



**Building Division**

801 228<sup>th</sup> Ave SE • Sammamish, Washington 98075 • Tel: 425.295-0500 • Fax: 425.295-0600 • Web: www.ci.sammamish.wa.us

**2015 WSEC & IRC Ventilation (Effective July 1, 2016)  
Residential Buildings Prescriptive Compliance Form**

This set of forms has been developed to assist permit applicants documenting compliance with the 2012 energy and ventilation codes. The following forms provide much of the required documentation for plan review. The details noted here must also be shown on the drawings.

**WSEC Table R402.1.1: Insulation and Fenestration Requirements by Component**

Climate Zone	Marine 4	
	R-Value <sup>a</sup>	U-Factor <sup>a</sup>
Fenestration U-Factor <sup>b</sup>	n/a	0.30
Skylight <sup>b</sup> U-Factor	n/a	0.50
Glazed Fenestration SHGC <sup>b,e</sup>	n/a	n/a
Ceiling <sup>f</sup>	4 <sup>g</sup>	0.026
Wood Frame Wall <sup>g,m,n</sup>	21 int	0.056
Mass Wall R-Value <sup>i</sup>	21/21 <sup>h</sup>	0.056
Floor	30 <sup>g</sup>	0.029
Below Grade Wall <sup>c,m</sup>	10/15/21 int + TB	0.042
Slab <sup>d</sup> R-Value & Depth	10, 2 ft	n/a

**WSEC Chapter 2 Definitions**

*Fenestration: includes products with glass and non-glass glazing materials.*

*SHGC: Solar Heat Gain Coefficient*

**WSEC Table R402.1.1 Footnotes**

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

- <sup>a</sup> R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the compressed R-value of the insulation from Appendix Table A101.4 shall not be less than the R-value specified in the table.
- <sup>b</sup> The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- <sup>c</sup> "10/15/21.+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21.+TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "TB" means thermal break between floor slab and basement wall.
- <sup>d</sup> R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.
- <sup>e</sup> There are no SHGC requirements in the Marine Zone.
- <sup>f</sup> Reserved.
- <sup>g</sup> Reserved.
- <sup>h</sup> Reserved.
- <sup>i</sup> The second R-value applies when more than half the insulation is on the interior of the mass wall.
- <sup>j</sup> Reserved.
- <sup>k</sup> For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.
- <sup>l</sup> Reserved.
- <sup>m</sup> Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.
- <sup>n</sup> Log and solid timber walls with a minimum average thickness of 3.5 inches are exempt from this insulation requirement.

**Table R402.1.3 Footnote**

<sup>a</sup> Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source or as specified in Section R402.1.3.

**Radiant Slab:**

R-10 foam insulation, continuous with thermal break (WSEC R402.2.9, Table R402.1.1)

**Lighting Efficiency:**

1. **Mandatory:** A minimum of 75 percent of all light fixtures will be high efficacy. (WSEC R404.1)

**Glazing Schedule (on pages 7 of this document)**

**Please check the box in front of the option which you will use to meet the requirements:**

1. Area weighted window, skylight or door U-factor (WSEC R402.1.4)
2. Glazing Schedule does not apply when using the prescriptive Table R402.1.1 shown on page 1 of this form.

**WSEC Section R406 Additional Energy Efficiency Requirements**

Each dwelling unit in one and two-family dwellings and townhouses, as defined in Section 101.2 of the International Residential Code shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits:

1. **Small Dwelling Unit: 1.5 points**  
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 less than 1500 square feet.
2. **Medium Dwelling Unit: 3.5 points**  
All dwelling units that are not included in #1 or #3.  
**Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.
3. **Large Dwelling Unit: 4.5 points**  
Dwelling units exceeding 5000 square feet of conditioned floor area.
4. **Additions less than 500 square feet: 0.5 credits.**

**Table R406.2 Summary**

Option	Description	Credit(s)	Check Selected Credit	Credit(s)
1a	Efficient Building Envelope 1a	0.5		
1b	Efficient Building Envelope 1b	1.0		
1c	Efficient Building Envelope 1c	2.0		
1 d	Efficient Building Envelope 1d	0.5		
2a	Air Leakage Control and Efficient Ventilation 2a	0.5		
2b	Air Leakage Control and Efficient Ventilation 2b	1.0		
2c	Air Leakage Control and Efficient Ventilation 2c	1.5		
3a	High Efficiency HVAC 3a	1.0		
3b	High Efficiency HVAC 3b	1.0		
3c	High Efficiency HVAC 3c	1.5		
3d	High Efficiency HVAC 3d	1.0		
4	High Efficiency HVAC Distribution System	1.0		
5a	Efficient Water Heating	0.5		
5b	Efficient Water Heating	1.0		
5c	Efficient Water Heating	1.5		
5d	Efficient Water Heating	0.5		
6	Renewable Electric Energy	0.5		

**Total Credits**

\*see pages 3 and 4 for the full table descriptions.

