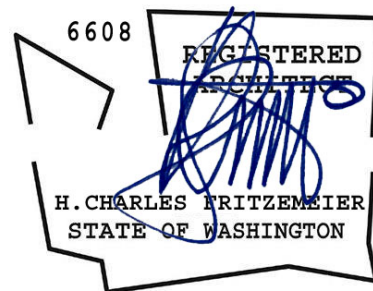


# ENERGY CODE COMPLIANCE INFORMATION FOR:

Pattison Residence  
8019 SE 20th Street  
Mercer Island

## FOR NEW CONSTRUCTION PERMIT SUBMITTAL

June 21, 2023



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**These requirements apply to all IRC building types, including detached one- and two-family dwellings and multiple single-family dwellings (townhouses).**

<i>Project Information</i>

<i>Contact Information</i>

**Instructions:** This single-family project will use the requirements of the Prescriptive Path below and incorporate the minimum values listed. Based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.

Provide all information from the following tables as building permit drawings: Table R402.1 - Insulation and Fenestration Requirements by Component, Table R406.2 - Fuel Normalization Credits and 406.3 - Energy Credits.

<b>Authorized Representative</b>	<b>Date</b>
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All Climate Zones (Table R402.1.1)		
	R-Value <sup>a</sup>	U-Factor <sup>a</sup>
Fenestration U-Factor <sup>b</sup>	n/a	0.30
Skylight U-Factor <sup>b</sup>	n/a	0.50
Glazed Fenestration SHGC <sup>b,e</sup>	n/a	n/a
Ceiling <sup>e</sup>	49	0.026
Wood Frame Wall <sup>g,h</sup>	21 int	0.056
Floor	30	0.029
Below Grade Wall <sup>c,h</sup>	10/15/21 int + TB	0.042
Slab <sup>d,f</sup> R-Value & Depth	10, 2 ft	n/a

a	R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity that 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.
c	"10/15/21 +5TB" 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 +5TB" 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. "5TB" means R-5 thermal break between floor slab and basement wall.
d	R-10 continuous insulation is required under heated slab on grade floors. See Section R402.2.9.1.
e	For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38 if the full insulation depth extends over the top plate of the exterior wall.
f	R-7.5 continuous insulation installed over an existing slab is deemed to be equivalent to the required perimeter slab insulation when applied to existing slabs complying with Section R503.1.1. If foam plastic is used, it shall meet the requirements for thermal barriers protecting foam plastics.
g	For log structures developed in compliance with Standard ICC 400, log walls shall meet the requirements for <i>climate zone 5</i> of ICC 400.
h	Int. (intermediate framing) denotes framing and insulation as described in Section A103.2.2 including standard framing 16 inches on center, 78% of the wall cavity insulated and headers insulated with a minimum of R-10 insulation.

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Each dwelling unit *in a residential building* shall comply with sufficient options from Table R406.2 (fuel normalization credits) and Table 406.3 (energy credits) to achieve the following minimum number of credits. To claim this credit, the building permit drawings shall specify the option selected and the maximum tested building air leakage, and show the qualifying ventilation system and its control sequence of operation.

1. **Small Dwelling Unit: 3 credits**  
 Dwelling units less than 1,500 sf in conditioned floor area with less than 300 sf of fenestration area.  
 Additions to existing building that are greater than 500 sf of heated floor area but less than 1,500 sf.
2. **Medium Dwelling Unit: 6 credits**  
 All dwelling units that are not included in #1 or #3
3. **Large Dwelling Unit: 7 credits**  
 Dwelling units exceeding 5,000 sf of conditioned floor area
4. **Additions less than 500 square feet: 1.5 credits**  
**All other additions shall meet 1-3 above**

Before selecting your credits on this Summary table, review the details in Table 406.3 (Single Family), on page 4.

Summary of Table R406.2 and 406.3				
Heating Options	Fuel Normalization Descriptions	Credits - select ONE heating option		User Notes
1	Combustion heating minimum NAECA <sup>b</sup>	0.0		
2	Heat pump <sup>c</sup>	1.0		
3	Electric resistance heat only - furnace or zonal	-1.0		
4	DHP with zonal electric resistance per option 3.4	0.5		
5	All other heating systems	-1.0		
Energy Options	Energy Credit Option Descriptions	Credits - select ONE energy option from each category <sup>d</sup>		
1.1	Efficient Building Envelope	0.5		
1.2	Efficient Building Envelope	1.0		
1.3	Efficient Building Envelope	0.5		
1.4	Efficient Building Envelope	1.0		
1.5	Efficient Building Envelope	2.0		
1.6	Efficient Building Envelope	3.0		
1.7	Efficient Building Envelope	0.5		
2.1	Air Leakage Control and Efficient Ventilation	0.5		
2.2	Air Leakage Control and Efficient Ventilation	1.0		
2.3	Air Leakage Control and Efficient Ventilation	1.5		
2.4	Air Leakage Control and Efficient Ventilation	2.0		
3.1 <sup>a</sup>	High Efficiency HVAC	1.0		
3.2	High Efficiency HVAC	1.0		
3.3 <sup>a</sup>	High Efficiency HVAC	1.5		
3.4	High Efficiency HVAC	1.5		
3.5.1	High Efficiency HVAC	1.5		
3.5.2	High Efficiency HVAC	1.5		
3.6 <sup>a</sup>	High Efficiency HVAC	2.0		
4.1	High Efficiency HVAC Distribution System	0.5		
4.2	High Efficiency HVAC Distribution System	1.0		

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Summary of Table R406.2 (cont.)				
Energy Options	Energy Credit Option Descriptions (cont.)	Credits - select ONE energy option from each category <sup>d</sup>		User Notes
5.1 <sup>d</sup>	Efficient Water Heating	0.5		
5.2	Efficient Water Heating	0.5		
5.3	Efficient Water Heating	1.0		
5.4	Efficient Water Heating	1.5		
5.5	Efficient Water Heating	2.0		
5.6	Efficient Water Heating	2.5		
6.1 <sup>e</sup>	Renewable Electric Energy (3 credits max)	3.0		
7.1	Appliance Package	0.5		
<b>Total Credits</b>				

- a. An alternative heating source sized at a maximum of 0.5 W/sf (equivalent) of heated floor area or 500 W, whichever is bigger, may be installed in the dwelling unit.
- b. Equipment listed in Table C403.3.2(4) or C403.3.2(5)
- c. Equipment listed in Table C403.3.2(1) or C403.3.2(2)
- d. You cannot select more than one option from any category EXCEPT in category 5. Option 5.1 may be combined with options 5.2 through 5.6. See Table 406.3.**
- e. 1.0 credit for each 1,200 kWh of electrical generation provided annually, up to 3 credits max. See the complete Table R406.2 for all requirements and option descriptions.
- f. Use the single radiobutton in the upper right of the second column to deselect radiobuttons in that group.

