



TECHNICAL BULLETIN
Community Development & Planning, Building Inspections
TOPIC: Energy Code Compliance for Commercial Buildings-
Storefront Glazing and Curtain Walls
August 23, 2013

This Technical Bulletin will provide designers, contractors and glazing installers with information regarding energy code compliance requirements for storefront glazing and curtain walls.

GENERAL INFORMATION

The International Energy Conservation Code (IECC) requires the *U*-factors of fenestration products (windows, doors and skylights) to be determined in accordance with NFRC (National Fenestration Rating Council) 100 by an accredited, independent laboratory, and to be labeled and certified by the manufacturer. Energy codes also require the solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) to be determined in accordance with NFRC 200 by an accredited, independent laboratory, and to be labeled and certified by the manufacturer.

When a manufacturer has not determined a glazing product *U*-factor or SHGC value in accordance with NFRC 100 or NFRC 200 for a particular product, compliance with the building envelope requirements of the energy code is determined by assigning the glazing products a default *U*-factor and/or default SHGC value in accordance with tables [Tables 303.1.3(1) and 303.1.3(3)] in the IECC.

Factory built windows that are typically installed in residential, multifamily and some light commercial projects that have been tested and labeled in accordance with the standards referenced above are identified with a label that is attached to the window (see **Sample NFRC Label** figure to the right). Building inspectors verify that the information contained in the **NFRC Label** meets or exceeds the energy code compliance information on the approved construction plans. **NFRC Labels** should not be removed until all inspections have been passed by the building inspector.

		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./ft²)		Solar Heat Gain Coefficient	
0.35		0.32	
ADDITIONAL PERFORMANCE RATINGS			
Visible Transmittance		Air Leakage (U.S./ft²)	
0.51		0.2	
Condensation Resistance			
51			—
<small>Manufacturers indicate that these ratings conform to applicable NFRC standards for determining what product performance NFRC ratings are determined for a final and accurate rating. Compliance of any product is subject to NFRC rules and procedures and any product deviations or manufacturer's liability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>			

Sample NFRC Label

Site fabricated glazing assemblies such as storefronts and curtain walls must also comply with minimum *U*-factor and SHGC energy code requirements based on the project design. Instead of the identifying the glazing assembly with an **NFRC Label**, an **NFRC Label Certificate** must be provided for the glazing assemblies. The details of the site fabricated glazing assembly are included on the **NFRC Label Certificate**. It is best to submit the **NFRC Label Certificate** with the plans accompanying the permit application; but, the **NFRC Label Certificate** must be provided to the building inspector on-site by the general contractor or the window fabricator before the project may be final approved. Examples of **NFRC Label Certificate** are attached (3 pages).

PLAN REVIEW PROCESSES

A new commercial building that contains conditioned space must satisfy the minimum thermal envelope requirements of the IECC. Depending on project scope, some remodeling projects may also have to comply with portions of the IECC. The IECC establishes the minimum *U*-factor and SHGC requirements for the glazing. If compliance can be achieved using default glazing *U*-factor for the type of fenestration and/or SHGC values including any projection factor adjustments, then no additional information is needed.

If compliance cannot be achieved using default glazing *U*-factor for the type of fenestration and/or SHGC values including any projection factor adjustments, then the *U*-factors and/or SHGC values for the proposed storefront and/or curtain wall assemblies must be verified by a ***NFRC Label Certificate***. The plans must include the *U*-factors and/or SHGC values as listed on the energy compliance certificate.

It is best to submit the ***NFRC Label Certificate*** with the plans accompanying the permit application; but, the ***NFRC Label Certificate*** must be provided to the building inspector on-site by the general contractor or the window fabricator before the project may be final approved.

INSPECTION PROCESSES

For projects constructed with storefronts, curtain walls and glazed doors, and compliance cannot be demonstrated using default *U*-factors and/or SHGC values, the general contractor must provide the building inspector with ***NFRC Label Certificate***(s) at the following inspection stages:

1. At the "Framing Inspection;" or
2. Immediately after the storefronts, curtain walls and glazed doors are installed.

There are 3 approaches for designers, architects or contractors when selecting storefronts, glass doors and/or curtain walls that will satisfy the necessary *U*-factor and SHGC values:

1. Select products from NFRC Certified Products Directory (<http://cpd.nfrc.org/search/searchdefault.aspx>)
2. Utilize the NFRC Component Modeling Approach (CMA) and select from approved components (frames, glass and spacer) (<http://www.nfrc.org/CMA/Default.aspx>)
3. Use NFRC Site-Built Certification and Rating Program (Note – this process takes about 100 days) (<http://www.nfrc.org/SB/Default.aspx>)

Any one of the three above approaches will provide a project address specific ***NFRC Label Certificate***. The *U*-factor and SHGC values on the ***NFRC Label Certificate*** must match or be better than the *U*-factor and SHGC values listed on the energy code compliance certificate.

