

# **NFRC WINDOW ENERGY RATINGS AND BUILDING ENERGY CODES**

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**Washington Glass  
Association**

**March 6, 2014**

# BUILDING ENERGY CODES

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- Incredibly complex codes
- Numerous building components to verify
- Sometimes hard to identify requirement and component value
  - *No time to look for either!*

NFRC  
National Fenestration  
Rating Council

# Building Energy Codes

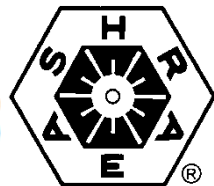
- Ensures building performance
- Codes are laws enacted by state legislatures
- IECC 09 and ASHRAE 90.1-07 most common
- Require window rating and labeling

National Fenestration  
Rating Council

# Energy Codes and NFRC

NFRC 100 (U-factor) and NFRC 200 (SHGC) are required in:

- International Energy Conservation Code (IECC)
- ASHRAE 90.1
- *ENERGY STAR*®
- USGBC-LEED
  - requires ASHRAE 90.1-2007/2010





# Residential

NFRC 100/200 =


 National Fenestration Rating Council® CERTIFIED	<b>World's Best Window Co.</b> Series "2000" Casement Vinyl Clad Wood Frame Double Glazing • Argon Fill • Low E ABC-X-1-00001-00001
<b>ENERGY PERFORMANCE RATINGS</b>	
U-Factor (U.S. / I-P) <b>0.35</b>	Solar Heat Gain Coefficient <b>0.32</b>
<b>ADDITIONAL PERFORMANCE RATINGS</b>	
Visible Transmittance <b>0.51</b>	Air Leakage (U.S. / I-P) <b>0.2</b>
<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. <a href="http://www.nfrc.org">www.nfrc.org</a></small>	

Sticker on each window!

# COMMERCIAL

NFRC 100/200 =

One Label Certificate  
For each project

 **NATIONAL FENESTRATION RATING COUNCIL  
LABEL CERTIFICATE**

**PRODUCT LISTING**

↓ **FOR CODE COMPLIANCE** ↓

**LABEL CERTIFICATE ID:** XYZ-001 **Issuance Date:** mm/dd/yyyy

**NFRC CERTIFIED PRODUCT RATING INFORMATION:\***  
The NFRC Certified Product Rating Information listed here is to be used to verify that the ratings meet applicable energy code requirements.

**PRODUCT LISTING:**

CPD ID	Total Area ft <sup>2</sup>	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size	U-Factor**	SHGC**	VT**
						1600 1600x1600			
P-PL-010	88.89	PL-2200 / PL-2210	FA-PL2210	GA-TT-001	SA-AM-001	0.53	0.58	0.66	
P-PL-005	182.87	PL-3400 / PL-3401	FA-PL3401	GA-TT-001	SA-AM-002	0.56	0.57	0.65	
P-PL-012	382.22	PL-8700 / PL-8720	FA-PL8720	GA-TO-002	SA-AM-001	0.34	0.21	0.30	
P-PL-002	60.00	PL-1100 / PL-1152	FA-PL1152	GA-TT-001	SA-AM-001	0.42	0.51	0.62	
P-PL-022	525.36	PL-8600 / PL-8615	FA-PL8615	GA-TO-003	SA-AM-002	0.43	0.13	0.19	

**FRAME, GLAZING and SPACER ASSEMBLIES:**

**FRAMING LISTING:**

FRAMING REF	SUPPLIER ID	DESCRIPTION
FA-PL2210		Single Casement Thermally Broken Aluminum
FA-PL3401		Projecting (Awning) Thermally Broken Aluminum
FA-PL8720		Vertical Slider PVC reinforced with Steel
FA-PL1152		Vertical Slider Thermally Broken Aluminum
FA-PL8615		Fixed Thermally Broken Aluminum

**GLAZING LISTING:**

GLAZING REF	SUPPLIER ID	DESCRIPTION
GA-TT-001		1" Double Glazed, 1/4" HC Low-e, 1/4" Clear, Argon (90%), 1/2" gap
GA-TT-002		1" Triple Glazed, 1/8" Clear, Coated film, 1/8" SC, Argon (90%), 3/8" gap
GA-TT-003		1" Double Glazed, 1/4" Bronze, 1/4" SC Low-e, Argon (90%), 1/2" gap

**SPACER LISTING:**

SPACER REF	SUPPLIER ID	DESCRIPTION
SA-AM-001		250P Mill Finish Aluminum Low profile (1/2")
SA-AM-002		15A Polymer Spacer (3/8")

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# BUILDING ENERGY CODE

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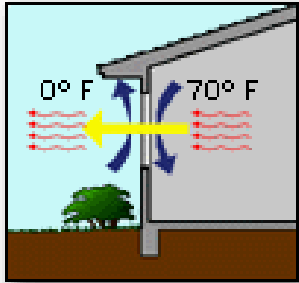
- NFRC 100 and NFRC 200 are instructions on how to determine **whole** window energy performance

The logo of the National Fenestration Rating Council (NFRC) is a circular emblem. The left half is orange with a white sunburst design, and the right half is blue with a white gear-like design. The letters 'NFRC' are in the center.

National Fenestration  
Rating Council

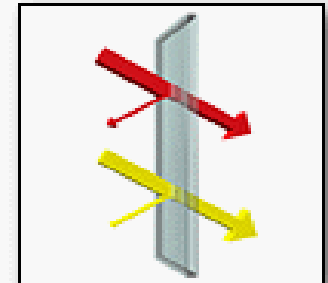
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# NFRC Rating Documents and Indices



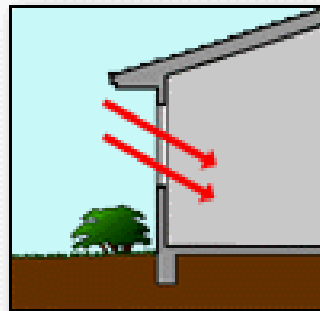
**U-factor (thermal transmission)**

**NFRC 100**



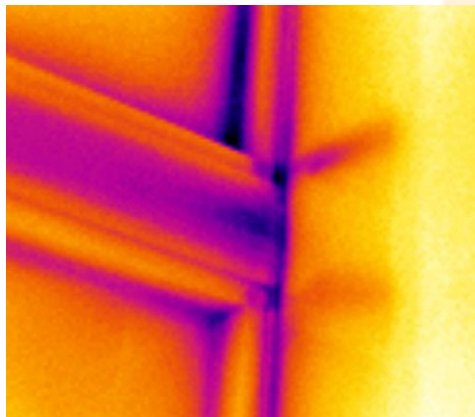
**VT (Visible Transmittance)**

**NFRC 200**



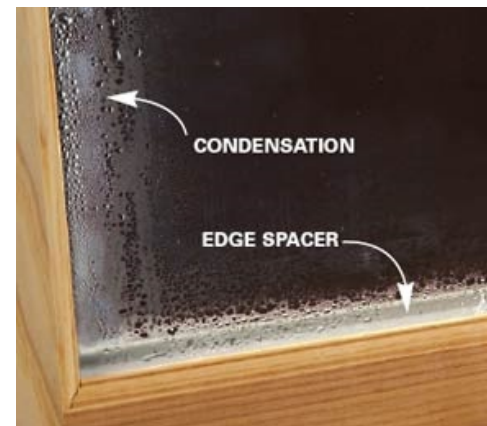
**SHGC (Solar Heat Gain)**  
**NFRC 200**

# NFRC Rating Documents and Indices



**Air Leakage (Air  
infiltration, no  
exfiltration)**

**NFRC 400**



**CR (Condensation  
Resistance)**

**NFRC 500**

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# LABELED = CERTIFIED

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**LABELED.** Equipment, materials or products 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 and whose labeling indicates either that

the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

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IECC Definition

# LABELED = CERTIFIED

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*labeled:* equipment or materials to which a symbol or other identifying mark has been attached by the manufacturer indicating compliance with specified standards or performance in a specified manner.

ASHRAE 90.1 Definition

National Fenestration  
Rating Council

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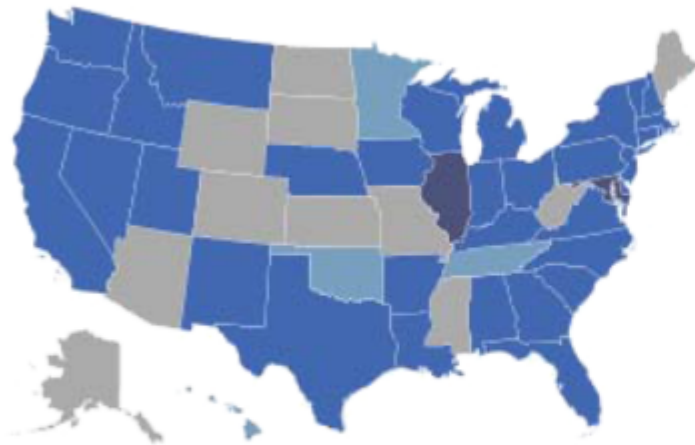
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# USE OCEAN WEB SITE TO DETERMINE CODE IN US

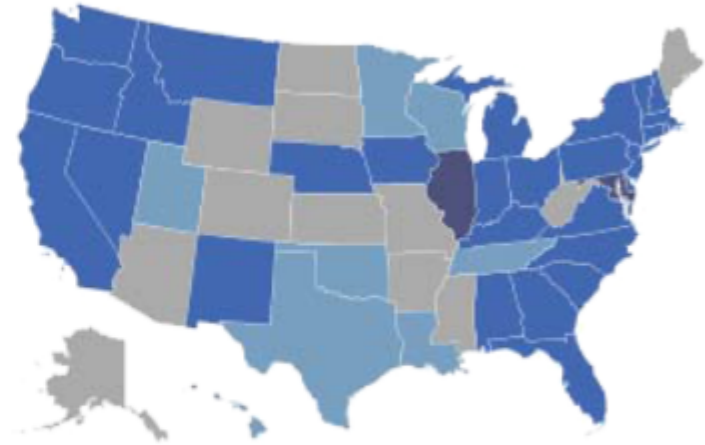
<http://energycodesocean.org/code-status>

## Code Status



### Commercial Adoption

States that have Adopted ASHRAE Standard 90.1



### Residential Adoption

States that have Adopted the IECC

Click on state to learn energy code specifics



# NFRC & Code Compliance

- WA State *Energy Code Requirements, effective July 1, 2013*
- *Chapter 51-11R WAC*
- Residential: **2012 IECC with amendments**
  - <http://apps.leg.wa.gov/WAC/default.aspx?cite=51-11R>

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# NFRC in IECC

## IECC 12 requirement

**303.1.3 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 303.1.3(1) or 303.1.3(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 303.1.3(3).

# NFRC & Code Compliance

## IECC Chapter 3/WSEC Mandates NFRC ratings

**R303.1.3 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 R303.1.3(1), R303.1.3(2) or R303.1.3(4). The solar heat gain coefficient (SHGC) and visible transmittance (VT) 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 or VT shall be assigned a default SHGC or VT from Table R303.1.3(3).

**EXCEPTION:**

Units without NFRC ratings produced by a *small business* may be assigned default *U*-factors from Table R303.1.3(5) for vertical fenestration.

