Energy Code Residential Prescriptive Requirements (2015)

2015 WSEC & IRC Ventilation, Vapor Barrier and Duct Requirements - Effective July 1,2015

The following forms assist in documenting compliance with the 2015 Washington State Energy Code, Residential Provisions and provide much of the required documentation for plan review. The details noted here must also be shown on the drawings.

Component	Fenestration (see page 2, Glazing Schedule)		Ceiling w/ Attic	Vaulted Ceiling	Wood Framed Wall (Int.)	Mass Wall (Above grade)	Below-Grade Wall	Framed Floor	Slab R-Value & Depth
	Vertical	Overhead							
Prescriptive Value	U-0.30 max.	U-0.50 max.	R-49 min.	R-38 min.	R-21 min.	R-21 min.	R-10/15/21 Int. + TB	R-30 min.	R-10 min. 2'

Vapor Barrier

☐ Class I or II vapor retarders are required on the interior side of above grade walls. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. **See page 6 to provide vapor retarder product information*

Class I 0.1 perm or less

- ☐ Sheet polyethylene
- ☐ Unperforated aluminum foil

Class II 0.1 < perm ≤1.0

- ☐ Kraft-faced fiberglass batts
- ☐ Vapor retarder primer*

Lighting Efficiency

☐ A minimum of 75 percent of permanently installed lamps in lighting fixtures will be high-efficacy. (WAC 51-11R-R404.1)

Whole House Ventilation (Prescriptive) *Please check the appropriate box to describe which of the four prescriptive Whole House Ventilation Systems you will be using.*

☐ 1. Intermittent Whole House Ventilation Using Exhaust Fans & Fresh Air Inlets. WAC, IRC M1507.3.4 and Table IRC M1507.3.3(2)

☐ or 1a. Continuous Whole House Mechanical Ventilation WAC, IRC M1507.3.3(1) and Table IRC M1507.3.3(1)

☐ 2. Intermittent Whole House Ventilation Integrated with a Forced Air System. WAC, IRC M1507.3.5

☐ 3. Intermittent Whole House Ventilation Using a Supply Fan. WAC, IRC M1507.3.6

☐ 4. Intermittent Whole House Ventilation Using a Heat Recovery Ventilation System. WAC, IRC M1507.3.7

Source Specific Exhaust Ventilation & Fan Efficiency *Required in each kitchen, bathroom, water closet compartment, laundry room, indoor swimming pool, spa and other rooms where water vapor or cooking odor is produced. (IRC M1507.4) Fan efficiency from WAC 51-11R - Table R403.5.1 If kitchen exhaust is over 400 cfm. make-up air is required at a rate equal to the exhaust air rate. (IRC M1503.4)*

Minimum Source Specific Ventilation Capacity Requirements				
	Bathrooms	**Utility Rooms**	**Kitchens**	**In-line fan**
Intermittently operating	50 cfm		100 cfm	
Continuous operation	20 cfm		25 cfm	
Air Flow Rate Minimum (cfm)	10	90	Any	Any
Minimum Efficacy (cfm/watt)	1.4 cfm/watt	2.8 cfm/watt	2.8 cfm/watt	2.8 cfm/watt
Air Flow Rate Maximum (cfm)	>90	Any	Any	Any
Please provide your sizing:				

360-487-7800 | permitcenter@cityofvancouver.us | www.cityofvancouver.us/permits

Required energy code worksheets

Forms and worksheets for the 2015 WSEC have changed. Instead of being grouped into one workbook, the Prescriptive Worksheet, Glazing Schedule and Heating Sizing Calculator are now independent documents.

