

How Window Film fits into the Green Initiative - White Paper

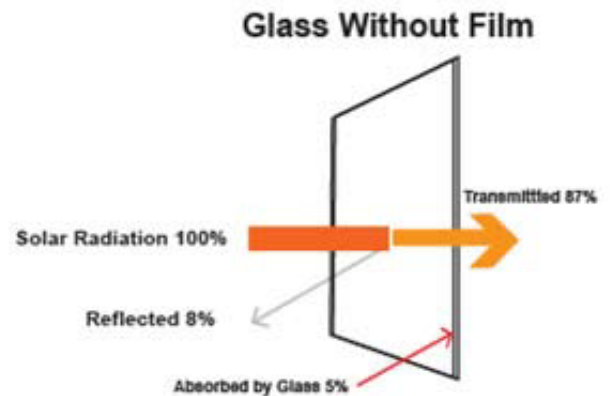
More people are becoming involved in the green initiative. It is quickly becoming one of the largest global environmental movements ever. But what does being "green" mean? In general terms, being green means displaying an ethical way of thinking in relation to the environment while considering the impact that is being made to the Earth's Ecological Footprint.

In the window film industry, "green" is achieved by sustainability through energy efficiency. The cost to heat and cool buildings, along with the knowledge of how to design and apply technology in ways that reduce energy consumption, are the major drivers of the green initiative. This document outlines how window film contributes to that reduction of energy consumption and cost, making Solar Gard and Panorama film products a perfect fit to the green initiative.

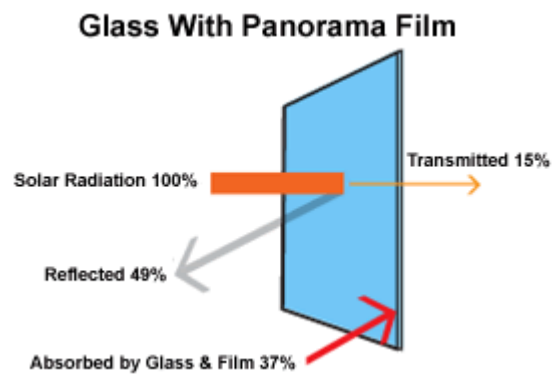
How Window Films Work

Window films are designed to reduce the amount of solar heat transmission through window glass by increasing the solar reflection and solar absorption of the glass. Window films reflect a significant portion of the total solar energy from passing through existing windows. The film also increases the absorption of that energy into the glass. A window with a film reflects and absorbs more solar energy than a window without a film.

As radiation from the sun strikes a window, window film blocks harmful UV rays as well as controls the amount of heat and light passing through the glass. The amount of heat and light controlled depends on the film which is chosen.

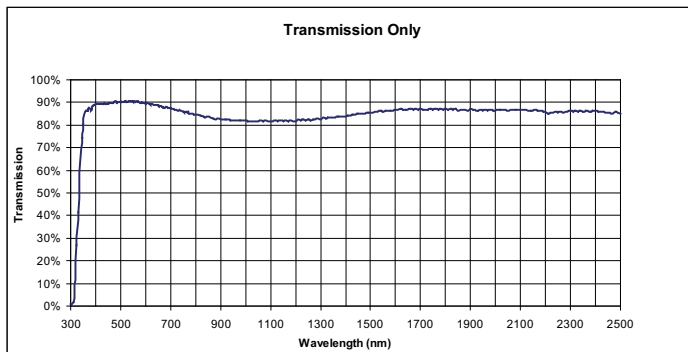


In 1/4" (3mm) annealed glass, 87% of the energy is transmitted, 5% is absorbed and 8% is reflected.



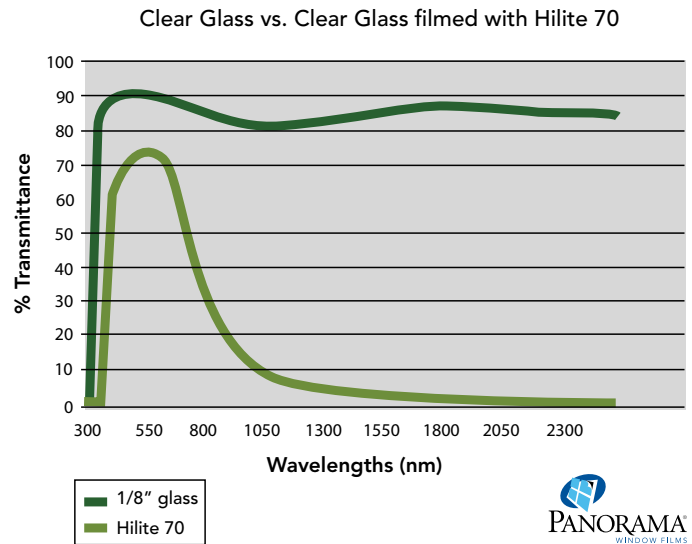
Using Panorama Sterling 20 window film, 15% of the energy is transmitted, 37% is absorbed, and 49% energy is reflected.

Clear Glass has a high transmission of the UV, Visible Light, and NIR Solar Energy Spectrum. This transmission stays linear from the visible wavelengths through the near infrared wavelengths (ref. graph below and note that the transmission curve remains flat).