Rating Council

# IECC CLIMATE ZONES

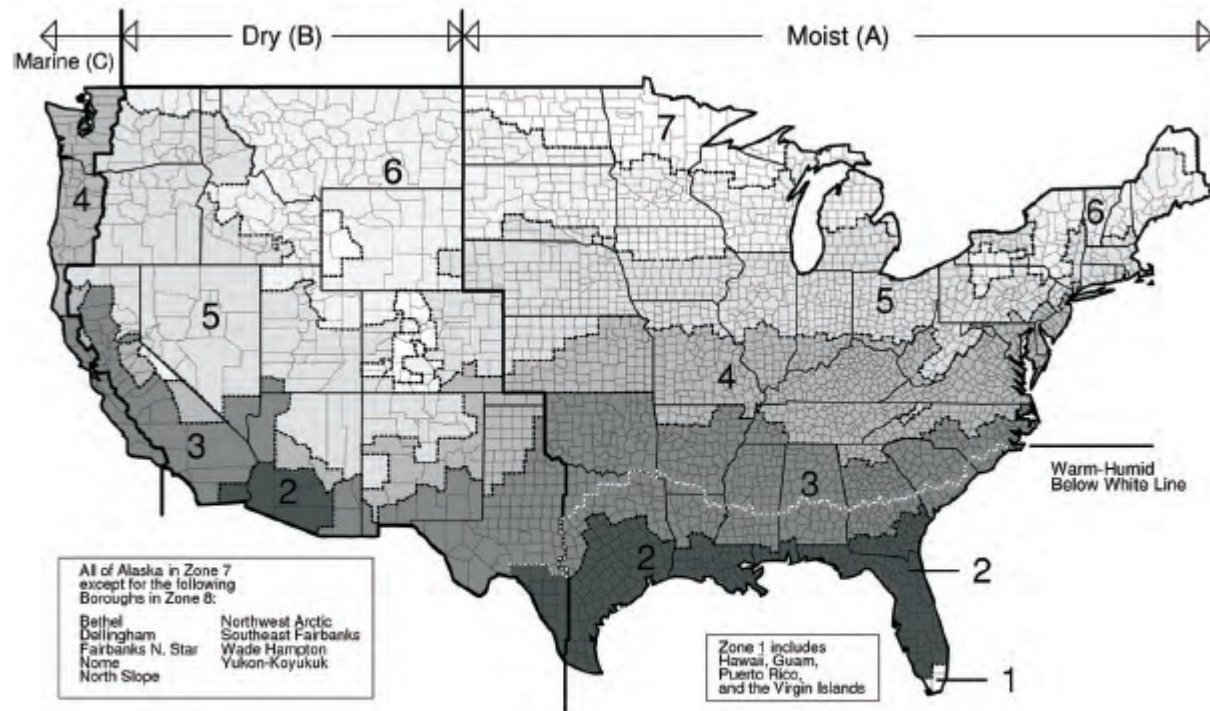


FIGURE 301.1  
CLIMATE ZONES

# IECC 09 PRESCRIPTIVE VALUES

TABLE 402.1.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R-VALUE	B.
1	1.2	0.75	0.30	30	13	3/4	13	
2	0.65 <sup>j</sup>	0.75	0.30	30	13	4/6	13	
3	0.50 <sup>j</sup>	0.65	0.30	30	13	5/8	19	
4 except Marine	0.35	0.60	NR	38	13	5/10	19	
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5 <sup>h</sup>	13/17	30 <sup>g</sup>	
6	0.35	0.60	NR	49	20 or 13+5 <sup>h</sup>	15/19	30 <sup>g</sup>	
7 and 8	0.35	0.60	NR	49	21	19/21	38 <sup>g</sup>	

# NFRC & Code Compliance

WSEC Residential Building Code Shown Below

TABLE R402.1.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>

Climate Zone	Fenestration U-Factor <sup>b</sup>	Skylight <sup>b</sup> U-Factor	Glazed Fenestration SHGC <sup>b, e</sup>	Ceiling R-Value <sup>i</sup>	Wood Frame Wall <sup>g, k, l</sup> R-Value	Mass Wall R-Value <sup>i</sup>	FI Va
5 and Marine 4	0.30	0.50	NR	49	21 int	21/ 21 <sup>h</sup>	3
6	0.30	0.50	NR	49	21+5ci	21+5 <sup>h</sup>	3

# IECC Window Defaults

- 2009 IECC window
- Defaults
- Punitive!
- Project not likely complaint

TABLE 102.1.3(1)  
DEFAULT GLAZED PENESTRATION 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(2)  
DEFAULT DOOR U-FACTORS

DOOR TYPE	U-FACTOR
Uninsulated Metal	1.20
Insulated Metal	0.60
Wood	0.50
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	0.35

TABLE 102.1.3(3)  
DEFAULT GLAZED PENESTRATION SHGC

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

# WSEC Defaults

**TABLE R303.1.3 (1)**  
**DEFAULT GLAZED FENESTRATION U-FACTOR**

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT See Table R303.1.3(4)
Metal	1.20	0.80	
Metal with Thermal Break <sup>a</sup>	1.10	0.65	
Nonmetal or Metal Clad	0.95	0.55	
Glazed Block	0.60		

**TABLE R303.1.3 (3)**  
**DEFAULT GLAZED FENESTRATION SHGC AND VT**

	SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
	Clear	Tinted	Clear	Tinted	
SHGC	0.8	0.7	0.7	0.6	0.6
VT	0.6	0.3	0.6	0.3	0.6



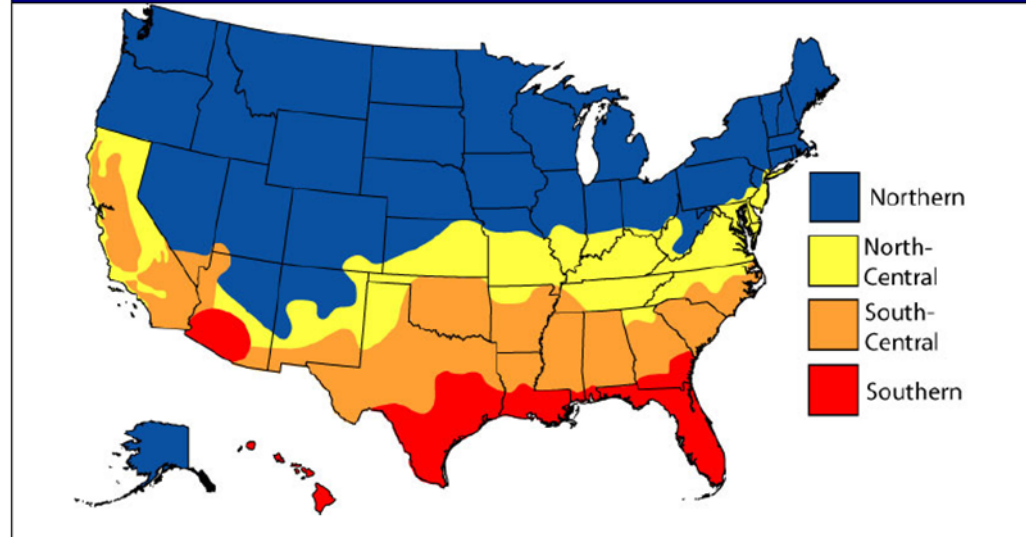
# WSEC Small Business Defaults

TABLE R303.1.3(5)  
SMALL BUSINESS COMPLIANCE TABLE  
DEFAULT U-FACTORS FOR VERTICAL FENESTRATION

Vertical Fenestration Description				Frame Type		
				Any Frame	Aluminum Thermal Break <sup>2</sup>	Wood/Vinyl/Fiberglass
Panes	Low-e <sup>1</sup>	Spacer	Fill			
Double <sup>3</sup>	A	Any	Argon	0.48	0.41	0.32
	B	Any	Argon	0.46	0.39	0.30
	C	Any	Argon	0.44	0.37	0.28
	C	High Performance	Argon	0.42	0.35	Deemed to comply <sup>5</sup>
Triple <sup>4</sup>	A	Any	Air	0.50	0.44	0.26
	B	Any	Air	0.45	0.39	0.22
	C	Any	Air	0.41	0.34	0.20
	Any double low-e	Any	Air	0.35	0.32	0.18

# ENERGY STAR-residential only

Figure 1: Revised Draft ENERGY STAR Climate Zone Map



2015 Revision  
Complete

Climate Zone	U-factor	SHGC
Northern	$\leq 0.30$	NR
	$= 0.31$	$\geq 0.35$
	$= 0.32$	$\geq 0.40$
North-Central	$\leq 0.32$	$\leq 0.40$
South Central	$\leq 0.35$	$\leq 0.30$
Southern	$\leq 0.60$	$\leq 0.27$

# NFRC & Code Compliance

- WA State *Energy Code Requirements, effective July 1, 2013*
- *Chapter 51-11R WAC*
- Commercial: **2012 IECC with amendments**
  - <http://apps.leg.wa.gov/WAC/default.aspx?cite=51-11C>

# NFRC and Compliance

## IECC 12/WSEC requirement

**C303.1.3 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 C303.1.3(1), C303.1.3(2) or C303.1.3(4). The solar heat gain coefficient (SHGC) and visible transmittance (VT) 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 or VT shall be assigned a default SHGC or VT from Table C303.1.3(3).

**EXCEPTION:**

Units without NFRC ratings produced by a small business may be assigned default *U*-factors from Table C303.1.3(5) for vertical fenestration.

Rating Council

# ASHRAE 90.1 NFRC Statements

## 5.8.2 Fenestration and Doors.

**5.8.2.1 Rating of Fenestration Products.** The U-factor, solar heat gain coefficient (SHGC), and air leakage rate for all manufactured *fenestration* products shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council.

**5.8.2.2 Labeling of Fenestration Products.** All manufactured *fenestration* products shall have a permanent nameplate, installed by the *manufacturer*, listing the U-factor, solar heat gain coefficient (SHGC), and air leakage rate.

**Exception to 5.8.2.2:** When the *fenestration* product does not have such nameplate, the installer or supplier of such *fenestration* shall provide a signed and dated certification for the installed fenestration listing the U-factor, SHGC, and the air leakage rate.

**5.8.2.3 Labeling of Doors.** The *U-factor* and the air leakage rate for all manufactured *doors* installed between *conditioned space*, *semi-heated space*, *unconditioned space*, and exterior *space* shall be identified on a permanent nameplate installed on the product by the *manufacturer*.

# NFRC IN ASHRAE 90.1

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**5.8.2.4 U-factor.** U-factors shall be determined in accordance with NFRC 100. U-factors for skylights shall be determined for a slope of 20 degrees above the horizontal.

**5.8.2.5 Solar Heat Gain Coefficient.** *SHGC* for the overall *fenestration area* shall be determined in accordance with NFRC 200.

**5.8.2.6 Visible Light Transmittance.** VLT shall be determined in accordance with NFRC 200. VLT shall be verified and certified by the *manufacturer*.

