



The National Fenestration Rating Council (NFRC) provides third-party rating, labeling, and certification systems that can be used to compare the energy performance of windows and other fenestration products in residential and nonresidential applications.

NFRC: The Trusted Source for Energy Performance Ratings For Windows and Other Fenestration Products

Studies at Lawrence Berkeley National Laboratory (LBNL) conclude that advanced window technologies, as part of integrated building designs incorporating dimmable lighting, have the technical potential to save as much as 4 quadrillion BTUs of energy annually, worth over \$40 billion a year.

The National Fenestration Rating Council (NFRC) is an independent, non-profit organization that administers a voluntary rating, labeling, and certification system that can be used to compare the energy performance of windows, doors, curtain walls, skylights, and other fenestration products. By providing fair and accurate information, NFRC ratings help to drive the market toward more efficient high-performance products.

Credibility, Uniformity to Window Energy Ratings

The fenestration industry, supported by the U.S. Department of Energy (DOE), the California Energy Commission, and other groups, founded NFRC in 1989 to address concerns that some manufacturers were making unsubstantiated claims about the performance of their products. In 1992, Congress codified NFRC's role as the nation's organization for rating and labeling the energy performance of fenestration products in the National Energy Policy Act.



"Fenestration" refers to any opening in a building's walls, such as a window, door, or skylight. It is based on the Latin word for windows – *"fenestra."*

Today, NFRC is the recognized leader in energy rating and certification programs for fenestration. NFRC's uniform, independent procedures are referenced in national building codes maintained by the International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

NFRC ratings are also a prerequisite for participation in the ENERGY STAR® Windows Program and many public and private rebate programs.

An Independent Rating and Certification Process

To rate and certify products, program participants:

- sign NFRC licensing agreements;
- submit drawings and specifications to an NFRC-accredited simulation laboratory that uses software to calculate energy ratings;
- provide a product to an NFRC-accredited laboratory for physical testing (if the results from the physical test are within the required tolerance of those from the simulation, the ratings are considered valid);
- await confirmation from an NFRC-Accredited Independent Certification and Inspection Agency that the simulation and testing results were conducted according to NFRC procedures (a quality check confirms that the product being produced at the facility meets the design requirements); and
- receive a certification authorization report and place NFRC labels on their products.

NFRC and Energy Efficiency

NFRC's third-party energy performance ratings enable the selection of energy-efficient fenestration, an important feature of high-performance buildings.

- The design and construction industry uses ratings to determine whether a fenestration product will meet state or local code, or to select products that perform above code.
- To qualify for an ENERGY STAR label, a residential fenestration product must be NFRC-certified.
- In 2010, the U.S. Environmental Protection Agency (EPA) approved NFRC as an EPA-recognized Certification Body for the ENERGY STAR Program. NFRC's rigorous certification program served as a model for some of EPA's efforts to develop its new certification body requirements.
- In 2011, NFRC will develop a product rating verification pilot program in which it will anonymously purchase ENERGY STAR-rated fenestration "off-the-shelf" and test it to verify that the ratings are consistent with those in NFRC's *Certified Products Directory*.



NFRC's *Certified Products Directory* is just one of the tools on its website (www.nfrc.org) that helps consumers, design professionals, and others make informed choices. The directory features more than 1.67 million products labeled by more than 700 participating manufacturers.

The NFRC Label for Residential Fenestration

 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider	
	ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P) A 0.30	Solar Heat Gain Coefficient B 0.30	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance C 0.51	Air Leakage (U.S./I-P) D 0.2	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>		

- A U-Factor** measures how well a product prevents heat from escaping or entering a home or building. U-Factor ratings generally fall between 0.09 and 1.20. The lower the U-Factor, the better a product is at keeping heat in. U-Factor is particularly important during the winter heating season. This label displays U-Factor in IP units.
- B Solar Heat Gain Coefficient (SHGC)** measures how well a product blocks heat from the sun. SHGC is expressed as a number between 0 and 1. The lower the SHGC, the better a product is at blocking unwanted heat gain. Blocking solar heat gain is particularly important during the summer cooling season. Products with higher SHGC provide greater passive solar heat, which may be preferred in cold climates.
- C Visible Transmittance (VT)** measures how much light comes through a product. VT is expressed as a number between 0 and 1. The higher the VT, the higher the potential for daylighting.
- D Air Leakage (AL)** measures how much outside air comes into a home or building through a product. AL rates typically fall in a range between 0.1 and 0.3. The lower the AL, the better a product is at keeping air out. AL is an optional rating, and manufacturers can choose not to include it on their labels. This label displays AL in U.S. units.

Nonresidential Ratings and Certification

For windows and other fenestration products used in nonresidential (or commercial) buildings, NFRC offers a specialized rating and certification procedure. The Component Modeling Approach (CMA) Program, launched in 2010, involves testing the various fenestration systems and product lines on a project, and listing the results on a Label Certificate.

