Energy Program
WASHINGTON STATE UNIVERSITY

Rater News

Rater News Spring 2023

Welcome to the Spring 2023 issue of ***Rater News***
Brought to you by the Washington State University Energy Program

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News from Jonathan Jones

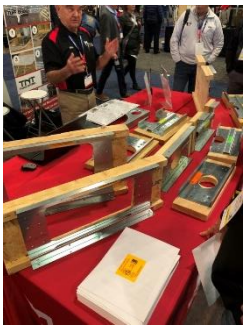
2023 International Building Show Report

The 2023 International Builders' Show was an amazing event. This year's show drew the largest attendance in more than 10 years. Nearly 70,000 home building professionals attended, including one of our WSU raters represented with a booth of their own. This year's exhibits had many new products to see, play with, and learn about from the sales' reps. I personally do not believe three days is enough time to see and experience everything the exhibits offer. NAHB should extend this part of the conference to a fourth day. I can say there was lots to learn at the construction demonstration booths. Unfortunately, my time was limited; but I highly recommend, if in the future, you wish to expand your construction knowledge; it would be well worth your time to spend it there.

There were many new products on display, some I found to be very impressive. One of interest is Carrier's Filter Box Energy Recovery Ventilator (ERV). This device offers conditioning and ventilation in a smaller package and offers Carrier's new evaporator coil with Vertex technology that meets the new U.S. DOE's efficiency requirements that took effect January 2023. IBS voted this product to be one of the finalists for the Best of IBS in 2023. This product offers straightforward installation,

and a clever use of space. An initial search shows it to be higher priced versus other available equipment, but with the same filtration and recovery ability.

Homasote's fire rated wall system offers sound resistant (deadening) fiberboard and adds an R-Value per inch of thickness. This product embodies an array of fiberboard products specific to sound control in floors and walls, fire protection for roof deck, is easy to install, and can be used for both wood and metal stud wall. This product would be applicable for common-wall townhome applications.



Tired of hearing "I can't cut that hole in the floor joist?" Metwood's Joist Repair Reinforcers™are engineered light gauge steel add-ons that allow you to run utilities right through wood joist. They easily cut a 6"hole in a 2"x 10"piece of lumber. Their Tuff Beam™ structural beams are very strong and capable of spanning great distances. Both products looked to be worth investigating.

I saw some really cool packaged terminal heat pump (PTHP) units now available on the market. Some offer integrated Energy Recovery Ventilation/Heat Recovery Ventilation systems which were available as wall mounts, are sleek and attractive, and installation is quick and easy. For those of you in the retrofit world, Rheem now offers a 120 Plug-In Heat Pump water heater. That's right, skip the expensive wiring cost and just plug in the heat pump. This is a big deal in the retrofit world. I also checked out radiant floors. Radiant floors are making a comeback in the Washington State Residential Codes.

Every year the IBS recognizes the most outstanding building products of the year with the Best of IBS Awards. You can check the *Best of IBS Awards for 2023* here; better yet, attend the NAHB IBS next year in Las Vegas Feb. 27-29, 2024.

Program News and Announcements

Meet Miguel Rodriquez

Miguel Rodriguez, Building Science Manager with the Home Builders Association of Tri-Cities, will be assisting the WSU HERS Program with QA file/field work and the utility support programs. Miguel has over four years of experience working as a HERS raters. In his free time, Miguel enjoys staying active with activities such as hiking, running half-marathons and visiting various national parks. Miguel is looking forward to meeting and working with all the raters throughout the region. Welcome Miguel!

Rater Reminders

Documentation for File and/or Field QAs and Axis

Please remember that we are now requiring documentation for File and/or Field QAs be loaded into Axis within 10 business days of our request. Or since you already have all this information as

part of your rating process, load it when you submit the home into Axis. This will greatly increase our efficiency and eliminate the need for additional reminders from us. It will also eliminate the need for additional surcharges that offset the cost of us tracking what we have requested.