**Please print only pages 1 through 3 of this worksheet for submission to your building official.**

**For Building Officials Only**



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Table 406.3 – Energy Credits (Single Family)		
Option	Description	Credits: SF
<b>1. EFFICIENT BUILDING ENVELOPE OPTIONS</b>		
Only one option from Items 1.1 through 1.7 may be selected in this category. Compliance with the conductive UA targets is demonstrated using Section R402.1.4, Total UA alternative, where: [1-(Proposed UA/Target UA)] > the required %UA reduction.		
1.1	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.24</b>	0.5
1.2	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.20</b>	1.0
1.3	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.28</b> 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 conductive UA by 5%	0.5
1.4	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.25</b> Wall R-21 plus R-4 ci 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 conductive UA by 15%	1.0
1.5	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.22</b> 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 conductive UA by 30%	2.0
1.6	Prescriptive compliance is based on Table R402.1.1 with the following modifications: <b>Vertical fenestration U = 0.18</b> 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 <b>or</b>  Compliance based on Section R402.1.4: Reduce the Total conductive UA by 40%.	3.0
1.7	Advanced framing and raised heel trusses or rafters Vertical Glazing U-0.28 R-49 Advanced (U-0.020) as listed in Section A102.2.1, <i>Ceilings below a vented attic and</i> <b>R-49 vaulted ceilings with full height of uncompressed insulation extending over the wall top plate at the eaves.</b>	0.5

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**Table 406.3 – Energy Credits (Single Family)**

Option	Description	Credits: SF
<b>2. AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION OPTIONS</b>		
Only one option from Items 2.1 through 2.4 may be selected in this category.		
2.1	<p>Compliance based on R402.4.1.2: Reduce the tested air leakage to <b>3.0 air changes per hour</b> maximum at 50 Pascals <b>or</b></p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>0.3 cfm/sf maximum at 50 Pascals and</b></p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a high efficiency fan(s) (<b>maximum 0.35 watts/cfm</b>), not interlocked with the furnace fan (if present). 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 the maximum tested building air leakage, and shall show the qualifying ventilation system and its control sequence of operation.</p>	0.5
2.2	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>2.0 air changes per hour maximum at 50 Pascals or</b></p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.25 cfm/sf maximum at 50 Pascals <b>and</b></p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of <b>0.65</b>.<sup>1</sup></p>	1.0
2.3	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>1.5 air changes per hour</b> maximum at 50 Pascals <b>or</b></p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>0.25 cfm/sf</b> maximum at 50 Pascals <b>and</b></p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of <b>0.75</b>.<sup>1</sup></p>	1.5
2.4	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>0.6 air changes per hour</b> maximum at 50 Pascals <b>or</b></p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to <b>0.15 cfm/sf</b> maximum at 50 Pascals <b>and</b></p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of <b>0.80. Duct installation shall comply with Section R403.3.7</b>.<sup>1</sup></p>	2.0
<sup>1</sup> 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.		

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**Table 406.3 – Energy Credits (Single Family)**

Option	Description	Credits: SF
<b>3. HIGH EFFICIENCY HVAC EQUIPMENT OPTIONS</b>		
Only one option from Items 3.1 through 3.6 may be selected in this category.		
3.1 <sup>2</sup>	Energy Star rated (U.S. North) Gas or propane furnace with minimum AFUE of 95% <i>or</i> Energy Star rated (U.S. North) Gas or propane boiler with minimum AFUE of 90%. <sup>2</sup>	1.0
3.2 <sup>2</sup>	Air-source centrally ducted heat pump with minimum HSPF of 9.5. <sup>3</sup>	1.0
3.3 <sup>2</sup>	Closed-loop ground source heat pump; with a minimum COP of 3.3 <i>or</i> Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6. <sup>3</sup>	1.5
3.4	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 of 10.0 shall be installed and provide heating to the largest zone of the housing unit. <sup>4</sup>	1.5
3.5.1 <sup>2</sup>	Air-source, centrally ducted heat pump with minimum HSPF of 11.0. <sup>4</sup>	1.5
3.5.2 <sup>2</sup>	Air-source, inverter driven (variable speed) centrally ducted heat pump with minimum HSPF of 10.0 with at least one of the following: <sup>4</sup> 1. The system is listed on the NEEP cold climate air source heat pump database. 2. Compliance based on Section R402.1.4: Reduce the total conductive UA by 22%. This option shall not be used if any other envelope category option is selected to show compliance with Section R406. 3. If Option 5.3 has been selected, upgrade the Tier III heat pump water heater to a Tier IV heat pump water heater that is a unitary (nonsplit) system. 4. Use the appliance credit option 7.1, but the dryer is required to have a CEF of 3.93 or higher. This option is not available if it is already selected as one of the options to show compliance with Section R406.	1.5
3.6 <sup>2</sup>	Ductless split system heat pumps with no electric resistance heating in the primary living areas. A ductless heat pump system with a minimum HSPF of 10 shall be sized and installed to provide heat to entire dwelling unit at the design outdoor air temperature.  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
<sup>2</sup> An alternative heating source sized at a maximum of 0.5 W/sf (equivalent) of heated floor area or 500 W, whichever is bigger, may be installed in the dwelling unit.		
<sup>3</sup> 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.		
<sup>4</sup> 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.		