# Energy Code Requirements for ASHRAE 90.1-07

TABLE 5.5-5 Building Envelope Requirements For Climate Zone 5 (A, B, C)\*

Opaque Elements	Nonresidential		Residential	
	Assembly Maximum	Insulation Min. R-Value	Assembly Maximum	Insulation Min. R-Value
Fenestration	Assembly Max. U	Assembly Max. SHGC	Assembly Maximum	Insulation Min. R-Value
<i>Vertical Glazing, % of Wall</i>				
Nonmetal framing (all) <sup>b</sup>	U-0.35	SHGC-0.40 all		
Metal framing (curtainwall/storefront) <sup>c</sup>	U-0.45			
Metal framing (entrance door) <sup>c</sup>	U-0.80			
Metal framing (all other) <sup>c</sup>	U-0.55			
<i>Skylight with Curb, Glass, % of Roof</i>				
0%-2.0%	U <sub>all</sub> -1.17	SHGC <sub>all</sub> -0.49		
2.1%-5.0%	U <sub>all</sub> -1.17	SHGC <sub>all</sub> -0.39		
<i>Skylight with Curb, Plastic, % of Roof</i>				
0%-2.0%	U <sub>all</sub> -1.10	SHGC <sub>all</sub> -0.77		
2.1%-5.0%	U <sub>all</sub> -1.10	SHGC <sub>all</sub> -0.62		
<i>Skylight without Curb, All, % of Roof</i>				
0%-2.0%	U <sub>all</sub> -0.69	SHGC <sub>all</sub> -0.49		
2.1%-5.0%	U <sub>all</sub> -0.69	SHGC <sub>all</sub> -0.39		

\*The following definitions apply: c.i. = continuous insulation (see Section 3.2). NR = no (insulation)

# WSEC Commercial Requirements

Table C402.3  
Building Envelope Requirements--Fenestration

CLIMATE ZONE	5 AND MARINE 4	6
<b>Vertical Fenestration</b>		
<i>U-factor</i>		
Nonmetal framing (all) <sup>a</sup>	0.30	0.30
Metal framing (fixed) <sup>b</sup>	0.38	0.36
Metal framing (operable) <sup>c</sup>	0.40	0.40
Metal framing (entrance doors) <sup>d</sup>	0.60	0.60
<b>SHGC</b>		
SHGC	0.40	0.40
<b>Skylights</b>		
<i>U-factor</i>	0.50	0.50
<b>SHGC</b>	0.35	0.35



# IECC 09, Commercial

TABLE 502.3  
BUILDING ENVELOPE REQUIREMENTS: FENESTRATION

CLIMATE ZONE	1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7	8
<b>Vertical fenestration (40% maximum of above-grade wall)</b>								
<i>U-factor</i>								
<b>Framing materials other than metal with or without metal reinforcement or cladding</b>								
<i>U-factor</i>	1.20	0.75	0.65	0.40	0.35	0.35	0.35	0.35
<b>Metal framing with or without thermal break</b>								
Curtain wall/storefront <i>U-factor</i>	1.0	0.70	0.60	0.50	0.45	0.45	0.40	0.40
Entrance door <i>U-factor</i>	1.20	1.10	0.90	0.85	0.80	0.80	0.80	0.80
All other <i>U-factor</i> <sup>a</sup>	1.20	0.75	0.65	0.55	0.55	0.55	0.45	0.45
<b>SHGC-all frame types</b>								
SHGC: $PF < 0.25$	0.25	0.25	0.25	0.40	0.40	0.40	0.45	0.45
SHGC: $0.25 \leq PF < 0.5$	0.33	0.33	0.33	NR	NR	NR	NR	NR
SHGC: $PF \geq 0.5$	0.40	0.40	0.40	NR	NR	NR	NR	NR
<b>Skylights (3% maximum)</b>								
<i>U-factor</i>	0.75	0.75	0.65	0.60	0.60	0.60	0.60	0.60
SHGC	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

# WSEC Defaults

**Table C303.1.3 (1)**  
**Default Glazed Fenestration U-Factor**

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKY-LIGHT
Metal	1.20	0.80	See Table C303.1.3(4)
Metal with Thermal Break	1.10	0.65	
Nonmetal or Metal Clad	0.95	0.55	
Glazed Block	0.60		

**Table C303.1.3 (3)**  
**Default Glazed Fenestration SHGC and VT**

	SINGLE GLAZED		DOUBLE GLAZED		GLAZE BLOCK
	Clear	Tinted	Clear	Tinted	
SHGC	0.40	0.40	0.40	0.40	0.40
VT	0.6	0.3	0.6	0.3	0.6

# WSEC Small Business Defaults

Table C303.1.3(5)  
Small Business Compliance Table  
Default *U*-Factors for Vertical Glazing

Vertical Glazing Description				Frame Type		
				Any Frame	Aluminum Thermal Break <sup>2</sup>	Wood/Vinyl/Fiberglass
Panes	Low-e <sup>1</sup>	Spacer	Fill			
Double <sup>3</sup>	A	Any	Argon	0.48	0.41	0.32
	B	Any	Argon	0.46	0.39	0.30
	C	Any	Argon	0.44	0.37	0.28
	C	High Performance	Argon	0.42	0.35	Deemed to comply <sup>5</sup>
Triple <sup>4</sup>	A	Any	Air	0.50	0.44	0.26
	B	Any	Air	0.45	0.39	0.22
	C	Any	Air	0.41	0.34	0.20
	Any double low-e	Any	Air	0.35	0.32	0.18

# No NFRC ratings, use defaults:

**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							
	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

# Window Energy Rating Confirmation

- NFRC offers a simple verification methods
- Residential
  - Online database
  - Look up CPD number
- Commercial
  - Online database
  - Look up project label certificate

# NFRC Makes Code Enforcement Easy

- Developed easily verifiable ratings
- Residential
  - Online database with 9.5 million rated products
- Commercial
  - Online database enabling project specific label certificates to be downloaded at no charge

# NFRC RESIDENTIAL RATING CONFIRMATION

[www.nfrc.org](http://www.nfrc.org)

Select “verify ratings”

Enter CPD #



## Directory Search

Back

New Search

### Product Type

<a href="#">Window</a>	Find ratings for window products.
<a href="#">Door</a>	Find ratings for door products.
<a href="#">Skylight</a>	Find ratings for skylight products.
<a href="#">Applied Film</a>	Find ratings for film-attachment products.

### Alternate Search Methods

<a href="#">CPD Number</a>	Find a product by CPD Number.
<a href="#">Label Verification</a>	Verify the ratings of an NFRC-certified product.

### Helpful NFRC Links

<a href="#">Fenestration Facts</a>	What is Fenestration?
<a href="#">FAQ</a>	FAQ about Certification and Commercial/Site Built Programs.
<a href="#">Helpful Links</a>	Helpful Links for Consumers and Technical Organizations.

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# Commercial Compliance

- Ask Manufacturer/Builder for NFRC Label Certificate
  - Found on NFRC web site ([www.nfrc.org](http://www.nfrc.org) )
  - Electronic (PDF)
  - No cost to download/access/view
- Caution
  - NFRC offers bid report
  - Preliminary document, accept during plan review
  - Insist on label certificate at occupancy



# NFRC CMA Bid Report

## NON-RESIDENTIAL FENESTRATION CALCULATION REPORT / BID REPORT ACCORDING TO NFRC CMA PROCEDURES – NFRC STANDARD SIZE

*NOTE: This is NOT an NFRC Label Certificate. This document can NOT be used in place of NFRC Label Certificate and can be used only for Bid and Design Purposes*

### PRODUCT LISTING:

ID	Name	Framing Ref	Glazing Ref	Spacer Ref	Performance at NFRC Standard Size		
					U	SHGC	VT
					Btu/h-ft <sup>2</sup> -F	-	-
P-MKW-12983	pnl comcheck	FA-MKW-17966	GA-VIR-5335	SA-TCN-3461	0.38	0.34	0.37

### FRAME, GLAZING and SPACER ASSEMBLIES:

#### GLAZING LISTING:

Glazing Ref	Supplier ID	Description
GA-VIR-5335	Viracoon, Inc.	test

#### SPACER LISTING:

Spacer Ref	Supplier ID	Description
SA-TCN-3461	Technoform	test

#### FRAMING LISTING:

Framing Ref	Supplier ID	Description
FA-MKW-17966	Manko Window Systems	test

## NON-RESIDENTIAL FENESTRATION CALCULATION REPORT / BID REPORT ACCORDING TO NFRC CMA PROCEDURES – ACTUAL PRODUCT SIZE

### PRODUCT LISTING:

ID	Qty	Total Area	Name	EnergyPlus Report File	Fenestration Performance at Actual Size*				
					Width	Height	U	SHGC	VT
		in <sup>2</sup>			in.	in.	Btu/h-ft <sup>2</sup> -F	-	-
P-MKW-12983	1	28800.00	pnl comcheck		120.00	240.00	0.32	0.37	0.40

\* Individual product performance at actual size is listed in the above table and has been determined in accordance with NFRC technical procedures; however the actual size performance calculations above are for information purposes and use in area-weighted average calculations and energy simulation programs.

- Use Bid Report during plan review
- Confirm ratings on Label Certificate for occupancy
- Product ID will remain identical from BR to LC, But performance may Change!

# Check NFRC Label Certificate for Compliance



## NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

### PRODUCT LISTING

FOR CODE COMPLIANCE

LABEL CERTIFICATE ID: **PJ-EFC-738**

Issuance Date: 8/10/2011

### NFRC CERTIFIED PRODUCT RATING INFORMATION: \*

The NFRC Certified Product Rating information listed here is to be used to verify that the ratings meet applicable energy code requirements.

### PRODUCT LISTING:

CPD ID	Total Area ft <sup>2</sup>	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size		
						U-factor** Btu/h·ft <sup>2</sup> ·°F	SHGC**	VT**
P-EFC-6848	282.03	660 Single Hung Window	FA-EFC-10519	GA-PPG-2947	SA-PPG-2586	0.66	0.29	0.61
P-EFC-6849	131.08	6600 Fixed Window	FA-EFC-10518	GA-PPG-2947	SA-PPG-2586	0.42	0.34	0.81

### FRAME, GLAZING and SPACER ASSEMBLIES

### FRAMING LISTING:

FRAMING REF	SUPPLIER ID	DESCRIPTION
FA-EFC-10518	EFC	6600 Fixed Window
FA-EFC-10519	EFC	660 Single Hung Window

### GLAZING LISTING:

GLAZING REF	SUPPLIER ID	DESCRIPTION
GA-PPG-2947	PPG	1"-(1/4" 8B60 on #2, 1/2" Air, 1/4" Clr)

### SPACER LISTING:

SPACER REF	SUPPLIER ID	DESCRIPTION
SA-PPG-2586	PPG	Intercept Spacer (1/2" Air Space)

Note: For NFRC-approved frame, glazing and spacer component performance information see the NFRC Approved Component Library Database: [www.nfrc.org/CMAST](http://www.nfrc.org/CMAST)

\*Certification information provided is for those fenestration systems listed and may not encompass all systems for the project.

\*\* Each individual product certified performance rating is based on NFRC standard size in accordance with NFRC procedures.

FOR CODE COMPLIANCE

# Confirm U, SHGC on Label Certificate



## NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

### PRODUCT LISTING

FOR CODE COMPLIANCE

**LABEL CERTIFICATE ID:** *PJ-EFC-738*

**Issuance Date:** 8/10/2011

### NFRC CERTIFIED PRODUCT RATING INFORMATION: \*

*The NFRC Certified Product Rating Information listed here is to be used to verify that the ratings meet applicable energy code requirements.*

### PRODUCT LISTING:

CPD ID	Total Area	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size		
						U-factor**	SHGC**	VT**
	ft <sup>2</sup>					Btu/ hr·ft <sup>2</sup> ·°F	-	-
P-EFC-6848	282.03	660 Single Hung Window	FA-EFC-10519	GA-PPG-2947	SA-PPG-2586	0.65	0.28	0.61
P-EFC-6849	131.08	6600 Fixed Window	FA-EFC-10518	GA-PPG-2947	SA-PPG-2586	0.42	0.34	0.81

# Where do I get the label certificates?

- NFRC posts all label certificates online as energy codes require
- Easy to use
- No cost
- Downloadable adobe documents
- [live demo on web]

# Verify Commercial Window Ratings

- Go here: [www.nfrc.org](http://www.nfrc.org)
- Click on commercial link:



# NFRC HAS NEW, DEDICATED COMMERCIAL CODE WEB SITE

<http://www.nfrc.org/Commercial/Code-officials/>



DO YOU HAVE THE CODE?



IS THERE A CERTIFICATE?



NO CERTIFICATE?



NFRC IS HERE



EDUCATIONAL OPPORTUNITIES

## COMMERCIAL WINDOW CODE COMPLIANCE

BROUGHT TO YOU BY THE NATIONAL FENESTRATION RATING COUNCIL



GETTING YOUR NUMBERS JUST GOT EASIER...

# Enter Search Criteria

[Home](#) [Switch Units](#) [Find](#) [Help](#)

## Find Label Certificate

To find an label certificate, enter values in some of the following fields. You may use the wildcard \*.

