Seattle Department of Construction and Inspections

sdci

Tip 403

Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

NFRC Labeling Requirements: 2021 Seattle Energy Code

Updated April 7th, 2025

What is NFRC?

NFRC, the National Fenestration Rating Council, maintains standards for rating the heat loss, solar heat gain, visible light transmittance, and other fenestration performance characteristics. "Fenestration" includes windows, doors, curtain walls, storefront glazing systems, skylights, and similar openings. For further information on the NFRC rating, labeling, and certification programs, see www.nfrc.org.

What the 2021 Seattle Energy Code Requires

Both the commercial and residential energy codes require almost all window glazing to have an NFRC label or label certificate. For both residential and commercial construction, the code provision reads: "U-factors of fenestration products (e.g. 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) must also be certified by NFRC.

There are a few exceptions:

- If no NFRC rating exists (such as for salvaged or owner-built windows), you may use the Default Value tables from Seattle Energy Code Chapter 3. (See Residential Tables R303.1.3(1) and R303.1.3(3) and Commercial Tables C303.1.3(1), C303.1.3(3) and C303.1.3(4). Use these default values only as a last resort - they are quite conservative.
- If a window is manufactured by a Washington State "small business," defined as a business with fewer than 50 employees, you may use the small business tables to comply with the commercial or residential energy code. (See Tables R303.1.3(5) and C303.1.3(5).

Where to Find These Requirements in the 2021 Seattle Energy Code

Residential Buildings – Windows and other fenestration, Sections R303.1.3 and R402.3.

- Note that the "residential buildings" portion of the energy code does not have an SHGC (Solar Heat Gain Coefficient) requirement. ("Residential buildings" include single-family and two-unit dwellings, plus townhouses.)

Commercial Buildings – Windows and other fenestration, Sections C303.1.3 and C402.4

The code allows higher SHGC where overhead projections partially shade the glazing – See Section C402.4.3.

You do not need to test or report air leakage of fenestration.

What to Include on Your Plans

You need to include fenestration and opaque door schedules on your plans. See pages 5 and 6 for typical schedule formats. As mentioned above, "fenestration" includes windows, glazed doors (more than half glass), curtain walls, glass blocks, skylights, and the like. (Opaque doors, including swinging doors, roll-up doors, sectional doors, etc., are no longer defined as "fenestration.") For each distinct product, your schedule must include the following:

- Product type (fixed or operable, metal or non-metal frame)
- Dimensions and number of each type
- U-factor (and whether it is an NFRC-certified value or taken from the default value tables)

700 5th Avenue, Suite 2000
P.O. Box 34019
Seattle, WA 98124-4019
(206) 684-8600

- SHGC and VT (Visible Transmittance) for buildings covered by the "commercial buildings" portion of the energy code (which includes multifamily buildings over three stories), but not for "residential buildings."
- NFRC CPD (Certified Products Directory) number, for factory-built windows, as follows:
  - We require the CPD number on plans only where the U-value claimed is lower (better) than the maximum allowable U-value, and you are using that lower U-value for UA trade-off or systems analysis calculations.
  - You are not required to include the CPD number where you are simply meeting the prescriptive U-value in the code.

    Note that frequently the only way to obtain a CPD number is to ask the manufacturer's representative, who will get it from the factory.

Windows made by Washington State small businesses do not require NFRC certificate but do require documentation of the manufacturer's small business status. (See Tables R303.1.3(5) and C303.1.3(5).)

We will not accept manufacturer's (non-NFRC) simulation reports and other product literature as substitutes for CPD numbers.

Site-Fabricated Fenestration

For curtain wall, storefront glazing, and other site-fabricated fenestration, you may submit an NFRC Component Modeling Approach (CMA) Bid Report for plan review instead of an NFRC simulation report. For more information, see **CMA Tools - National Fenestration Rating Council**.

