

Prescriptive Energy Code Compliance for All Climate Zones in Washington

Project Information

Contact Information

This project will use the requirements of the Prescriptive Path below and incorporate the minimum values listed. In addition, based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.

Authorized Representative _____ Date _____

All Climate Zones		
	R-Value ^d	U-Factor ^d
Fenestration U-Factor ^b	n/a	0.30
Skylight U-Factor	n/a	0.50
Glazed Fenestration SHGC ^{b,e}	n/a	n/a
Ceiling ^k	49 ^j	0.026
Wood Frame Wall ^{g,m,n}	21 int	0.056
Mass Wall R-Value ^l	21/21 ⁿ	0.056
Floor	30 ^g	0.029
Below Grade Wall ^{c,m}	10/15/21 int + TB	0.042
Slab ^o R-Value & Depth	10, 2 ft	n/a

*Table R402.1.1 and Table R402.1.3 Footnotes included on Page 2.

Each dwelling unit in a residential building 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 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 less than 1500 square feet.
- 2. Medium Dwelling Unit: 3.5 credits**
 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 credits**
 Dwelling units exceeding 5000 square feet of conditioned floor area.
- 4. Additions less than 500 square feet: .5 credits**

Table R406.2 Summary

Option	Description	Credit(s)		
1a	Efficient Building Envelope 1a	0.5	<input type="checkbox"/>	
1b	Efficient Building Envelope 1b	1.0	<input type="checkbox"/>	
1c	Efficient Building Envelope 1c	2.0	<input type="checkbox"/>	
1d	Efficient Building Envelope 1d	0.5	<input type="checkbox"/>	
2a	Air Leakage Control and Efficient Ventilation 2a	0.5	<input type="checkbox"/>	
2b	Air Leakage Control and Efficient Ventilation 2b	1.0	<input type="checkbox"/>	
2c	Air Leakage Control and Efficient Ventilation 2c	1.5	<input type="checkbox"/>	
3a	High Efficiency HVAC 3a	1.0	<input type="checkbox"/>	
3b	High Efficiency HVAC 3b	1.0	<input type="checkbox"/>	
3c	High Efficiency HVAC 3c	1.5	<input type="checkbox"/>	
3d	High Efficiency HVAC 3d	1.0	<input type="checkbox"/>	
4	High Efficiency HVAC Distribution System	1.0	<input type="checkbox"/>	
5a	Efficient Water Heating 5a	0.5	<input type="checkbox"/>	
5b	Efficient Water Heating 5b	1.0	<input type="checkbox"/>	
5c	Efficient Water Heating 5c	1.5	<input type="checkbox"/>	
5d	Efficient Water Heating 5d	0.5	<input type="checkbox"/>	
6	Renewable Electric Energy	0.5	<input type="checkbox"/>	*1200 kwh

Total Credits

0.0
0.00

*Please refer to Table R406.2 for complete option descriptions

Table R402.1.1 Footnotes

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

^a 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.

^b The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

^c "10/15/21.+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 on the 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.

^d R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.

^e There are no SHGC requirements in the Marine Zone.

^f Reserved.

^g Reserved.

^h Reserved.

ⁱ The second R-value applies when more than half the insulation is on the interior of the mass wall.

^j Reserved.

^k For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.

^l Reserved.

^m Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

Table R402.1.3 Footnote

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

Table 406.2 Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
1a	<p>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</p> <p>or</p> <p>Compliance based on Section R402.1.4: Reduce the Total UA by 5%.</p>	0.5	
1b	<p>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</p> <p>or</p> <p>Compliance based on Section R402.1.4: Reduce the Total UA by 15%.</p>	1.0	
1c	<p>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</p> <p>or</p> <p>Compliance based on Section R402.1.4: Reduce the Total UA by 30%.</p>	2.0	
1d ^a	<p>EFFICIENT BUILDING ENVELOPE 1d: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.24</p>	0.5	
2a	<p>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</p> <p>and</p> <p>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.</p> <p>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.</p>	0.5	
2b	<p>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</p> <p>and</p> <p>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.</p> <p>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.</p>	1.0	

