

Windows and Energy Ratings

ECOBUILD 2007

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Session Agenda

- Introduction to NFRC
 - NFRC Programs
 - Why rate windows?
 - NFRC standards
 - What do the energy codes say?
 - Q/A
-

Introduction to NFRC



Global Warming

The NFRC's mission:

NFRC develops and administers comparative energy and related rating programs that serve the public and satisfy the needs of its private sector partners by providing fair, accurate and credible, user-friendly information on fenestration product performance.

Introduction to NFRC



Global Warming

*National Fenestration Rating
Council*

What is FENESTRATION?

*Windows, Doors, Skylights, Curtain
Wall and Storefront systems*

Introduction to NFRC



Energy Efficiency

- Created in 1989
- Unique, educational non-profit public/private organization representing:

Industry (fenestration and building)

State energy offices

Design Professionals

Representatives from Higher Education

Utilities

Consumer Organizations

(Not a trade association)

Introduction to NFRC

- ❑ Develop and publish nationally recognized standards for determining fenestration performance
- ❑ Provide energy ratings for fenestration products
- ❑ Administer an independent, 3rd party certification and labeling program



NFRC Programs

Product Certification Program

- establishes rules for NFRC certified ratings

Laboratory Accreditation Program

- Maintains credibility of simulation and test labs

Certification and Inspection Agency Program

- Maintains credibility of third-party program

Compliance Assurance and Monitoring Program

- Provides assistance to building officials, enforces program requirements

Research Program

Education Program

NFRC SERVICES

- Certified Products Directory
 - Energy information on thousands of fenestration products
 - Fact Sheets
 - Information on window ratings
 - Standards/Publications
 - NFRC 100, 200, 300, 400, 500
-

NFRC RATINGS ASSIST



*Architects, builders,
contractors, and homeowners*

- ❑ Make informed decisions when specifying or purchasing energy efficient fenestration products.
 - ❑ Assures that products will perform “as specified”
-

NFRC RATINGS ASSIST



Building officials and State and local governments

- ❑ Provides nationally recognized standards for reference in establishing minimum performance requirements
- ❑ Independent 3rd party certification and labeling provide tools for determining energy code compliance and enforcement

NFRC Ratings Assist

Government and Utility Energy Efficiency Programs

- Energy Star ® Windows
 - Provides assurance they are getting the energy benefits paid for
-



