Living on Campus

2013 ANNUAL REPORT ON STUDENT HOUSING

IEQ FOR HISTORIC FACILITIES
MERGING HEALTHY INTERIORS WITH SIGNIFICANT ARCHITECTURE

MULTIMEDIA CLASSROOMS
INNOVATIVE AND EFFECTIVE TOOLS FOR ENGAGING STUDENTS

SPECIAL SECTION
EDUCATIONAL INTERIORS: FURNITURE, FINISHES, FIXTURES, AND MORE
P&M: WHAT IS WINDOW FILM? IS THERE MORE THAN ONE TYPE? If so, what would be the best choices for educational interiors?

SMITH: Window film is a flexible product composed of one or more layers of coated or chemically treated polyester that can be installed on glass. It is primarily used for retrofit applications to existing windows.

There are several types of window film products, with each type specifically designed for a particular end use. These include solar-control films, insulating films, ultraviolet (UV)-blocking films, safety/security films, glare control/privacy films, decorative films, and automotive films.

Since all quality window films offer up to 99 percent UV-protection, and solar-control films can be had with different levels of insulation improvement, then for exterior windows solar-control and safety/security films (or products which offer both properties in a single product) would likely be the most beneficial. For interior windows used on doors or glass partitions, decorative products or safety and security products would be used.

P&M: What are the benefits of window film?

SMITH: Solar-control films can block as much as 80 percent of the solar heat coming through glass into a building, thus decreasing the heat load on the air conditioning system and creating reduced energy costs. Professionally installed window film can reduce cooling costs by up to 30 percent.

Films can be darker for glare control or privacy purposes or else appear almost totally clear, depending on the required building and customer needs. Over 250 solar-control films are National Fenestration Rating Council-certified, so...
users can be assured of the energy performance potential of the window film. Both the safety/security films and solar-control films all offer up to 99 percent UV-protection as a standard feature.

Safety/security window film works when glass breaks, controlling the post-break behavior of the broken fragments, generally by holding the pieces together attached to the film. This may greatly enhance the safety of building occupants and protection of furnishings/internals from damage caused by broken and/or flying glass pieces. These products can be used to bring unprotected glass up to certified safety standards for impact (both impact by objects and for human impact), enhanced blast protection (such as from a chemical explosion, i.e. from a laboratory), and other events that create hazards from broken glass.

Decorative films can be used to make standard glass look like frosted, etched, or patterned glass, in colors or in white or black matte looks, enhancing both aesthetics and privacy. Although not designed specifically for that purpose, both standard solar-control films and decorative films have the ability to minimize a portion of flying glass fragments should the glass ever break.

CP&M: Can window film contribute to LEED points?
SMITH: Window film can be used to earn LEED points, as it reduces energy use and carbon emissions while having a small carbon footprint relative to its potential energy savings.

CP&M: Does it help in preventing fading of fabrics?
SMITH: It is estimated that 40 to 60 percent of fade is due to exposure to ultraviolet energy; the use of window film with its UV-blocking ability can prevent up to 99 percent of that contribution to fading. Other factors that contribute to fading are visible light and heat, so the glare reduction and energy savings properties of window film can further reduce the rate of fading that might otherwise occur.

CP&M: How is window film installed? Is it difficult or time-consuming? Would a facility need to be offline for a length of time?
SMITH: Although window film can be installed as a do-it-yourself product, to get
the best results and maximum manufacturer’s warranty coverage, a skilled professional window film company should install it. Installation of the film can be done on a room-by-room basis or else after regular facility hours (such as evenings or weekends), so literally overnight windows can be covered with little to no disruption to normal operations.

CP&M: How long will window film last?
SMITH: Window films will normally have at least a five-year manufacturer’s warranty, but products today generally have 10 to 20 years of warranty coverage from the manufacturer, dependent on the specific film and intended use. The U.S. Department of Energy Weatherization software uses a 15-year life expectancy for low- to medium-price window films on windows in older buildings. Suffice to say that the expected actual life of quality window films may greatly exceed the warranty period.

CP&M: Does window film require special care/maintenance/cleaning methods once it is in place?
SMITH: Installed window films can be cleaned with normal non-abrasive, non-corrosive cleaning liquids and soft paper towels just as you would clean glass. The films have a scratch-resistant surface like the scratch-resistant lenses found in many eyeglasses today.

CP&M: Is window film something that is more likely to installed on older windows/glass? Is there treated glass used in construction that would not require window film because the benefits provided by window film are already “built in?”
SMITH: The newer the building, generally the greater the energy-control capability of the window system, so there may be less energy savings potential for the use of window films on newer glass.

However, normal glass stops little ultraviolet energy, so even the addition of clear UV-blocking window film offers benefits. In addition, some newer windows have extremely high visible-light transmission and may create areas of excess glare, where window film may also be desirable to make use of an area more feasible and comfortable.

Even the newest windows, which advertise added UV protection as a benefit, usually provide no more than 70 percent UV block. A trained window film specialist, using specific tools and guidelines from a manufacturer, can determine how much added energy savings or other benefits might be achieved by adding window film to these newer types of windows.

CP&M: Are there benefits provided by window film to reflective glass?
SMITH: “Reflective” glass can be single-pane glass with a hard metallic coating applied to the inside of the glass or it may be a dual- or triple-pane window with very thin, higher-performance metallic coatings on one or more inner surfaces within the window structure. A determination of the window construction, the specific glass, and its thickness and coatings can be made by a trained window film specialist, using specific tools and guidelines from a manufacturer. A recommendation can then be made as to how much (if any) added energy savings or other benefits might be achieved by adding window film to this type of glass/window combination.

The International Window Film Association (IWFA, www.iwfa.com) is a nonprofit organization of window film dealers, distributors, and manufacturers that facilitates the growth of the industry by providing unbiased research, influencing policy, and promoting consumer awareness of the many benefits of window film.
The Vocabulary of Window Film

**DEFINITION OF TERMS**

**TOTAL SOLAR TRANSMITTANCE:** The ratio of the amount of total solar energy in the full solar wavelength range (300 to 2,100 nanometers) that is allowed to pass through a glazing system to the amount of total solar energy falling on that glazing system. Value is usually expressed as a percent.

**TOTAL SOLAR REFLECTANCE:** The ratio of total solar energy that is reflected outward by the glazing system to the amount of total solar energy falling on the glazing system. On filmed windows this reflectance is a function of the side of the film facing the window surface. Value is usually expressed as a percent.

**TOTAL SOLAR ABSORPTION:** The ratio of the amount of total solar energy absorbed by a glazing system to the amount of total solar energy falling on the glazing system. Solar absorption is that portion of total solar energy neither transmitted nor reflected.

**ULTRAVIOLET (UV) TRANSMITTANCE:** The ratio of the amount of total UV solar energy (300 to 380 nanometers) that is allowed to pass through a glazing system to the amount of total UV solar energy falling on the glazing system. Ultraviolet is one portion of the total solar energy spectrum that greatly contributes to fading and deterioration of fabric and furnishings.

**U-FACTOR:** The overall heat transfer coefficient of the glazing system, U-Factor is a measure of the heat transfer that occurs through the glazing system, and its outer and inner surfaces. This value is a function of temperature. The lower the U-Factor, the better the insulation qualities of the glazing system.

**SHADING COEFFICIENT (SC):** The ratio of the solar heat gain through a given glazing system to the solar heat gain under the same conditions for clear, unshaded double-strength window glass (DSA). The shading coefficient defines the sun control capability or efficiency of the glazing system.

Source: The International Window Film Association (www.iwfa.org).

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