

Saving Energy With Window Film

Those products with solar control properties can help to keep out unwanted heat.

By Anne Vazquez

With the virtues of natural light inside facilities being extolled by many building practitioners, it may appear that to have sunlight streaming into a building would be highly desirable. With proper design, an abundance of natural light can be beneficial to occupants in terms of productivity. However, there can be a downside. For instance, when heat from the sun builds up inside a facility, it can become uncomfortable for occupants.

As a result, the facility manager will often turn up the air conditioning, which means more energy is used and a higher utility bill results. In its "Building Energy Databook," an annual report of data averages, the U.S. Department of Energy (DOE) has found about one-third of an average building's cooling load is due to solar heat gain through its windows. This can pose a problem for facility managers who want to capitalize on the natural light, yet do not have windows in place designed to combat solar heat gain.

Window film can be a solution in these scenarios. While this type of film is manufactured for safety and security purposes as well, a large portion of these products is manufactured to control solar heat gain.

When considering whether or not window film will be effective in reducing unwanted heat, it is important to understand how solar control window film works. While specific materials and characteristics may vary by manufacturer, the basic concept is that the film serves as an insulator on the window to which it is applied. This means that it will reduce the heat that enters the building in the warmer months, and it can also keep some heat from escaping through windows, which benefits in colder months. To what extent depends upon each product's performance measurements.

"The primary thing a facility manager should focus on is preventing as much solar energy as possible from entering the building," says Darrell Smith, executive director of the International Window Film Association, located in Martinsville, VA. "The measure of a product's solar control is expressed as the

solar heat gain coefficient. This takes into account the entire fenestration system, including the glass, the frame, the sash, and the seal.”

The solar heat gain coefficient (SHGC) also takes into account a product’s performance related to all three spectral regions of solar light—ultraviolet, visible light, and near-infrared radiation. Smith notes this holistic approach makes the SHGC the most important performance measurement. “There are manufacturers that put a major focus on the infrared protection their products provide,” he says.

“However, infrared is only about half (53%) of the total solar energy. So, even if all the infrared is blocked, only about half of the energy is being eliminated. That is why the entire solar spectrum must be considered for total solar control of a product.”

As with most energy efficient projects, one size does not fit all when choosing window film, and factors specific to the facility and its location must be taken into consideration. A product with a low SHGC rating is more effective at reducing cooling loads during warmer months by blocking solar heat gain. On the other hand, a product with a high SHGC rating is more effective at collecting solar heat during the winter.

If a facility manager is comparing two window films with the same SHGC, he or she can begin to differentiate them by next looking at the U-factor—the rate at which the film will conduct non-solar heat flow. Smith explains, “A product with a lower U-factor acts as a better insulator. So, when keeping heat inside is a main concern—as might be the case in a northern climate, the facility manager will want to choose a film with a lower U-factor.”

The third major characteristic to be considered is visible light transmittance—the amount of visible light that passes through the glazing material of a window, expressed as a percentage. The higher the visible light transmittance is, the more natural light that will be allowed to a building’s interior.

On the other hand, the lower the visible light transmittance is, the less light that will be allowed to enter. This is important to note, because as some window films reduce solar heat gain, they also cut the amount of light entering in the building. As Smith notes, this effect can offset some savings in cooling, because lighting may need to be increased to make up for the loss of sunlight. However, if glare control is a

problem, a lower visible light transmittance may be desirable.

A recent development that may eventually help facility managers specify the best window film for their projects is a third party certification program enacted by the National Fenestration Rating Council (NFRC).

In July 2006, the Council, located in Silver Spring, MD, approved testing and certification procedures for window film, and many products are currently in the approval process. The NFRC program does not set acceptable measurement parameters; instead, it verifies manufacturers' claims about their products' performance. The three performance measurements that will appear on the NFRC label are SHGC, U-Factor, and visible light transmittance.

No matter what kind of window film a facility manager chooses, it is crucial to evaluate window conditions. This includes looking at type of glazing, size of the window, and its location. Notes Smith, "It is also important to inspect the rubber gaskets or caulking around windows to ensure they are not brittle. If the gaskets or caulking are brittle, it is recommended that the installation include new gaskets or recaulking."

Ensuring a comfortable temperature inside their buildings is an important concern for facility managers. Properly installed, window film can help to achieve this while also reducing the demands on the facility's HVAC system.

Information for this article was compiled, in part, through an interview with Smith.

For more information, visit the International

Window Film Association

Web site at www.iwfa.com.

Have you benefited from installing window film for solar control? Share your experience by sending an e-

mail to avazquez@groupc.com