RESNET News

RESNET and Building Talent Foundation Launch RESNET JobstoBuild.com Page for HERS® Job Openings

With the growth in the demand for HERS® Index ratings, RESNET needs a steady flow of professionals entering the industry as Quality Assurance Designees, HERS® Raters, Rating Field Inspectors, and Energy Modelers. To respond to this need for workforce development in the HERS® industry, RESNET has partnered with the Building Talent Foundation (BTF) to assist HERS® Rating companies and HERS® Providers in recruiting the next generation of the industry… Through this collaboration, RESNET and the BTF have launched the new RESNET-branded landing page on JobsToBuild.com, BTF's career platform… RESNET Blog, Feb. 14, 2023—https://www.resnet.us/articles/resnet-and-btf-launch-resnet-jobstobuild-com-page-for-hers-job-openings/

Open Up New Opportunities by Becoming a Phius Certified Verifier

The number of submissions for Passive House (Phius) project certification is exploding across the country, and each of them needs a Phius Certified quality assurance professional! If you want to take advantage of this burgeoning market, register for the online Phius Certified Verifier training course that begins April 10. The training runs from April 10-14 on Monday, Wednesday and Friday from 2-5 p.m. Eastern

Note: in order for a Phius Verifier to inspect and verify a Phius 2021 multifamily project (including townhomes) they must have the multifamily designation. Learn more here—RESNET, Mar. 15, 2023: https://www.resnet.us/articles/open-up-new-opportunities-by-becoming-a-phius-certified-verifier/

Newsbriefs

Inflation Reduction Act Produces Urgent Need for Certified Home Energy Raters, Energy Modelers, and Field Inspectors

President Biden has signed the Inflation Reduction Act into law. This act includes some excellent incentives for residential new construction that are guaranteed to save energy and prepare residences to become zero energy structures. Plus this act will provide many good paying career jobs, especially for certified home energy raters (HERS* Raters), energy modelers, and rating field inspectors—EIN Presswire, Dec. 15, 2022: https://www.einnews.com/pr_news/604268294/inflation-reduction-act-produces-urgent-need-for-certified-home-energy-raters-energy-modelers-and-field-inspectors

International Code Council and Interstate Renewable Energy Council Release Energy Storage Systems Guide

The International Code Council, in collaboration with the Interstate Renewable Energy Council (IREC), has released a new guide, Energy Storage Systems: Based on the IBC, IFC, IRC and NEC, which is now available on IREC's Clean Energy Clearinghouse. The guide was developed with the help of building officials, emergency services, planners, architects, and engineers to safely plan, design, build, and permit energy storage systems (ESS) in the built environment—ICC [News Release], Dec. 7, 2022: https://www.iccsafe.org/about/periodicals-and-newsroom/international-code-council-and-interstate-renewable-energy-council-release-energy-storage-systems-guide/

RESNET Featured in Green Home Builder Magazine November/December Issue

The latest issue of Green Home Builder magazine highlights RESNET via two of its feature articles and recognition for RESNET Executive Director Steve Baden, Energy Smart Builder KB Home, and Jacob Atalla, KB Home's Vice President of Sustainability and Innovation and RESNET Board of Directors member – RESNET, Dec. 20, 2022: https://www.resnet.us/articles/resnet-featured-in-green-home-builder-magazine-november-december-issue/

Congress Passes Legislation: Vets and Active Military for VA Loan Program

For the past two years, RESNET has worked with Congressman Mike Levin (D-CA) on legislation, the "Veterans Home Energy Savings Act" that would incorporate energy savings documented by HERS® Ratings in Veteran Home Loans… Congress passed and President Biden signed into the $1.7 trillion omnibus bill to fund the government, which included language introduced by Congressman Levin. The legislation creates a process for veterans and service members who are purchasing energy-efficient homes to factor their lower-cost energy bills into their residual income requirement, allowing them to qualify for higher VA home loans and incentivizing home upgrades that reduce greenhouse gas emissions. The legislation requires an energy report developed by "the Residential Energy Service Network's Home Energy Rating System (commonly known as 'HERS') by an individual certified by such Network"—RESNET, Jan. 4, 2023: https://www.resnet.us/articles/congress-passes-legislation-vets-and-active-military-for-va-loan-program/

