



## Northwest ENERGY STAR<sup>®</sup> Homes Approved Technical Compliance Options Summary

TCO: Hybrid “Ductless-Split” Heat Pump/ Electric Resistance Zonal Heating (Washington)	
<b>Option Type:</b>	Component Trade-Off
<b>Submitted By:</b>	NEEA
<b>Date Approved:</b>	December 2010
<b>Description:</b>	Allow a ductless-split heat pump in combination with electric resistance zonal (ductless) as the heating source within a WA BOP 1 home.
<b>References:</b>	<ol style="list-style-type: none"> <li>1. Northwest ENERGY STAR Homes 2011 Specifications for WA BOP1.</li> <li>2. Ductless-split Heat Pump Specification, attached</li> </ol>
<b>Additional Comments:</b>	<ol style="list-style-type: none"> <li>1. All requirements specified in WA BOP 1 shall apply to this tradeoff except as specified below.</li> <li>2. The primary heating system in this trade-off shall be a ductless split heat pump with an HSPF rating that has the capacity to supply part of the heating and cooling requirements of the house as indicated in the specifications under section 1.2.</li> <li>3. The ductless split heat pump shall have a minimum HSPF rating of 10.5 for a single indoor fan coil or an overall system average of 8.5 HSPF if two or more indoor fan coils are installed.</li> <li>4. Sizing of the ductless split heat pump shall meet the minimum output requirements in the attached specifications.</li> <li>5. Zonal electric heaters may be installed to supplement the output rated capacity of the ductless split heat pump system heaters. The total capacity of these zonal electric heaters shall meet the capacity limitation in the specifications (Section 1.6).</li> <li>6. Lighting in the home shall use ENERGY STAR qualified CFLs or pin-based lighting in 90% of fixtures or use any lighting designing achieving a maximum 0.6 W/ft<sup>2</sup>.</li> </ol>



## **Ductless-Split Heat Pump System Specifications**

### **1.1. General**

This section focuses on the equipment and installation standards for ductless split heat pumps for use as the space conditioning system applied to ENERGY STAR homes constructed under NWBOP 1 in Washington.

### **1.2. Sizing**

Equipment used to meet this specification shall have a *minimum* heating size (output) as specified below (depending on the climate of the installation):

1. Coastal zones west of the Cascades (Zone 1), 6 BTU<sub>h</sub>/ft<sup>2</sup> of heated floor area;
2. Inter-mountain zones of eastern Washington with less than 7000 heating degree days (Zone 2), 8 BTU<sub>h</sub>/ft<sup>2</sup> of heated floor area;

Equipment shall be sized and rated using the AHRI HSPF rating. More than one ductless split heat pump meeting these specifications may be used to achieve these sizing requirements.

### **1.3. Location**

At least one indoor fan coil shall be located in the main living area of the house. Multiple indoor fan coils are allowed provided one is in the main living area. Typically, more than one indoor fan coil will be required for homes with capacity requirements above 2 tons as calculated in section 1.2. Ducted systems (either direct or indirect) shall not be allowed, except when used as part of a Ceiling Concealed Duct indoor fan coil system. The short duct runs for this exception shall be sealed and located within the conditioned space of the house.

### **1.4. Equipment Efficiency**

Ductless split heat pumps used under this Technical Compliance Option shall have a minimum HSPF of 10.5 for a single indoor fan coil or a system average of 8.5 for two or more indoor fan coils as rated under the AHRI guidelines and as specified in Additional Comment #3. Equipment without an AHRI seasonal performance rating meeting these requirements is not allowed.

### **1.5. Distribution and Control**

#### **1.5.1. Heat delivery**

An external surface mounted fan (such as a ceiling fan) may be allowed, but under no circumstances is a separate duct system to be attached to either the indoor unit or the auxiliary fans, unless the indoor unit is the ceiling concealed duct type and specifically designed for use with short duct runs. The ducts shall be sealed and located within the conditioned space of the house.



### 1.5.2. Control

The unit heater/fan coil must be controlled by a thermostat that is adjustable by a controller separate from the unit and can be directly controlled by the occupant. The thermostat shall be capable of turning on the unit heater without intervention to maintain the room at the desired set point.

### 1.5.3. Commissioning

The split system heat pump installed under this TCO shall be charged in accordance with the manufacturer specifications.

## 1.6. Electric Resistance heaters

In addition to the ductless split heat pump fan coils, the home may be heated by supplemental electric unit heaters or zone heaters. Electric unit heaters complying with this specification shall have a total *maximum* size as specified below (depending on the climate of the installation):

1. Coastal zones west of the Cascades (Zone 1), 3 W/ft<sup>2</sup> of entire house heated floor area;
2. Inter-mountain zones of eastern Washington with less than 7000 heating degree days (Zone 2), 4 W/ft<sup>2</sup> of entire house heated floor area;

Each room in which the heaters are located shall have a thermostat capable of controlling the room heaters separately from other zones in the house.

## 1.7. Additional Measure Requirements

### 1.7.1. Lighting

As stated in Additional Comment #6, lighting in the home shall use ENERGY STAR qualified CFL's or pin-based lighting in 90% of fixtures or use any lighting designing achieving a maximum 0.6 W/ft<sup>2</sup>.