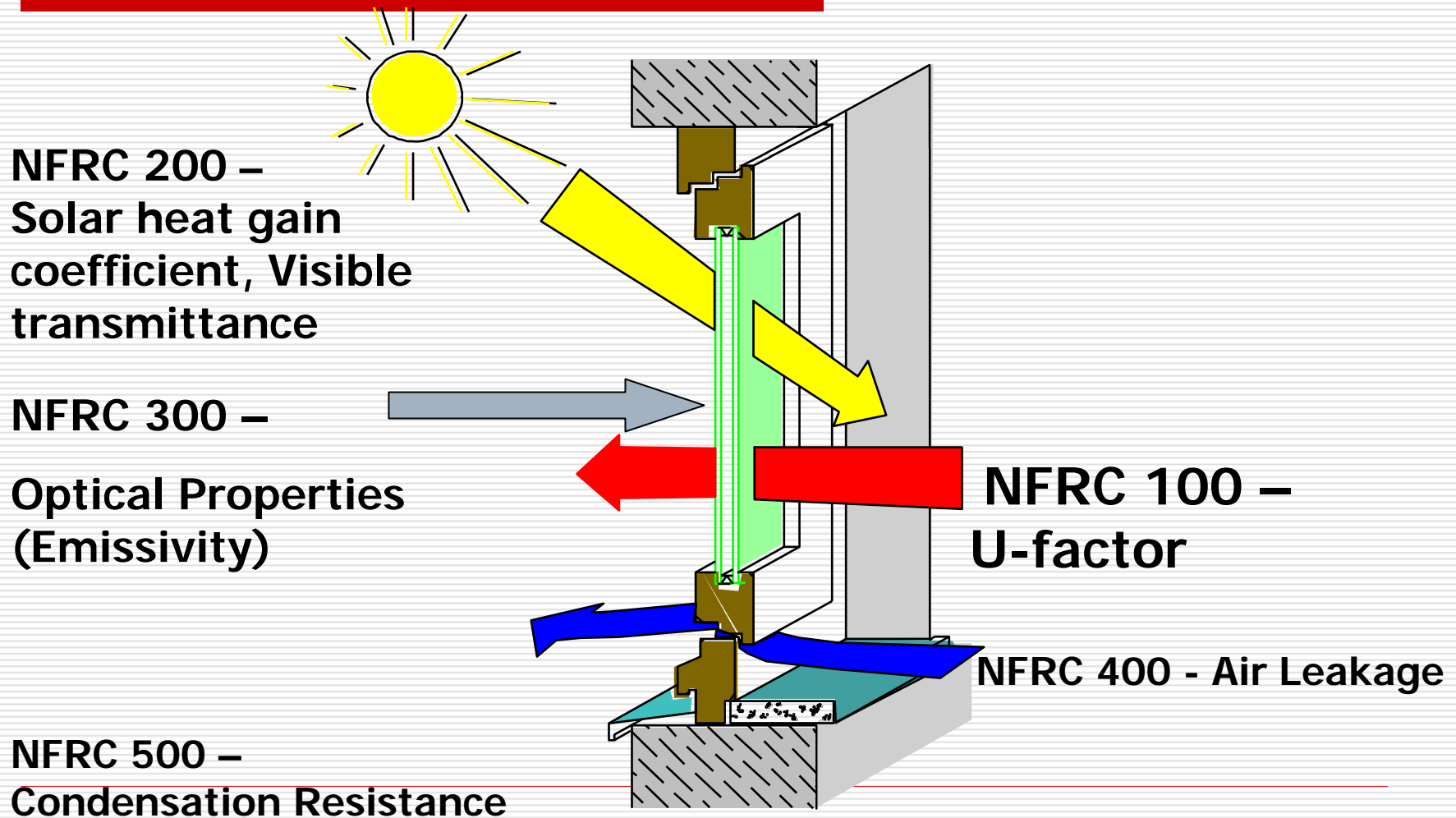
NFRC Ratings Assist



Manufacturers

- ❑ Provides a uniform method (fair and level playing field) for competition in the market
 - ❑ Assures that they get credit for new, energy-efficient technology
-

NFRC Energy Performance Ratings



U-factor (thermal transmittance)

- The **rate** of heat transfer through the fenestration product
 - The lower the U-factor the more efficient the energy performance of the unit
 - Depends upon size, temperature and components in the window
 - Component properties include;
 - Conductivity
 - Emissivity – the ability to absorb and transmit IR energy
-

Solar Heat Gain (SHGC)

The rate of heat transfer through a window product depending upon both directly transmitted solar gain and absorbed (and transmitted) solar gain.

The lower the SHGC, the lower the heat gain through a window.

(SHGC is a ratio based on 0 to 1)

- Depends upon size, temperature and components in the window
 - Component properties include:
 - Emissivity
 - Transmittance
-

Visible Transmittance (VT)

The amount of visible light transmitted through the window unit.

Depends upon unit size, glass-to-frame ratio and transmittance of the glass.

Important for determining the potential for daylighting.



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)

0.35

Solar Heat Gain Coefficient

0.32

ADDITIONAL PERFORMANCE RATINGS

Visible Transmittance

0.51

Air Leakage (U.S./I-P)

0.2

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

NFRC Label

NFRC Label Certificate
(For Buildings with 10,000 sq ft. of glazing area)

NFRC Label Certificate

(for Site-Built Products)



World's Best Window Co.
Millennium 2000+
Vinyl-Clad Wood Frame
Double Glazing • Argon Fill • Low E
Product Type: **Vertical Slider**

ENERGY PERFORMANCE RATINGS

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PROJECT LOCATION

Street address: _____
City, state, zipcode: _____
Project name (optional): _____ Designer (optional): _____

PRODUCT LINE INFORMATION

Operator type (per NFRC 100, Table 1): _____
Product line ID number: _____ Individual product ID number: _____
How many of this individual product: _____ Location in building: _____
Elevation drawing page: _____ Fenestration (window & door) schedule page: _____

FRAME MATERIAL SUPPLIER

Company name, address: _____
City, state, zipcode: _____
Contact person, phone & fax number: _____

GLAZING MATERIAL SUPPLIER

Company, name, address: _____
City, state, zipcode: _____
Contact person, phone & fax number: _____

GLAZING CONTRACTOR/INSTALLER

Company, name, address: _____
City, state, zipcode: _____
Contact person, phone & fax number: _____

CERTIFICATION AUTHORIZATION


Independent Certification and Inspection Agency (IA): _____
Date Certification Authorization Issued: _____