[The Energy Conservatory] Announcing Partnership with NCI for HVAC Air Flow & Diagnostics Training

The Energy Conservatory (TEC) and National Comfort Institute (NCI) are partnering to provide field training on HVAC air flow and pressure measurement equipment and diagnostic process intended for the HVAC and Building Performance industries. This partnership combines the strengths of TEC (Industry-leading air pressure & flow measurement products) with the strengths of NCI (Industry leading training focused on driving improved performance and better business for HVAC Contractors)—TEC Press Release, Jan. 5, 2023: https://energyconservatory.com/announcing-partnership-with-nci-for-hvac-air-flow-diagnostics-training/

DOE Releases New National Requirements for Zero Energy Ready Single-Family Homes
DOE's Zero Energy Ready Home (ZERH) program in EERE's Building Technologies Office (BTO) has released Version 2 of its national program requirements for single-family homes (ZERH V2), the most significant overhaul of DOE's energy and environmental performance benchmarks in history. Since 2013, the DOE Zero Energy Ready Homes program has consistently set the federal government's highest standards for the U.S. housing industry to follow—DOE, EERE, Jan. 26, 2023: https://www.energy.gov/eere/articles/doe-releases-new-national-requirements-zero-energy-ready-single-family-homes

45L Tax Credits for Zero Energy Ready Homes: The Updated Section 45L
The Inflation Reduction Act of 2022 (IRA) amended Internal Revenue Code Section 45L to provide taxpayers with a tax credit for eligible new or substantially reconstructed homes that meet applicable ENERGY STAR home program or DOE Zero Energy Ready Home (ZERH) program requirements. The new 45L provisions include two tiers of credits, with the higher credits for eligible homes and dwelling units certified to applicable ZERH program requirements—DOE, EERE, [Jan. 2023]: https://www.energy.gov/eere/buildings/45l-tax-credits-zero-energy-ready-homes

Number of Homes HERS Rated in the U.S. in 2022 Tops 330,000 Mark
Its good news for the HERS® industry, the number of homes that were HERS rated and received a HERS Index Score in 2022 continued to break historical records. In 2022, there were 337,962 homes HERS Rated in the country. This pushed the total number of homes HERS Rated in the U.S. to date to over 3.6 million. The previous record from 2021 was 313,153 homes HERS rated. The average HERS Index Score in 2022 was 58. This is 42% more efficient than a home built as recently as 2006—ACHR News, Feb. 1, 2023: https://www.achrnews.com/articles/147555-number-of-homes-hers-rated-in-the-us-in-2022-tops-330-000-mark

What you Need to Know for 2023 Code Changes in the Pacific Northwest
Energy codes continue to evolve in the Northwest, as each state in the region evaluates and updates their energy codes on a regular cycle (typically every three years). Some energy code advancements are set to go into effect in 2023 and 2024, while others face a potential overhaul. Read these summaries of crucial code updates in Idaho, Montana, Oregon, and Washington—BetterBuilt NW, Feb. 23, 2023: https://betterbuiltnw.com/news/what-you-need-to-know-for-2023-code-changes-in-the-northwest

Indoor airPLUS Version 2: Certification and Gold Specifications
In February 2023, EPA proposed updates to the Indoor airPLUS program including a two-tiered certification program and other changes to strengthen and update program specifications and requirements… Additionally, EPA is proposing changes to the training requirements for verifiers, and a Home Certification Organization model to improve quality assurance, as well as a 5-year expiration date to the new Indoor airPLUS labels with voluntary recertification by the home/building owner. See the Executive Summary documents below, along with the draft National Program Requirements and Certification System, for additional information.

Under the proposed Indoor airPLUS Version 2:

The new "Indoor airPLUS Certification" specifications focus on fundamental strategies to improve indoor air quality without a pre-requisite of ENERGY STAR certification.