Table 406.2 Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
2c	<p>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</p> <p>and</p> <p>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.</p> <p>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.</p>	1.5	
3a ^b	<p>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%</p> <p>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	
3b ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 9.0</p> <p>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	
3c ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3</p> <p>or</p> <p>Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6</p> <p>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>	1.5	
3d ^b	<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 the largest zone of the housing unit.</p> <p>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>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM:</p> <p>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.</p> <p>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.</p> <p>Locating system components in conditioned crawl spaces is not permitted under this option.</p> <p>Electric resistance heat and ductless heat pumps are not permitted under this option.</p> <p>Direct combustion heating equipment with AFUE less than 80% is not permitted under this option.</p> <p>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	

Table 406.2 Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
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.^c 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>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 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.</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 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.</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 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	

Table 406.2 Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
6	<p>RENEWABLE ELECTRIC ENERGY:</p> <p>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:</p> <p>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.</p> <p>For wind generation projects designs shall document annual power generation based on the following factors:</p> <p>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.</p> <p>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	

0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00

*Sum of Vertical Fenestration Area and UA
Vertical Fenestration Area Weighted U = UA/Area*

0.0	0.00
	0.00

Overhead Glazing (Skylights)

Component Description	Ref.	U-factor

Qt.	Width		Height	
	Feet	Inch	Feet	Inch

Area	UA
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00

*Sum of Overhead Glazing Area and UA
Overhead Glazing Area Weighted U = UA/Area*

0.0	0.00
	0.00

Total Sum of Fenestration Area and UA (for heating system sizing calculations)

0.0	0.00
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Simple Heating System Size: Washington State

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](#)

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

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 ---

U-Factor X **Area** = **UA**
 0.50 ---

Skylights

[Instructions](#)

U-Factor X **Area** = **UA**
 No selection ---

U-Factor X **Area** = **UA**
 No selection ---

U-Factor X **Area** = **UA**
 No selection ---

U-Factor X **Area** = **UA**
 No selection ---

U-Factor X **Area** = **UA**
 No selection ---

F-Factor X **Length** = **UA**
 No selection ---

F-Factor X **Length** = **UA**
 No selection ---

Insulation

Attic

[Instructions](#)

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

Above Grade Walls (see Figure 1)

[Instructions](#)

Floors

[Instructions](#)

Below Grade Walls (see Figure 1)

[Instructions](#)

Slab Below Grade (see Figure 1)

[Instructions](#)

Slab on Grade (see Figure 1)

[Instructions](#)

Location of Ducts

[Instructions](#)

Duct Leakage Coefficient

1.10

Sum of UA _____

Envelope Heat Load _____ Btu / Hour
Sum of UA X ΔT

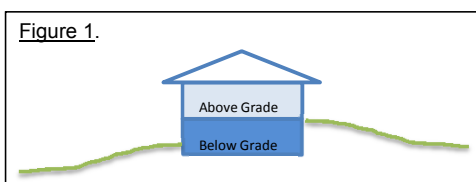
Air Leakage Heat Load _____ Btu / Hour
Volume X 0.6 X ΔT X .018

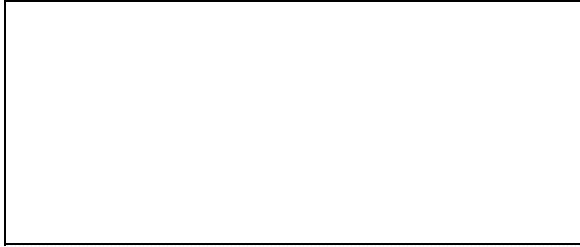
Building Design Heat Load _____ Btu / Hour
Air Leakage + Envelope Heat Loss

Building and Duct Heat Load _____ Btu / Hour
*Ducts in unconditioned space: Sum of Building Heat Loss X 1.10
 Ducts in conditioned space: Sum of Building Heat Loss X 1*

Maximum Heat Equipment Output _____ Btu / Hour
*Building and Duct Heat Loss X 1.40 for Forced Air Furnace
 Building and Duct Heat Loss X 1.25 for Heat Pump*

Figure 1.