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**Table 406.3 – Energy Credits (Single Family)**

Option	Description	Credits: SF
<b>4. HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM OPTIONS</b>		
4.1	<p>All supply and return ducts located in an unconditioned attic shall be deeply buried in ceiling insulation in accordance with Section R403.3.7.</p> <p>For mechanical equipment located outside the conditioned space, a maximum of 10 linear feet of return duct and 5 linear feet of supply duct connections to the equipment may be outside the deeply buried insulation. 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.</p> <p>Duct leakage shall be limited to 3 cfm per 100 square feet of conditioned floor area.</p> <p>Air handler(s) shall be located within the conditioned space.</p>	0.5
4.2	<p>HVAC equipment and associated duct system(s) installation shall comply with the requirements of Section R403.3.7.</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

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**Table 406.3 – Energy Credits (Single Family)**

Option	Description	Credits: SF
<b>5. EFFICIENT WATER HEATING OPTIONS</b>		
Only one option from Items 5.2 through 5.6 may be selected in this category. Item 5.1 may be combined with any option.		
5.1	A drain water heat recovery unit(s) shall be installed, which captures waste water heat from all and only the showers, and has 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
5.2	Water heating system shall include one of the following: Energy Star rated gas or propane water heater with a minimum UEF of 0.80. <sup>5</sup>	0.5
5.3	Water heating system shall include one of the following: Energy Star rated gas or propane water heater with a minimum UEF 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> Water heater heated by ground source heat pump meeting requirements of Option 3.3. 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 minimum energy savings.	1.0
5.4	Water heating system shall include one of the following: Electric heat pump water heater meeting the standards for Tier I of NEEA's advanced water heating specification <b>or</b> For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier I 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. <sup>5</sup>	1.5
5.5	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 <b>or</b> 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. <sup>5</sup>	2.0
5.6	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 <i>Advanced Water Heating Specification</i> with the UEF noted above <b>or</b> 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. <sup>5</sup>	2.5
<sup>5</sup> 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.		

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**Table 406.3 – Energy Credits (Single Family)**

Option	Description	Credits: SF
<b>6. RENEWABLE ELECTRIC ENERGY OPTION</b>		
6.1	<p>For each 1200 kWh of electrical generation per housing unit provided annually by on-site wind or solar equipment a 1.0 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 or approved alternate by the code official.</p> <p>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.</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>	1.0
<b>7. APPLIANCE PACKAGE OPTION</b>		
7.1	<p>All of the following appliances shall be new and installed in the dwelling unit and shall meet the following standards:</p> <p>Dishwasher – Energy Star rated  Refrigerator (if provided) – Energy Star rated  Washing machine – Energy Star rated  Dryer – Energy Star rated, ventless dryer with minimum CEF rating of 5.2.</p> <p>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.</p>	0.5

**THE FOLLOWING PAGES INCLUDE SPECIFIC  
INFORMATION REGARDING THE SPECIFICS  
OF MEETING EACH CREDIT.**

### 3. HIGH EFFICIENCY HVAC EQUIPMENT OPTION

GOAL: 1.0 Credits

STRATEGY: 3.2

Air-sourced centrally located ducted heat pump system with a minimum HSPF of 9.5.

NOTE : Multi -zone electric heat pump , forced air heat pump heating and cooling HVAC split - system , min . HSPF 9.5. All equipment and ductwork to be located within the conditioned space, per 2018 WSEC Table 406.3, 4.2 and section R403.7. Domestic hot water provided by Tier-1 split HP water heater.



#### 4. HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM OPTIONS

GOAL: 1.0 Credits

STRATEGY: Credit 4.2 HVAC equipment and associated duct systems installation shall comply with the requirements of Section R403.3.7.

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.

NOTE: (1) A multi-zoned electric, forced air heat pump supplying both heating and cooling shall be used.

(2) Mechanical room location is shown on drawing A1.1.

(3) Duct work shall be located in soffits and chaseways which are shown on drawings A1.1, A1.2, A1.3, and A1.4.

## 5. EFFICIENT WATER HEATING OPTION

GOAL: 1.5 Credits

STRATEGY: Credit 5.4 Electric heat pump water heaters, meeting the standards for tier I of the NEEA's advanced water heating specification, shall supply domestic hot water to all units.

SEE FOLLOWING PAGES

### VOLTEX® HYBRID ELECTRIC HEAT PUMP WATER HEATER



The Voltex Hybrid Electric heat pump water heater from A. O. Smith is the most cost effective energy-efficient option available for consumers who want to save money on their utility bills. Voltex can reduce water heating costs up to 71% and provide payback in 2-3 years. With annual savings of \$437 or more, there is no better way to go green than Voltex.

#### HOW DO THEY WORK?

Absorb ambient heat from the surrounding air to heat water using a compressor and "Environmentally-Friendly" R134a refrigerant

- Self-contained heat pump unit is integrated into the top of the tank
- Multiple operating modes to maximize efficiency and performance

**QUALIFIES FOR MANY STATE AND LOCAL UTILITY REBATES - CHECK WWW.DSIREUSA.ORG**

#### INCREASED ENERGY EFFICIENCY

- Improved efficiency designed in, to ensure available hot water at the lowest possible cost. Up to a 3.24 Energy Factor (EF) Rating conserves energy and meets ENERGY STAR® qualifications

#### CHOICE OF OPERATING MODES

- Select from Efficiency, Hybrid, or Electric modes to match heating requirements to environmental conditions.
- Hybrid mode automatically adjusts between compressor and element, depending upon heat requirements.
- Vacation mode reduces operating costs and provides freeze protection during extended absence

#### BACKUP ELECTRIC ELEMENTS

- Long-lasting backup heating elements help heat water according to environmental conditions, demand, and the chosen operating mode

#### COREGARD™ ANODE ROD

- Our anode rods have a stainless steel core that extends the life of the anode rod allowing superior tank protection far longer than standard anode rods
- 66 and 80 gallon models have dual anodes for added protection.

#### DRY FIRE PROTECTION

- Control system checks to ensure the tank is full of water during start up to prevent dry firing the heating elements

#### ELECTRONIC USER INTERFACE

- User-friendly electronic interface allows easy control of temperature setting, operating mode, and communicates diagnostics
- Easy to read temperature display (see back) shows temperature in °F or °C
- Advanced diagnostics convey error messages for service purposes. The last four error messages are saved in the control system memory.

