
AABC Commissioning Group

AIA Provider Number: 50111116



Fenestration Energy Performance Rating Label

Course Number: CXENERGY1514

***Tom Herron, Director of Communications and
Marketing, National Fenestration Rating Council***

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Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members.

Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Course Description

This session will give you a detailed look at how the NFRC rating system works, its interaction with Energy Star, and what information it provides about the performance and energy characteristics of fenestration products such as windows, frames, and doors. Understanding how U-factors, visible transmittance, solar heat gain coefficient and condensation resistance ratings are determined will be useful to energy managers, commissioning providers and design engineers.

Learning Objectives

At the end of the this course, participants will be able to:

1. Learn about the *National Fenestration Rating Council (NFRC)* Fenestration Energy Performance Rating Label and its relationship to Energy Star.
2. Understand the information the NFRC rating system provides regarding the performance and energy characteristics of windows, frames and doors.
3. Learn how U-factors, visible transmittance, solar heat gain coefficient and condensation resistance ratings are determined.
4. Understand how data derived from the NFRC rating system can be utilized by energy managers, commissioning providers and design engineers in the pursuit of high performance buildings.



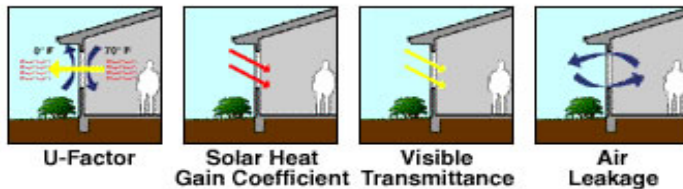
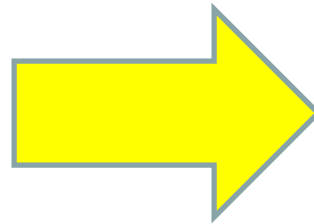
**Understanding
NFRC's
Fenestration
Energy
Performance
Rating Label**

Who is NFRC?



NFRC – the Path to ENERGY STAR

ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.35	0.32
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance	Air Leakage (U.S./I-P)
0.51	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. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>	



NFRC Empowers the Public

- Serving the public
- Not a trade association



Certified Products Directory

- Compare the energy performance of fenestration products before making a purchasing decision
- <http://www.nfrc.org/participantinfo.aspx>



NFRC DOES *NOT*...

- Sell windows
- Recommend or endorse any products, retailers, or contractors
- Repair windows
- Deal with warranties
- Provide legal advice



WHY IS NFRC IMPORTANT?

- Because Energy is Important
- Facilitates Energy Efficient Building Design




UNDERSTANDING LABELING AND CERTIFICATION

- Authoritatively confirmed as meeting specified requirements or standards.
- Allows for performance verification.