Certificate Number:

Project Name:

Specified By:

Calculated By:

Project Location Zip Code:  OR City:  State:

Issue Date:  and

Display:  results

SEARCH

# Click on Label Certificate Link for Project

Home Switch Units Find Help 12/06				
Find Label Certificate Results				
Certificate	Project	Specified By	Issue Date	Address
<a href="#">PJ-SGS-639</a>	<a href="#">1000 Denny</a>	<a href="#">SGS Glass Co., Inc.</a>	5/11/2011 9:47:08 PM	121 Boren Ave., Seattle, WA 98122
<a href="#">PJ-EFC-950</a>	<a href="#">12th District Police Station</a>	<a href="#">EFCO Corporation</a>	1/24/2012 5:06:16 PM	1412 S. Blue Island Ave., Chicago, IL 60617
<a href="#">PJ-EFC-1033</a>	<a href="#">12th District Police Station (Revised Glass)</a>	<a href="#">EFCO Corporation</a>	3/6/2012 5:10:21 PM	1412 S. Blue Island Ave., Chicago, Illinois 60617
<a href="#">PJ-ANG-926</a>	<a href="#">224 Westlake Building Renovation</a>	<a href="#">All New Glass</a>	1/20/2012 2:34:21 PM	224 Westlake Ave., North, Seattle, WA 98109

National Fenestration  
Rating Council



# Review U-factor and SHGC Values or Download Label

## Project #PJ-SGS-639

Project: Certificate PJ-SGS-639  
Dick Ohls  
253-886-1774  
rohls@sgsglass.com

Specified by: [SGS Glass Co., Inc.](#)

Frame by: Kawneer Company Inc.

Glazing by: [PPG Industries](#)

Inspection Agency: [Keystone Certifications, Inc.](#)

Status: Certified 05-11-2011

Approved Calculation Entity: Lanny Dana

[Access Label Certificate](#)

### PRODUCTS LISTING:

CPD ID	Name	Product Type	Framing Ref	Glazing Ref	Spacer Ref	At NFRC Size			
						U (open)	SHGC (open)	VT (open)	U (cl)
						[BTU / hr-ft <sup>2</sup> -F]			[BTU / ft <sup>2</sup> -F]
<a href="#">P-KAW-5641</a>	<a href="#">1000 Denny - Window Wall</a>	Glazed Wall/Sloped Glazing	FA-KAW-8853	GA-PPG-3993	SA-NFC-2791	0.368	0.338	0.616	

National Fenestration  
Rating Council

# Compare to NFRC Label Certificate

FOR CODE COMPLIANCE

**LABEL CERTIFICATE ID:** *PJ-SGS-639*

**Issuance Date:** 5/11/2011

## NFRC CERTIFIED PRODUCT RATING INFORMATION: \*

*The NFRC Certified Product Rating Information listed here is to be used to verify that the ratings meet applicable energy code requirements.*

## PRODUCT LISTING:

CPD ID	Total Area	Name	Framing Ref	Glazing Ref	Spacer Ref
	ft <sup>2</sup>				
P-KAW-5641	2,626.39	1000 Denny - Window Wall	FA-KAW-8853	GA-PPG-3993	SA-NFC-2791

### CERTIFIED Performance Rating at NFRC Standard Size

U-factor**	SHGC**	VT**
Btu/ hr·ft <sup>2</sup> ·°F	-	-
0.37	0.34	0.62

**FRAME, GLAZING and SPACER ASSEMBLIES**

# What if no certificate is available?

- Codes require default values be assigned
- You may direct manufacturers to use NFRC ratings
  - Put manufacturers in contact with NFRC

National Fenestration  
Rating Council

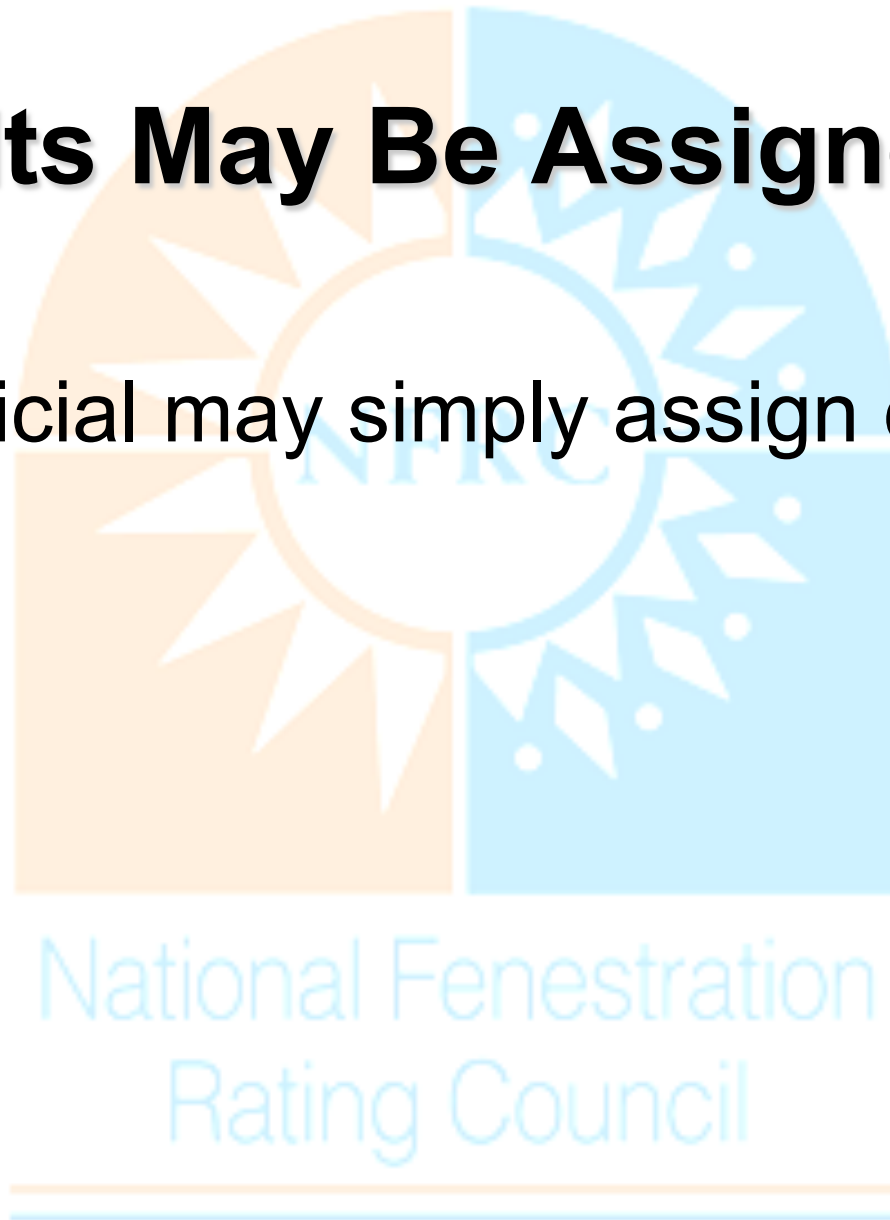
# If no label certificate...

- Manufacturers may offer test reports per NFRC 100/200
  - Difficult to confirm
  - May not be current
  - NFRC does not recommend this method

National Fenestration  
Rating Council

# Defaults May Be Assigned

- Code official may simply assign defaults



# Unacceptable Window Energy Performance documents

- U-factors and SHGC on drawings
- Marketing literature
- Center of glass values
- Documents from previous jobs
- Code officials determine what is acceptable per the energy code!
- Architects can specify NFRC ratings to ensure code compliance

# NOT ACCEPTABLE

## CERTIFICATE of COMPLIANCE

10.0 – Certificate of Compliance

OVERALL RATING	
<b>U-Factor:</b> (Btu/h·ft <sup>2</sup> ·°F)	<b>.44</b>
<b>SHGC:</b>	<b>.36</b>
<small>Directions: Fill out form completely. Determine the Overall Rating for this project by using the C.O.G. U-Factor and C.O.G. SHGC from Table 1 and looking up the overall rating from Table 2. Indicate the Overall Rating in the space above. Linear interpolation is permitted.</small>	

### Certificate Authorization

Name:

Tommy Coulter

Signature:

Company:

Coulter & Company

Date:

1/31/13

CERTIFIES THAT THE MATERIALS LISTED ON THIS CERTIFICATE WERE INSTALLED ON THE PROJECT IDENTIFIED BELOW.

### PROJECT INFORMATION:

**Chick Fil A**

Street Address:

City:

Lakewood

State:

CO

Zip:

Contact Person:

# NOT ACCEPTABLE




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NFRC U-FACTOR, SHGC, VT, &  
CONDENSATION RESISTANCE  
COMPUTER SIMULATION REPORT

Rendered to:  
US DAYLIGHTING

SERIES/MODEL:  
Storefront with AeorGlass IG Panel





# UNACCEPTABLE-SIMPLE DECLARATION

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Thermal NFRC Simulation: thermal computer simulation per NFRC 100-2010 on a 60" x 99" test size triple glazed with exterior 1" insulating glass made with 1/4" glass with a soft coat low E coating on surface #2, argon gas in the airspace made with a polymer-coated stainless steel spacer, and 1/4" clear glass, and interior 1/4" single glass with the following test result: Standardized Thermal Transmittance to be maximum 0.237 BTU/HR/SQ.FT/°F.

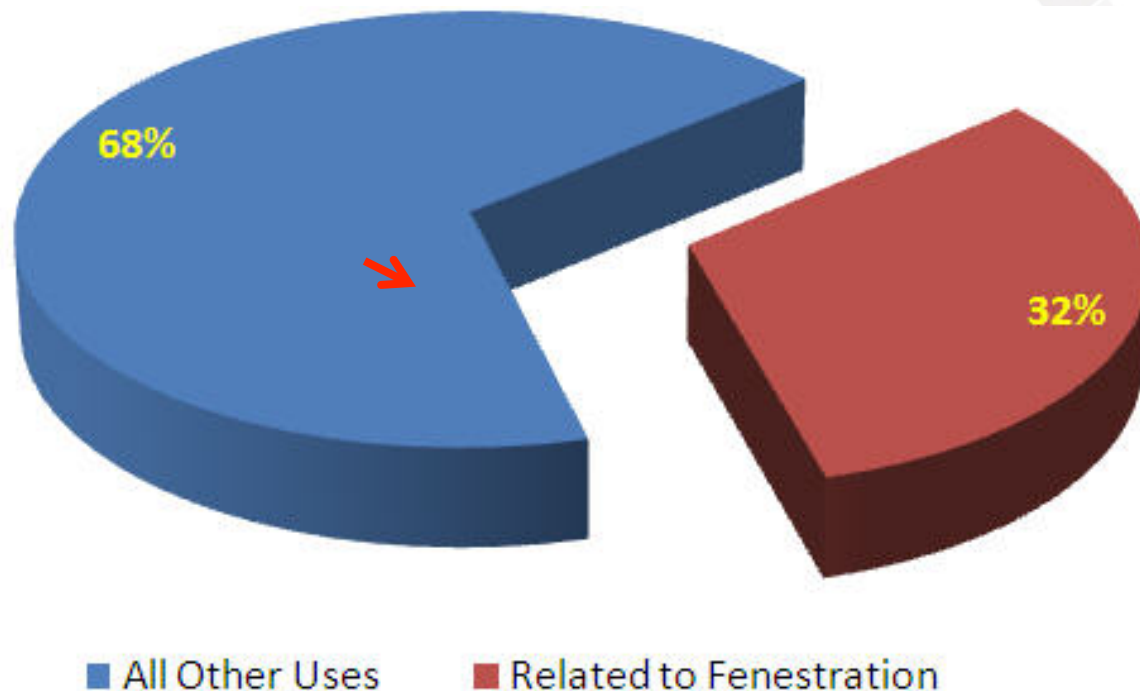
# About NFRC



- Formed by industry in 1989
- To provide standardized **fenestration energy performance** ratings
- Educational non-profit public/private organization, not a trade association, 501 C3
  - 16on staff in five states, HQ near Washington DC
  - 750participants (manufacturers labeling product)
  - 260 members (vote at meetings, develop standards)
  - Members may be:
    - Fenestration and related building industry
    - State energy offices
    - Design professionals
    - Utilities, consumer organizations
    - Anyone with a fenestration interest

