Chasing Points in the 2021 Energy Code

Implementation began March 15, 2024

Disclaimer

This presentation is not intended as a substitute for the code books referenced. Rather this is a resource to recognize significant changes and locate them in the applicable code book(s) and/or WACs.

Please be advised that the list of significant code changes covered in this material is not exhaustive.

Code Resources

- **SBCC** → https://www.sbcc.wa.gov/state-codes-regulations-guidelines/state-building-code/energy-code
- **WSU Energy Program** → energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx
- **BIAW FAQs** → https://www.biaw.com/codefaqs/

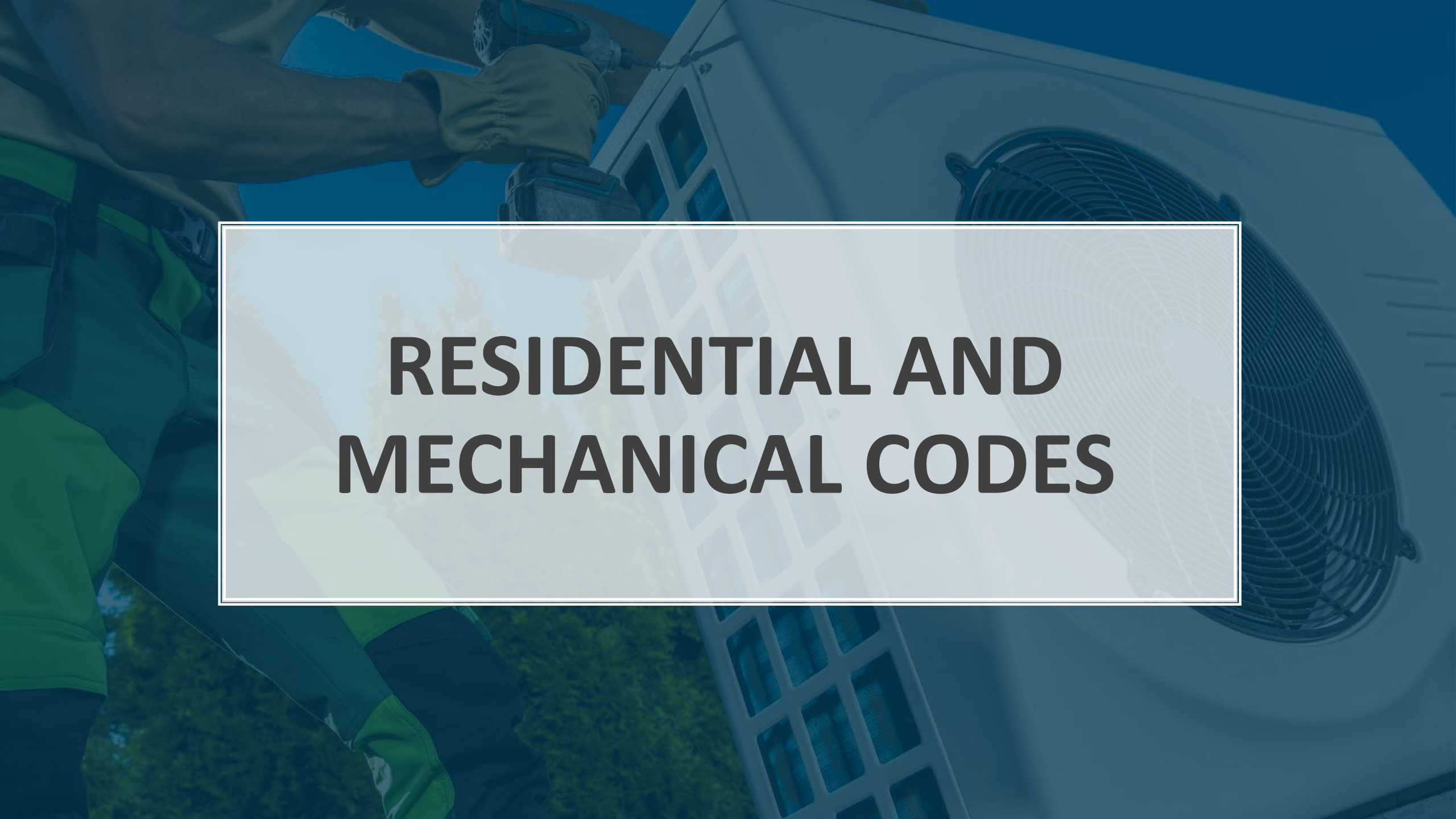
Distinguishing between Model Code and WA Amendments

Washington follows the model codes produced by the International Code Council but often adopt amendments to these codes.

- Exceptions: Energy Code, National Electrical Code, and the Universal Plumbing Code.

Throughout the presentation, you will see black text and green text.

- **Black = model code language adopted.**
- **Green = WA specific amendment adopted.**



RESIDENTIAL AND MECHANICAL CODES

R102.7.1 Additions, alterations or repairs

Clarification on when to use the IEBC, when there is a use or occupancy change that falls outside of the scope of the IRC.

WA amendment adds exceptions to model code:

1. Additions with less than 500 square feet of conditioned floor area are exempt from the requirements for Whole House Ventilation Systems, Section M1505.4.
2. Additions or alterations to existing buildings which do not require the construction of foundations, crawlspaces, slabs or basements shall not be required to meet the requirements for radon protection in Section R332.1 and Appendix F.

Section R202 Definitions (Added)

BUILDING, EXISTING. A building or structure erected prior to the adoption of this code, or one that has passed a final inspection.

LOFT. A space on an intermediate level or levels between the floor and ceiling of a dwelling or sleeping unit, open on one or more sides to the room or space in which the loft is located, and in accordance with Section R326.

R301.1.4 Intermodal Shipping Containers

The use of intermodal shipping containers as buildings and structures is now specifically recognized in the IRC and criteria have been established to address the minimum safety requirements by reference to Section 3115 of the International Building Code (IBC).