Energy Performance Rating Label

Whole-Product Ratings

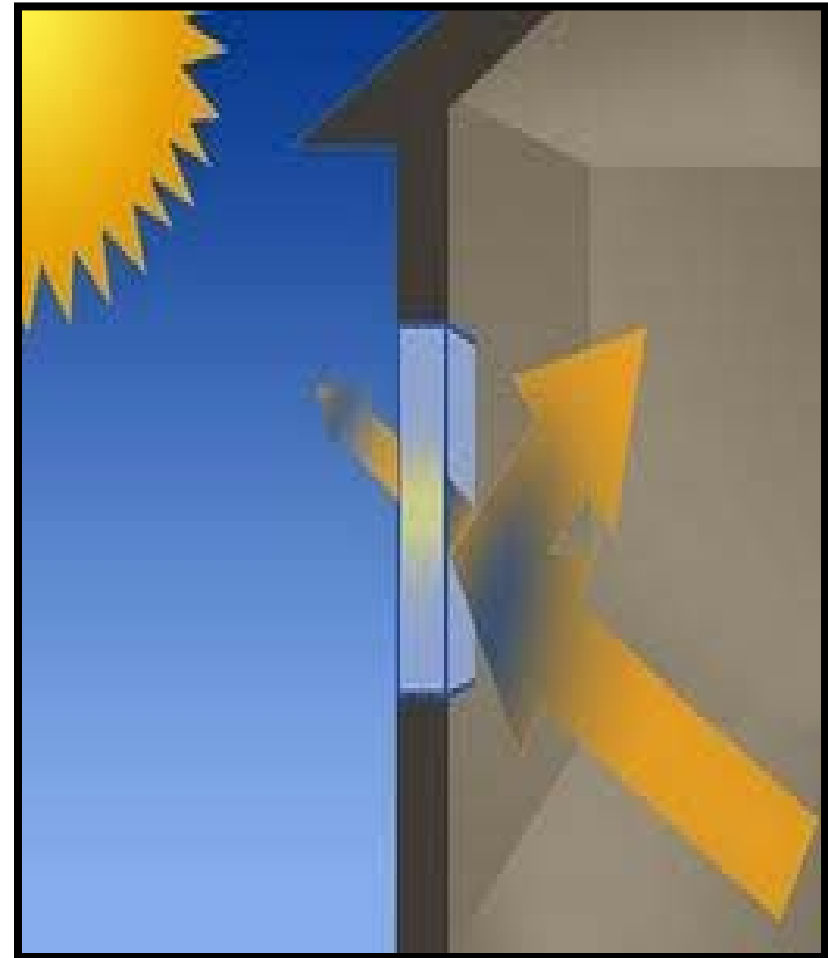
	
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P) 0.35	Solar Heat Gain Coefficient 0.32
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance 0.51	Air Leakage (U.S./I-P) 0.2
Condensation Resistance 51	—
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining 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>	



U-factor

Non Solar Heat Loss
Lower = Less Heat Escape

ENERGY PERFORMANCE RATINGS	
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SHGC

Solar radiation transmitted through a window
Lower = Less heat transmitted

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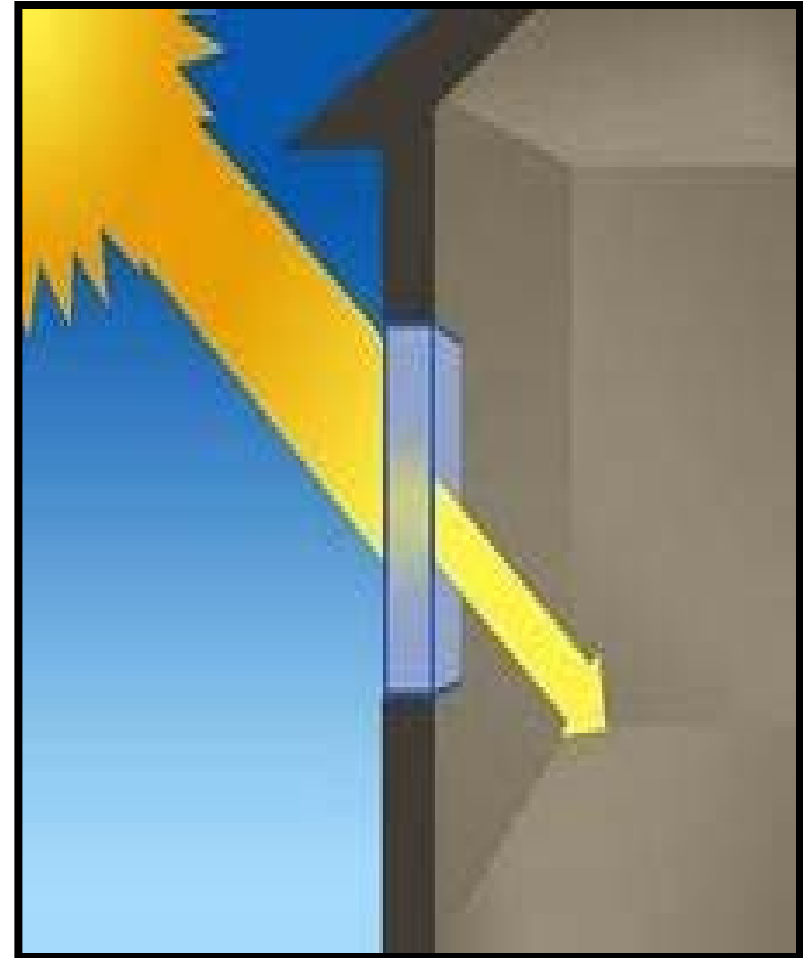


