energy that has escaped or to remove heat energy that has come in. In either case the dollars required to run the HVAC are literally going right out the window.
- **Solar Comfort** products greatly reduce the movement of heat in both summer and winter. Many **Solar Comfort** customers have reported being able to turn down, or turn off, their HVAC systems at times of the year where they had not been able to so before. Some customers have reported room temperature reductions of up to 20 degrees F after the installation of Solar Comfort Products during the summer months.
- The extent of energy savings realized with **Solar Comfort** products will depend on: 1) the number, size and exposure of the windows, 2) the size and location of the rooms, 3) the age and efficiency of the HVAC unit, and 4) the cost of energy. Our experience shows that when **Solar Comfort** products are used throughout the home or office, energy savings between 30 to 40% of the annual energy costs can be achieved.

# DIRECTIONAL HEAT FLOW CHARTS



## AVERAGED

7% **Conductive:** Direct contact. If you touch a pot on the stove, this is conductive heat transfer.

15% **Convective:** Steam, moisture. If you put your hand above a boiling pot, you will feel heat in the form of steam. This is convective heat transfer.

80% **Radiant:** Electromagnetic. Step outside on a sunny day and feel the sun's rays on your face. You are feeling radiant heat transfer. All objects above absolute zero (-459.7 degrees F.) emit infrared rays in a straight line in all directions.

## CLARITY OF VISION



Examples of two offices with the new radiant barrier installed. The one on the right shows the difference between a pane of glass with the product in place and the regular view through the sliding glass doors. The product controls heat flow and glare. The natural view through the windows are improved.