- **Prescriptive Method.** This approach is the simplest method of WSEC code compliance. A project complies with building envelope requirements if it meets all minimum insulation levels for the applicable climate zone. This worksheet (excel) provides a method for documenting compliance with the prescriptive standards:

  http://www.energy.wsu.edu/Documents/Prescriptive Worksheet Both Zones 2015 mod.xlsx

- **Glazing Schedule.** Using the Prescriptive Method, all glazing must have an "area weighted average" U-Factor of 0.30. This means that some windows can have a higher U-factor than 0.30 and some can have a lower U-factor than 0.30, as long as the area weighted average is U-0.30 or lower. You may need to complete this form to document glazing compliance when applying for your permit:

  http://www.energy.wsu.edu/Documents/2015 Glazing Schedule.xlsx

- **Heating System Sizing Calculator.** This calculator - a simpler version of previous worksheets for newly constructed buildings - assumes that your glazing products have an area weighted average of U-0.30. Use the dropdown boxes to choose insulation levels and enter the areas of each building component. The form has embedded instruction; hover your cursor over the red triangles to see the help notes. This calculator sizes heating systems only; it will not accurately size cooling systems.

  http://www.energy.wsu.edu/Documents/Heat_Sizing_code specs_final_2015.xls

- **WSEC Residential Plan Sheet.** Provide two (2) copies of the completed Washington State Energy Code Plan Sheet (minimum size is 11" x 17")

  http://www.cityofvancouver.us/sites/default/files/fileattachments/community_and_economic_development/page/860/2015_washington_state_energy_code.pdf

Certificate - A permanent certificate shall be posted within three feet of the electrical distribution panel.

Energy Efficiency Credits

Each dwelling unit in a residential building shall comply with the sufficient options from Table R406.2 so as to achieve the following number of credits:

- **1. Small Dwelling Unit: 1.5 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 that are greater than 500 square feet of heated floor area but are less than 1500 square feet.
- **2. Medium Dwelling Unit: 3.5 credits**
  All dwelling units that are not included in #1 or #3. ***Exceptions****: Dwelling units serving R-2 occupancies shall require 2.5 credits.*
- **3. Large Dwelling Unit: 4.5 credits**
  Dwelling units exceeding 5000 square feet of conditioned floor area.
- **4. Additions less than 500 square feet: .5 credits**

Table 406.2 Energy Credits (2015 Code)			
Option	**Description**	**Credit(s)**	**Estimated Cost**
1a	**Efficient Building Envelope 1a:** Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.28, Floor R-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 R402.1.4: Reduce the Total UA by 5%	0.5	
1b	**Efficient Building Envelope 1b:** Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.25, Wall R-21 plus R-4, Floor R-38, Basement wall R-21 int plus R-5 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 R402.1.4: Reduce the Total UA by 15%	1.0	
1c	**Efficient Building Envelope 1c:** Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.22, Ceiling and single-rafter or joist-vaulted R-49 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 R402.1.4: Reduce the Total UA by 30%	2.0	
1d	**Efficient Building Envelope 1d:** Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.24	0.5	
2a	**Air Leakage Control and Efficient Ventilation 2a:** Compliance based on R402.4.1.2: Reduce the tested air leakage to 3.0 air changes per hour maximum **and** All whole house ventilation requirements as determined by Section M1507.3 of the *International Residential* Code shall be met with a high efficiency fan (maximum 0.35 watts/ cfm), not interlocked with the furnace fan. Ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode. 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 qualifying ventilation system.	0.5	
2b	**Air Leakage Control and Efficient Ventilation 2b:** Compliance based on R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum **and** All whole house ventilation requirements as determined by Section M1507.3 of the *International Residential* Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. 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.	1.0	
2c	**Air Leakage Control and Efficient Ventilation 2c:** Compliance based on R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum **and** All whole house ventilation requirements as determined by Section M1507.3 of the *International Residential* Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. 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	
3a	**High Efficiency HVAC Equipment 3a:** Gas, propane or oil-fired furnace with minimum AFUE of 94% , or Gas, propane or oiled-fired boiler with minimum AFUE of 92% 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	