*Missing Conditioned Floor Area
 Missing Exterior Doors Information
 Missing Vertical Glazing Information
 Missing Ceilings Information
 Missing Walls (Above Grade) Information
 Missing Floor, Slab OR Below Grade Info.*

Conditioned Floor Area

Component Performance, R occupancies

Code Target Values

Proposed Design

Doors U = 0.300
 Overhead Glazing U = 0.500
 Vertical Glazing U = 0.300
 Flat/Vaulted Ceilings U = 0.026
 Wall (above grade) U = 0.056
 Floors U = 0.029
 Slab on Grade F = 0.540
 Below Grade Wall U = 0.042
 Below Grade Slab F = 0.570

Area	UA
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0

Area	UA
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0

Target UA Total

Proposed UA Total

Target Credits from Table 406.2

Proposed Credits from Table 406.2

If the Proposed UA ≤ the Target UA, and the Proposed Credits from Table 406.2 are ≥ those required in Section R406.2, then the home meets the 2015 WSEC.

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Inch	Height Feet	Inch	Area	UA
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0

Sum of Area and UA

Overhead Glazing:

Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Inch	Height Feet	Inch	Area	UA
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0
		0	0.00						0	0

Sum of Area and UA

Plan ID	Component Description	Ref.	Attic U	Area	UA
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0

Sum of Area and UA

0	0
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Walls (Above Grade)

Plan ID	Component Description	Ref.	Wall U	Net Area	UA
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0

Sum of Area and UA

0	0
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Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0

Sum of Area and UA

0	0
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Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F	Slab Length	UA
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0
		▼ 0	0.000		0

Sum of Area and UA

0	0
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Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Length	Slab UA
		▼ 0	0.000		0.0	0.000		0
		▼ 0	0.000		0.0	0.000		0
		▼ 0	0.000		0.0	0.000		0
		▼ 0	0.000		0.0	0.000		0

Sum of Area, Length and UA

0	0.0
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0	0
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Table R406.2 Summary

Opt.	Description	Credit(s)		
1a	Efficient Building Envelope 1a	0.5		<input type="checkbox"/>
1b	Efficient Building Envelope 1b	1.0		<input type="checkbox"/>
1c	Efficient Building Envelope 1c	2.0		<input type="checkbox"/>
1d	Efficient Building Envelope 1d	0.5		<input type="checkbox"/>
2a	Air Leakage Control and Efficient Ventilation 2a	0.5		<input type="checkbox"/>
2b	Air Leakage Control and Efficient Ventilation 2b	1.0		<input type="checkbox"/>
2c	Air Leakage Control and Efficient Ventilation 2c	1.5		<input type="checkbox"/>
3a	High Efficiency HVAC 3a	1.0		<input type="checkbox"/>
3b	High Efficiency HVAC 3b	1.0		<input type="checkbox"/>
3c	High Efficiency HVAC 3c	1.5		<input type="checkbox"/>
3d	High Efficiency HVAC 3d	1.0		<input type="checkbox"/>
4	High Efficiency HVAC Distribution System	1.0		<input type="checkbox"/>
5a	Efficient Water Heating 5a	0.5		<input type="checkbox"/>
5b	Efficient Water Heating 5b	1.0		<input type="checkbox"/>
5c	Efficient Water Heating 5c	1.5		<input type="checkbox"/>
5d	Efficient Water heating 5d	0.5		<input type="checkbox"/>
6	Renewable Electric Energy	0.5	<input type="text" value=""/>	<input type="checkbox"/>
Total Credits				0.0

*Please refer to Table R406.2 for complete option descriptions

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open, access hatches to conditioned crawl spaces and conditioned attics shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.