NFRC Temporary Label

NFRC logo indicates licensure by NFRC

Remains attached to fenestration product through product installation and Code inspection

Details on NFRC rating procedures, disclaimer, & NFRC web address

 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) 0.35	Solar Heat Gain Coefficient 0.32	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance 0.51	Air Leakage (U.S./I-P) 0.2	
Condensation Resistance 51	—	
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		

Mfr. Name/ID & Product Description

Ratings are product-specific

If the label contains a box without a rating, the box is left blank except for a dash



Fenestration & Energy Codes

- **IECC** International Energy Conservation Code
 - IECC requires ratings for Residential and Non-Residential Buildings and specify NFRC ratings for compliance.

 - **ASHRAE** (American Society of Heating, Refrigeration & Air Conditioning Engineers)
 - ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings* require U-factor and Solar Heat Gain and specify NFRC certification for compliance.

 - **ASHRAE** (American Society of Heating, Refrigeration & Air Conditioning Engineers)
 - ASHRAE 90.2: *Energy Standard for Low-Rise Residential Buildings* require U-factor and Solar Heat Gain and specify NFRC certification for compliance.
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IECC Language

- **102.5.2 Fenestration product rating, certification and labeling.** *U*-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Such certified and labeled *U*-factors and SHGC's shall be accepted for purposes of determining compliance with the building envelope requirements of this code
-

Fenestration and Energy Codes

Fenestration Requirements (U-factor, SHGC) are based upon:

- Climate Zone (heating degree days)
 - Glazing Area (square foot of windows, doors, skylights)
 - Projection Factor (commercial only)
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New Codes (IECC 2006)

IECC - Established a new prescriptive standard:

NO minimum/maximum fenestration area requirements!

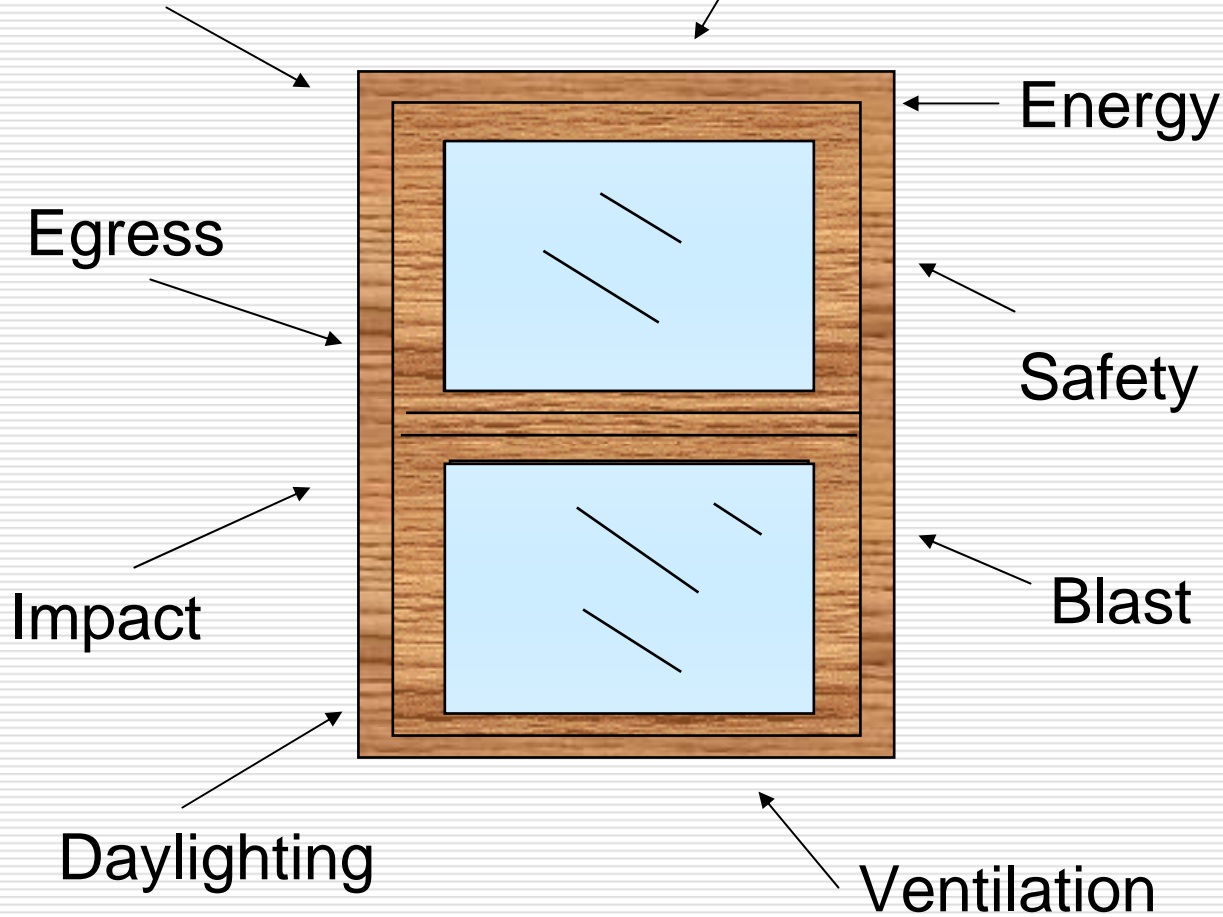
Why is third-party certification so important?