END OF TECHNICAL BULLETIN



NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

PROJECT INFORMATION

LABEL CERTIFICATE ID: *PJ-EFC-331*

Issuance Date: 4/13/2010

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: 1915 1st Ave. West

City: Seattle **State:** WA **Zip code:** 98119

Contact person: Scott Katzele **Title:** _____

Phone: 206-932-7628 **Facsimile:** 206-932-2821 **Email:** scottk@seattleglass.com

Project name (optional): McClure Middle School **Designer (optional):** _____

IDENTIFICATION OF SPECIFYING AUTHORITY:

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@efcocorp.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@efcocorp.com

GLAZING SUPPLIER:

Company name: Guardian Industries **ID:** GUA

Address: 2300 Harmon Road

City: Auburn Hills **State:** MI **Zip code:** 48326

Contact person: _____ **Title:** _____

Phone: _____ **Facsimile:** _____ **Email:** _____

IDENTIFICATION NAME OF APPROVED CALCULATION ENTITY (ACE):

EFCO Corporation **ID:** EFC

IDENTIFICATION NAME OF INSPECTION AGENCY (IA):

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

Number of individual products listed on this label certificate: **11**



NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

PRODUCT LISTING

FOR CODE COMPLIANCE

LABEL CERTIFICATE ID: *PJ-EFC-331*

Issuance Date: 4/13/2010

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 ²	Name	Framing Ref	Glazing Ref	Spacer Ref	CERTIFIED Performance Rating at NFRC Standard Size		
						U-factor** Btu/ hr•ft ² •°F	SHGC**	VT**
P-EFC-2767	774.59	2700 Project-Out	FA-EFC-4471	GA-GUA-2876	SA-PPG-2110	0.51	0.26	0.44
P-EFC-2768	7,254.48	2700 Fixed	FA-EFC-4454	GA-GUA-2876	SA-PPG-2110	0.37	0.33	0.58

FRAME, GLAZING and SPACER ASSEMBLIES

FRAMING LISTING:

FRAMING REF	SUPPLIER ID	DESCRIPTION
FA-EFC-4454	EFC	2700 Fixed
FA-EFC-4471	EFC	2700 Project-Out

GLAZING LISTING:

GLAZING REF	SUPPLIER ID	DESCRIPTION
GA-GUA-2876	GUA	1"--1/4"SN68, 1/2"Argon, 1/4"Clr

SPACER LISTING:

SPACER REF	SUPPLIER ID	DESCRIPTION
SA-PPG-2110	PPG	

Note: For NFRC-approved frame, glazing and spacer component performance information see the NFRC Approved Component Library Database: 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



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-EFC-331* 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 ²	Name	Energy Plus Report File*	NON-CERTIFIED Performance at Actual Size				
					Width in.	Height in.	U-factor Btu/ hr·ft ² ·°F	SHGC -	VT -
P-EFC-2767	180	750.01	2700 Project-Out	P-EFC-2767.txt	30.00	20.00	0.60	0.22	0.36
P-EFC-2767	6	24.58	2700 Project-Out	P-EFC-2767.txt	29.50	20.00	0.60	0.22	0.36
P-EFC-2768	8	43.33	2700 Fixed	P-EFC-2768.txt	39.00	20.00	0.48	0.29	0.50
P-EFC-2768	502	5,438.38	2700 Fixed	P-EFC-2768.txt	30.00	52.00	0.41	0.31	0.55
P-EFC-2768	8	105.45	2700 Fixed	P-EFC-2768.txt	36.50	52.00	0.39	0.32	0.56
P-EFC-2768	12	127.83	2700 Fixed	P-EFC-2768.txt	29.50	52.00	0.41	0.31	0.55
P-EFC-2768	8	112.67	2700 Fixed	P-EFC-2768.txt	39.00	52.00	0.39	0.32	0.57
P-EFC-2768	2	11.67	2700 Fixed	P-EFC-2768.txt	30.00	28.00	0.46	0.30	0.51
P-EFC-2768	8	40.56	2700 Fixed	P-EFC-2768.txt	36.50	20.00	0.48	0.29	0.50
P-EFC-2768	6	24.58	2700 Fixed	P-EFC-2768.txt	29.50	20.00	0.50	0.28	0.48
P-EFC-2768	324	1,350.01	2700 Fixed	P-EFC-2768.txt	30.00	20.00	0.50	0.28	0.48

* 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://cmast.nfrc.org/docs/temp/>" followed by the file name from this column.