The new "Indoor airPLUS Gold" specifications include more advanced protections for improved indoor air quality in conjunction with ENERGY STAR certification as a prerequisite.Comments may be submitted through April 2, 2023. See EPA, Indoor airPLUS for further information: https://www.epa.gov/indoorairplus/indoor-airplus-version-2-0#:~:text=The%20new%20%E2%80%9CIndoor%20airPLUS%20Certification%E2%80%9D%20specifications%20focus%20on,conjunction%20with%20ENERGY%20STAR%20certification%20as%20a%20prerequisite.

U.S DOE Posts FAQs for the Zero Energy Ready Homes Program

The recently extended and reformed 45L federal tax credit for energy-efficient homes that RESNET has long advocated for includes a $5,000 tax credit to builders whose homes are certified by the U.S. Department of Energy (DOE) Net Zero Energy Ready Home program… DOE has posted a list of Frequently Asked Questions (FAQs) that are now live on their website and will grow over time. These questions will focus primarily on program operations, such as how to register, and how to certify homes, as well as common questions on program requirements—RESNET Blog, Mar. 16, 2023: https://www.resnet.us/articles/u-s-doe-posts-faqs-for-the-zero-energy-ready-homes-program/

Upcoming Training Opportunities

ENERGY STAR Residential New Construction webinars

Visit the Residential New Construction ENERGY STAR recorded webinars webpage for all recently recorded webinars: https://www.energystar.gov/partner_resources/residential_new/educational_resources/energy_star_webinars/recorded_webinars

Online Courses Available On-Demand by BetterBuiltNW

BetterBuiltNW offers online trainings across a wide spectrum of building science topic areas and energy performance levels -- available anytime and at your own pace. Access the BetterBuiltNW online training portal here.

Train the Trainer for HVAC Instructors June 6-8, Minneapolis, MN
This course will give instructors hands-on time with TEC equipment, as well as access to training materials which can be used for training your students. Space is limited, so we encourage you to submit the form below right away if you are interested.

- Day 1: HVAC System Performance: Air flow, psychrometric
- Day 2: Sensible Heat Factor & Sensible Heat Ratio, Blower Door Envelope Testing
- Day 3: Duct leakage Testing, Duct Leakage to Outside, Building Pressurization testing & review

For more info and to register: Click here.

Conferences and Events

RESNET Conference 2023
We currently have no official information on dates, location or format. The WSU Energy Program will keep you informed with email announcements and future newsletters. Participation in the annual RESNET conference keeps you up-to-date with current industry trends; and you can earn up to 18 RESNET approved Profesional Development credits.

Better Buildings, Better Plants Summit, Apr 11-13, Washington, D.C.
The U.S. Department of Energy's Better Buildings, Better Plants Summit will be April 11-13, 2023 at the Capital Hilton in Washington, D.C. Join us for engaging and interactive sessions, as well as opportunities to network with your fellow industry peers and experts. Stay tuned for information about plenaries, special events, and more. For more info (the 2023 Agenda-at-a Glance, Session Details, and Hotel Room Block (closes March 20)) and to register Click here.

Northwest Green Home Tour, Saturday April 29
For dozens of site hosts, the annual Northwest Green Home Tour is a chance to educate the public about green building and connect with potential clients. We are back to “in-person” home tours in 2023! … If you have a residential or multi-family project that you would like to showcase on the 2023 Tour, register now to get the greatest benefit from the event’s extensive publicity and advertising reach! For more info see: Northwest Green Home Tour

National Home Performance Conference & Trade Show, April 17-20, Seattle, WA
We will be in Seattle, WA in April of 2023 for our national conference. Each year, this event brings together contractors, weatherization professionals, trainers, program administrators, energy auditors, and others working in residential energy efficiency for the latest developments and education in the industry. Sign up today and join us for four days of opportunities you will not want to miss. For more information and to register click here.

Volunteers at the NHP Conference will receive free registration. For more information on volunteering please contact Ruben Perez at rperez@building-performance.org.

Technical Q&As Answered

Regarding Fenestration and the Washington State Energy Code

What is the definition of fenestration?