**TABLE 406.2 -- ENERGY CREDITS (DEBITS)**

OPTION	DESCRIPTION	CREDIT(S)
1a	EFFICIENT BUILDING ENVELOPE 1a: Prescriptive compliance is based on Table R402.1.1 with the following modifications: 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: 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: 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 <b>or</b> 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 <b>and</b> All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> 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. <b>**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.</b>	0.5
2b	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b: 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 <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. <b>**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.</b>	1.0
2c	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c: 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 <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. <b>**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.</b>	1.5
3a	HIGH EFFICIENCY HVAC EQUIPMENT 3a: Gas, propane or oil-fired furnace with minimum AFUE of 94% or Gas, propane or oil-fired boiler with minimum AFUE of 92% <b>**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.</b>	1.0
3b	HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 9.0 <b>**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.</b>	1.0
3c	HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3 <b>or</b> Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6 <b>**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.</b>	1.5

3d	<p>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 at least one zone of the housing unit.  <b>**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.</b></p>	1.0
4	<p>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.  <b>**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.</b></p>	1.0
5a	<p>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.<sup>c</sup>  <b>**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 shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.</b></p>	0.5
5b	<p>EFFICIENT WATER HEATING 5b:  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.  <b>**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.</b></p>	1.0
5c	<p>EFFICIENT WATER HEATING 5c:  Water heating system shall include one of the following:  Gas, propane or oil water heater with a minimum EF of 0.91  <b>or</b>  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.  <b>or</b>  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.  <b>**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.</b></p>	1.5
5d	<p>EFFICIENT WATER HEATING 5d:  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 with CSA B55.1 and be so labeled.  <b>**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 and labels or other documentation shall be provided that demonstrates that the unit complies with the standard.</b></p>	0.5
6	<p>RENEWABLE ELECTRIC ENERGY:  For each 1200 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 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.  <b>**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.</b></p>	0.5

(see next page for footnotes)

**TABLE 406.2-ENERGY CREDITS: Footnotes**

- 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

**Typical Energy Option Credit Scenarios for 3.5 points**

Scenario	Option	Description	Points	Total
<b>Case 1</b>	<b>3a or 3b</b>	Gas furnace with AFUE>0.94 <b>OR</b> 9.0 HSPF Heat pump	1.0	<b>3.5</b>
	<b>4</b>	All ducts and furnace located in conditioned space	1.0	
	<b>5a</b>	Kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1gpm	0.5	
	<b>5b</b>	Gas water heater EF ≥ 0.74	1.0	
<b>Case 2</b>	<b>1a</b>	R-38 floor insulation, and openings U < 0.28	0.5	<b>3.5</b>
	<b>3a or 3b</b>	Gas furnace with AFUE >0.94, <b>OR</b> 9.0 HSPF Heat pump	1.0	
	<b>5a</b>	kitchen sink and showerheads < 1.75 gpm, lavatory faucets < 1 gpm	0.5	
	<b>5c</b>	Gas water heater EF > 0.91 <b>OR</b> Electric water heater EF > 2.0	1.5	
<b>Case 3</b>	<b>1a</b>	R-38 floor insulation, and openings U < 0.28	0.5	<b>3.5</b>
	<b>2a</b>	Air leakage < 3.0 ACH @ 50 pa.	0.5	
	<b>3a or 3b</b>	Gas furnace with AFUE >0.94, <b>OR</b> 9.0 HSPF Heat pump	1.0	
	<b>5a</b>	kitchen sink and showerheads < 1.75 gpm, lavatory faucets < 1 gpm	0.5	
	<b>5b</b>	Gas water heater EF > 0.74	1.0	
<b>Case 4</b>	<b>2a</b>	Air leakage < 3.0 ACH @ 50 pa.	0.5	<b>3.5</b>
	<b>3a or 3b</b>	Gas furnace with AFUE >0.94, <b>OR</b> 9.0 HSPF Heat pump	1.0	
	<b>5a</b>	kitchen sink and showerheads < 1.75 gpm, lavatory faucets < 1 gpm	0.5	
	<b>5c</b>	Gas water heater EF > 0.91 <b>OR</b> Electric water heater EF > 2.0	1.5	
<b>Case 5 All Electric</b>	<b>1a</b>	R-38 floor insulation, and openings U < 0.28	0.5	<b>3.5</b>
	<b>3d</b>	Ductless Heat Pump	1.0	
	<b>5a</b>	kitchen sink and showerheads < 1.75 gpm, lavatory faucets < 1 gpm	0.5	
	<b>5c</b>	Electric water heater EF > 2.0	1.5	

**Whole House Ventilation (Prescriptive) IRC Sec. M1507.3 Whole-House Ventilation**

Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.7.