#### OTHER FEATURES

- Ideal for basements or garage installations; the compressor transfers heat to the water while dehumidifying and cooling the ambient air
- Washable air filter is easily removed for routine cleaning

#### OPTIONAL AIR DUCT ADAPTER KIT

- Permits installation in confined spaces

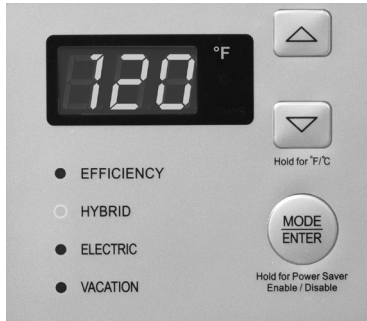
#### TEN YEAR LIMITED WARRANTY

- For complete information, consult written warranty or go to hotwater.com



Model Number	Gallon Capacity	Energy Factor by Mode			1st Hour Rating (Gal) By Mode			Dimensions in Inches					Approx. Shipping Weight (lbs)	Warranty Term
		Efficiency	Hybrid	Electric	Efficiency	Hybrid	Electric	A	B	C	D	E		
HPTU-50N	50	3.61	3.24	0.93	44.4	70	57.3	63	22	40-5/8	3-3/4	40-1/2	196	10
HPTU-66N	66	3.44	3.17	0.92	62.5	80	78.6	61	27	38	4	38	289	10
HPTU-80N	80	3.27	3.06	0.92	76.3	95	90.1	69	27	46	4	46	307	10

Requires 30 amp breaker.  
Top T&P option not available.



### ELECTRONIC USER INTERFACE

- User friendly, easy to read display.
- LEDs clearly indicate the current operating mode.
- Easily select operating mode:
  - Efficiency
  - Hybrid
  - Electric
  - Vacation
- Display communicates current status, mode and set point, and displays error messages when applicable.

### EFFICIENCY MODE

- Utilizes the heat pump for all water heating.
- Automatically reverts to heating element if ambient air or water temperatures are outside optimal operating range for heat pump.

### HYBRID MODE

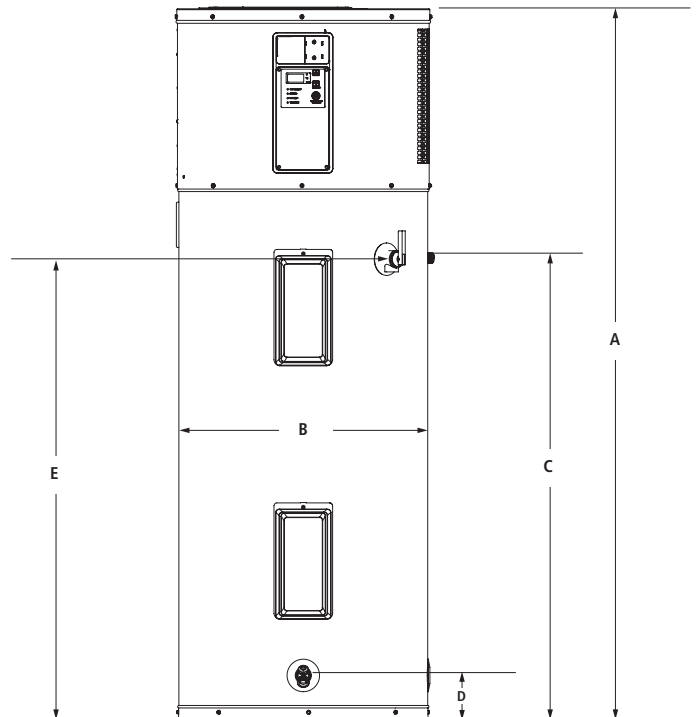
- Utilizes the heat pump or heating element, depending on demand.

### ELECTRIC MODE

- Standard electric water heater operation.

### VACATION MODE

- One touch operation maintains tank temperature of 60°F (15.6°C) during vacation or extended absence to reduce operating costs and provide freeze protection.
- Programmable up to 99 days.



### OTHER FEATURES:

- Sacrificial anode to protect against tank corrosion.
- Environmentally-friendly non-CFC foam insulation.
- Durable, enhanced-flow brass drain valve.
- CSA certified and ASME rated temperature & pressure relief valve.

### OPERATING REQUIREMENTS:

- Requires provision for condensate draining; if a suitable drain is not available, a condensate pump is required.
- 208/240 VAC 60Hz single phase 30 amp power supply.

For Technical Information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

**6. RENEWABLE ELECTRIC ENERGY OPTION**

**GOAL: 3.0 Credits**

**STRATEGY: See following pages**



**RESULTS**

**PATTISON HOUSE 8019 SE 20th Street**

**3,674 kWh/Year\***

*System output may range from 3,506 to 3,798 kWh per year near this location.*

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at //sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

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The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

Month	Solar Radiation ( kWh / m <sup>2</sup> / day )	AC Energy ( kWh )
January	1.08	95
February	1.93	162
March	2.80	262
April	4.67	416
May	5.09	465
June	5.59	484
July	6.22	550
August	5.62	501
September	4.08	355
October	2.21	201
November	1.14	99
December	0.95	83
<b>Annual</b>	<b>3.45</b>	<b>3,673</b>

**Location and Station Identification**

Requested Location	Mercer Island, WA
Weather Data Source	Lat, Lng: 47.57, -122.22 0.7 mi
Latitude	47.57° N
Longitude	122.22° W

**PV System Specifications**

DC System Size	7.140 kW																								
Module Type	Premium																								
Array Type	Fixed (open rack)																								
System Losses	53%																								
Array Tilt	4°																								
Array Azimuth	180°																								
DC to AC Size Ratio	1.2																								
Inverter Efficiency	96%																								
Ground Coverage Ratio	0.4																								
Albedo	From weather file																								
Bifacial	No (0)																								
Monthly Irradiance Loss	<table border="1"> <tr><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>June</td></tr> <tr><td>0%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr> <tr><td>July</td><td>Aug</td><td>Sept</td><td>Oct</td><td>Nov</td><td>Dec</td></tr> <tr><td>0%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr> </table>	Jan	Feb	Mar	Apr	May	June	0%	0%	0%	0%	0%	0%	July	Aug	Sept	Oct	Nov	Dec	0%	0%	0%	0%	0%	0%
Jan	Feb	Mar	Apr	May	June																				
0%	0%	0%	0%	0%	0%																				
July	Aug	Sept	Oct	Nov	Dec																				
0%	0%	0%	0%	0%	0%																				