Fenestration products include windows, doors and skylights. The definition in the Washington State Energy Code, Residential (WSEC-R) defines fenestration as:

> ***Fenestration**. Products classified as either vertical fenestration or skylights. (WSEC-R 2021)*

Vertical fenestration consists of windows and doors installed at a slope are 60 degrees or greater from horizontal. The definition is:

> ***Vertical Fenestration:** Windows (fixed or operable), glazed doors, glazed block and combination opaque/glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees from horizontal. Opaque areas such as spandrel panels are not considered vertical fenestration. (WSEC-R 2021)*

Skylights are windows installed at an angle of less than 60 degrees from horizontal. The definition is:

> ***Skylight**. Glass or other transparent or translucent glazing material installed at a slope of less than 60 degrees from horizontal. (WSEC-R 2021)*

Are opaque doors fenestration? Yes

> All doors – whether opaque, glazed or a combination of opaque and glazed -- are fenestration, although this may not be obvious in the definition of "vertical fenestration" given in the WSEC-R. Other residential codes more clearly include opaque doors as fenestration. For example, the International Energy Conservation Code (IECC 2021) defines "vertical fenestration" as:
>
> ***Vertical fenestration**. Windows that are fixed or operable, opaque doors, glazed doors, glazed block and combination opaque and glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees (1.05 rad) from horizontal. (IECC 2021)*

That opaque doors are intended to be included in fenestration is clear when considering that opaque doors are not treated separately anywhere in the rest of the WSEC-R. For example, in Table R402.1.1 "Insulation and Fenestration Requirements by Component", maximum U-values are given for fenestration except skylights (0.3) and for skylights (0.5). From this we can assume, "fenestration except skylights" is intended to include all doors because their required U-value would not otherwise be specified.

Do all windows have to meet the U-factor target for the code baseline or energy credit option I select?

To meet code baseline, the target U-value for vertical windows and doors is 0.3 or less. However, your windows and doors do not each need to meet the U-factor target individually. It is the *area-weighted*

average U-value of all your vertical fenestration that needs to meet the target value. This means that you can select some vertical fenestration with U-values exceeding the target of 0.3 as long as others are sufficiently less than the target to compensate. We recommend calculating the area-weighted average U-value of fenestration using the Glazing Schedule Worksheet, which is available from WSUEP's energy code website at https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#Permit.

Example 1

Five windows will be added in an addition. **Figure 1** illustrates using Glazing Schedule Worksheet to calculate the area weighted U-factor of these windows. Two 3'x4' windows have a U-value 0.34 and three 4'x4' windows have a U-value of 0.28. The area weighted U-value of 0.30 is shown in Row 60.

Figure 1. Excerpt from Glazing Schedule Worksheet with example of area-weighted U-factor of five windows.

13	**Vertical Fenestration (Windows and doors)**										
14	Component					Width		Height			
15	Description	Ref.	U-factor	Qt.	Feet	Inch	Feet	Inch	Area	UA
16	Window Model 1		0.34	2	3		4		24.0	8.16
17	Window Model 2		0.28	3	4		4		48.0	13.44
57									0.0	0.00
58										
59									72.0	21.60
60										0.30

Sum of Vertical Fenestration Area and UA

Vertical Fenestration Area Weighted U = UA/Area

Do you have any tips for finding very low U-value windows?