# Windows Matter!

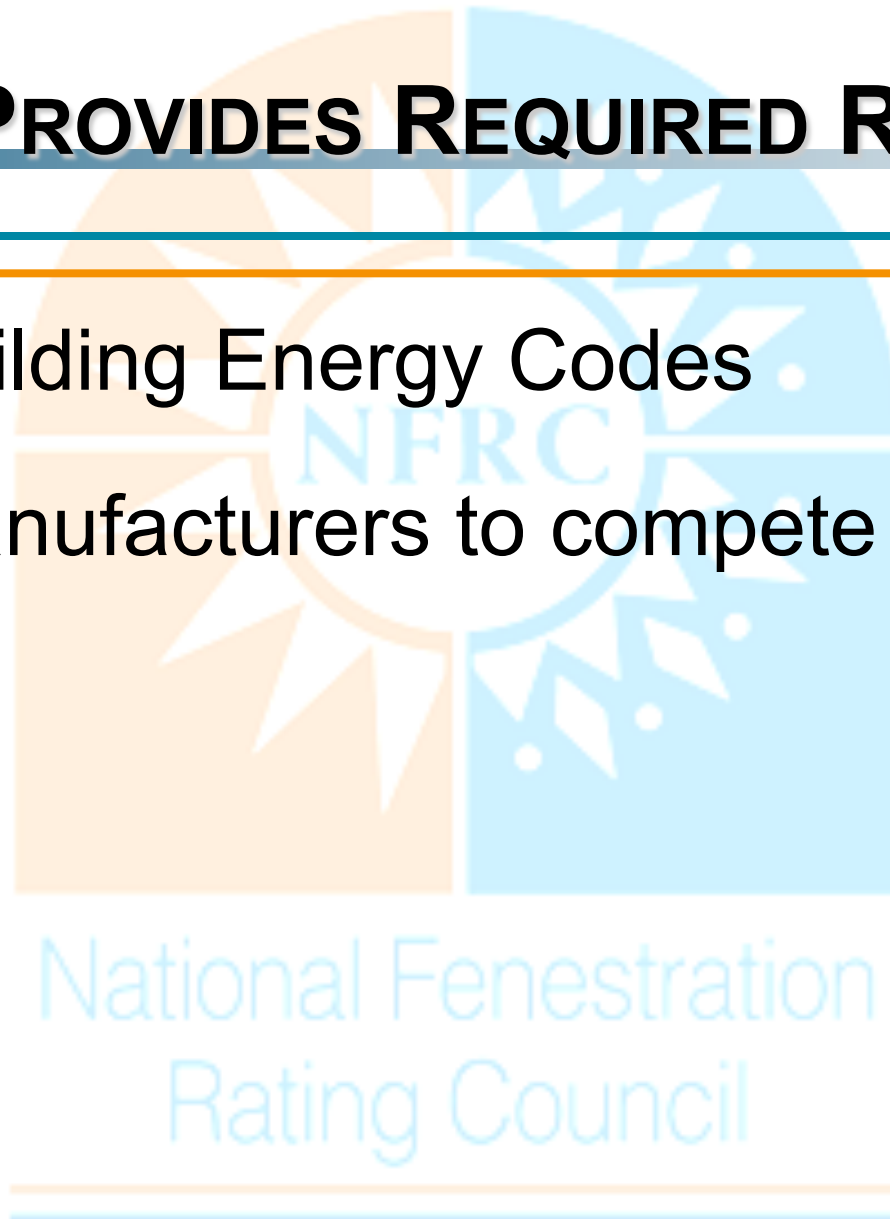
**Fenestration consumes 32% of that primary energy :**



# NFRC PROVIDES REQUIRED RATINGS

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- For Building Energy Codes
- For Manufacturers to compete fairly



# NFRC Rating Determination



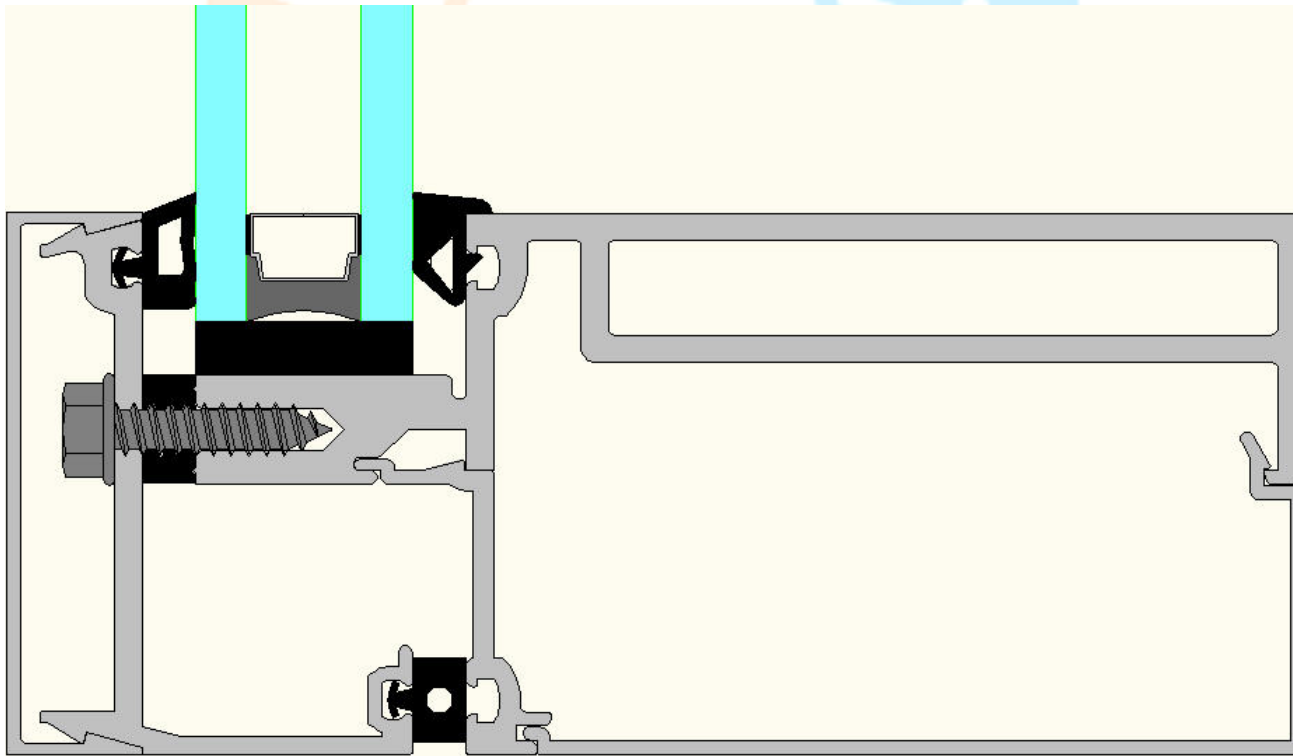
- Computer simulation is the basis of all ratings
- Simulation performed at standardized sizes & environmental conditions
- Simulation generates a **whole-product rating**
- Simulated U-factors validated by physical testing
  - **4000 tests/year**
- Always whole product rating!

# ENERGY SIMULATION SOFTWARE

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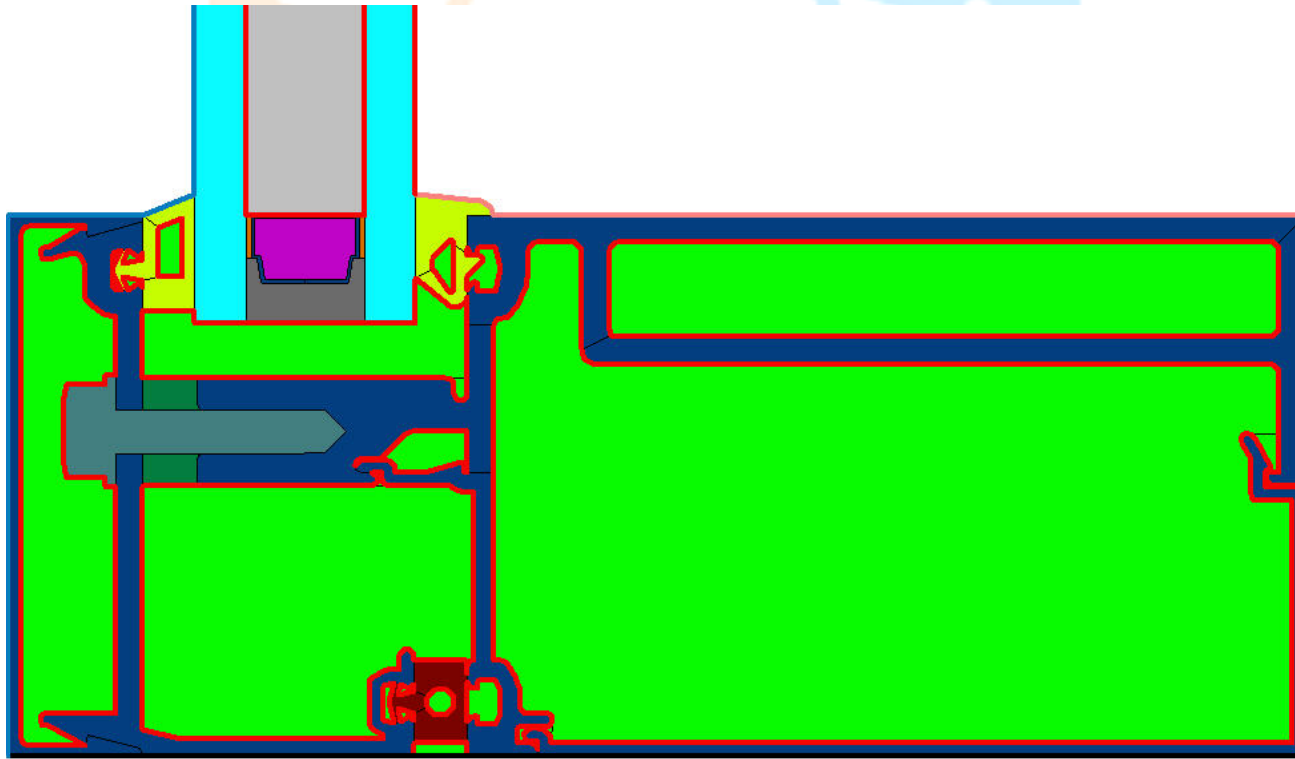
- Residential
  - WINDOW 6.3 and THERM 6.3
  - Written by University of CA-Lawrence Berkeley National Labs
- Commercial
  - Component Modeling Approach Software Tool
  - Written by NFRC
  - WINDOW is embedded
  - THERM files are imported

# THERM Profiles use CAD drawings



*CAD drawing file, section view, curtain wall*

# THERM assigns properties



*THERM simulation file, profile view, curtain wall*



# SIMULATION AND TESTING

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- All products are simulated
  - Simulated values appear on labels
- One product/product line tested every 4 years
  - About 4,000 tests each year
- Simulated U-factor compared to tested U-factor
  - $\pm 10\%$  variance allowed

# U-FACTOR TESTING



# RESIDENTIAL RATING PROCESS

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- Product Certification Program
  - Governs rating and labeling
- Laboratory Accreditation Program
  - Governs test and simulation labs
- Certification Accreditation Program
  - Governs Inspection Agencies

# RESIDENTIAL PROGRAM

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- 12 test labs
  - US, Canada, South Africa
- 20 simulation labs
  - US, Canada, Philippines

National Fenestration  
Rating Council

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# NFRC RESIDENTIAL PROGRAM

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- 750 participants
  - 95% of residential market
  - Windows, doors, skylights, tubular daylighting devices, some blinds/frits
  - 8,000 product lines
  - 9 million product options
  - Only about 1% actual produced
- Must have NFRC ratings for energy codes and ENERGY STAR

# Residential Quality Control



**Simulation Laboratory  
Simulate All Option**

**Testing Laboratory  
(Test One Base Line Product)**

**Inspection Agency (IA)  
Issue Certificate authorization, Plant  
inspection**

**NFRC Label or Label Certificate**

**Market Place  
Responsible Party Label Product**

**Compliance Assurance and  
Penalties for non-compliance**



# Residential-without NFRC Process (simulation only)



Simulation Laboratory  
Simulate All Option

NO Quality control!