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

**Indicate Continuous or Intermittent and provide Run Time %** \_\_\_\_\_ (see Table M1507.3.3(2))

1. Whole House Ventilation Using Exhaust Fans & Outdoor Air Inlets or Operable Windows. (M1507.3.4)
2. Whole House Ventilation Integrated with a Forced Air System. (M1507.3.5)
3. Whole House Ventilation using a Supply Fan. (M1507.3.6)
4. Whole House Ventilation Using a Heat Recovery Ventilation System (M1507.3.7)

**TABLES FOR USE WITH CALCULATING WHOLE HOUSE VENTILATION OPTIONS**

**TABLE M1507.3.3(1)  
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow In CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 cubic foot per minute = 0.0004719 m<sup>3</sup>/s.

**TABLE M1507.3.3(2)  
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS<sup>a, b</sup>**

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor <sup>a</sup>	4	3	2	1.5	1.3	1.0

- a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
- b. Extrapolation beyond the table is prohibited.

**See modified Tables M1507.3.3(1) implementing intermittent factors shown in Table M1507.3.3(2)—on next page.**

**IRC Table M1507.3.6.2: Prescriptive Supply Fan Duct Sizing**

Supply Fan Tested at 0.40" W.G.		
Specified Volume from Table M1507.3.3(1)	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter
50 – 90 CFM	4 inch	5 inch
90 – 150 CFM	5 inch	6 inch
150 – 250 CFM	6 inch	7 inch
250 – 400 CFM	7 inch	8 inch

**Source Specific Exhaust Ventilation**

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.

**TABLE M1507.4  
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS**

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m<sup>3</sup>/s.

The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2)

**MODIFIED TABLE M1507.3.3(1)**  
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**  
 Using Table M1507.3.3(2) Factor of 4 for 25%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	120	180	240	300	360
1,501 - 3,000	180	240	300	360	420
3,001 - 4,500	240	300	360	420	480
4,501 - 6,000	300	360	420	480	540
6,001 - 7,500	360	420	480	540	600
> 7,500	420	480	540	600	660

**MODIFIED TABLE M1507.3.3(1)**  
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**  
 Using Table M1507.3.3(2) Factor of 3 for 33%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	90	135	180	225	270
1,501 - 3,000	135	180	225	270	315
3,001 - 4,500	180	225	270	315	360
4,501 - 6,000	225	270	315	360	405
6,001 - 7,500	270	315	360	405	450
> 7,500	315	360	405	450	495

**MODIFIED TABLE M1507.3.3(1)**  
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**  
 Using Table M1507.3.3(2) Factor of 2 for 50%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	60	90	120	150	180
1,501 - 3,000	90	120	150	180	210
3,001 - 4,500	120	150	180	210	240
4,501 - 6,000	150	180	210	240	270
6,001 - 7,500	180	210	240	270	300
> 7,500	210	240	270	300	330

**MODIFIED TABLE M1507.3.3(1)**  
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**  
 Using Table M1507.3.3(2) Factor of 1.5 for 66%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	45	67.5	90	112.5	135
1,501 - 3,000	67.5	90	112.5	135	157.5
3,001 - 4,500	90	112.5	135	157.5	180
4,501 - 6,000	112.5	135	157.5	180	202.5
6,001 - 7,500	135	157.5	180	202.5	225
> 7,500	157.5	180	202.5	225	247.5

**MODIFIED TABLE M1507.3.3(1)**  
**INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**  
 Using Table M1507.3.3(2) Factor of 1.3 for 75%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	39	58.5	78	97.5	117
1,501 - 3,000	58.5	78	97.5	117	136.5
3,001 - 4,500	78	97.5	117	136.5	156
4,501 - 6,000	97.5	117	136.5	156	175.5
6,001 - 7,500	117	136.5	156	175.5	195
> 7,500	136.5	156	175.5	195	214.5



### Simple Heating System Size

(Electronic version: <http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#EnergyCodeWorksheets> )

This heating system sizing calculator is based on the Prescriptive Requirements of the 2015 Washington State Energy Code (WSEC) and ACCA Manuals J and S. This calculator will calculate heating loads only. ACCA procedures for sizing cooling systems should be used to determine cooling loads.

The glazing (window) and door portion of this calculator assumes the installed glazing and door products have an area weighted average U-factor of 0.30. The incorporated insulation requirements are the minimum prescriptive amounts specified by the 2015 WSEC.

Please fill out all of the green drop-downs and boxes that are applicable to your project. As you make selections in the drop-downs for each section, some values will be calculated for you. If you do not see the selection you need in the drop-down options, please call the WSU Energy Extension Program at (360) 956-2042 for assistance.