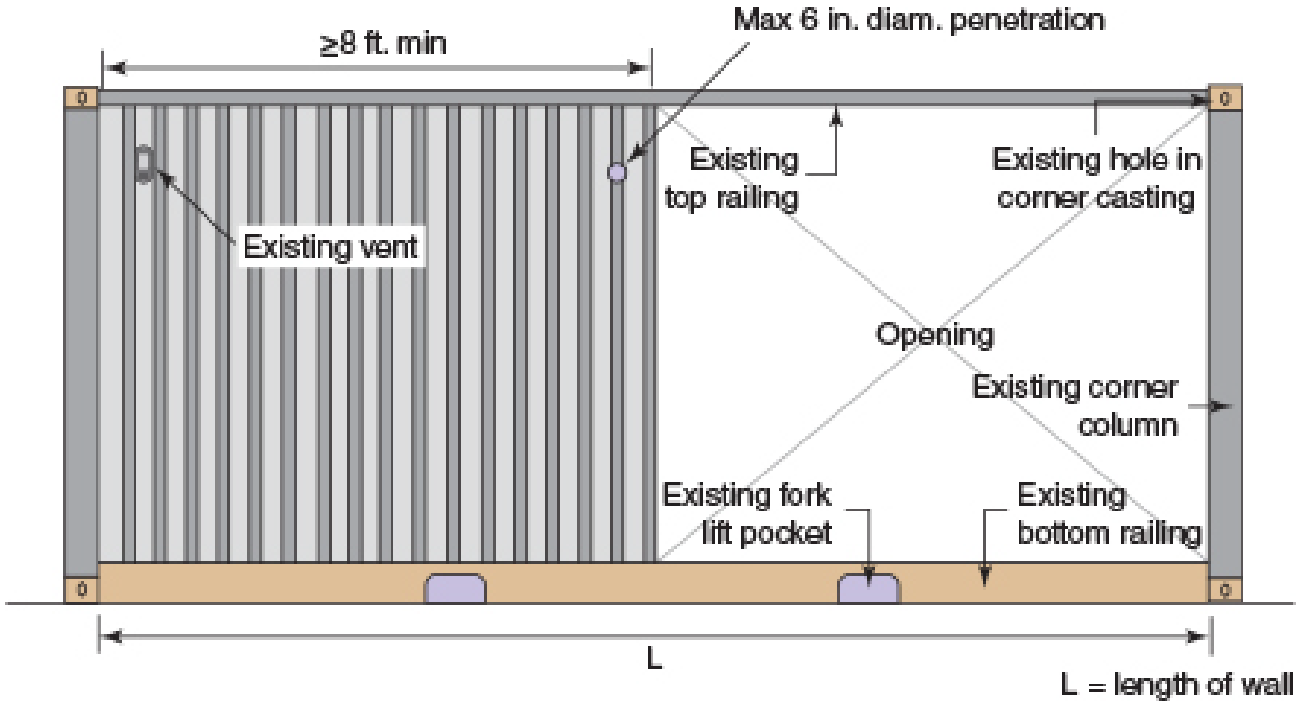


Image by International Code Council via iccsafe.org

R301.2 Wind Speeds

- Updated wind speed maps in IRC to match IBC and ASCE 7 maps.
- While wind speeds have decreased in certain parts of the country, component and cladding roof wind pressures in certain cases have increased due to changes in Table R301.2.1(1).

Table R301.2.1(1) Component & Cladding Wind Pressures

- C&C zones are different from roof zones in previous editions of the IRC.
- Separates the roof slope into multiple categories and divides the roof surface into multiple regions.
  - Nailing patterns are increased only when necessary and less restrictive patterns can be used where appropriate.

R301.2.1.1 Special Wind Regions

Clarifies the intent of the code by stating that the IRC prescriptive provisions can be used in special wind regions where the wind speed is less than 140 mph. If design wind speeds are 140 mph or greater, an alternative design method must be followed.

R301.3 Story Height

Maximum story height for wood wall framing is increased to 13.7 feet when exception requirements are met.

Exception: A *story height* not exceeding 13 feet 7 inches (4140 mm) is permitted provided that the maximum wall stud clear height does not exceed 12 feet (3658 mm), the wall studs are in accordance with Exception 2 or 3 of Section R602.3.1 or an engineered design is provided for the wall framing members, and wall bracing for the building is in accordance with Section R602.10. Studs shall be laterally supported at the top and bottom plate in accordance with Section R602.3.

R302.2 Townhouses

Common walls separating townhouses are permitted to terminate at the inside of exterior walls where the prescribed fire blocking is provided.

R302.2.2 Common walls

Common walls separating townhouse units should be rated for fire exposure from both sides.

R302.3.1 Separation

Where an accessory dwelling unit is added within an existing single-family residence to create a two-family dwelling, fire rated separation between the accessory dwelling unit and the primary dwelling unit is not required when all required smoke alarms are interconnected in such a manner that the actuation of one alarm will activate all alarms in both the primary dwelling unit and the accessory dwelling unit.

R302.3.4 Openings protection between two-family dwellings

Limits opening to a door located within the unit demising wall.

Maintains unit separation continuity with minimum 45-minute fire-rating and self-closing device.

Exception recognizes reduced hazard when automatic sprinklers are installed by reducing the opening rating to 20-minutes.

R302.3.5 Shared Accessory Rooms

Treats shared accessory rooms as garages within code requirements.

R302.3.5.1 Opening Protection

Openings from shared accessory room directly into a room used for sleeping is not permitted.

R302.5.2 Duct penetration

- Ducts penetrating the walls or ceilings separating the dwelling unit from the shared accessory room need to be constructed with a minimum No. 26 gauge sheet steel or other approved material.
- No openings into shared accessory room.

Table R302.3.5 Dwelling Shared Accessory Room Separation

SEPARATION	MATERIAL
From the dwelling units and attics	Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall.
From habitable rooms above or below the shared accessory room.	Not less than 5/8-inch Type X gypsum board or equivalent.
Structures supporting floor/ceiling and wall assemblies used for separation required by this section.	Not less than 1/2-inch gypsum board or equivalent.
Shared accessory rooms located less than 3 feet from a dwelling unit on the same lot.	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area.

R302.5 Dwelling-Garage Opening Protection

- Doors between the garage and residence must be self-latching.
- This provision is intended to minimize CO migration into living structure from garage & provide “latched” protection at door opening during a fire event.

R303.1 Mechanical Ventilation

A local exhaust system is an acceptable substitute for natural ventilation in kitchens.