Market Place  
Responsible Party Label Product

No way to enforce  
compliance!

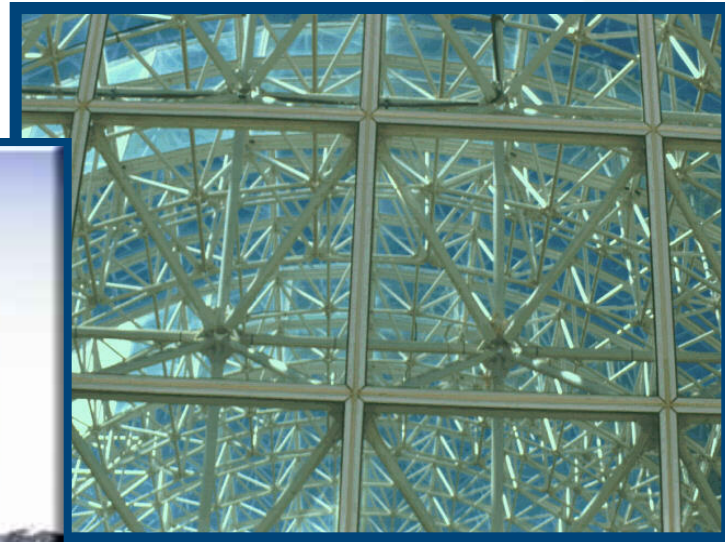
# Commercial Fenestration Energy Rating Program

- NFRC has only allowable rating software
- **Component Modelling Approach Software Tool (CMAST)**
  - LBNL's WINDOW program embedded
  - LBNL's THERM program provided spacer and frame component modules for upload
- **Most efficient method to rate commercial products**

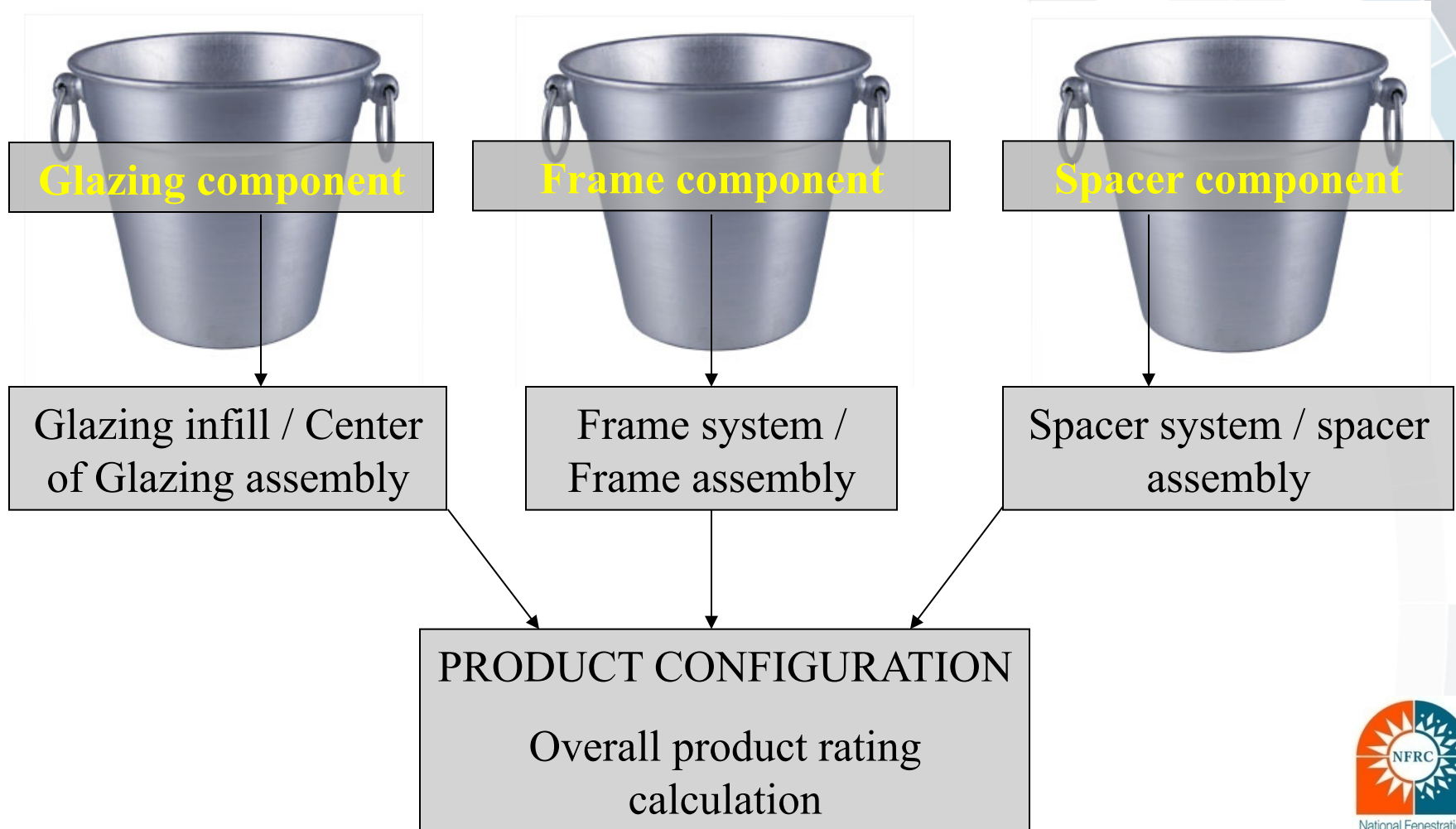


# Commercial Window Certification

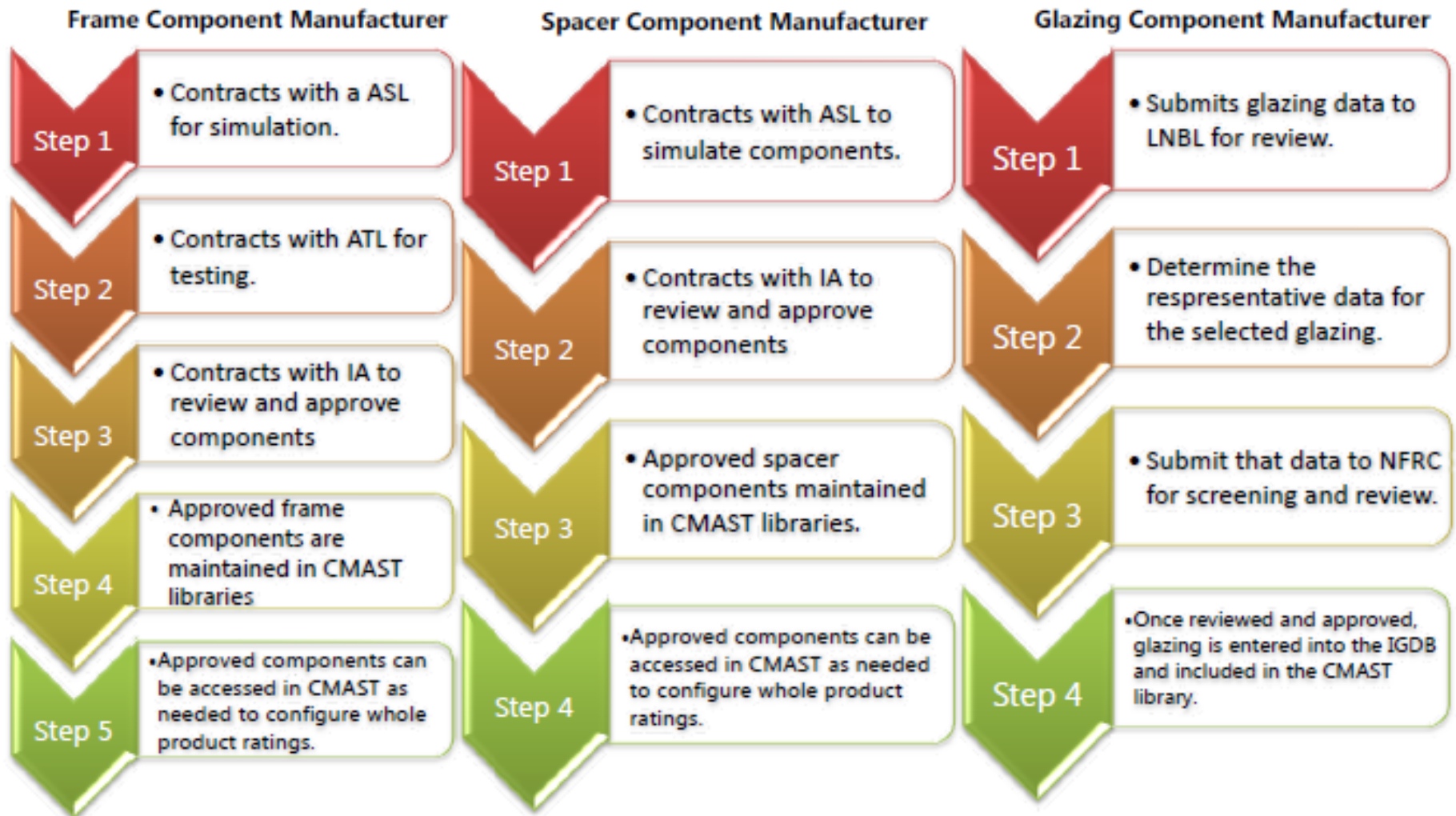
## Overview of the *Component Modeling Approach* ('CMA') Program



# Non-Res. Certification: CMA



# GET COMPONENTS IN CMAST



# FRAME COMPONENT

## Step 1

- Select a Certification & Inspection Agency (IA)
- Select a Simulation Laboratory (ASL)
- Select a Test Laboratory (ATL)
- Work with the ASL regarding test specimen

## Step 2

- Send drawings, BOM's and products specs to the ASL.
- ASL performs computer simulations and issues a report to you
- You instruct the ASL to release the report to your selected IA
- You instruct the ASL to upload the related THERM files into the CMAST library.

## Step 3

- Send test sample to ATL for Framing Product Line validation testing purposes
- You instruct the ATL to release report to your selected IA

## Step 4

- IA reviews both simulation and test reports and component data.
- IA validates Framing Product Line
- IA approves frame components & updates the status in the CMAST libraries
- You will be notified of approval via email.



# FRAME COMPONENT SUBMISSION

---

- **Simulate components using accredited simulations labs**
- **20 simulation labs in US, Canada, Philippines**
- **Requires validation test**
  - U-factor test
  - Specific glass and spacer required
- **Frame Product line is validated**
  - Compare simulation to test,  $\pm 10\%$  variation allowed
  - Can group numerous variations
  - NFRC 100 dictates the rules
- **30 participants**
  - 6000 components

# NFRC Accredited Labs

- **20 simulation labs, 4 in Canada**
  - Perform component simulations
- **9 Accredited Calculation Entities (ACES), 1 in Canada**
  - Issue LCs
- **11 Testing labs, 1 in Canada**
  - Test whole product
  - Validate U-factor for components

# Frame Component Costs

- \$7500/\$8500 annual participation fee (member/nonmember)
- \$15/\$30 annual frame component fee
- Simulation, testing, and inspection fees are charged separately
  - Contact simulation and testing labs

# GLAZING COMPONENT

Glazing is approved through NFRC's Spectral Data Program (NFRC 300)

Step 1

- Participate in an NFRC Round Robin (Glazing suppliers submit specific samples to a Testing Laboratory or use own testing facilities.)

Step 2

- Determine the representative data for the selected glazing.

Step 3

- Submit that data to NFRC for screening and peer review.

Step 4

- Once reviewed and approved, glazing is entered into the International Glazing Database (IGDB) and included in the CMAST component library.