**Project Information**

**Contact Information**

**Heating System Type:**

All Other Systems

Heat Pump

To see detailed instructions for each section, place your cursor on the word "Instructions".

**Design Temperature**

[Instructions](#)

City: Sammamish - 26 degrees F.

Design Temperature Difference ( $\Delta T$ )

$\Delta T = \text{Indoor (70 degrees)} - \text{Outdoor Design Temp}$

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**Area of Building**

**Conditioned Floor Area**

[Instructions](#)

Conditioned Floor Area (sq ft)

**Average Ceiling Height**

[Instructions](#)

Average Ceiling Height (ft)

Conditioned Volume

**Glazing and Doors**

[Instructions](#)

U-Factor	X	Area	=	UA
0.30		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

U-Factor	X	Area	=	UA
0.50		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Skylights:**

[Instructions](#)

**Insulation**

**Attic**

[Instructions](#)

R-49 (U-0.026) or R-38 Advanced (U-0.026)

U-Factor	X	Area	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Single Rafter or Joist Vaulted Ceilings**

[Instructions](#)

R-38 (U-0.027) vented or no vaulted ceilings

U-Factor	X	Area	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Above Grade Walls (see Figure 1)**

[Instructions](#)

R-Value: R-21 (U-0.056)

U-Factor	X	Area	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Floors**

[Instructions](#)

R-30 (U-0.029) or no floors above unconditioned space

U-Factor	X	Area	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Below Grade Walls (see Figure 1)**

[Instructions](#)

R-21 (U-0.042) interior or R-10 cont. exterior (U-0.064 or no below grade walls.

U-Factor	X	Area	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Slab Below Grade (see Figure 1)**

[Instructions](#)

Conditioning: R-5 thermal break at slab edge (F-0.570), or no slab below grade

F-Factor	X	Length	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Slab on Grade (see Figure 1)**

[Instructions](#)

R-Value: R-10 perimeter (F-0.540) or R-10 fully insulated (F-0.360), or no slab on grade.

F-Factor	X	Length	=	UA
<div style="border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="background-color: #c6e0b4; border: 1px solid black; width: 60px; height: 15px;"></div>		<div style="border: 1px solid black; width: 60px; height: 15px;"></div>

**Location of Ducts**

[Instructions](#)

Conditioned (1.0) or unconditioned space (1.10)

**Duct Leakage Coefficient**

**Sum of UA** \_\_\_\_\_

**Envelope Heat Load**

*Sum of UA X  $\Delta T$*

\_\_\_\_\_ Btu / Hour

**Air Leakage Heat Load**

*Volume X 0.6 X  $\Delta T$  X 0.18*

\_\_\_\_\_ Btu / Hour

**Building Design Heat Load**

*Air Leakage + Envelope Heat Loss*

\_\_\_\_\_ Btu / Hour

**Building and Duct Heat Load**

*Ducts in unconditioned space: Sum of Building Heat Loss X 1.10*

*Ducts in conditioned space: Sum of Building Heat Loss X 1*

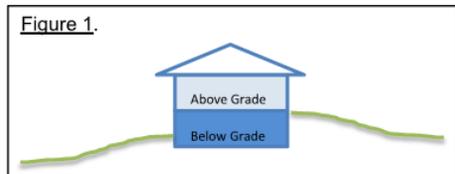
\_\_\_\_\_ Btu / Hour

**Maximum Heat Equipment Output**

*Building and Duct Heat Loss X 1.40 for Forced Air Furnace*

*Building and Duct Heat Loss X 1.25 for Heat Pump*

\_\_\_\_\_ Btu / Hour



**The following documents are required prior to final:**

- Insulation Certification (R303.1.1).
- Blower Door Test Result Form (R402.4.1.2).
- Duct Testing Affidavit (New or Existing Construction).
- Air leakage Testing.
- WSEC 2015 Certificate.

**Compliance Publications & Tools**

(Available online: <http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#EnergyCodeWorksheets> )

- Blower Door Test Result Form.
- 2015 Prescriptive Energy Code Checklist.
- Duct and Blower Door Test Hand Calculator.
- Duct and Blower Door Test Calculator.
- Duct Testing Standard (RS-33)
- Duct Testing Affidavit (New Construction).
- Duct Testing Affidavit (Existing Construction).
- Contact jurisdiction for a modifiable copy of the Duct Testing Affidavit, via WSU.edu, Energy Program.
- Air Leakage Testing.
- WSEC 2015 Certificate.
- Insulation Certificate.
- Getting to Know Your Ventilation System: Exhaust Type – Whole House.
- Benefits of Duct Sealing.

**Energy Code Worksheets**

(Available online: <http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#EnergyCodeWorksheets> )

- Total UA Alternative Worksheet