R305.1 Ceiling Height

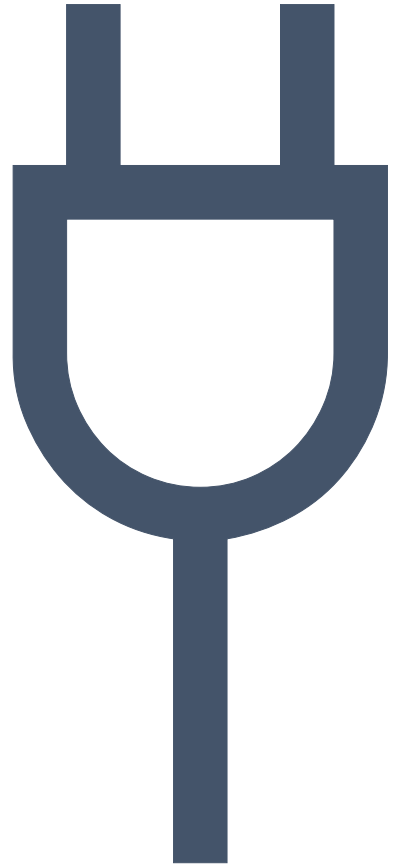
- Minimum ceiling height is reduced to 6 feet 6 inches under beams spaced at least 36 inches apart.
- This provision is for the **ENTIRE** living space, not just the basement area, due to increased beam sizing to comply with loading requirements.

R308.4.5 Glazing and Wet Surfaces

- Glazing installed in the vicinity of tubs, showers, and swimming pools must be safety glazing.
- Glazing installed adjacent to tubs, showers… must be safety glazed. Then add the final sentence of the “change significance” to bring home the point of this change.

R309.6 Electric vehicle charging

- Applies to new homes with attached private garages or attached private carports should install dedicated circuit for electric vehicle charging.
- Minimum of one 40-amp dedicated 208/240-volt branch circuit installed in electrical panel.
- Branch circuit should terminate at junction box, receptacle outlet, or EV charging equipment.



R310.1 Emergency Escape and Rescue Opening Required

- Gates with operational constraints without the use of keys, tools, or specific knowledge (such as a passcode) are not considered egress obstructions.
- Gates with locking mechanisms are considered obstructions.
- Windows with removable covers are not considered obstructions.
- Yard can open into “unobstructed pathway” that leads to a public way.

R311.4 Vertical egress

Exception modified to address sleeping lofts.

EXCEPTION: ((~~Stairs~~)) Stairways, alternating tread devices, ship's ladders, or ladders within an individual dwelling unit or sleeping unit used for access to areas of 200 square feet (18.6 m2) or less, ((~~and not containing the primary bathroom or kitchen~~)) are exempt from the requirements of Sections R311.4 and R311.7, where such devices do not provide exclusive access to a kitchen or bathroom. Such areas shall not be located more than 10 feet (3048 mm) above the finished floor of the space below.

R311.7.11 Alternating tread devices

Alternating tread devices not to be used as a means of egress.

R311.7.12 Ship’s ladders

Ship’s ladders not to be used as means of egress.

Example provided to the right.

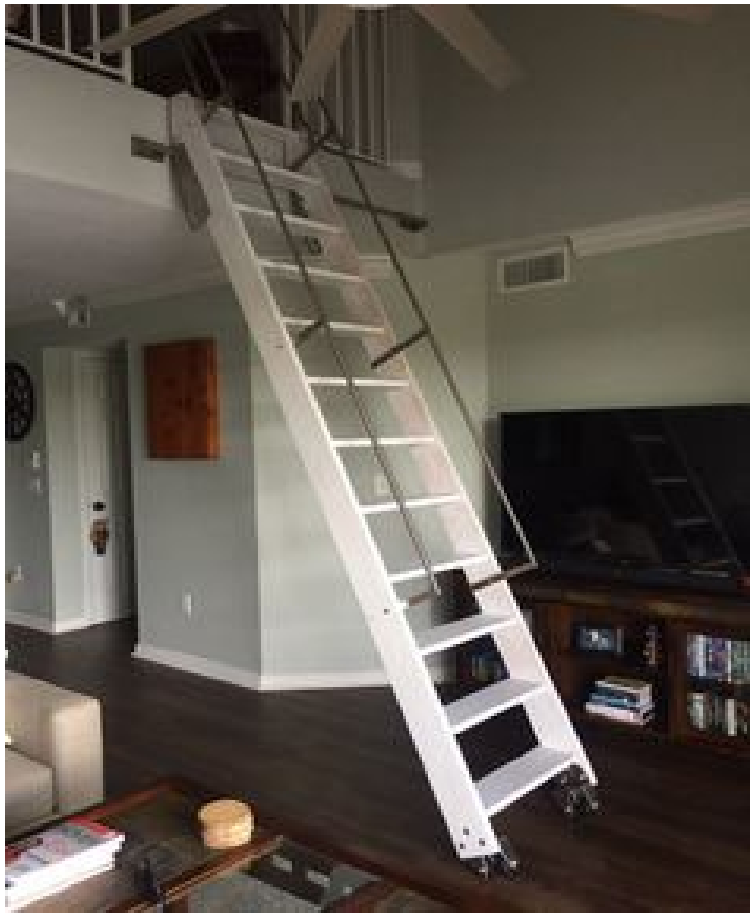


Image by @**aleksas** via pinterest.com

R312 Guards and Window Fall Protection

- Guards are required for open-sided walking surfaces, including mezzanines, lofts, stairs, ramps and landings that are located more than 30 inches high.
- Required guards at open-sided walking surfaces such as stairs, porches, balconies, or landings.
- Guards cannot be less than 36 inches in height.

R312.2 Window Fall Protection

Clarification that measurements are taken from bottom of the clear opening of the window.

R314.3 Smoke Alarm Location

Smoke alarms are required in lofts.

R314.3 Location.

6. In the hallway and in the room open to the hallway in dwelling units where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.

7. Within the room to which a loft is open, in the immediate vicinity of the loft.

R320 Accessibility

Clarifies the accessibility requirements as they apply to live/work units in townhouses and owner-occupied lodging houses with no more than five sleeping units (typically bed and breakfast establishments), both allowed to be constructed under the exceptions to the scope of the IRC.

R324.3 Photovoltaic Systems

- Building-integrated photovoltaic (BIPV) systems meeting the specified criteria do not require firefighter access pathways and setbacks.
  - PV shingles or PV panels installed flush with the surface of the shingles and has solid sheathing underneath.