With solar film installed on the inside of a window, the proportions are changed dramatically, with reflected energy and absorption increasing. This corresponds to a reduction in solar heat transmitted (solar heat gain) inside the room. The properties of the window film dramatically influence how and in what way transmission, reflection and absorption change.

The movement or transfer of heat from a region of higher temperature to one of cooler temperature is called heat transfer. The transfer of heat always flows from hot to cold. No heat will transfer if there is no difference in temperature.



For example, when viewing the chart above, you will see that 1/8" (3mm) clear glass transmits approximately 87% of the solar energy which strikes the outside of the glass. When the glass is filmed with Panorama Hilite 70, the transmittance of solar energy in the visible light range is not reduced dramatically, -this permits a significant amount of light to pass through the glass. However, the solar energy in the infrared region is greatly minimized to less than 5%, an extreme rejection of most of the radiant heat. Infrared solar energy accounts for approximately 53 percent of the sun's energy. Infrared is found in the range from 780nm to 2500nm. Above this range is known as thermal radiation and is the range from 2500nm to 1mm. Heat radiating from a fire or your central heating system is thermal radiation. Panorama Hilite 70 will allow the room to retain most of the visible light coming through the window while rejecting the associated heat. This will result in a drastic load reduction on your AC unit during the warmer months.



Window Film Reduces Energy Consumption

Only a few degrees in temperature reduction can have up to a 25% reduction in cooling costs, due to the laws of thermodynamics. It requires considerable amounts of energy to remove heat from a room through air conditioning. During peak summer times in the middle of the day, loads on air conditioning systems can be reduced enough to turn off entire units or to install a less costly system.

Single-glazed windows are only about one-third as energy-efficient as modern, low-E units. According to the Department of Energy, when it's cold and windy outside, an old window loses energy about 10 times faster than an equal area of insulated wall. In many homes, heat transfer through and around older windows accounts for more than 25 percent of home heating and cooling bills.

How lowering the temperature saves energy

Window film improves glazed windows ability to conserve energy. Glazed windows can be responsible for a major part of a home's energy loss.

One of the most effective ways to save energy is to use high-performance glazing to include window film. One of the best ways to do this is to control the solar heat gain radiating through your windows from the sun. Controlling solar gain is to allow it in during cold months and keep it out during the heat of summer. Consider walking into a room, and discovering it was a bit too warm. Drawing the window coverings to control that heat seems like an effortless solution, is preferable to turning down the air conditioner to "kick it on." This simple action could be an important clue for how you as a homeowner can gain a greater degree of control over your home's energy costs, your comfort.

Reduce energy use and cost.

Here's how Solar Gard window film can help save energy in a Los Angeles building, built in the 1970's, with 500,000 sq. ft. of office space on 20 floors, and equipped with 30,000 sp. ft. of single pane glass windows.


Information is based on an estimate generated by Demand Analyzer, which utilizes the U.S. Department of Energy's DOE-2 energy analysis software. Calculations shown are for illustration purposes only. Projected results vary depending on climate, geography, home construction, thermostat setting, and type of window film installed.

Projected reduction in energy use (kWh)	397,656
Average cost per kWh	\$.125
Projected reduction in annual energy spending	\$49,707

Without window film, consistently warm states, send money right out the window every day. Window film keeps heat out and allows your home to retain cool air produced by the air conditioning unit. The result is that the cooling system doesn't have to work as hard, and that saves money. Maintaining a home's internal temperature reduces energy usage, and provides a more comfortable environment during the day.

Roughly one third of an average building's cooling load is due to Solar Heat gain through windows, according to the *Building Energy Databook*, an annual report of data averages published by the U.S. Department of Energy.

In warm climates, solar gain through windows can increase the usage of air conditioning systems, therefore, increasing the cost for cooling. One of the best ways to lessen heat gain from the sun is to install window film. This resolution is particularly useful for southern regions.



Reflective films applied to the inside of the window are relatively effective in reducing heat gain and also protects interior finishes from harmful UV rays.

If your home experiences intense solar gain, a dual reflective film such as Panorama Slate 10 can lower cooling costs. It is recommended to check with the window manufacturer to ensure that a specific application of window film to glass is suitable. Reflective films can increase thermal stress and may damage windows if used improperly.

Clinton Climate Initiative

On November 1st, President Bill Clinton announced two new partnerships to make green products more affordable and accessible to city governments and consumers across the United States. In response to growing demand, Clinton Climate Initiative will extend its programs and purchasing consortium, which offers lower-cost green products from 25 manufacturers, to 1,100 cities in the US Conference of Mayors.

High performance Solar Gard window film was included in this program because it improves energy efficiency and offers significant related benefits. Installation of Solar Gard window film is included under the Energy Efficiency Building Retrofit Program, which was designed to help public entities lower their energy consumption. Solar Gard window film can be sized to fit any glass door or window, making it an essential measure for government buildings which are often historic and frequently characterized by oversized windows. Now, all public organizations that have committed to reducing their carbon footprint can easily and cost-effectively fit Solar Gard window film into an overall strategy to reduce CO2 emissions.

Conclusion

Window film is one of the fastest payback of any building product you can put in a house or building. Window film can reduce up to two thirds of the heat load of your air conditioner, thus cutting down on the run time, the amount of heat that has to be overcome, reduces utility bills and adds years to the life of your air conditioner.

www.solargard.com

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