**Performance Metrics**

DC Capacity Factor	5.9%
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# Your technical specs






Proposed 7.14kW REC

## SYSTEM DESIGN



kW	energy offset
<b>7.14</b>	<b>30%</b>
<i>solar power capacity</i>	<i>based on estimated usage of 12,000 kWh/yr</i>

## SYSTEM SPECIFICATIONS

PV module	Inverter(s)	Batteries (Separate)	System monitoring	Racking system	Mounting system
REC 420W	Enphase micro-Inverters	<i>Not Included: Per National Electric Code, solar that operates during a grid outage requires a battery system.</i>	Enphase IQ Combiner w/ Envoy+Consumption	IronRidge XR100 (Black)	U-Anchor
					

## PRODUCT WARRANTIES

		
PV Module Manufacturer's Power Warranty	PV Module Manufacturer's Product Warranty	Inverter Manufacturer's Product Warranty
25 years	25 years	25 years

## WASHINGTON STATE ENERGY CODE

3 credit(s) via 3,638kWh estimated production



# Your system's performance

Proposed 7.14kW REC

## SYSTEM PRICING

System price	\$34,647
Referral Discount	(\$500)
Sales Tax (10.3%) with exemption	\$0
Out of Pocket	\$34,147
Federal Tax Credit	(\$10,244)
Energy Savings*	(\$5,419)
<hr/>	
Total investment after incentives & utility savings <i>*Over the first ten (10) years</i>	\$18,483
Increased Home Value of \$2/Watt	\$14,280

## SUMMARY OF VALUES\*

Annual energy savings in 1st year	\$474
Cumulative Savings over 15 years	\$19,321
Cumulative Savings over 25 Years	\$29,348
Levelized Cost of Energy over 30 years	33.13¢

\*Any tax provisions, financial performance, or production estimates referenced are for discussion purposes only and should not be relied upon. You should consult your tax advisor to learn how each law applies to your specific circumstances.

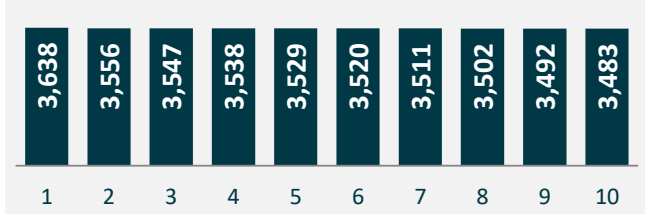
## Financing Options

Loan Amount	\$34,147
Loan Terms (720+ FICO)	15 years @ 4.99%
Initial Monthly Loan Payment	\$274
Reamortized Monthly Loan Payment	\$192

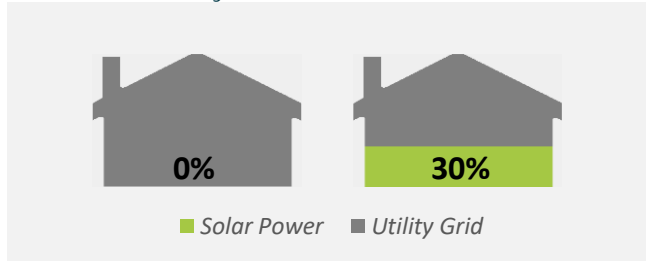
## Swap Your Utility Bill for a Solar Loan

Monthly Avg. Energy Bill <i>Before</i> Solar	\$138
Monthly Avg. Energy Bill <i>After</i> Solar	\$98
Reamortized Monthly Loan Payment	\$192
Average Monthly Energy Savings	(\$39)
Own Solar for the Monthly Difference of...	\$152

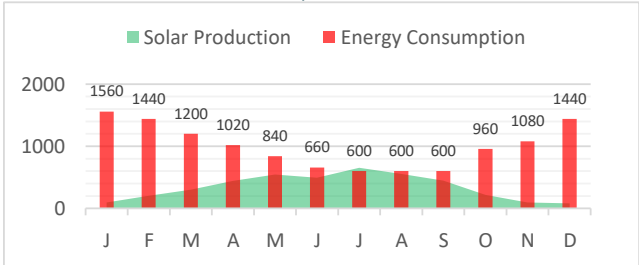
## Estimated Annual Performance (kWh/yr)



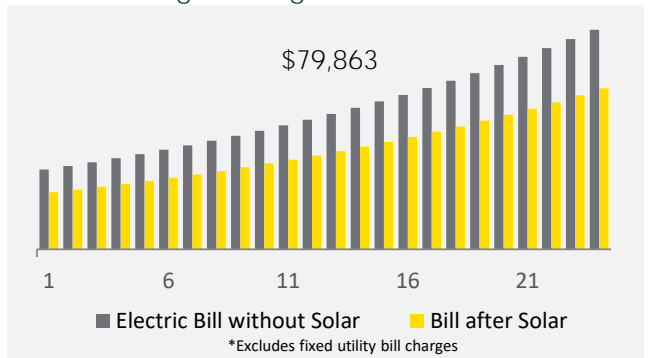
## Home Electricity Source



## Production & Consumption (kWh/month)



## Cost of Doing Nothing



## Assumptions

Starting utility rate	13.02¢
Annual utility escalation factor	4.5%



## 7. APPLIANCE PACKAGE OPTION

GOAL: 0.5 Credits

STRATEGY: See following pages

Item # bci4301576

**LG** 5.8 Cu. Ft. Energy Star Rated Front Load Washer and 9.0 Cu. Ft. Electric Dryer

Model: **WM9500HKA-DLEX9500K**



---

## **Washer Features**

### **Features:**

- Large 5.8 Cu.Ft. capacity allows a larger clothing load, saving you time and energy overall
- Slim direct drive motor gives you unprecedented energy savings, up to 30 percent above Energy Star standards, using less parts and no belt
- TurboWash® helps you cut your washing time down without losing any cleaning power
- Steam technology helps to penetrate the fabrics deeply, loosening particles to be able to be completely cleaned by the regular cycle
- Sanitary cycle will remove bacteria that accumulates over time
- LoDecibel operation makes this one of the quietest washers on the market
- Child-lock adds extra safety
- The ergonomic, angled door gives you unprecedented ease of access to the inside of the washer so you don't have to reach in as far to retrieve items
- Touch controls are easy to use and look great

### **Product Technologies:**

- **Smart Diagnosis™:** The SmartDiagnosis™ feature was created to give you more control and flexibility should you run into any problems with your LG appliance. It

has the capability of transmitting data from your appliance to LG specialists who can quickly analyze and solve the issue from the service center instead of physically arriving to your home for maintenance, which ultimately saves you time and money. SmartDiagnosis™ can be used through the LG service center by telephone or through the LG SmartDiagnosis™ application on your smartphone.