R326 Habitable Attic

- R326.3 states that a habitable attic is a story above grade plane.
- Habitable attics are allowed above the third story and are not considered a story above grade plane if the dwelling unit is protected with a fire sprinkler system.
- WA specific exception: lofts in dwelling units and sleeping units are required to comply with section R333. *See next slide…*

R333 Lofts

- Lofts now recognized in code and treated like a mezzanine as opposed to habitable attic.
  - Allows for lower ceiling height.
  - Does not count as a story.
  - Large lofts meeting size requirements of habitable space must meet all habitable space requirements unless it’s the only loft in room and it’s sprinklered.
- Lofts not restricted to sleeping areas, use of space unrestricted.
- Needs permanent means of egress.
- Guards required on open side of loft.

R406.2 Foundation Waterproofing

Six-mil polyvinyl chloride and polyethylene fabrics are removed from the list of approved waterproofing materials.

R408.2 Openings for under-floor ventilation

Adds operational louvers as permissible under the code.

R506.2.3 Vapor Retarders Under Concrete Slab

- Thicker vapor retarders are now required below slabs-on-grade.
- Increased to 10 mil as requirement.

R507.10 Exterior railing guards

- Sets requirements for exterior railing guards on decks.
- Designing guard railings for decks will be majorly impacted.

Table R602.3(1) Fasteners – Roof Sheathing

- Additional fastener options are added to the fastener table in the roof sheathing section while maximum field nailing is reduced.
- Additional fastener options are added to the fastener table for roof and walls.

R602.9 Cripple walls

Cripple wall requirements apply only to *exterior* cripple walls due to seismic requirements.

R602.10.1.2 Location of Braced Wall Lines

- Requires that at least one-third of all braced wall panels be either on a braced wall line or on the opposite side of the braced wall line from the other braced wall panels.
- Braced wall panels continue to be required to be within 4 feet of the braced wall line.

R602.10.2.2 Location of Braced Wall Panels

Clarified starting point of the first braced wall panel when not placed at the corner of the structure.

R602.10.3(1) Bracing for Winds

Additional requirements for wind bracing for 95 mph wind speeds.

R602.10.6.5 Stone and Masonry Veneer

- Veneer applications in high seismic areas are broken into first story and veneer above the first story applications.
- Table R602.10.3(4) is updated to clarify the limits of brick veneer use and when additional bracing must be used on the building in Seismic Design Categories D0, D1 and D2.

R609.4.1 Garage Vehicle Entry Doors

All garage doors must have a permanent label identifying wind pressure ratings among other information.

R703.2, R703.7.3 Water-Resistive Barriers

- Sheet-type water-resistive barriers complying with ASTM D226, ASTM E331 or ASTM E2556 may be used.
- Nonsheet-style materials that provide equivalent protection may also be used.
- Section R703.2 now lists materials which may be used and testing standards that alternative materials must meet to be used as water-resistive barriers.
- R703.7.3 (stucco) is updated to account for climatic differences.

Table R703.8.4(1) Veneer Attachment

- Larger air gaps are allowed behind veneer to accommodate thicker continuous insulation.
- Applicable to masonry veneer application.

R703.11.2 Vinyl Siding Installation Over Foam Plastic Sheathing

Wind pressure ratings for vinyl siding are decreased.

R704 Soffits

- Requirements for soffit material and installation are expanded.
- Applicable to wind load resistance.

802.11 Roof tie uplift resistance

Exceptions added, provides more flexibility.

Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: Rafters or trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where either of the following occur:

1. Where the uplift force per rafter or truss does not exceed 200 pounds (90.8 kg) as determined by Table R802.11.

2. Where the basic wind speed does not exceed 115 miles per hour (51.4 m/s), the wind exposure category is B, the roof pitch is 5 units vertical in 12 units horizontal (42-percent slope) or greater, the roof span is 32 feet (9754 mm) or less, and rafters and trusses are spaced not more than 24 inches (610 mm) on center.

Table R804.3 CFS Roof Framing Fasteners

Connections for cold-formed steel (CFS) roof framing members are updated and clarified.

R905.4.4.1 Metal Roof Shingle Wind Resistance

Clarifications for metal shingle wind resistance requirements.

1503.5 Kitchen exhaust rates

- Exhaust fans to be sized in accordance with Section M1505.4.4.
- Sets minimum airflow rates or capture efficiencies for kitchen range hoods based on the type of kitchen appliance installed.

Table M1505.4.4.3

Hood Over Electric Range	Hood Over Combustion Range
65% CE or 160 cfm	80% CE or 250 cfm

1505.4.1.4 Balanced whole house ventilation system

- Local exhaust systems that are not a component of the whole house mechanical ventilation system are exempt from the balanced airflow calculation and are permitted for use.
- If building under the Washington IMC, you must use balanced and distributed ventilation system, with 60% recover required.
- Exemption exists for R-2 residential buildings: balancing is still required but distributed is not with this exemption.

1505.4.4.3.1 Field verification and diagnostic testing for local intermittent kitchen exhaust system

Requires verification for either the capture efficiency or airflow rate as specified in Table 1505.4.4.3.

1802.4 Blocked Vent Switch for Oil-fired Appliances

Additional safety device for oil-fired appliances has been added to be consistent with what is required for some gas-fired appliances.

2101 Hydronic Piping Systems Installation

Provisions for ground source heat pump loop piping systems in Section M2105 have been duplicated in Section M2101 to apply to all hydronic piping systems.

Chapter 45 Existing buildings and structures

- Covers repairs, alterations, additions, and relocations.
- Moves Appendix J to the body of the IRC.
  - Adds requirements for additions and relocations.

Chapter 45 continued

- As in prior codes, any modification to an existing structure must have modifications meet current code requirements. If it is not altered, it can stay as-is.
- Flexibility for vertical height of window opening control devices and fall protection devices in existing openings.
  - These are not required when window replacement is of the glazing only.
- Ceiling heights should not be less than 6 feet 8 inches (includes attics).
- Bathrooms, toilet rooms and laundry rooms are allowed to have a ceiling height not less than 6 feet 4 inches.

Chapter 45 continued

- The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches.
- The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction.
- Provides exception on full compliance for stair width, headroom and landings for alterations to existing stairs.
- Exceptions also granted for stair treads and risers that is consistent with a more general break for existing stairs.