# GLAZING COMPONENTS

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- **Most are already there**
  - 2700 glazing components
- **New glass added and taken out each quarter**
- **CMAST is updated accordingly**
- **NFRC partnered with LBNL**
  - LBNL manages IGDB

# Glazing Participant Costs

- Glazing manufacturer pays
- \$3500/\$4500 annual fee (member/nonmember)
- \$82/\$137 annual component fee
- 2015 changes underway

# SPACER COMPONENT

## Step 1

- Choose an IA & Simulation Lab.

## Step 2

- Work with the Simulation Lab and submit spacer drawings of spacer to be rated and placed into the CMAST library.

## Step 3

- The Simulation Lab performs simulations and submits data to IA for review and approval.

## Step 4

- Once the simulation data is reviewed and approved by the IA, the spacer data is entered into the CMAST component library.

# SPACER COMPONENT

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- **6 participants**
  - 170 components
- **Generic spacers available**
  - 4 common configurations

# Spacer Component Costs

- \$3500/\$4500 annual participation fee (member/nonmember)
- \$60/\$100 annual component fee
- Simulation and inspection agency fees separate

# COMPONENTS

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- *Once glazing, frame and spacer components are in, no further work necessary!*
- No expiration for component performance
- **Can reuse performance values indefinitely**
- Tremendous savings over product based program (residential)
- Primary advantage of CMA system over existing site built system



# Quality Control

ACE or Simulation Laboratory  
Simulate All Option

Testing Laboratory  
(Test One Base Line Product)

Inspection Agency (IA)-reviews  
LC, test, and sim reports

NFRC Label or Label Certificate

Market Place  
Responsible Party Label Product

Compliance Assurance and  
Penalties for non-compliance

# CMA Process Includes:

- Frames, spacers, glass manufacturers (participants)
- accredited simulation laboratory (ASL)
  - provide frame and spacer component simulations
- accredited testing laboratory (ATL)
  - U-factor tests to validate
- Specifying Authority (SA)
  - determines product specifications, responsible for final Label Certificate
- Approved Calculation Entity (ACE)
  - perform final calculations for project
- Inspection Agency (IA)
  - Checks ACE calculations and frame component simulations
- NFRC staff
  - Audits ACEs, inspects test and sim labs, trains ACEs



# Specifying Authority

- Dictates terms of the project
- Various stakeholders may be SA
  - architect
  - GC (general contractor)
  - glazing subcontractor
  - manufacturer of the fenestration system
- Executes a project-specific license agreement with NFRC
- Owns the CMA Label Certificate
- No cost to be SA

# Approved Calculation Entity

- Makes final label certificate calculation
- Trained by staff
- ACE must be employed by an ACE Organization
  - Manufacturer ACE Org. or Independent ACE Org.
- Assembler of product using CMAST
- Only ACE Organizations generate a label certificate

# ACE Organization Costs

- **\$3500/\$5000 annual participation fee**
  - No CMAST usage fee! (\$1000 annual savings per user)
- **\$550 application fee**
- **\$200 workshop fee**
- ***Great advantage: issue your own label certificates!***

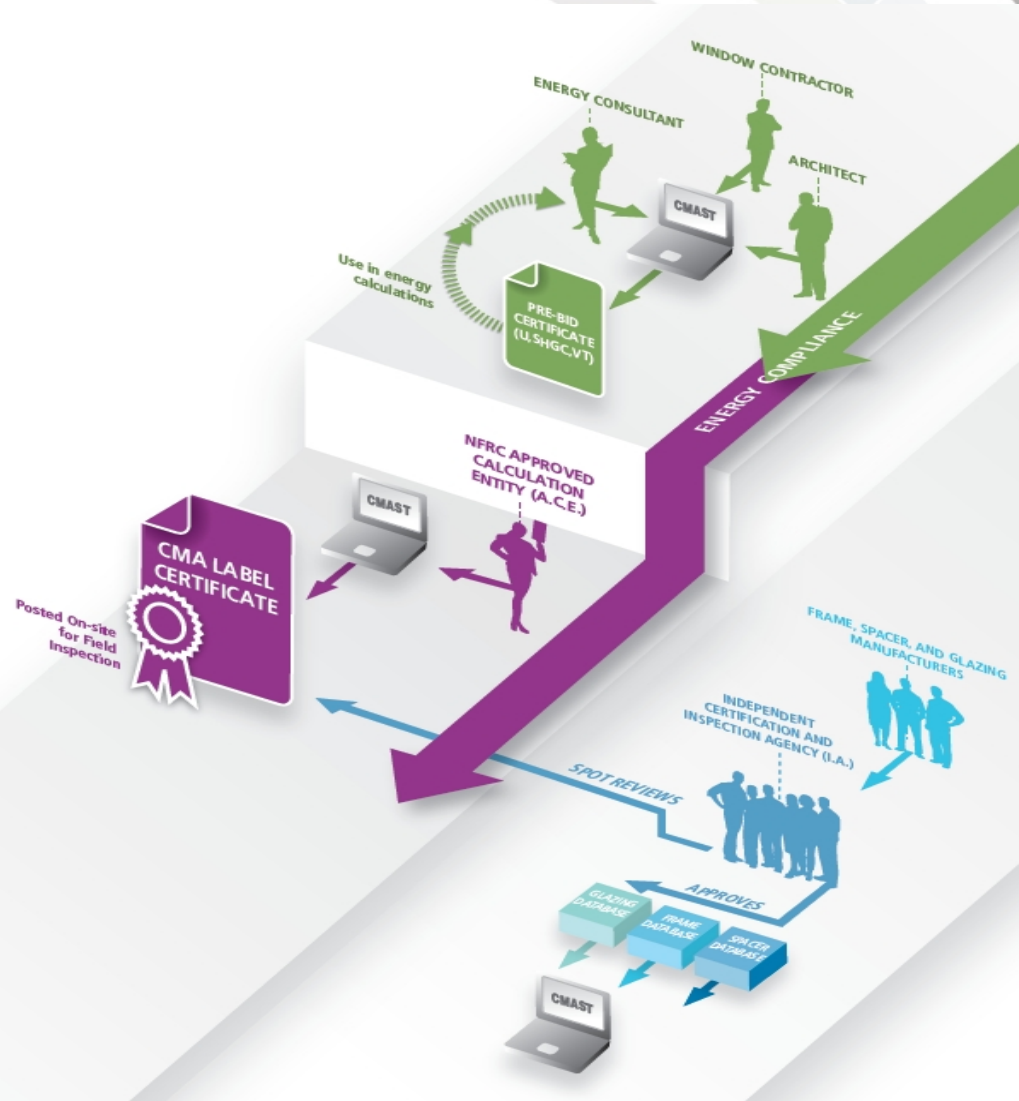
# ACE Organization

- **NFRC recommends Manufacturers become ACE Organization**
- **Advantages**
  - CMAST usage savings
  - Control own certificates
  - Beat competition

# Inspection Agency

- Accredited by staff
- Reviews simulation lab and test lab reports
- Reviews calculation reports (pre certified) prepared by ACE
- Conducts audits

# CMA Process



# CMAST

- Maintain libraries of component data
- Define projects
- Assemble components, and
- Calculate whole product ratings
- Loads onto desktop
- Synchronizes with servers at NFRC
- \$1,000/year in 2014 to use

# CMAST U-factor, SHGC Calculation Screen Shot

Product

Product Information

Server ID: P-ARA-13116 Client ID:

Product Name: 2013 ACE Exam-problem 3

Manufacturer: Arcadia Inc

Description:

Notes:

Frame Assembly: FA-ARA-18334: 2013 ACE Exam-problem 3

Product Type: GWWW - Glazed Wall System Window Wall

Width: 70.00 in. Height: 100.00 in.

Status: Design

Component Selection for Individual Product

Framing

Frame Member:

Insulated Glazing Unit

Center Of Glazing: GA-GIN-5395: 2013 ACE Exam-

Spacer Edge Seal Assembly: SA-TRU-3571: 2013 ACE Exam-

☐ Dividers:

Visibility

My Company Only Additional Persons & Companies

History Calculate EnergyPlus Report Doe2 Report

NFRC Size: 78.74 X 78.74 in. Actual Size: 70.00 X 100.00 in.

U factor: 0.354 0.350  $\text{Btu/h}\cdot\text{ft}^2\cdot\text{F}$

SHGC: 0.269 0.270

VT: 0.551 0.554

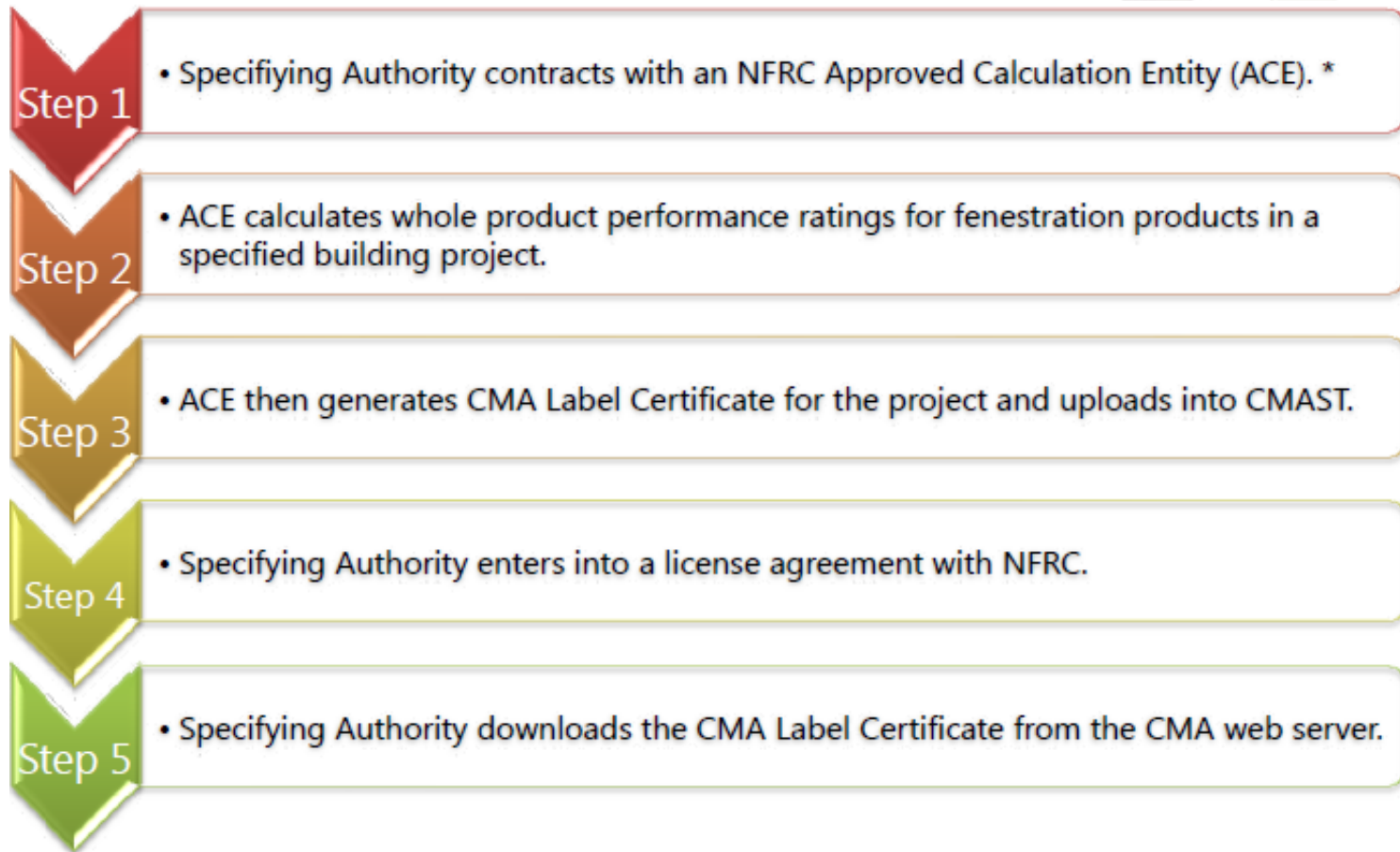
Configuration

Edit Dims

OK Cancel



# OBTAIN A LABEL CERTIFICATE



# Label Certificate Costs

- **\$0, no cost**
- New in 2014
- In 2013, charged based on project glass square footage