- **SenseClean™:** This system will automatically adjust the amount of water and cycle time needed for the load, saving on time and energy
- **Smart Grid:** This washer is Wi-Fi enabled and features a Smart Grid function which works when registered with the Smart Grid (Demand Response) service with your local electric company. When activated, your washer can control or delay energy usage by navigating peak usage hours to maintain lower energy bills in the long run

### **Specifications:**

- Depth: 33-1/16"
- Height: 41-3/16"
- Width: 29-5/8"
- Number of Cycles: 14
- Number of Options: 13
- Total Capacity: 5.8 Cu. Ft.

## **Dryer Features**

### **Features:**

- Large 9.0 cu. ft. capacity is capable of fitting a full set of king size bedding in a single load
- Electronic touch control panel is fully integrated into the door for a striking seamless appearance
- Ergonomic angled door makes for less bending and reaching into the drum
- FlowSense duct sensor notifies you when the duct needs to be cleared for maximum safety and performance

BI-48SID/S



## FEATURES

- Monitor and control remotely with Wi-Fi connectivity
- Preserves refrigerated foods with cool, moist air and frozen foods with frigid, dry air
- Fight spoilage and odors with a NASA-inspired air purification system
- Locks in cold air to ensure freshness with magnetic door seals
- Keeps produce fresher with high-humidity, sealed crisper and deli drawers
- Controls temperature within one degree of setpoint
- Filters water and ice, removing contaminants, chlorine taste, and odor
- Delivers fresh, filtered water through an internal dispenser designed to discreetly rest within the refrigerator
- Yields ice automatically and "max ice" for additional production
- Ensures excellent visibility with bright halogen lights
- Refer to freshness cards for tips on food preservation, use, and care

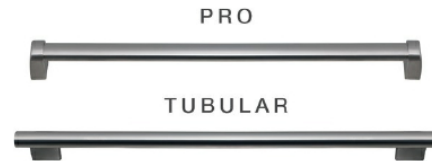
## ACCESSORIES

- 48" Stainless Steel Kickplate
- 90° Door Stop
- Air Purification Cartridge
- Egg Container
- Stainless Steel Pro Louvered Grille - 84"
- Stainless Steel Side Panel
- Water Filter
- White Side Panel
- Built-In Stainless Steel Pro Louvered Grilles

Accessories are available through an authorized dealer.  
For local dealer information, visit [subzero-wolf.com/locator](http://subzero-wolf.com/locator).



## HANDLE OPTIONS



## PRODUCT DETAILS

### REFRIGERATOR

- 1 adjustable dairy compartment
- 1 high-humidity crisper drawer with adjustable dividers
- 2 refrigerator storage drawers with adjustable dividers
- 5 refrigerator door bins (3 adjustable; 2 stationary)
- 5 glass refrigerator shelves (4 adjustable; 1 stationary)
- Internal water dispenser
- LED refrigerator and freezer lights

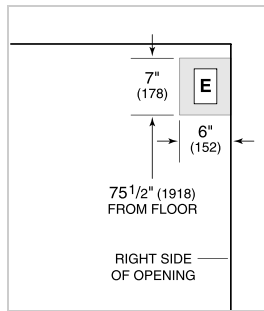
### FREEZER

- 3 freezer storage drawers
- 4 wire freezer shelves (3 adjustable; 1 stationary)

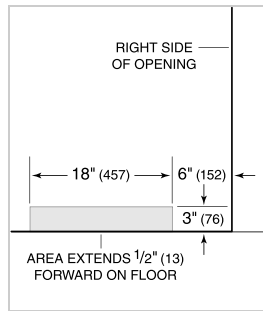
**PRODUCT SPECIFICATIONS**

Model	BI-48SID/S
Dimensions	48"W x 84"H x 24"D
Door Clearance	30"
Weight	656 lbs
Refrigerator Capacity	18.6 cu. ft.
Freezer Capacity	9.6 cu. ft.
Electrical Supply	115 VAC, 60 Hz
Electrical Service	15 amp dedicated circuit
Receptacle	3-prong grounding-type

**ELECTRICAL**



**PLUMBING**



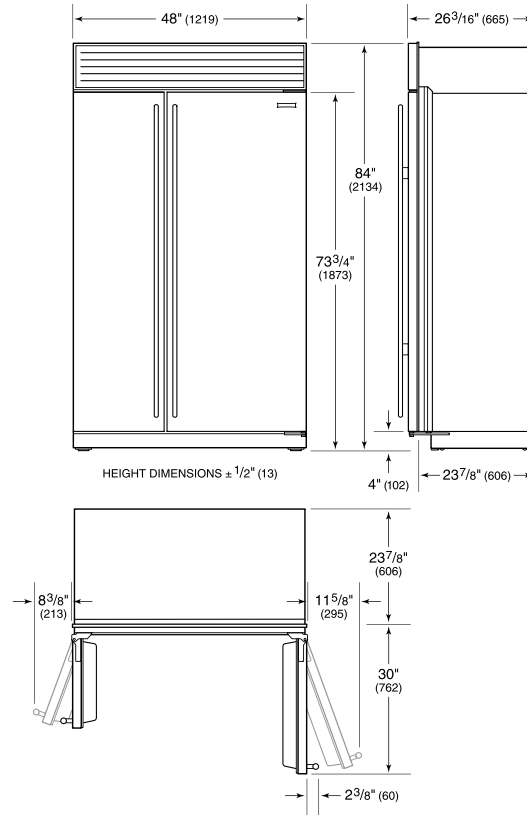
NOTE: Dimensions in parenthesis are in millimeters unless otherwise specified