Visible Transmittance (VT)

Visible light Transmitted Through a Window

Lower = Less

ENERGY PERFORMANCE RATINGS	
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Air Leakage

ENERGY PERFORMANCE RATINGS	
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Condensation Resistance 51	—
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Condensation Resistance

ENERGY PERFORMANCE RATINGS	
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NFRC AND ENERGY EFFICIENCY

	
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P) 0.30	Solar Heat Gain Coefficient 0.30
ADDITIONAL PERFORMANCE RATINGS	
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Condensation Resistance 51	—
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Valid NFRC Label



Certified Product



Will Perform as Promised



Implement to Improve EE

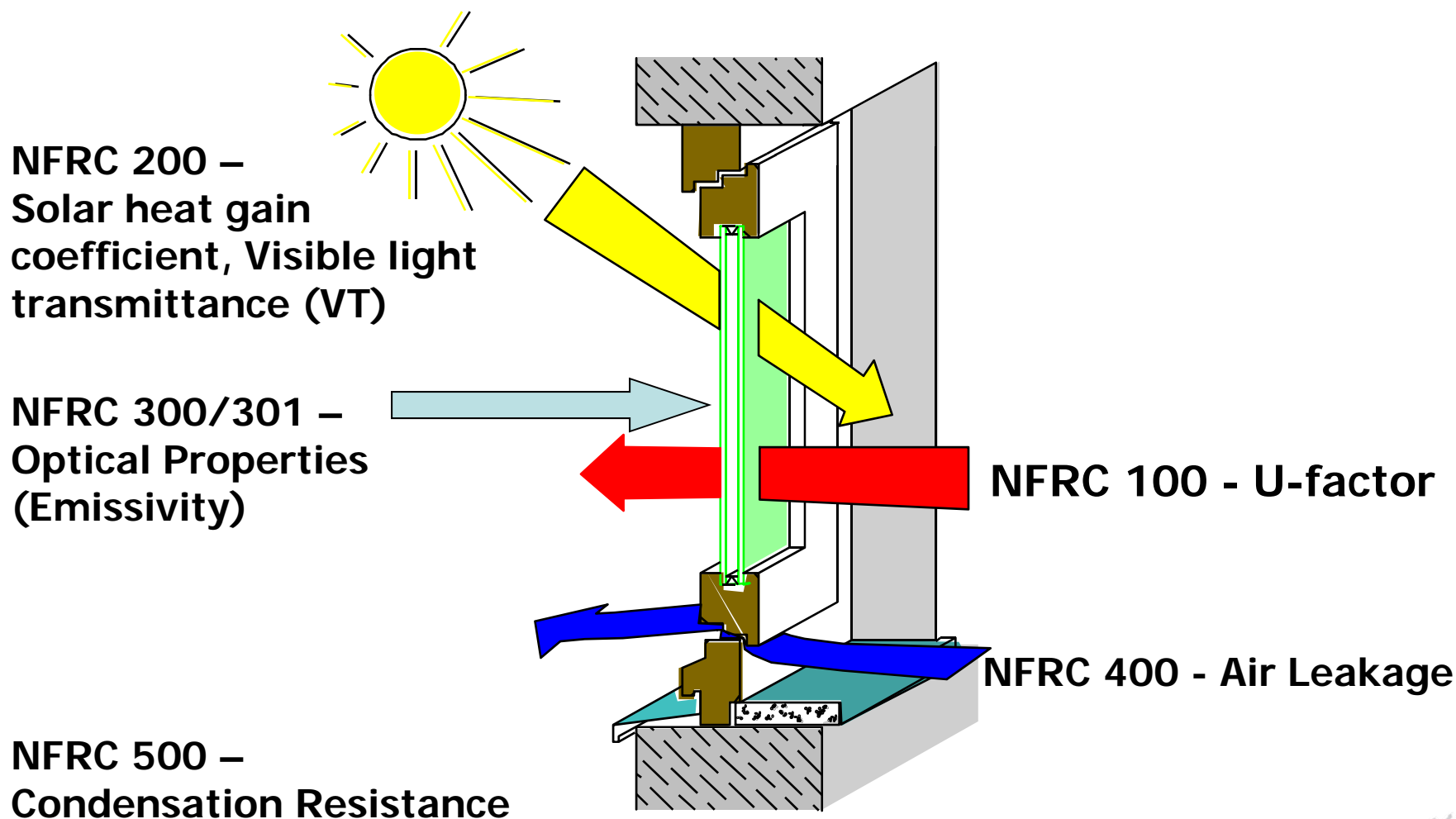


NFRC Programs

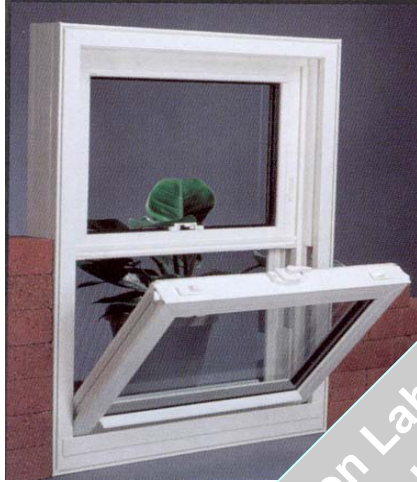
- **Product Certification Program (PCP)**
- **Laboratory Accreditation Program (LAP)**
- **Certification Accreditation Program (CAP)**
- **Compliance Assurance and Monitoring Program**
- **Independent Verification Program (IVP)**
- **Educational Outreach Program**
- **International Outreach Program**



NFRC Energy Performance Ratings



The NFRC Rating Process



Fenestration and Codes

- International Energy Conservation Code (IECC)
- American Society of Heating, Refrigeration & Air Conditioning Engineers (ASHRAE Std. 90.1)
(Shown Below)