Appendix Y

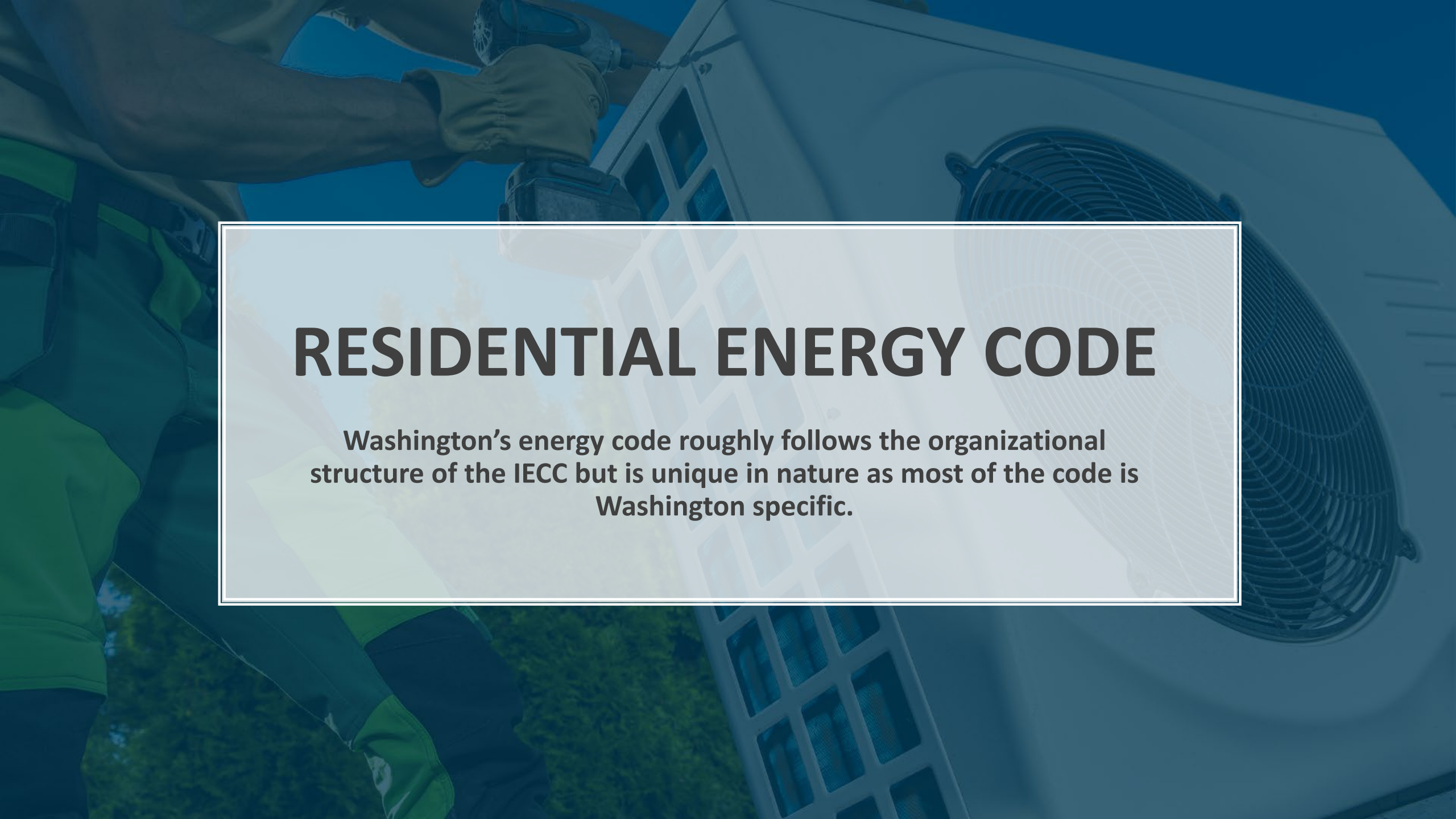
- Optional appendix for jurisdictions to adopt.
- Addresses construction and demolition waste.
- Code language helps to increase the amount of material that is salvaged for reuse – or recycled.

Appendix Z

- Optional appendix for jurisdictions to adopt.
- Aims to reduce the amount of material that is destroyed when demolishing a building so that it can be reused or recycled.

AF104 Radon Testing

- This appendix is not optional for high radon counties.
- Procedures for radon testing are added to appendix.
- Where radon reduction systems are required, if a test result is below 4 pCi/L, the level of radon in the building is deemed to be below the action level and further mitigation is not required.
- If testing reveals levels higher than 4 pCi/L, further mitigation and re-testing must continue until this level (or less) is achieved.



RESIDENTIAL ENERGY CODE

Washington's energy code roughly follows the organizational structure of the IECC but is unique in nature as most of the code is Washington specific.

R202 and R401.1 Residential Building Definition and Scoping Update

Residential units 3-stories or less with entrances from interior are now under commercial code.

R402.1.2 Insulation and fenestration requirements by component

- U-factor table as the default performance basis, with the R-value as an alternate.
- Ceiling U-factor is .024, target R-60 (previous code: R-49).
- Wood frame R-value went from 21 int. to 20+5 or 13+10.
- Slab insulation depth changed from 2 feet to 4 feet.

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE 5 AND MARINE 4	
Fenestration U-Factor[b]	0.30
Skylight U-Factor	0.50
Ceiling U-Factor	0.024
Above-Grade Wall U-Factor	0.056
Floor U-Factor	0.029
Slab on Grade F-Factor	0.54
Below Grade 2' Depth	
Wall *U*-Factor	0.042
Slab *F*-Factor	0.59
Below Grade 3.5' Depth	
Wall *U*-Factor	0.040
Slab *F*-Factor	0.56
Below Grade 7' Depth	
Wall *U*-Factor	0.035
Slab *F*-Factor	0.50

For SI: 1 foot = 304.8 mm, ci = continuous insulation, int = intermediate framing.

a. *U*-factors or F-factors shall be obtained from measurement, calculation or an approved source, or as specified in Section R402.1.5.

b. A maximum U-factor of 0.32 shall apply to vertical fenestration products installed in buildings located above 4000 feet in elevation above sea level, or in windborne debris regions where protection of openings is required under Section R301.2.1.2 of the International Residential Code.

TABLE R402.1.3
INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENTS[a]

CLIMATE ZONE 5 AND MARINE 4	
Fenestration U-Factor[b, j]	0.30
Skylight[b] U-Factor	0.50
Ceiling R-Value[e]	60
Wood Frame Wall[g,i] R-Value	20+5 or 13+10
Floor R-Value	30
Below-Grade[c,h] Wall R-value	10/15/21 int + 5TB
Slab[d,f] R-Value & Depth	10, 4 ft

Continuous Insulation

Two Options

1. Following the Prescriptive Path, you would need to do an R-21 cavity PLUS R-5 continuous insulation on the exterior.
2. Following the Performance Path, you can use the U-value table, the equivalent U-value for the above grade wall would be U-0.45 but it was amended to U-0.56 which is the same as today's U-value. Therefore, an intermediate R-21 wall meets code.
3. One of the easiest ways to demonstrate performance compliance is to use the WSU C3 calculator.