NFRC Label Certificate Drawing Note for Site-Fabricated Fenestration

Place a prominent note on permit drawings stating "An NFRC Label Certificate must be delivered to the building inspector before any portion of curtain wall, storefront, window wall, or other site-fabricated fenestration assembly is installed on the building. The Label Certificate U-values and SHGC values must be equal to or lower than those on the permit documents and the NFRC CMA bid report." SDCI will not accept manufacturers' simulation reports, product literature, or AAMA reports.

The prescriptive performance requirement and the Label Certificate are both based on the standard 78" X 78" panel size. However, you can base the performance for energy modeling purposes on the actual size, as shown on the label certificate. This performance will often be better for larger glass panel sizes, due to the smaller percentage of the glazing area that consists of metal framing.

Where factory U-values are not available, as is often the case with salvaged windows, use the default U-value tables (Tables C303.1.3(1), C303.1.3(3) and C303.1.3(4)) instead of NFRC ratings. Indicate for each distinct product whether it is fixed or operable, as well as the frame material, thermal break type, and number of glass planes.

Opaque doors don't typically have U-value ratings from NFRC, so the "default" U-factors from Section A107 in Appendix A are commonly used. Section A107 includes tables for a wide variety of wood and steel doors, as well as overhead doors and even aircraft hangar doors.

The default U-factors for revolving doors from Table A107.1(2) are often used, since revolving door U-factors are not generally available from manufacturers.

Default U-values for spandrel panels in glass curtain walls are defined in Table C303.1.5 and rules for applying these values are described in Section C303.1.5.

What to Have Available for Inspectors at the Construction Site

- NFRC Label: Each factory-built fenestration product must have an NFRC label showing its CPD number.
- NFRC "Label Certificate": Each distinct type of site-assembled fenestration, such as curtain wall, store-front, or ribbon window, must have a unique NFRC Label Certificate generated by an NFRC-accredited testing agency, specific to that product and that address. You must have a separate label or label certificate for each type of fixed window, operable window, glass entrance door, and sliding glass door installed on the job site. You must have the label certificate on site and show it to the inspector before you install any portion of the fenestration.
- Default table and small business products: Products that are unrated, either those manufactured by a small business or those using the default tables, must describe the frame type, thermal break type, and number of glass panes used in each product. This information enables the site inspector to verify that the installed fenestration types match those on your approved plans.

Basic Fenestration Performance Parameters

Understanding a few basic parameters of fenestration energy performance makes product comparisons easier. When heating is needed, the key rating parameter is the U-factor. When cooling is needed, the key rating parameter is the (SHGC). For residential spaces, heating and cooling typically shift with the seasons. Commercial buildings, however, frequently move from heating to cooling mode during the course of a day. Cooling occurs during the day when people are working and the lights and equipment are on, while heating occurs at night and during morning warm-up when there is little heat available. Good (VT) is important for daylighting.