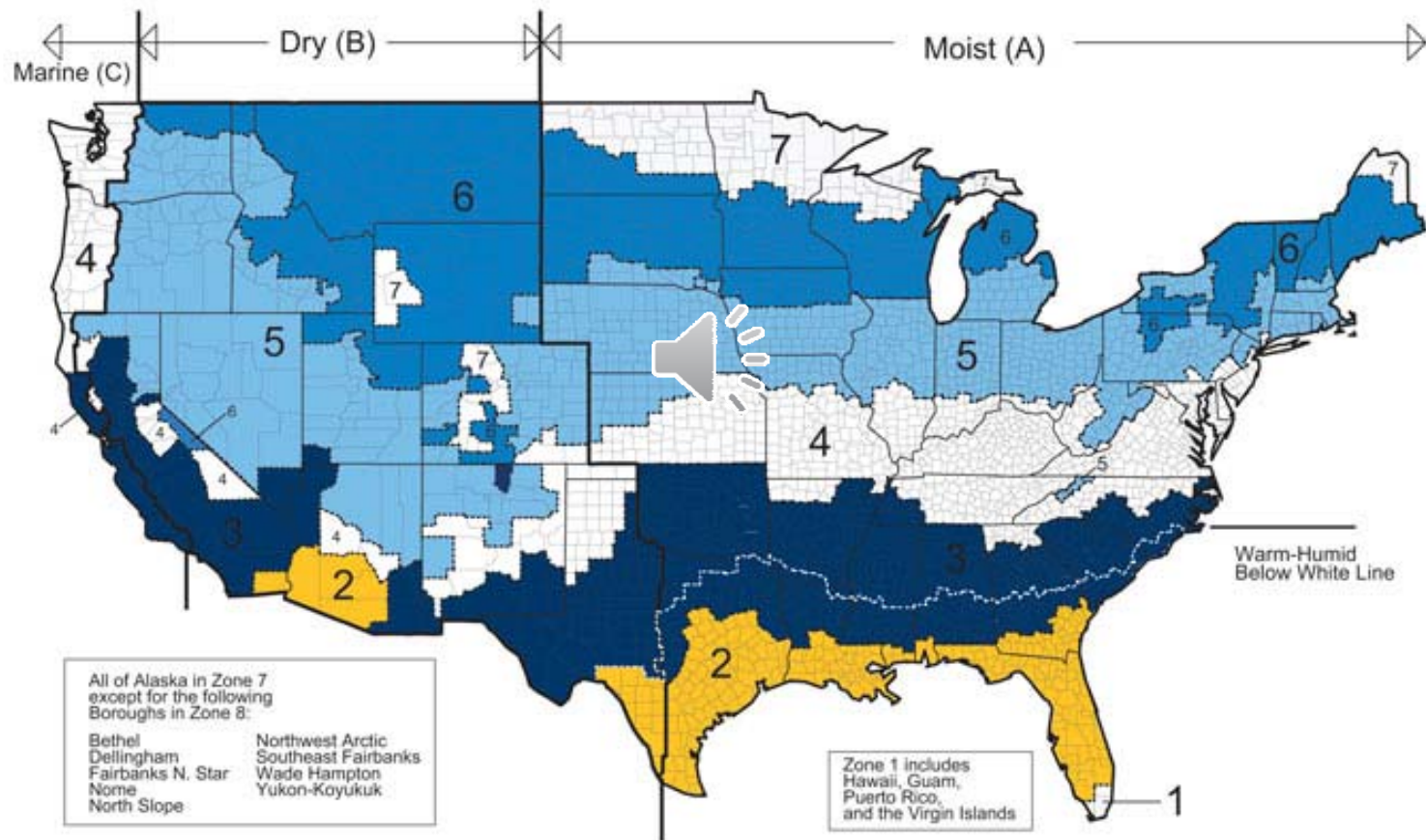
Building Energy Codes

- Compliance with U-factors and SHGC
- Product labeling required

Building Energy Codes

- Prescriptive Requirements
- Envelope Trade-off equations
- Energy Cost Budget Method

ASHRAE Climate Zones



ASHRAE Fenestration Defaults (unlabeled products)

TABLE A8.2 Assembly U-Factors, Assembly SHGCs, and Assembly Visible Light Transmittances (VLTs) for Unlabeled Vertical Fenestration

Frame Type	Glazing Type	Unlabeled Vertical Fenestration					
		Clear Glass			Tinted Glass		
		U-Factor	SHGC	VLT	U-Factor	SHGC	VLT
All frame types		1.25	0.82	0.76	1.25	0.70	0.58
	Single glazing	1.25	0.82	0.76	1.25	0.70	0.58
	Glass block	0.60	0.56	0.56	n.a.	n.a.	n.a.
Wood, vinyl, or fiberglass frames							
	Double glazing	0.60	0.59	0.64	0.60	0.42	0.39
	Triple glazing	0.45	0.52	0.57	0.45	0.34	0.21
Metal and other frame types							
	Double glazing	0.90	0.68	0.66	0.90	0.50	0.40
	Triple glazing	0.70	0.60	0.59	0.70	0.42	0.22

What is Labeling?



“Labeled” Defined

- Labeled. Devices, equipment or materials to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items that attests to compliance with a specific standard.

IECC-06 References NFRC