The checks and balances are designed to ensure design intent and performance!

Windows are Complicated

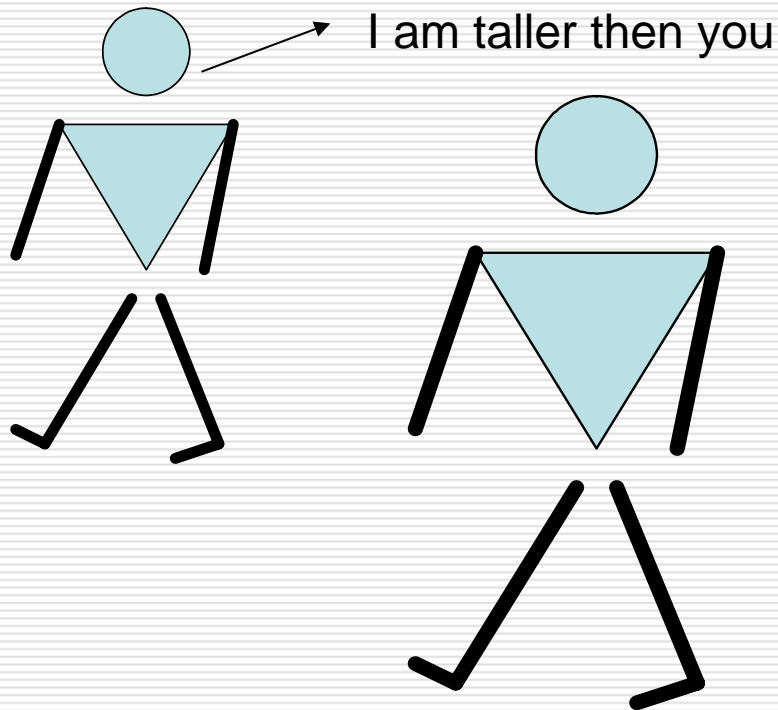
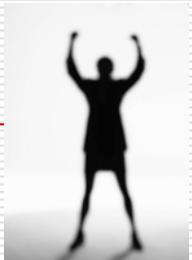
Structural