Table 406.2 Energy Credits (2015 Code)			
Option	**Description**	**Credit(s)**	**Estimated Cost**
3b	**High Efficiency HVAC Equipment 3b:** Air-source heat pump with minimum HSPF of 9.0 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	
3c	**High Efficiency HVAC Equipment 3c:** Closed-loop ground source heat pump, with a minimum of 3.3 **or** Open loop water source heat pump with a maximum pumping hydraulic head of 150 feed 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	
3d	**High Efficiency HVAC Equipment 3d:** Ductless Split System Heat Pumps, Zonal Control: In homes where the primary space heating system is zonal electric heating, a ductless heat pump system 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.	1.0	
4	**High Efficiency HVAC Distribution System:** All heating and cooling system components installed inside the conditioned space. This includes all equipment and distribution system components such as forced air ducts, hydronic piping, hydronic floor heating loop, convectors and radiators. All combustion equipment shall be direct vent or sealed combustion. For forced air ducts: A maximum of 10 linear feet of return ducts and 5 linear feet of supply ducts may be located outside the conditioned space. All metallic ducts located outside the conditioned space must have both transverse and longitudinal joints sealed with mastic. If flex ducts are used, they cannot contain splices. Flex duct connections must be made with nylon straps and installed using a plastic strapping tensioning tool. Ducts located outside the conditioned space must be insulated to a minimum of R-8. Locating system components in conditioned crawl spaces is not permitted under this option. Electric resistance heat 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 maximum tested building air leakage and shall show the heat recovery ventilation system.	1.0	
5a	**Efficient Water Heating 5a:** All showerhead and kitchen sink faucets installed in the house shall be rated at 1.75 GPM or less. All other lavatory faucets shall be rated at 1.0 GPM or less. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.	.05	
5b	**Efficient Water Heating 5b:** Water heating system shall include the following: Gas, propane or oil water heater with a minimum EF of 0.74 **or** water heater heated by ground source heat pump meeting the requirements of option 3c. **or** For R-2 occupancy, a central heat pump water heater with an EF greater than 2.0 that would supply DHW to all the units through a central water loop 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.	1.0	

Table 406.2 Energy Credits (2015 Code)			
Option	**Description**	**Credit(s)**	**Estimated Cost**
5c	**Efficient Water Heating 5c:** Water heating system shall include the following: Gas, propane or oil water heater with a minimum EF 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 Systems **or** Electric heat pump water heater with a minimum EF of 2.0 and meeting the standards of NEEA's Northern Climate Specifications for Heat Pump Water Heaters. 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	
5d	**Efficient Water Heating 5d:** A drain water heat recovery unit(s) shall be installed, which captures waste water heater from all the showers, and has a minimum efficiency of 40% if installed for equal flow or a minimum efficiency of 52% if installed for unequal flow. Such units shall be rated in accordance CSA B55.1 and be so labeled. To qualify to claim this credit, the building permit drawings shall include a plumbing diagram that specified the drain water heat recovery units and the plumbing layout needed to install it and labels or other documentation shall be provided that demonstrates that the unit complies with the standard.	1.5	
6	**Renewable Electric Energy:** For each 1200 kWh of electrical generation per each housing unit provided annually by on-site wind or solar equipment a 0.5 credit shall be allowed, up to 3 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. 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	

Vapor Retarder Product INFORMATION SHEET

VAPOR RETARDER PRODUCT INFORMATION SHEET*

***Must Attach Product Data Cut Sheet**

Permit Number _____

Site Address _____

Class I 0.1 perm or less

- ☐ Sheet polyethylene
- ☐ Unperforated aluminum foil

Class II 0.1 < perm ≤1.0

- ☐ Kraft-faced fiberglass batt
- ☐ Vapor retarder primer

Product Brand_____

Product Number and Name_____

Product Description:_____

_____

_____

VOC:_____ **Perm Rating (1.0 perm or less)**_____

Required Film Thickness: (Dry Mil)_____ **Wet Mil**_____

Square Feet Effected_____ **Gallons Used**_____

Wet Film Thickness Measured_____

_____

PRINT Contractor Name

_____

Contractor Signature ** **Date**

***By signing this, I am verifying that all information listed above is true, and accurate to the best of my knowledge.*