R403.3.5, R403.3.6 Duct testing

- Exception for ducts within the conditioned space was removed.
- The ducts must now be tested but are allowed double the leakage rate.

Table R403.6.1 Mechanical ventilation system fan efficacy

Efficacy requirements updated to the Energy Star Version 4.0.

R403.6.2 Testing

Mechanical ventilation be tested and verified to meet the minimum flow rate requirements.

Heat pump water heaters installed in conditioned spaces should be double ventilated (intake and exhaust) to avoid creating a negative pressure environment.

Exception: kitchen range hoods ducted to the outside with a 6" or larger duct with no more than one 90-degree elbow.

R404 Electrical power and lighting

- Dimmers or occupancy sensors required on all lighting except hallways and bathrooms.
- Requires daylight sensors on all exterior lighting.
- If you replace more than 10% of the exterior fixtures, compliance with R404.1 is required.

R402.4.1.2 Testing

- Test must include information on time, date, and location of where testing was performed.
- Requirement that testing professional be trained by an accredited program.

R402.4.1.3 Leakage rate

- Separates out the requirements for single family and multifamily dwelling air leakage testing.
- Maximum leakage rate was reduced from 5 air changes per hour to 4 air changes per hour for single-family.
- For multi-family, 0.25 cfm (the same as the commercial requirement).

HSPF / SEER Standard Update

- DOE new efficiency standards (SEER2, EER2, HSPF2).
- Went into effect January 1, 2023.
- Compliance is determined by each system's manufacturing date.
  - Example: heat pumps must meet 14.3 SEER2 (15.0 SEER) and 7.5 HSPF2 (8.8 HSPF)
- Crosswalk/Conversion resource → https://seer2.com/region-north.html

R403.4.1 Protection of piping insulation

Requires insulation be removable near the equipment requiring maintenance.

R403.5.2 Water volume determination

- Provides the reference and procedure for determining the volume of water in piping when selecting one of the new options for credits in Section R406.
- ***This is not a base code requirement.***

Section R405

Changes scope of R405 performance pathway to reflect ability to meet requirements by showcasing total building performance that encapsulates requirements in Table R405.2(1) and reduces annual carbon emissions of standard reference design by:

- 64% for structures under 1,500 sq. ft.
- 47% for structures 1,500 to 5,000 sq. ft.
- 41% for structures over 5,000 sq. ft.
- 615 for R-2 occupancies

New Credit Requirements

R406.3 Additional energy efficiency requirements. Each dwelling unit in a residential building shall comply with sufficient options from Tables R406.2 and R406.3 so as to achieve the following minimum number of credits:

1. Small Dwelling Unit: ..... 5.0 credits
   Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building greater than 500 square feet of heated floor area but less than 1500 square feet.
2. Medium Dwelling Unit: ..... 8.0 credits
   All dwelling units that are not included in #1, #3 or #4.
3. Large Dwelling Unit: ..... 9.0 credits
   Dwelling units exceeding 5000 square feet of conditioned floor area.
4. Dwelling units serving Group R-2 occupancies: ..... 6.5 credits
   See Section R401.1 and *residential building* in Section R202 for Group R-2 scope.
5. Additions 150 square feet to 500 square feet: ..... 2.0 credits

The drawings included with the building permit application shall identify which options have been selected and the point value of each option, regardless of whether separate mechanical, plumbing, electrical, or other permits are utilized for the project.

Table R406.2

Renames the Fuel Normalization Table to the Energy Equalization Credit Table. Heating system installed (dependent on fuel type) will dictate how you comply with the code.

TABLE R406.2
ENERGY EQUALIZATION CREDITS

System Type	Description of Primary Heating Source	Credits	
		All Other	Group R-2[a]
1	For combustion heating equipment meeting minimum federal efficiency standards for the equipment listed in Table C403.3.2(5) or C403.3.2(6)	0	0
2	For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) and supplemental heating provided by electric resistance or a combustion furnace meeting minimum standards listed in Table C403.3.2(5)[b]	1.5	0
3	For heating system based on electric resistance only (either forced air or Zonal)	0.5	-0.5
4[c]	For heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) or C403.3.2(9) **or** Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590	3.0	2.0
5	For heating system based on electric resistance with: 1. Inverter-driven ductless mini-split heat pump system installed in the largest zone in the dwelling, **or** 2. With 2kW or less total installed heating capacity per dwelling	2.0	0

R406 Energy Credit Options Table

Screenshots included from the second edition of the 2021 WSEC-R provided by SBCC

TABLE R406.3
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2[b]
1. EFFICIENT BUILDING ENVELOPE OPTIONS Only one option from Items 1.1 through 1.4 may be selected in this category. Compliance with the conductive UA targets is demonstrated using Section R402.1.5, Total UA alternative, where [1-(Proposed UA/Target UA)] > the required %UA reduction			
1.1	Prescriptive compliance is based on Table R402.1.3 with the following modifications: Vertical fenestration U = 0.22.	0.5	0.5
1.2	Prescriptive compliance is based on Table R402.1.3 with the following modifications: Vertical fenestration U = 0.25 FloorR-38 Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab **or** Compliance based on Section R402.1.5: Reduce the Total conductive UA by 15%.	1.0	1.0
1.3	Prescriptive compliance is based on Table R402.1.3 with the following modifications: Vertical fenestration U = 0.18 Ceiling and single-rafter or joist-vaulted R-60 advanced Wood frame wall R-21 int plus R-12 ci Floor R-38 Basement wall R-21 int plus R-12 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab **or** Compliance based on Section R402.1.5: Reduce the Total conductive UA by 22.5%.	1.5	0.5

TABLE R406.3 (continued)
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT	
		All Other	G
1.4	Prescriptive compliance is based on Table R402.1.3 with the following modifications: Vertical fenestration U = 0.18 Ceiling and single-rafter or joist-vaulted R-60 advanced Wood frame wall R-21 int plus R-16 ci Floor R-48 Basement wall R-21 int plus R-16 ci Slab on grade R-20 perimeter and under entire slab Below grade slab R-20 perimeter and under entire slab **or** Compliance based on Section R402.1.5: Reduce the Total conductive UA by 30%.	2.5	

2. AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION OPTIONS Only one option from Items 2.1 through 2.3 may be selected in this category.			
2.1	Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum at 50 Pascals, or for R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.25 cfm/ft^2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.65. To qualify to claim this credit, the building permit drawings shall specify the option being selected, the maximum tested building air leakage, and shall show the qualifying ventilation system and its control sequence of operation.	1.0	1.0
2.2	Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum at 50 Pascals, or for R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.20 cfm/ft^2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.75. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	1.5	1.5

You only need to include HRV if you are claiming points in this section

3. HIGH EFFICIENCY HVAC EQUIPMENT OPTIONS Only one option from Items 3.1 through 3.10 may be selected in this category. Item 3.11 may be taken with Items 3.1 or 3.3[c] only.			
3.1[a]	For a System Type 1 in Table R406.2: Energy Star rated (U.S. North) Gas or propane furnace with minimum AFUE of 95% **or** Energy Star rated (U.S. North) Gas or propane boiler with minimum AFUE of 90%. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.0	1.0
3.2[a]	For secondary heating system serving System Type 2 in Table R406.2: Air-source centrally ducted heat pump with minimum HSPF of 9.5 **or** Energy Star rated (U.S. North) Gas or propane boiler with minimum AFUE of 90%. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	0.5	0.5
3.3[a,c,d]	Air-source, centrally ducted heat pump with minimum HSPF 2 of 8.1 (HSPF of 9.5). In areas where the winter design temperature as specified in Appendix RC is 23°F or below, a cold climate heat pump found on the NEEP cc ASHP qualified product list shall be used. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	0.5	NA

TABLE R406.3 (continued)
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2[b]
3.4[a,d]	Closed-loop ground source heat pump; with a minimum COP of 3.3 **or** Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.5	1.0
3.5[d]	Ductless mini-split heat pump system, zonal control: In homes where the primary space heating system is zonal electric heating, a ductless mini-split heat pump system with a minimum HSPF 2 of 9 (HSPF of 10.0) shall be installed and provide heating to the largest zone of the housing unit. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.5	2.0
3.6[a]	Air-source, centrally ducted heat pump with minimum HSPF 2 of 9.4 (HSPF of 11.0). A centrally ducted air source cold climate variable capacity heat pump (cc VCHP) found on the NEEP cc VCHP qualified product list with a minimum of 9 HSPF 2 (10 HSPF) may be used to satisfy this requirement. In areas where the winter design temperature as specified in Appendix RC is 23°F or below, an air source centrally ducted heat pump shall be a cold climate variable capacity heat pump as listed on the NEEP qualified product list. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.0	N/A

3.7[a,d,e]	Ductless split system heat pumps with no electric resistance heating in the primary living areas. A ductless heat pump system with a minimum HSPF 2 of 9 (HSPF of 10) shall be sized and installed to provide heat to entire dwelling unit at the design outdoor air temperature. **Exception:** In homes with total heating loads of 24,000 or less using multi-zone mini-split systems with nominal ratings of 24,000 or less, the minimum HSPF s to claim this credit shall be 8.19 HSPF 2 (or 9 HSPF). To qualify to claim this credit, the building permit drawings shall specify the option being selected, the heated floor area calculation, the heating equipment type(s), the minimum equipment efficiency, and total installed heat capacity (by equipment type).	2.0	3.0
3.8[a,d]	Air-to-water heat pump with minimum COP of 3.2 at 47°F, rated in accordance with AHRI 550/590 by an accredited or certified testing lab. To qualify to claim this credit, the building permit drawings shall specify the option being selected, the heated floor area calculation, the heating equipment type(s), the minimum equipment efficiency, and total installed heat capacity (by equipment type).	1.0	NA
3.9	Gas-fired heat pump(s) meeting ANSI Z21.40.2 and Z21.40.4 or CSA, with a minimum UEF of 1.15. For R-2 Occupancy, gas-fired heat pump(s) meeting ANSI Z21.40.2 and Z21.40.4 or CSA, with a minimum UEF of 1.15, shall serve all units.	1.5	1.5

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2[b]
3.10[f]	Combination water heating and space heating system shall include one of the following: Gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0. **or** For R-2 Occupancy, gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0., shall serve all units. **or** For R-2 Occupancy, gas-fired heat pump(s) meeting ANSI Z21.40.2 and Z21.40.4 or CSA, with a minimum UEF of 1.15, shall serve all units. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.	2.5	2.5
3.11[c]	Connected thermostat meeting ENERGY STAR Certified Smart Thermostats/EPA ENERGY STAR specifications. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the thermostat model.	0.5	0.5

You can only claim the credit and use an ES Thermostat on system types 3.1 (gas FA) or 3.3 (Federal Minimum HP)

4. HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM OPTIONS			
4.1	HVAC equipment and associated duct system(s) installation shall comply with the requirements of Section R403.3.2. Electric resistance heat, hydronic heating and ductless heat pumps are not permitted under this option. Direct combustion heating equipment with AFUE less than 80% is not permitted under this option. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.	0.5	N/A

R403.3.2: All equipment in conditioned space except 10 LF of return and 5 LF of supply

5. EFFICIENT WATER HEATING OPTIONS Only one option from Items 5.3 through 5.8 may be selected in this category. Items 5.1 and 5.2 may be combined with any option.			
5.1	A drain water heat recovery unit(s) shall be installed, which captures waste water heat from at least two showers, including tub/shower combinations. It is acceptable, but not required, for sink water to be connected. Unit shall have a minimum efficiency of 40% if installed for equal flow or a minimum efficiency of 54% if installed for unequal flow. Such units shall be rated in accordance with CSA B55.1 or IAPMO IGC 346-2017 and be so labeled. To qualify to claim this credit, the building permit drawings shall include a plumbing diagram that specifies the drain water heat recovery units and the plumbing layout needed to install it. Labels or other documentation shall be provided that demonstrates that the unit complies with the standard.	0.5	0.5