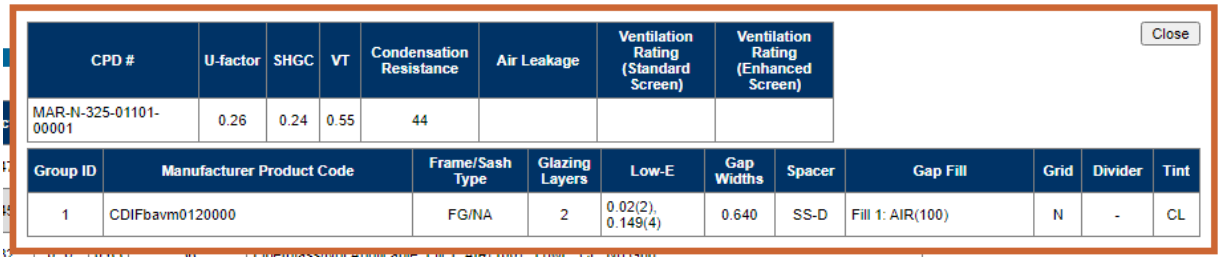
- The Energy Star website has listings for the "most efficient" products in several categories that are updated annually at https://www.energystar.gov/products/most_efficient. The window listings are for vertical sliders, horizontal sliders, casement style, fixed or picture, and sliding glass door.
- The Efficient Windows Collaborative has an easy to use Window Selection Tool that gives good, better and best options with links to manufacturer product information. Visit https://efficientwindows.org/.

Where can I find the rated U-value of my windows, doors and skylights?

NRFC ratings for various fenestration types may be obtained from manufacturer's product information or from the National Fenestration Rating Council's Certified Products Directory on their website at https://www.nfrc.org/.

Click on the link in the CPD# column for the product to show a summary table of data for the product. An example is shown in **Figure 2**.

Figure 2. Example detail for a window from the NRFC's Certified Products Directory



Close

CPD #	U-factor	SHGC	VT	Condensation Resistance	Air Leakage	Ventilation Rating (Standard Screen)	Ventilation Rating (Enhanced Screen)
MAR-N-325-01101-00001	0.26	0.24	0.55	44			

Group ID	Manufacturer Product Code	Frame/Sash Type	Glazing Layers	Low-E	Gap Widths	Spacer	Gap Fill	Grid	Divider	Tint
1	CDIFbavm0120000	FG/NA	2	0.02(2), 0.149(4)	0.640	SS-D	Fill 1: AIR(100)	N	-	CL

What U-value should I use for a window or door that is not in the NFRC database?

If a window, door or skylight does not have a NFRC rated U-value, then you must use the default U-values in WSEC-R Tables R303.1(1) to R303.1(5).

Example 2

A home has an existing double-pane metal-framed window with thermal break that does not have a rated U-value. For use in calculations and permit submittals, select the default U-value of 0.65 from Table R303.1.3(1), as shown in **Figure 3**.

Figure 3. Example showing selection of default U-value from Table R303.1.3 for double-pane metal-framed window with thermal break.

TABLE R303.1.3(1)
DEFAULT GLAZED WINDOW, GLASS DOOR AND SKYLIGHT *U*-FACTOR

FRAME TYPE	WINDOW AND GLASS DOOR		SKYLIGHT
	SINGLE PANE	DOUBLE PANE	
Metal	1.20	0.80	See Table R303.1.3(4)
Metal with Thermal Break[a]	1.10	0.65	
Nonmetal or Metal Clad	0.95	0.55	
Glazed Block	0.60		

How is the area measured?

Use the rough opening of the door, window or skylight to calculate the area, per the definition of "fenestration area":

> *FENESTRATION AREA. Total area of the fenestration measured using the rough opening, and including the glazing, sash and frame.*

The rough opening is generally defined as "the full untrimmed opening for a window or door." The rough opening is large enough for proper installation of the door or window, allowing for shim space. (https://www.builder-questions.com/construction-glossary/rough-opening-ro/.)

For small dwelling units, does the limit of 300 ft^2 include all doors, windows and skylights? Yes

A "small dwelling unit" is defined as a dwelling unit that is "less than 1500 square feet in conditioned floor area *with less than 300 square feet of fenestration area*."

This fenestration area includes all doors, windows and skylights. This is because the general word "fenestration" is used without qualifying it as vertical or specifically referring to doors, windows or skylights.

How are exempt doors and exempt windows used? Are these exempt from the 300 ft^2 calculation for small dwelling units? No

A certain amount of fenestration area is permitted to be exempt from prescriptive U-factor requirements. The intention is to allow decorative doors and windows commonly used in entries. Up to 15 square feet of glazed fenestration and one side-hinged opaque door assembly up to 24 square feet per dwelling can be exempted.