# NFRC CMA Label Certificate (cover page):



## NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

### PROJECT INFORMATION

**LABEL CERTIFICATE ID:** PJ-WTI-1974

**Issuance Date:** 6/24/2013

*This is to be completed by an NFRC Approved Calculation Entity (ACE), based on information provided by the Specifying Authority and calculated in accordance with NFRC procedures.*

#### PROJECT LOCATION:

**Address:** 3220 100th St. SW

**City:** Everett **State:** Washington **Zip code:** 98204

**Contact person:** Bemie Thueringer **Title:** \_\_\_\_\_

**Phone:** 425-277-1800 **Facsimile:** 425-277-0225 **Email:** bemie.th@pacific-glass.com

**Project name (optional):** Boeing (Dreamliner Operations Center)

#### IDENTIFICATION OF SPECIFYING AUTHORITY:

**Company name:** Window Tech Inc. **ID:** WTI

**Address:** 6520 212th St. SW

**City:** Lynnwood **State:** WA **Zip code:** 98036

**Contact person:** Andy Richi **Title:** \_\_\_\_\_

**Phone:** 425-778-2050 **Facsimile:** 425-778-3476 **Email:** andy@windowtechinc.com

#### FRAMING SUPPLIER:

**Company name:** EFCO Corporation **ID:** EFC

**Address:** 1000 County Road

**City:** Monett **State:** MO **Zip code:** 65708

**Contact person:** Joseph Holmes **Title:** \_\_\_\_\_

**Phone:** 417-235-3193 **Facsimile:** \_\_\_\_\_ **Email:** jholmes@efco.com

#### GLAZING SUPPLIER:

**Company name:** PPG Industries **ID:** PPG

**Address:** 400 Guys Run Road

**City:** Cheswick **State:** PA **Zip code:** 15024

**Contact person:** Paul Bush **Title:** Manager, Technical Services

**Phone:** 412-820-4926 **Facsimile:** 412-826-2299 **Email:** pwbush@ppg.com

#### IDENTIFICATION NAME OF APPROVED CALCULATION ENTITY (ACE):

Window Tech Inc. **ID:** WTI

#### IDENTIFICATION NAME OF INSPECTION AGENCY (IA):

Keystone Certifications, Inc. **ID:** KCI

**Number of individual products listed on this label certificate:** **29**

# NFRC CMA Label Certificate (page 2):



## NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

### PRODUCT LISTING

FOR CODE COMPLIANCE

LABEL CERTIFICATE ID: **PJ-WT1-1974**

Issuance Date: 6/24/2013

#### NFRC CERTIFIED PRODUCT RATING INFORMATION: \*

The NFRC Certified Product Rating Information listed here is to be used to verify that the ratings meet applicable energy code requirements.

#### PRODUCT LISTING:

CPD ID	Total Area ft <sup>2</sup>	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size		
						U-factor** Btu/h·ft <sup>2</sup> ·°F	SHGC**	VT**
P-EFC-18844	2,156.31	5600 2-1/2" x 6" Durocoat CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path I, Group 1 Spacer	FA-EFC-8133	GA-PPG-8129	SA-NFC-3553	0.44	0.40	0.42
P-EFC-18845	1,400.66	403 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path I, Group 1 Spacer	FA-EFC-8257	GA-PPG-8129	SA-NFC-3553	0.48	0.39	0.41

#### FRAME, GLAZING and SPACER ASSEMBLIES

#### FRAMING LISTING:

FRAMING REF	SUPPLIER ID	DESCRIPTION
FA-EFC-8133	EFC	5600 2-1/2" x 6" Durocoat CW
FA-EFC-8257	EFC	403 Storefront

#### GLAZING LISTING:

GLAZING REF	SUPPLIER ID	DESCRIPTION
GA-PPG-8129	PPG	1" IG (1/4" Solarblue x 1/2" Air x 1/4" Clear w/ Sungate 500 on #3)

#### SPACER LISTING:

SPACER REF	SUPPLIER ID	DESCRIPTION
SA-NFC-3553	NFC	Path I, Group 1

Note: For NFRC-approved frame, glazing and spacer component performance information see the NFRC Approved Component Library Database: [www.nfrc.org/CMAST](http://www.nfrc.org/CMAST)

\*Certification information provided is for those fenestration systems listed and may not encompass all systems for the project.

\*\* Each individual product certified performance rating is based on NFRC standard size in accordance with NFRC procedures.

FOR CODE COMPLIANCE

# Label Certificate

## PRODUCT LISTING:

CPD ID	Total Area	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size		
						U-factor**	SHGC**	VT**
	ft <sup>2</sup>					Btu/ hr·ft <sup>2</sup> ·°F	-	-
P-EFC-18544	2,158.31	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path I, Group 1 Spacer	FA-EFC-6133	GA-PPG-8129	SA-NFC-3553	0.44	0.40	0.42
P-EFC-18545	1,400.66	403 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path I, Group 1 Spacer	FA-EFC-6237	GA-PPG-8129	SA-NFC-3553	0.48	0.39	0.41

# NFRC CMA Label Certificate (optional page 4): (project- specific sizes)



## NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

### SUPPLEMENTAL PRODUCT INFORMATION For Informational Purposes Only

#### Non-Certified Product Information at Actual Product Size

Reference NFRC Labeled Certificate ID: **PJ-WT1-1974** for Certified Ratings for Code Compliance:

Individual product performance at actual size is listed in the table below and has been determined in accordance with NFRC technical procedures; however, these are not certified ratings. Certified ratings are determined at NFRC model sizes for comparative purposes and are listed on the actual Label Certificate referenced above. The actual size performance calculations below are for information purposes and use in calculations and energy simulation programs to estimate energy use, and are not intended for use in code compliance.

#### PRODUCT LISTING:

CPD ID	Qty	Total Area ft <sup>2</sup>	Name	Energy Plus Report File*	NON-CERTIFIED Performance at Actual Size				
					Width in.	Height in.	U-factor Btu/h·ft <sup>2</sup> ·°F	SHGC -	VT -
P-EFC-18844	2	417.88	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	197.20	152.50	0.38	0.42	0.44
P-EFC-18844	2	417.28	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	197.00	152.50	0.38	0.42	0.44
P-EFC-18844	1	83.72	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	102.80	117.50	0.41	0.41	0.43
P-EFC-18844	1	23.85	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	68.00	50.50	0.47	0.39	0.40
P-EFC-18844	2	119.03	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	58.20	152.50	0.45	0.40	0.41
P-EFC-18844	1	138.28	5800 2-1/2" x 6" Duracast CW 1" IG (1/4" Solarblue x 1/2" Air x 1/4" Sungate 500 #3) Path L, Group 1 Spacer	P-EFC-18844.txt	197.20	99.50	0.39	0.42	0.44

\* In order to download EnergyPlus report file for a product, you need to open your web browser, go to the address bar and type <http://cmaest.nfrc.org/product/EPlusReport.aspx?id=> followed by the certified product CPD ID





# Actual Size Data for Energy Plus or other programs

```

cmast example - Notepad
File Edit Format View Help
window5 Data File for EnergyPlus
Window v6.2.23.0
Date : 10/29/2012
Window name : ACE Exam 11/12, Product 4
Description : Custom Single Vision
# Glazing Systems: 1
GLAZING SYSTEM DATA: Height width nPanels Uval-center SC-center SHGC-center Tvis-center
System1 : 1671 1114 2 1.168 0.472 0.410 0.652
FRAME/MULLION DATA: width OutsideProj InsideProj Cond EdgeCondRatio SolAbs VisAbs Emiss Orient'n (null)
L Sill : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
R Sill : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
L Head : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
R Head : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
Top L Jamb : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
Bot L Jamb : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
Top R Jamb : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
Bot R Jamb : 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
Mullion : None
Average frame: 93.7 25.4 25.4 6.228 3.547 0.300 0.300 0.90
DIVIDER DATA : width OutsideProj InsideProj Cond EdgeCondRatio SolAbs VisAbs Emiss Type #Hor #Vert
System1 : 0.0 0.0 0.0 0.000 0.000 0.000 0.000 0.000 None 0 0
GLASS DATA : Layer# Thickness Cond Tsol Rfsol Rbsol Tvis Rfvis Rbvis Tir EmissF EmissB SpectralDataFile
System1 : 1 4.623 0.986 0.493 0.056 0.056 0.782 0.073 0.072 0.000 0.840 0.840 Green_50.GRD
2 5.613 1.000 0.542 0.206 0.182 0.830 0.052 0.060 0.000 0.095 0.149 CGIS-15_8070c6.grd
GAP DATA : Gap# Thick nGasses
System1 : 1 14.30 2
GAS DATA : GasName Fraction Mweight ACond BCond CCond AVisc BVisc CVisc AspHeat BSpHeat CSpHeat
System1 Gap1 : Air 0.0500 28.97 0.002873 7.76E-005 0 3.723E-006 4.94E-008 0 1002.74 0.012324 0
Argon 0.9500 39.95 0.002285 5.149E-005 0 3.379E-006 6.451E-008 0 521.929 0 0
GLAZING SYSTEM OPTICAL DATA
Angle 0 10 20 30 40 50 60 70 80 90 Hemis
System1
Tsol 0.311 0.312 0.305 0.296 0.284 0.263 0.225 0.158 0.067 0.000 0.247
Abs1 0.491 0.490 0.495 0.503 0.513 0.522 0.524 0.505 0.415 0.000 0.499
Abs2 0.102 0.103 0.106 0.107 0.104 0.101 0.100 0.093 0.055 0.000 0.098
Rfsol 0.096 0.095 0.094 0.095 0.099 0.114 0.151 0.244 0.463 1.000 0.145
Rbsol 0.205 0.198 0.196 0.199 0.209 0.228 0.264 0.350 0.557 0.999 0.251
Tvis 0.652 0.656 0.645 0.630 0.610 0.573 0.496 0.354 0.155 0.000 0.534
Rfvis 0.106 0.101 0.100 0.103 0.114 0.138 0.192 0.316 0.558 1.000 0.174
Rbvis 0.110 0.103 0.101 0.103 0.116 0.140 0.187 0.292 0.524 0.999 0.169

```

# COMMERCIAL PARTICIPANTS

- **31 Frame Man.**
  - 6,000 components
- **6 Spacer Man.**
  - 169 components
- **45 Glazing Man.**
  - 2700 components





# Commercial Market

- **About 50,000 projects each year, 17000 LEED projects total in the world**
  - Only 300 Label Certificates since 2009
  - A long ways to go!
- **Educational efforts**
  - Meetings with code officials around US/Canada
  - Energy code enforcement is most important

# Commercial Fenestration Quality Control

- **ACE's audited every two years by staff**
  - Includes frame, spacer manufacturers
  - Participate in interlaboratory study
- **Test, simulation labs**
  - Audited every two years
  - Participate in interlaboratory studies each year
- **Label Certificates**
  - Audited during inspections
  - Confirm construction documents match what is on Label Certificate

# Compliance Program

- **NFRC can fine for mislabelling**
  - \$5000 per incident
  - Follow up with audit if necessary
  - Revocation possible if egregious

# Market Discussion

- **Commercial code enforcement best in:**
  - Seattle
  - California
  - Salt Lake City
  - NFRC marketing effort in North Carolina

# Market Discussion

- **Use CMA Label Certificates to sell products**
  - If you have components ready, competitor may not
  - Use this to your advantage

# Please contact NFRC with any questions

- NFRC Webpage: [www.nfrc.org](http://www.nfrc.org)
- Ray McGowan
  - *Sr. Program Manager*
  - [rmcgowan@nfrc.org](mailto:rmcgowan@nfrc.org)
  - 240-821-9510