



Greater efficiency supports patient care.

INSTALL LOW-EMISSIVITY WINDOW FILMS

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DESCRIPTION

Installing high-performance low-emissivity (low-e) window film to the inside of your hospital's windows can decrease building energy use, improve window insulation performance, lower year-round HVAC loads, and shorten HVAC equipment run times, reduce dependence on artificial lighting, and increase patient and staff satisfaction and comfort levels. Window film can also be used to provide UV protection.

PROJECT TALKING POINTS

- Uncontrolled daylight coming in through windows can cause glare, patient and staff discomfort, warm temperatures, hot/cold spots, and HVAC systems to run excessively to try to keep up.
- A building's directional orientation can create areas that receive significantly more sunlight than others. Depending on the sophistication of a facility's HVAC system, this can create challenges for maintaining comfort.
- A major component of any building envelope is its fenestration (windows, doors, skylights, and curtainwalls). A 10% to 40 % reduction in lighting and HVAC costs can be achieved by improving the energy efficiency of fenestration of commercial buildings, according to the National Institute of Building Sciences.
- Window film is a retrofit solution for facilities professionals who want to control solar heat gain and glare, provide UV protection, and experience year-round insulating benefits of low-e coatings.
- Utility rebates are available to reduce installation costs of low-e window film.
- Most commercial and institutional buildings, including hospitals, can expect a return on investment from window film in less than four years.
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TRIPLE BOTTOM LINE BENEFITS

- **Cost benefits:** The year-round energy savings from low-e window film translate to savings in heating and cooling costs.
- **Environmental benefits:** Low-e window film reduces energy use, and therefore the emissions associated with energy use. Low-e film can also extend window life, which means windows last longer and are replaced and sent to the landfill less often.

- **Social benefits:** Low-e window film offers improved comfort without blinds or shades, which translates to improved levels of natural daylight. Numerous studies have shown that exposure to daylight and outdoor views can improve health and well-being for patients and decrease length of hospital stays. Daylight has also been shown to improve productivity and efficiency for staff members.

PURCHASING CONSIDERATIONS

- Search for an authorized low-e window film installer in your area to ensure warranty coverage.
- At this time, there are no simple calculators available that can accurately predict energy savings from window film. Energy savings from window film application can only be estimated using a whole-building energy model (eQUEST, DOE-2, EnergyPlus) that takes window performance into account.
- Several factors should be considered when prior to purchasing window films, including:
 - Building orientation
 - Type and age of HVAC system
 - Type of low-e window film in consideration
 - Existing glass type
 - Window-to-wall ratios

HOW-TO

1. Assemble team members who might be involved in the decision-making and/or installation process. This could include facilities and maintenance staff, building engineers, energy managers, healthcare engineers, administrators, and chief nursing officers.
2. Assess the condition of your hospital's windows; determine that there are no leaks or cracks. As long as the windows are in good condition and don't need to be replaced due to broken or damaged components, low-e window film can be applied to almost any type of window, including windows with "tint" built into the glass (bronze, green, gray, or blue glass) and dual-pane windows.
3. Evaluate whether there are currently solar coatings or low-e coatings on the existing windows. This may affect which type of low-e window film will work best. If the wrong type of window film is paired with the glass, thermal stress may cause glass failure.
4. Discuss temperature and discomfort issues with staff, especially if opposite sides of the building feature high levels of glass. Are there certain patient rooms or staff work areas that suffer from warm temperatures, too much glare, or fading of assets?
5. Analyze interior building spaces to determine where hot or cold spots might be, how comfortable interior temperatures are near windows, and which windows are exposing patients and staff to harmful UV rays.
6. Determine whether any hospital assets need protection from fading due to UV ray exposure (artwork, flooring, window coverings, wall coverings, etc.).

7. Select the right low-e window film for your facility based on energy performance, solar heat gain coefficients, and visible light transmittance figures. Look for an NFRC rating label that outlines solar heat gain coefficient (SHGC), U-factor, and visible transmittance (VT). Manufacturers can provide other window film performance data, such as UV blockage, glare reduction, and security features.
8. Professional installation for low-e window film is required for warranty coverage; search for an authorized installer in your area that installs the type of low-e window film you're looking for.

REGULATIONS, CODES AND STANDARDS, POLICIES

Beginning in 2014, window film will be incorporated into [California state building code](#). Window film will be recognized as a building product just like glass or roofing materials, but primarily for retrofit applications. The new building code for window film will require a National Fenestration Rating Council (NFRC) certification label, the manufacturer's name, a 10-year warranty certificate, and compliance with the International Window Film Association's Visual Quality Standards.

ANSI Standards [ASTM E903](#) and [ASTM D1044-93](#) relate to solar/UV transmission properties and abrasion resistance. Major window film manufacturers use these standards to guarantee the quality of their raw materials and finished products.

ANSI Standard [Z97.1](#) relates to the installation of glazing systems and safety requirements. The goal is to reduce or eliminate unreasonable risks of death or serious injury when glazing material is broken by human impact.

CROSS REFERENCES: LEED

Window film can be used to help achieve LEED certification, providing up to nine LEED points total.

LEED for Healthcare (2009): New Construction and Major Renovations

- Sustainable Sites Credit 8: Light Pollution Reduction (1 point)
- Energy & Atmosphere Credit 1: Optimize Energy Performance (1-3 points)
- Indoor Environmental Quality Credit 6.2: Controllability of Systems-Thermal Comfort (1 point)
- Indoor Environmental Quality Credit 8.1: Daylight and Views-Daylight (1-2 points)
- Indoor Environmental Quality Credit 2.4: Daylight and Views (1-2 points)

LEED for Existing Buildings (2009): Operations + Maintenance

- Sustainable Sites Credit 8: Light Pollution Reduction (1 point)
- Energy & Atmosphere Credit 1: Optimize Energy Performance (1-3 points)
- Indoor Environmental Quality Credit 2.4: Daylight and Views (1-2 points)

RESOURCES

- ENERGY STAR, [*Invest in Energy Efficiency Measures that Have a Rapid Payback*](#)
- [International Window Film Association](#)
- [National Fenestration Rating Council](#)
- Rifaadh, Rafid- ['HEALING ARCHITECTURE': DAYLIGHT IN HOSPITAL DESIGN](#)
- Whole Building Design Guide, [Daylighting](#)
- Whole Building Design Guide, [Windows and Glazing](#)

ECM LEVEL: Beginner

CATEGORY: Envelope

DEPARTMENT: Engineering/Facilities Management

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