**INTERIOR VIEW**

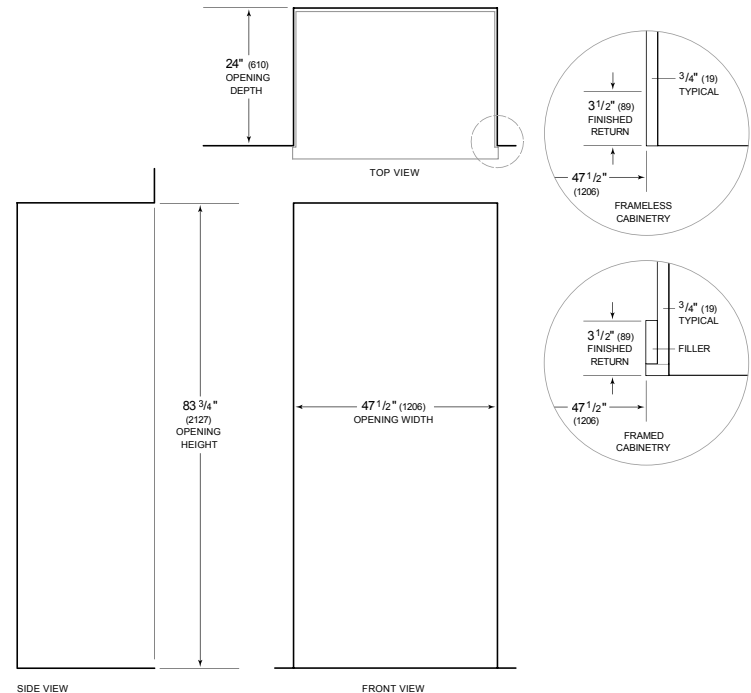


This illustration is intended for interior reference only and may not represent the exterior of the model being specified.

**DIMENSIONS**



**STANDARD INSTALLATION**



NOTE: 3 1/2" (89) finished returns will be visible and should be finished to match cabinetry. Shaded line represents profile of unit.

BI-36R/O



## FEATURES

Monitor and control remotely with Wi-Fi connectivity

Accepts custom panels for an integrated look within cabinetry or stainless-steel accessory panels and handles to match other Sub-Zero, Wolf, and Cove products

Fight spoilage and odors with a NASA-inspired air purification system

Locks in cold air to ensure freshness with magnetic door seals

Keeps produce fresher with high-humidity, sealed crisper and deli drawers

Controls temperature within one degree of setpoint

Ensures excellent visibility with bright halogen lights

Refer to freshness cards for tips on food preservation, use, and care

## ACCESSORIES

66" Dual Flush Inset Stainless Grille Panel

90° Door Stop

Air Purification Cartridge

Custom Side Panel Mounting Kit

Dual Installation Kit

Egg Container

Extended Framed Handle Kit

Framed Handle

Framed Louvered Grille Insert

Framed Stainless Steel Front Panels

Framed White Front Panels

Pro Louvered Flush Inset Grille - 84"

Stainless Steel Dual Flush Inset Door Panel with Pro Handle

Stainless Steel Dual Flush Inset Door Panel with Tubular Handle

Stainless Steel Dual Flush Inset Grille Panel

Stainless Steel Flush Inset Door Panel with Pro Handle

Stainless Steel Flush Inset Door Panel with Tubular Handle

Stainless Steel Flush Inset Grille Panel

Stainless Steel Kickplate - Left Hinge

Stainless Steel Kickplate - Right Hinge

Stainless Steel Side Panel

White Side Panel

Dual Installation Kit with Dual Wide Grille

Stainless Steel Pro Handles

Stainless Steel Tubular Handles

Built-In Louvered Grilles



## HANDLE ACCESSORIES

PRO



TUBULAR



## PRODUCT DETAILS

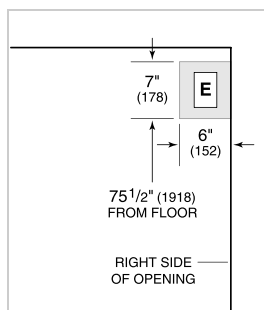
### REFRIGERATOR

- LED refrigerator lights
- 4 glass refrigerator shelves (3 adjustable; 1 stationary)
- 1 high-humidity crisper drawer with adjustable dividers
- 2 storage drawers with adjustable dividers
- 5 door bins (3 adjustable; 2 stationary)

**PRODUCT SPECIFICATIONS**

Model	BI-36R/O
Dimensions	36"W x 84"H x 24"D
Door Clearance	37 1/4"
Weight	420 lbs
Refrigerator Capacity	23.5 cu. ft.
Electrical Supply	115 VAC, 60 Hz
Electrical Service	15 amp dedicated circuit
Receptacle	3-prong grounding-type

**ELECTRICAL**



**PANEL SPECIFICATIONS** For complete panels specifications including width/height, weight requirements, thickness requirements and offset details visit [subzero-wolf.com/builtinconfigurator](http://subzero-wolf.com/builtinconfigurator).

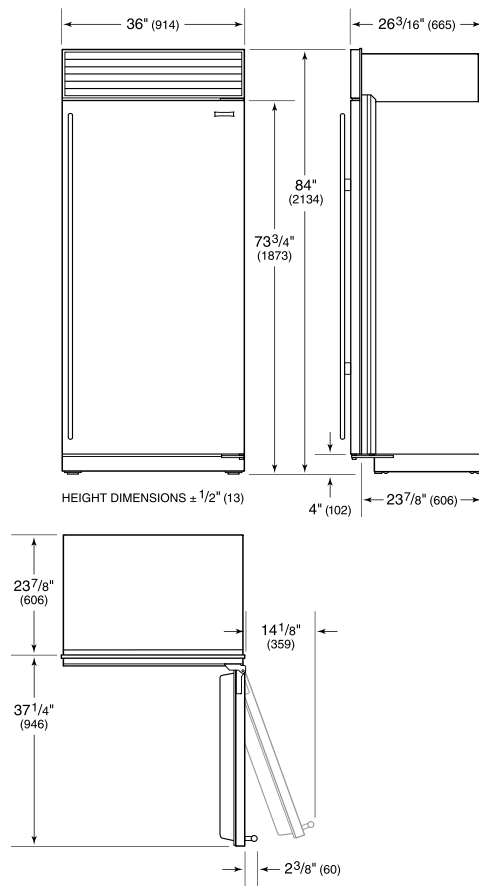
**NOTE:** Dimensions in parenthesis are in millimeters unless otherwise specified