- **Whole product performance:** The NFRC performance factors below are based on "whole product performance," which includes the glass, frame, and seals, not just the glass itself.
- **U-Factor:** Lower U-factors indicate better performance and thus less heat transfer. Available U-factors range from 1.30 for the worst single-pane windows to 0.15 for the most advanced glazing systems. Typical U-values required by the energy code range from 0.26 to 0.36 for vertical glazing, and 0.45 for skylights.
- **Solar heat gain coefficient:** Lower SHGC values generally indicate better performance; less heat gain from direct sun. In some cases however, the additional passive solar heat gain through south-facing windows is beneficial in the winter. Seattle typically has overcast skies in winter and sunny skies in summer, so the passive solar benefit might be small compared to the unwanted extra heat in the summer. The maximum allowable SHGC ranges from 0.38 to 0.61, depending on orientation and projection factor, for buildings covered by the "commercial buildings" portion of the energy code. There is no SHGC requirement for single-family houses or townhouses.
- **Visible transmittance:** Higher VT indicates better daylighting performance. VT is the percentage of the visible light striking the outside of the glass that passes through into the interior. The optimal glass combination has a high VT and a low SHGC, as well as a low U-value.
- **Low-e coatings:** Low-e (low emissivity) coatings are applied to one of the inner surfaces of almost all double-paned glazing installed in Seattle. The coatings reflect heat back into the space while allowing light to pass through. Higher performance glazing units are also available with an additional "hard coat" low-e coating applied to the exposed room-side face of these units.
- **Inert gas fills:** The space between the glass panes can be filled with argon or krypton, which increases the performance of the glazing unit. However, these gas- ses could potentially leak out of the window unit over time and degrade performance.
- **Low conductivity spacers:** The spacers that hold the glass panes apart can be made with materials that provide a better thermal break than aluminum (e.g., stainless steel or plastics). Since the edges of the glass unit transfer more heat than the center of glass, this can substantially improve performance.
- **Frame materials:** Low-performing aluminum frames can lose more heat than the entire glass area. A frame with a thermal break will perform much better, as will wood, fiberglass, or vinyl frames. Since the whole fenestration unit, including glass, frame, and seals, is tested for U-value, aluminum frames without thermal breaks cannot generally meet the code requirements.
- **Dynamic glazing:** Advanced glazing materials that are beginning to appear on the market are able to change their transmittance of solar heat and light based on daylight conditions. This "dynamic glazing" or "smart window" technology can potentially provide automatic shading when unwanted sun strikes the glass and then revert to clear glass at other times. As the cost of this technology decreases, it could become a significant energy-saving option.

Further Information

Further information on *Seattle Energy Code* requirements is available on the Energy Code website at **Energy Code - Overview - SDCI | seattle.gov.**

Access to Information

Links to electronic versions of SDCI Tips, Director's Rules, and the Seattle Municipal Code are available on the "Tools and Resources" page of our website at **www.seattle.gov/scdi** or by calling (206) 684-8600.

Example of NFRC label.

FENESTRATION AND OPAQUE DOOR SCHEDULE: NONRESIDENTIAL SPACES[1]

(Sample)

FENESTRATION (VERTICAL)[2]

Fenestration Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq.ft.)	No	Total VFA	U-factor	NFRC-CPD Bid Report or Default	VFA x U =
SLW-1	A-3,4	EnergyInc/47: metal, double w/low-E & argon	casement	3'0" x 5"0"	15.0	x 4	= 60	0.42	BEN-L-6-00037-00007	25.2
SLW-2	A-3,4	XY/1: mtl w/tb, dbl w/ low-E0.10, argon, 0.5" gp	tilt-turn.	4'0" x 6"0"	24.0	x 2	48	0.60	Default Table C303.1.3(1)	28.8
PIC-1	A-3	Curtain Wall Masters/87: dbl w/low-E & argon	curtain wall	5'0" x 6"0"	30.0	x 80	2400	0.34	CCI-L-7-00005-00001 Bid Report P-EFC-4494	816.0
				Total VFA =			**2508**		**Total VFA x U =**	**870.1**
Area-Weighted Average Vertical Fenestration U-factor = (Total VFA x U) / (Total VFA) =										**0.347**

FENESTRATION (SKYLIGHTS)[3]

Fenestration Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq.ft.)	No.	Total SKA	U-factor	NFRC-CPD No. or Default	SKA x U =
ATR-1	A-5	BigSky/57: metal w/tb, triple w/low-E, argon	sloped glass	3'0" x 5"0"	15.0	x 7	= 105	0.37	BIG-E-4-00003-00002	38.9
ATR-2	A-5	ZZ/7: mtl w/tb, tpl w/2low-E0.10, argon, 0.5" gp	sloped glass	5'0" x 6"0"	30.0	x 3	= 90	0.42	Default Table C303.1.3(4)	37.8
				Total SKA =			**195**		**Total SKA x U =**	**76.7**
Area-Weighted Average Skylight Fenestration U-factor = (Total SKA x U) / (Total SKA) =										**0.393**

OPAQUE DOOR[4]

Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq.ft.)	No.	Total ODA	U-factor	NFRC-CPD No. or Default	ODA x U=
SDR-1	A-3	DoorPro/3: steel exit door 1-3/8" w/mineral wool	swing door	3'0" x 6"8"	20.0	x 2	= 40.0	0.47	Default Table A107.1(3)	18.8
NDR-2	A-3	GD/26: steel sectional tilt-up door 1-3/8" w/EPS	garage door	9'0" x 7'0"	63.0	x 1	= 63.0	0.39	Default Table A107.1(4)	24.57

1. See the following page for example for single-family residential spaces and multi-family buildings up to 3 stories above grade plane, which comply with the "residential" portion of the energy code. Multifamily residential buildings over 3 stories tall, plus all non-residential buildings, comply with the "commercial" portion of the energy code.
2. For vertical fenestration, area-weighted averaging must be done separately for nonresidential & residential spaces, and for nonmetal, metal fixed/operable, and metal entrance doors.
3. For skylights, area-weighted averaging must be done separately for nonresidential & residential spaces.
4. For opaque doors, area-weighted averaging must be done separately for nonresidential & residential spaces, and for opaque swinging doors and opaque non-swinging doors.

GLAZING AND OPAQUE DOOR SCHEDULE: SINGLE-FAMILY RESIDENTIAL SPACE
(Sample)

GLAZING (VERTICAL)

Fenestration Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq.ft.)	No.	Total VGA	U-factor	NFRC-CPD No. or Default Table	VFA x U =
SLW-1	A-3,4	Best Energy/123: triple w/low-E & argon	slid. win.	3’0” x 5”0”	15.0	x 4	= 60	0.42	BEN-L-6-00037-00007	25.2
SLW-2	A-3,4	Best Energy/123: triple w/low-E & argon	slid. win.	4’0” x 6”0”	24.0	x 2	= 48	0.60	BEN-L-6-00037-00007	28.8
PIC-1	A-3	Best Energy/253: triple w/low-E & argon	fixed. win.	5’0” x 6”0”	30.0	x 2	= 60	0.34	BEN-L-4-00054-00011	12.6
GAR-1	A-3	Greenhouse: vinyl, dbl w/low-E, argon, 0.5” gap	garden win.	3”0” x 4”0”	12.0	x 1	= 12		Default Table 10-6A	17.6
SLD-1	A-3,4	Best Energy/433: triple w/low-E & argon	lid. door	6’0” x 6”8”	40.0	x 1	= 40		BEN-L-9-00012-00004	10.0
				Total VGA =			**220**		**Total VGA x U =**	**65.1**

GLAZING (OVERHEAD)

Skylight Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq.ft.)	No.	Total OGA	U-factor	NFRC-CPD No. or Default	SKA x U =
SKY-1	A-5	Sky Systems/57: triple w/low-E	skylight	2’0” x 4”0”	8.0	x 2	= 16	0.44	SKY-D-2-00004-00005	7.0
SKY-2	A-5	Dome/101: alum.clad wood, triple	skylight	2’0” x 2”0”	4.0	x 1	= 4	0.67	Default Table 10-6E	2.7
				Total OGA =			**20**		**Total OGA x U=**	**9.7**
Area-Weighted Average Overhead Glazing U-factor = (Total OGA x U) / (Total OGA) =										**0.486**

OPAQUE DOOR

Number	Plan Page	Manufacturer/Model No. and Special Features	Product Type	Size W x H	Area (sq. ft.)	No.	Total ODA	U-factor	NFRC-CPD No. or Default	ODA x U =
INS-1	A-3	Insuldoor/VIZ: insul. fiberglass w/ wood frame	swing door	3’0” x 6”8”	20.0	x 2	= 40.0	0.15	Default Table A107.1(3)	6.0
WD-2	A-3	Utilidoor/26: insul. steel w/wood edge & frame	swing door	2’-8” x 6’-8”	17.8	x 1	= 17.8	0.16	Default Table A107.1(4)	2.8
				Total ODA=			**57.8**		**Total ODA x U =**	**8.8**
Area-Weighted Average Opaque Door U-factor = (Total OGA x U) / (Total OGA) =										**0.153**

NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

PROJECT INFORMATION

LABEL CERTIFICATE ID: PJ-OBE-7589 **Issuance Date:** 8/31/2017

NFRC CERTIFIED PRODUCT RATING INFORMATION:*
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: 1010 Park Avenue
City: New York **State:** NY **Zip Code:** 10028
Contact person: Phil Benes
Phone: 715.841.1435 **Facsimile:** **Email:** pbenes@obe.com
Project name (optional): 1010 Park Avenue

IDENTIFICATION OF SPECIFYING AUTHORITY:

Company name: Oldcastle BuildingEnvelope **ID:** OBE
Address: 803 Airport Rd
City: Terrell **State:** TX **Zip Code:** 75160
Contct person: James P Clark **Title:** Designer
Phone: 800-869-4567 **Facsimile:** 800-551-6174 **Email:** pclark@oldcastlebe.com

IDENTIFICATION NAME OF APPROVED CALCULATION ENTITY (ACE) ORGANIZATION:

Company name: Quast Consulting and Testing, Inc. **ID:** QCT
Address: 1065 Indianhead Dr
City: Mosinee **State:** wi **Zip Code:** 54455
Contct person: Brian M Sasman **Title:** VP
Phone: 715-693-83789 **Facsimile:** 715-693-0689 **Email:** bsasman@qcandt.com

IDENTIFICATION NAME OF INSPECTION AGENCY (IA):

Company name: Not Required **ID:**
Address:
City: **State:** **Zip Code:**
Contct person: **Title:**
Phone: **Facsimile:** **Email:**

Number of individual products listed on this label certificate: **3**

NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

PRODUCT LISTING

FOR CODE COMPLIANCE

LABEL CERTIFICATE ID: PJ-OBE-7589 **Issuance Date:** 8/31/2017

NFRC CERTIFIED PRODUCT RATING INFORMATION: *

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.

PRODUCT LISTING:

						CERTIFIED Performance Rating at NFRC Standard Size		
CPD ID	**Product Name**	**Framing Ref**	**Glazing Ref**	**Spacer Ref**	**Total Area**	**U-factor****	**SHGC****	**VT****
					ft²	**Btu/ hr·ft²·°F**	-	-
Metal - Entrance Door					22.18			
P-OBE-59224	TerraSwing 62E-Ren	FA-OBE-74381	GA-PPG-14195	SA-TCN-5099	22.18	0.50	0.27	0.44
Metal - Fixed					12.12			
P-OBE-59226	SIG5-REN Fixed	FA-OBE-74385	GA-PPG-14195	SA-TCN-5099	12.12	0.38	0.34	0.60
Metal - Operable					21.16			
P-OBE-59225	SIG5-REN Vent	FA-OBE-74383	GA-PPG-14195	SA-TCN-5099	21.16	0.47	0.25	0.42

FRAME, GLAZING and SPACER ASSEMBLIES

FRAMING LISTING:

Framing Ref	Supplier ID	Product Type	Frame Material	Description
FA-OBE-74381	OBE	Swinging Door	AT	TerraSwing 62E-Ren
FA-OBE-74383	OBE	Casement	AT	SIG5-REN Vent
FA-OBE-74385	OBE	Fixed	AT	SIG5-REN Fixed

GLAZING LISTING:

Glazing Ref	Supplier ID	# Layers	Low-e	Gap Fill	Description
GA-PPG-14195	PPG	2	Y	Air	1/4 Starphire SB60 #2, 1/2 Air, 5/16 Starphire

SPACER LISTING:

Spacer Ref	Supplier ID	Sealant Config.	Spacer Material	Description
SA-TCN-5099		Dual Seal	Thermo-plastic	TGI Wave Spacer