102.1.3 Fenestration product rating. *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. Products lacking such a labeled *U*-factor shall be assigned a default *U*-factor from Table 102.1.3(1) or 102.1.3(2). 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. Products lacking such a labeled SHGC shall be assigned a default SHGC from Table 102.1.3(3).

IECC 06 Requirements

TABLE 402.1.1
INSULATION AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	M V R-V
1	1.20	0.75	0.40	30	13	
2	0.75	0.75	0.40	30	13	
3	0.65	0.65	0.40 ^e	30	13	
4 except Marine	0.40	0.60	NR	38	13	
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5 ^g	
6	0.35	0.60	NR	49	19 or 13+5 ^g	
7 and 8	0.35	0.60	NR	49	21	

IECC 06-Fenestration Defaults

TABLE 102.1.3(1)
DEFAULT GLAZED FENESTRATION *U*-FACTOR

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			Single	Double
Metal	1.20	0.80	2.00	1.30
Metal with Thermal Break	1.10	0.65	1.90	1.10
Nonmetal or Metal Clad	0.95	0.55	1.75	1.05
Glazed Block	0.60			



TABLE 102.1.3(3)
DEFAULT GLAZED FENESTRATION SHGC

SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
Clear	Tinted	Clear	Tinted	
0.8	0.7	0.7	0.6	0.6



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This concludes The American Institute of Architects Continuing Education Systems Course



Tom Herron
Director,
Communications/Marketing

therron@nfrc.org

240-821-9505