**INTERIOR VIEW**

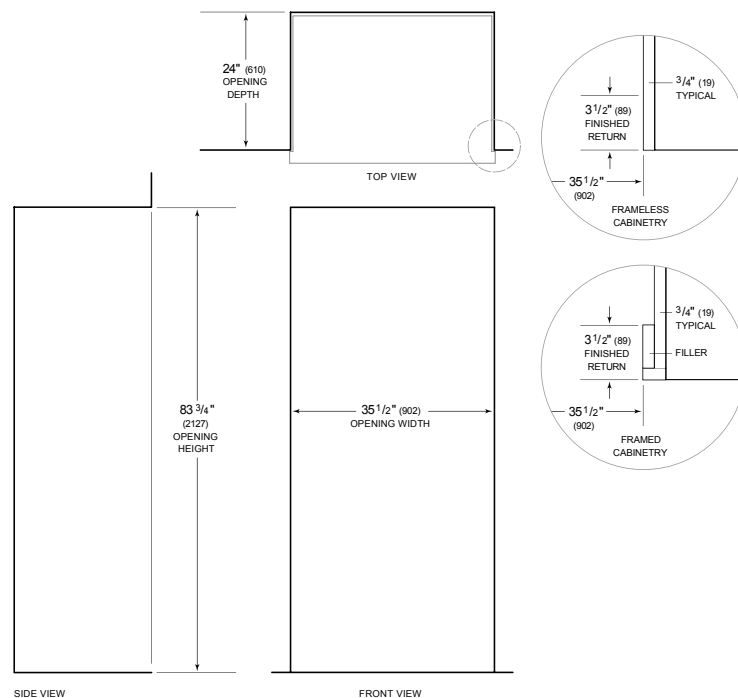


This illustration is intended for interior reference only and may not represent the exterior of the model being specified.

**DIMENSIONS**



**STANDARD INSTALLATION**



**NOTE:** 3 1/2" (89) finished returns will be visible and should be finished to match cabinetry. Shaded line represents profile of unit.

# 24" Bar Handle Dishwasher

800 Series – Stainless Steel SHX78B75UC



**SHX78B75UC**  
Stainless Steel

**Patented CrystalDry™ technology transforms moisture into heat to get dishes, including plastics, 60% drier.<sup>1</sup>**

## Features & Benefits

42 dBA: dishwasher runs quietly so your kitchen conversations aren't interrupted.

The Flexible 3rd Rack with fold down sides adds 30% more<sup>2</sup> loading area, perfect for utensils and ramekins.

Connect to WiFi and enable Home Connect™ to reorder dish tabs via Amazon<sup>3</sup>, plus get alerts when dishes are done.

The Favorite button allows you to easily access your preferred cycle/option combination with 1 touch.

The AquaStop® leak protection system contains leaks through a precisely engineered system, giving you the ultimate peace of mind whether you are away or at home.

General Properties	
Number of wash cycles	7
Number of options	7
dBA	42
Drying system	CrystalDry™ option
Third rack	Flexible 3rd Rack
Rack adjustability	Rackmatic®
Tub material	Stainless Steel
Control type	Touch Control
Concealed water heating element	Yes
Leak protection system	24/7 AquaStop® Plus
Sanitize option	Yes
Water softener	Yes
Five-level wash	Yes
ChildLock	No
Home Connect™ (WiFi enabled)	Yes
Special features	InfoLight®
Efficiency	
Water usage per cycle	3.5
Energy efficiency class	Tier 1
ENERGY STAR® qualified	Yes
Total annual energy consumption	269 kWh
Total annual water consumption	623.5 g



Capacity	
Number of place settings	15
Technical Details	
Watts	1440 W
Current	12 A
Volts	120 V
Frequency	60 Hz
Power cord full length	67"
Power cord install length from edge of unit when facing the door	Left – 47 1/4" Right – 47 1/4"
Minimum water pressure	14 lb/sin
Length outlet hose	74 3/4"
Dimensions & Weight	
Overall appliance dimensions (HxWxD)	34 1/16" x 23 9/16" x 22 9/16"
Required cutout size (HxWxD)	34 1/16" x 24" x 24"
Adjustable feet	Yes
Net weight	106 lbs
Accessories—Optional	
Junction Box	SMZPCJB1UC
Drain Hose Extension Kit	SGZ1010UC
Dishwasher Accessory Kit	SMZ5000
Anti-Tarnish Silverware Cassette	SMZ5002UC
Edge Protector + Power Cord Clip Install Kit	SMZEPCC1UC

<sup>1</sup>Based on aggregate average drying performance of Bosch Dishwashers with CrystalDry on combined household load including plastics, glass, steel, and porcelain as compared to Bosch Dishwashers with PureDry®. Drying performance may vary by dish type.

<sup>2</sup>Compared to a Bosch dishwasher with 2 racks.

<sup>3</sup>Smart reordering via the Amazon Alexa app. Only available in participating countries.

**Accessories:** To purchase Bosch accessories, cleaners & parts please visit [www.bosch-home.com/us/store](http://www.bosch-home.com/us/store) or call 1-800-944-2904 (Mon to Fri 5 am to 6 pm PST, Sat 6 am to 3 pm PST).

**Notes:** All height, width and depth dimensions are shown in inches. BSH reserves the absolute and unrestricted right to change product materials and specifications, at any time, without notice. Consult the product's installation instructions for final dimensional data and other details prior to making cutout.

**Warranties:** Please see Use & Care manual or Bosch website for statement of limited warranty.

**For more information on our entire line of products, go to [www.bosch-home.com/us](http://www.bosch-home.com/us) or call 1-800-944-2904**

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