Notably, this exempt fenestration is not exempt from the following:

- Exempt fenestration is included in heat loss calculations and system sizing calculations using, for example, the Heating System Sizing Worksheet, , available from WSUEP's energy code website at https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#Permit.
- The exemptions do not apply if you are using the Total UA Alternative compliance pathway per Section R402.1.4.
- Exempt fenestration must be included in the 300 ft^2 of fenestration area allowed for small dwelling units.

How is the "maximum fenestration U-factor" in Section R402.5 used in UA trade off analyses?

UA tradeoffs allow a higher performing building component to compensate for a lower performing component. For example, if the area weighted average U-factor of your windows exceeds the target U-value, you could offset this by installing, for example, more ceiling insulation than is required. The amount of extra insulation to offset the poorer performing windows depends on your home's design and may be calculated using a tool such as the Code Compliance Calculator, available from WSUEP's energy code website at https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#Permit.

In such analyses, Section R402.5 sets a maximum on the area-weighted U-factors for fenestration of 0.48. This section essentially disallows installing mostly very poorly performing windows, such as single-pane windows, even if you are able to compensate for their poor performance in a UA trade off with some other building component.

For a curved structure, such as a dome or Quonset hut, how do I distinguish windows and skylights?

Any fenestration installed at an angle of 60 degrees or greater from the horizontal is defined as vertical fenestration and any glazed fenestration at an angle less than 60 degrees as skylights. For a curved structure, such as domes and Quonset huts, there may be no other distinction between its skylights and windows other than their installation angle.

Note that the WSEC-R does not have a similar distinction between walls and roofs based on angle for curved structures. Instead of angle, roofs are defined by their materials and function.

What about garage doors?

If your garage will be conditioned, then the thermal envelope of the garage must meet the insulation and fenestration requirements of the WSEC-R. Note a space is considered conditioned if a heating system provides heat to it – regardless of how frequently you intend to heat it. The garage doors of conditioned garages are treated like any other door by the energy code. This means you will need to include the garage door with your other doors and windows in the calculation of the area-weighted U-value of your vertical fenestration.

If a low U-value garage door is cost prohibitive, consider doing a UA trade off (see previous question) to offset a lower performing garage door by over-insulating another building element, being careful to not exceed the maximum fenestration U-factor in your selection.

Keep in mind that a conditioned garage needs to be included in any required blower door testing of the thermal envelope. So you will need to make sure its bottom door seal and the weather stripping on the stop molding along the sides and top of the door are in good condition and properly installed to ensure you meet the target air leakage rate.

For a curved structure, such as a dome or Quonset hut, how do I distinguish windows and skylights?

Any fenestration installed at an angle of 60 degrees or greater from the horizontal is defined as vertical fenestration and any glazed fenestration at an angle less than 60 degrees as skylights. For a curved structure, such as domes and Quonset huts, there may be no other distinction between its skylights and windows other than their installation angle.

Note that the WSEC-R does not have a similar distinction between walls and roofs based on angle for curved structures. Instead of angle, roofs are defined by their materials and function.

For More Information:

- Energy Star, "Guide to Energy-Efficient Windows", U.S. Department of Energy
- "Air Sealing Window and Door Rough Openings", Office of Energy Efficiency and Renewable Energy, Building America Solution Center
- National Fenestration Ratings Council, https://www.nfrc.org

Disclaimer

Our WSEC-Residential technical support team is not an affiliate of, nor do we speak for, the Washington State Building Code Council (SBCC). Official opinions of WSEC intent are made only by the SBCC in response to official inquiries submitted to the SBCC by authorities having jurisdiction. While we try to stay aligned with the SBCC, the technical support we provide is advisory only and non-binding on authorities having jurisdiction, builders, designers, and the building trades personnel involved with construction and remodeling of residential structures.

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Rater News

Washington State University Energy Program. Home Energy Raters Program

We welcome rater's questions, comments or ideas for articles. Please send to: NWrater@energy.wsu.edu