Design

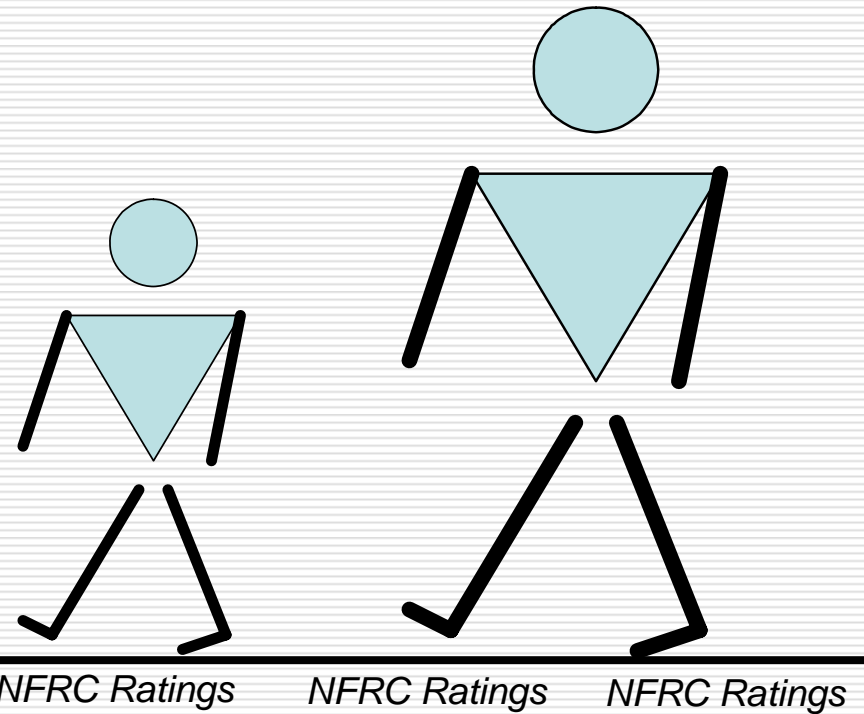


In Rating and Codes a

Level Playing Field is Required



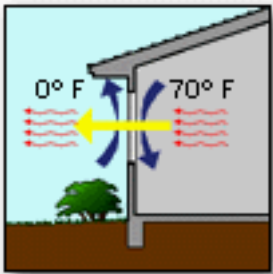
Consumer is the winner



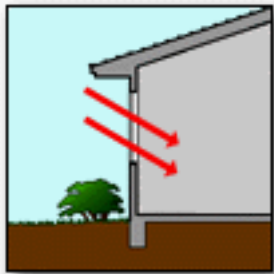
If Fair Rating is available



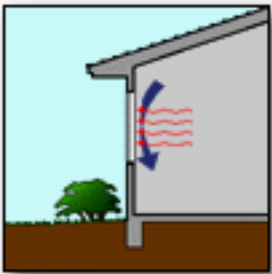
Benefits To the Building Owner



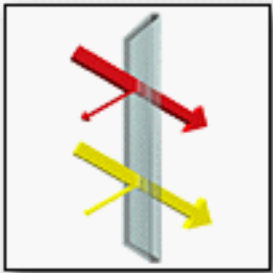
Energy Savings



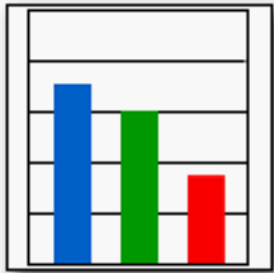
Improve Comfort



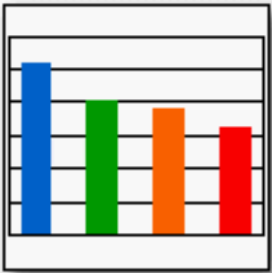
Less Condensation



Increased Light & View



Potential for Reduced Fading



Lower HVAC Costs

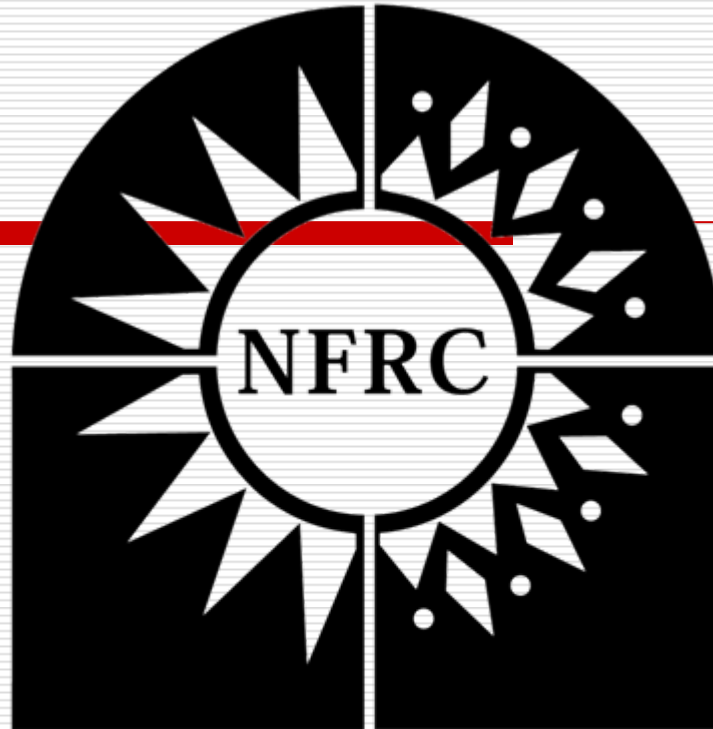
THANK YOU!

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WWW.NFRC.ORG

The National Fenestration Rating Council



National Fenestration
Rating Council®

*To rate the energy efficiency of
windows, doors, & skylights and other
Fenestration products*