TABLE R406.3 (continued)
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2[b]
5.2	For Compact Hot Water Distribution system credit, the volume shall store not more than 16 ounces of water between the nearest source of heated water and the termination of the fixture supply pipe where calculated using Section R403.5.2. *Construction documents* shall indicate the ounces of water in piping between the hot water source and the termination of the fixture supply. When the hot water source is the nearest primed plumbing loop or trunk, this must be primed with an On Demand recirculation pump and must run a dedicated ambient return line from the furthest fixture or end of loop to the water heater. To qualify for this credit, the dwelling must have a minimum of 1.5 bathrooms.	0.5	0.5
5.3	Water heating system shall include the following: Energy Star rated gas or propane water heater with a minimum UEF of 0.80. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.	0.5	0.5
5.4	Water heating system shall include one of the following: Energy Star rated gas or propane water heater with a minimum UEF of 0.91 **or** Solar water heating supplementing a minimum standard water heater. Solar water heating will provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating System **or** Water heater heated by ground source heat pump meeting the requirements of Option 3.4. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.	1.0	1.0

5.5	Water heating system shall include one of the following: Gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0. **or** For R-2 Occupancy, gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0. shall supply domestic hot water to all units. **or** For R-2 Occupancy, gas-fired heat pump water heater(s) meeting ANSI Z21.40.2 and Z21.40.4 or CSA, with a minimum UEF of 1.15, shall supply domestic hot water to all units. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.	1.5	1.5

5.6	Water heating system shall include one of the following: Electric heat pump water heater meeting the standards for Tier III of NEEA's advanced water heating specification **or** For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier III of NEEA's advanced water heating specification, shall supply domestic hot water to all units. If one water heater is serving more than one dwelling unit, all hot water supply and recirculation piping shall be insulated with R-8 minimum pipe insulation. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.	2.0	2.5

5.7	Water heating system shall include one of the following: Electric heat pump water heater with a minimum UEF of 2.9 and utilizing a split system configuration with the air-to-refrigerant heat exchanger located outdoors. Equipment shall meet Section 4, requirements for all units, of the NEEA standard *Advanced Water Heating Specification* with the UEF noted above **or** For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier III of NEEA's advanced water heating specification and utilizing a split system configuration with the air-to-refrigerant heat exchanger located outdoors, shall supply domestic hot water to all units. If one water heater is serving more than one dwelling unit, all hot water supply and recirculation piping shall be insulated with R-8 minimum pipe insulation. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.	2.5	3.0
5.8	Combination water heating and space heating system shall include one of the following: Gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0. **or** For R-2 Occupancy, gas-fired heat pump water heater(s) meeting Tier 2 of the NEEA Advanced Water Heating Specification for Gas-Fueled Residential Storage Water Heaters Version 1.0., shall supply all units. **or** For R-2 Occupancy, gas-fired heat pump(s) meeting ANSI Z21.40.2 and Z21.40.4 or CSA, with a minimum UEF of 1.15, shall supply all units. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.	2.5	2.5

6. RENEWABLE ELECTRIC ENERGY OPTION			
6.1	For each 600 kWh of electrical generation per housing unit provided annually by on-site wind or solar equipment a 0.5 credit shall be allowed, up to 4.5 credits. Generation shall be calculated as follows: For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTs or alternative approved by the code official. Documentation noting solar access shall be included on the plans. For wind generation projects designs shall document annual power generation based on the following factors: The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar and wind access, and include a calculation of the minimum annual energy power production.	0.5 – 4.5	0.5 – 4.5

7. APPLIANCE PACKAGE OPTION			
7.1	All of the following appliances shall be new and installed in the dwelling unit and shall meet the following standards: 1. Dishwasher, standard – Energy Star rated, Most Efficient 2021 or Dishwasher, compact – Energy Star rated (Version 6.0) 2. Refrigerator (if provided) – Energy Star rated (Version 5.1) 3. Washing machine (Residential) – Energy Star rated (Version 8.1) 4. Dryer – Energy Star rated, Most Efficient 2022 To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the appliance type and provide documentation of Energy Star compliance. At the time of inspection, all appliances shall be installed and connected to utilities. Dryer ducts and exterior dryer vent caps are not permitted to be installed in the *dwelling unit*.	0.5	1.5

Importance of Footnotes

a. An alternative heating source sized at a maximum of 0.5 Watts/ft^2 (equivalent) of heated floor area or 500 Watts, whichever is bigger, may be installed in the dwelling unit.

b. See Section R401.1 and *residential building* in Section R202 for Group R-2 scope.

c. Option 3.11 can only be taken with Options 3.1 and 3.3. To qualify to claim Option 3.11 with 3.3, the system shall be a 1-2 speed heat pump system. Variable capacity heat pumps are ineligible from claiming this option.

d. This option may only be claimed if serving System Type 4 or 5 from Table R406.2.

e. Primary living areas include living, dining, kitchen, family rooms, and similar areas.

f. Option 3.10 may one be taken with Efficient Water Heating Option 5.1 or 5.2. Equipment sizing for space heating shall be calculated as provided in Section R403.7 with increased capacity to provide a minimum of 75 percent of peak hot water demand or shall be sized in accordance with *approved* manufacturer's specifications or guidance. Supplementary heat for water heating shall be in accordance with Section R403.5.7.

R502.1.1 Small additions

Small additions (under 150 sq. ft.) are exempt from energy code requirements.

R502.3.1.1 Existing ceilings with attic spaces

When additions over 150 sq. ft. adjoin existing attic spaces, the existing attic space needs to be brought into full compliance with the envelope provisions in R402.

Tax Credits

- New homes are eligible for the revised 45L tax credit if they are certified to the ENERY STAR New Homes Program.
- There is a significant bonus credit if the home is certified to the DOE Zero Energy program.
- Clients may be able to qualify for energy efficiency upgrade tax credits to offset some costs of remodels/renovations.

Disclaimer: BIAW and instructors will not provide tax advice. Please utilize tax professionals in your local association as a resource.

Recommended Path for Compliance

All information, content, and materials regarding pathways for energy code compliance are for general informational purposes only, and do not constitute a formal recommendation from the Building Industry Association of WA (BIAW). No reader or user of this information should act or refrain from acting on the basis of this information without consulting the appropriate professionals. All liability with respect to actions taken or not taken based on the information provided are hereby expressly disclaimed.

Pathway is provided based on cost effectiveness

Medium Dwelling

8 credits

STEP 1

R406.2 Energy Equalization Credits

- Ductless Mini-Split
- Type 4 = 3 credits

STEP 2

R406.3 Energy Credits

- Option 1.2 = 1 credit
- Option 3.7 = 2 credits
- Option 5.6 = 2 credits

Questions?

A copy of this presentation will be provided to class attendees.

If you'd like to get involved in code development this next cycle (for the 2024 codes), please contact Andrea Smith at AndreaS@BIAW.com