CMA users can assemble a fenestration product online, choosing from pre-approved glazing, frame, and spacer components. They can see how changing components affects the overall energy performance of the product modeled. After a product is rated by an NFRC-Approved Calculation Entity (ACE) organization, and the party responsible for fenestration ratings on the project signs a license agreement with NFRC, the energy performance ratings are listed on a CMA Label Certificate. (Under CMA, all NFRC ratings on a project are listed on a single Label Certificate.) Additionally, Independent Certification and Inspection Agencies (IAs) will perform spot-checks on CMA Label Certificates to ensure that the ACE is using CMA correctly.



NFRC's CMA product certification program uses data from the three primary fenestration components – glazing, frames, and spacers – to generate overall energy performance ratings for nonresidential fenestration.

The sheets provide basic information on NFRC ratings and the label to homeowners and contractors.

- **Materials** – NFRC offers brochures and factsheets on a variety of fenestration energy performance topics of interest to consumers, the fenestration industry, architects, and others.
- **Media outreach** – NFRC issues press releases regularly to update the fenestration, design, and construction industries about its latest activities and developments.

Learn the latest about NFRC's activities by following it on Facebook, Twitter (@NFRC Windows) and its blog, *NFRC News Now* (<http://nfrcnews.blogspot.com/>).

Rating Blinds, Shades, and Other Attachments

In 2008, NFRC expanded its energy ratings by certifying its first window film product. Around the same time, NFRC agreed to work with the attachments industry to explore procedures for their products. In November 2010, NFRC's Board of Directors approved technical procedures for the development of U-Factor, SHGC, and VT ratings for co-planar interior and exterior attachment products such as blinds and shades. NFRC members, including representatives from the attachments industry, now are working on certification and labeling procedures for these products. Once these rating procedures are approved, manufacturers will be able to rate, certify, and label their attachment products so that consumers can make informed choices.



NFRC ratings help building officials verify energy code compliance for fenestration products and systems.

Educating Stakeholders

NFRC actively reaches out to its customers and stakeholders – consumers, design and construction professionals, building officials, the fenestration industry, and others – to educate them about its programs and ratings.

- **Workshops and webinars** – NFRC organizes educational opportunities for small groups, such as design firms, and webinars about its Component Modeling Approach (CMA).
- **Retailer program** – Homeowners have told NFRC that putting information about its ratings in home stores is the best place to reach them. Since 2005, NFRC has provided hundreds of thousands of informational tear sheets to retailers nationwide.

NFRC's International Influence

For years, NFRC has worked with other nations to harmonize fenestration energy rating programs around the world. NFRC provides advice to countries developing rating programs and documents, conducts training workshops, and helps set up testing facilities. Highlights of NFRC's international work:

- The Australian Fenestration Rating Council provides NFRC 100 and 200 ratings for more than 90,000 products.
- The Australian Building Energy Code references NFRC 100 and 200.
- South African fenestration experts have received NFRC-approved software training and built a thermal test chamber in accordance with NFRC requirements.
- NFRC staff conducted NFRC-approved software training in India.
- NFRC conducted NFRC-approved software training in the Philippines. The country now has both Approved Calculation Entities (ACE) and NFRC-accredited Window 5-Therm 5 simulators.
- Kuwait and Jordan each plan to build a component thermal testing laboratory using NFRC ratings standards.

- NFRC participated in the Asia-Pacific Partnership on Clean Development and Climate's initiative to harmonize window labeling programs.
- NFRC hosted part of an Asia-Pacific Economic Cooperation (APEC) Green Building Summit in Washington, DC, in March 2011.

NFRC also has a contract with APEC to gather and analyze window energy rating activity within its 20 member nations and to identify window labeling and rating potential in those countries. NFRC presented its preliminary findings at the APEC Green Building Summit.

In China, NFRC is working with the Ministry of Housing and Urban-Rural Development, which operates a fenestration rating system, to harmonize ratings. While in Jordan, NFRC is offering technical assistance on developing a window energy rating system.

Through its international activities, NFRC hopes to help transform the fenestration market, promote energy-efficient fenestration products, lower U.S. exports costs, and reduce energy use globally.

The Future

As the industry develops new technologies, NFRC will continue to work with stakeholders to develop ratings that will inform product choices. These technologies include:

- Electrochromic windows that use dynamic glazing with an electrochemical coating that tints on-demand using a small amount of electricity.
- Photoactive windows that tint based on the amount of sunlight that strikes them (much like sunglasses).
- Vacuum-insulated glass, a.k.a., evacuated insulated glass, in which the air is removed from between the glass of double-paned products to increase insulation performance.
- Active fenestration systems coated with photovoltaic cells that actually generate electricity.

NFRC is well-positioned to respond to the energy rating needs of new fenestration technologies and processes entering the marketplace.

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The U.S. Department of Energy (DOE) and industry partners installed electrochromic (EC) windows in a conference room at DOE headquarters to demonstrate the technology's integration with dimmable lighting. The energy performance values of the EC windows were submitted to NFRC for verification and product certification.

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