



# #B103

## RESIDENTIAL ENERGY CODE WORKSHEET

This worksheet has been developed to assist permit applicants documenting compliance with the 2015 International Energy Conservation Code (IECC) as amended by Washington State. **All heated areas must comply with energy code.** This form is not a substitute for the energy code itself. To obtain a copy of the energy code, go to the following web address. <http://www.energy.wsu.edu/code>. A permanent certificate shall be completed and posted on or within three feet of the electrical distribution panel by the builder or registered design professional showing compliance with energy code requirements.

Applicant Name: \_\_\_\_\_ Assessor Tax Parcel #: \_\_\_\_\_

### Section 1 - General Information

Proposed heating system: (Check one box)

<input type="checkbox"/> Wall/ Baseboard heaters	<input type="checkbox"/> Radiant Heat (requires fully insulated slab)	<input type="checkbox"/> Furnace/Heat Pump Complete a sizing worksheet found at <a href="http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx">http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx</a>	<input type="checkbox"/> Other: _____
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### **R403.7.1 Electric resistance zone heated units.**

All detached one- and two-family dwellings and multiple single-family dwellings (townhouses) up to three stories in height above grade plan using electric zonal heating as the **primary heat source** shall install an inverter-driven ductless mini-split heat pump in the largest zone in the dwelling.

Building permit drawings shall specify the heating equipment type and location of the heating system.

**Exception:** Total installed heating capacity of 2Kw per dwelling or less.

### Section 2 - Prescriptive Energy Compliance (WSEC Table R402.1.1)

<b>Glazing:</b> Windows: U.30 Skylights: U.50	<b>Walls<sup>1,2,3</sup>:</b> Above Grade: R-21 (intermediate framed) <b>Basement Walls (below grade)</b> <i>Insulated on the Interior:</i> <ul style="list-style-type: none"> <li>• R-15 continuous</li> <li>• R-21 cavity</li> <li>• R-13 cavity with R-5 continuous installed on the inside or outside of the wall.</li> </ul> <i>Insulated on the Exterior:</i> <ul style="list-style-type: none"> <li>• R-10 continuous</li> </ul>
<b>Ceiling:</b> Flat: R-49 Vaulted: R-38	
<b>Floor:</b> R-30	
<b>Slab On Grade:</b> R-10	

<sup>1</sup> Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

<sup>2</sup> Log and solid timber walls with a minimum average thickness of 3.5 inches are exempt from this insulation requirement.

<sup>3</sup> Where faced batt is used, the installation tabs must be stapled to the face of the stud. There shall be no compression to the batt at the edges of the cavity due to inset stapling installation tabs.

**Garage Doors** when used in conditioned space must meet or exceed requirements listed in Table R402.1.1.

**Section 3 – Prescriptive Whole House Ventilation** (IRC M1508)

Type of System:  Continuous (fan runs continuously)  Intermittent (fan runs \_\_\_\_\_% of the time)  
 Integrated Forced Air System \_\_\_\_\_cfm airflow rate required

**Section 4 – Energy Credits.**

Chapter 4 of the IECC requires additional energy efficiency to your project using a “credit” system. In order to determine how many credits apply to your project, please identify the number of credits required from **Table 1**. Then, select enough credits from **Table 2** to meet that requirement. Please note: The building permit drawings shall reflect required heating equipment type, minimum equipment efficiency and any other requirements to show compliance.

**Table 1**

↓	Description	Required Credit
#1	. 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.	1.5
#2	All dwelling units that are not included in #1 or #3. Exception: Dwelling units serving R-2 occupancies shall require 2.5 credits.	3.5
#3	Dwelling units exceeding 5000 square feet of conditioned floor area. Exception: Dwelling units serving R-2 occupancies shall require 2.5 credits.	4.5

**Table 2**

↓	Option	Description	Credit(s)
	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 <b>or</b> 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 <b>or</b> 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	2.0

↓	Option	Description	Credit(s)
		<b>or</b> Compliance based on Section R402.1.4: Reduce the Total UA by 30%.	
	1d <sup>a</sup>	<b>EFFICIENT BUILDING ENVELOPE 1d:</b> Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.24	0.5
	2a	<b>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2a:</b> Compliance based on R402.4.1.2: Reduce the tested air leakage to 3.0 air changes per hour maximum <b>and</b> 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	<b>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b:</b> Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum <b>and</b> 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	<b>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c:</b> Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum <b>and</b> 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 <sup>b</sup>	<b>HIGH EFFICIENCY HVAC EQUIPMENT 3a:</b> 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
	3b <sup>b</sup>	<b>HIGH EFFICIENCY HVAC EQUIPMENT 3b:</b> 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 <sup>b</sup>	<b>HIGH EFFICIENCY HVAC EQUIPMENT 3c:</b> Closed-loop ground source heat pump; with a minimum COP of 3.3	1.5

↓	Option	Description	Credit(s)
		<p><b>or</b>  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.</p>	
	3d <sup>b</sup>	<p><b>HIGH EFFICIENCY HVAC EQUIPMENT 3d:</b>  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.</p>	1.0
	4	<p><b>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM:</b>  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 heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.</p>	1.0
	5a	<p><b>EFFICIENT WATER HEATING 5a:</b>  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.</p>	0.5
	5b	<p><b>EFFICIENT WATER HEATING 5b:</b>  Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.74  <b>or</b>  Water heater heated by ground source heat pump meeting the requirements of Option 3c.  <b>or</b>  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.</p>	1.0

↓	Option	Description	Credit(s)
	5c	<p><b>EFFICIENT WATER HEATING 5c:</b> Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.91</p> <p><b>or</b></p> <p>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</p> <p><b>or</b></p> <p>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.</p>	1.5
	5d	<p><b>EFFICIENT WATER HEATING 5d:</b> A drain water heat recovery unit(s) shall be installed, which captures waste water heat 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.</p>	0.5
	6	<p><b>RENEWABLE ELECTRIC ENERGY:</b> 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.</p>	0.5

- a. Projects using this option may not use Option 1a, 1b or 1c.
- b. Projects may only include credit from one space heating option, 3a, 3b, 3c or 3d. When a housing unit has two pieces of equipment (i.e., two furnaces) both must meet the standard to receive the credit.
- c. **Plumbing Fixtures Flow Ratings.** Low flow plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following requirements:
  1. Residential bathroom lavatory sink faucets: Maximum flow rate - 3.8 L/min (1.0 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
  2. Residential kitchen faucets: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
  3. Residential showerheads: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.