

ENERGY STAR[®]

Residential New Construction Programs

Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision. Please find current program documents on the [Program Requirements](#) webpage.

Use of older Versions and Revisions, such as this document, are typically limited to homes and buildings with a permit date (or, for manufactured homes, a production date) prior to a specified date. Consult the [Implementation Timeline](#) table to assess whether a home or apartment is still eligible to be certified using this document.

For questions or more information, contact us at energystarhome@energystar.gov.



HERS Index Target Procedure for the States of Oregon and Washington ENERGY STAR Certified Homes, Version 3.2 (Rev. 08)

This document provides instructions for determining the ENERGY STAR HERS Index Target, the highest numerical HERS Index value that each rated home may achieve to earn the ENERGY STAR. Note that, in addition to meeting the ENERGY STAR HERS Index Target, homes shall also meet all Mandatory Requirements for All Certified Homes in Exhibit 2 of the Oregon and Washington Program Requirements, ENERGY STAR Certified Homes, Version 3.2 (Rev. 08).

A RESNET-accredited Home Energy Rating software program shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Reference Design) this target for each rated home. This shall be done by configuring the ENERGY STAR Reference Design Home in accordance with Exhibit 1, the Expanded ENERGY STAR Reference Design Definition, and calculating its associated HERS Index value. This value, rounded to the nearest whole number, shall equal the ENERGY STAR HERS Index Target.



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Exhibit 1: Expanded ENERGY STAR Reference Design Definition for the States of Oregon and Washington

Building Component	Expanded ENERGY STAR Reference Design Definition ¹			
Foundations:	Construction Type & Structural Mass: Same as Rated Home, except: <ul style="list-style-type: none"> For masonry floor slabs, modeled with 80% of floor area covered by carpet and 20% of floor directly exposed to room air 			
	Conditioning Type: Same as Rated Home, except: <ul style="list-style-type: none"> Crawlspaces shall be modeled as vented with net free vent aperture = 1sq. ft. per 150 sq. ft. of crawlspace floor area 			
	Gross Area: Same as Rated Home ²			
	Insulation: ^{3,4} Choose appropriate insulation level below: <ul style="list-style-type: none"> Basement Wall Assembly U-factor only applies to conditioned bsmt.'s; if applicable, insulation shall be located on interior side of walls Floor assemblies above crawlspace foundations shall be configured to meet the applicable floor assembly U-factor listed in the building component section for Floors Over Unconditioned Spaces On-grade and below-grade slab floors shall be insulated to the Slab Insulation R-value at both the perimeter for the entire depth of the slab, or 2 ft. if slab depth is not specified by user, and under the entire slab area. 			
	Climate Zone:	CZ 4C & 5	CZ 6	
Slab Insulation R-Value:	10	10		
Basement Wall Assembly U-Factor:	0.042	0.042		
Floors Over Unconditioned Spaces:	Construction Type: Wood frame			
	Gross Area: Same as Rated Home			
	Insulation: ^{3,4}			
	Climate Zone:	CZ 4C & 5	CZ 6	
	Floor Assembly U-Factor:	0.028	0.028	
Above-Grade Walls:	Interior and Exterior Construction Type: Wood frame			
	Gross Area: Same as Rated Home			
	Solar Absorptance = 0.75			
	Emittance = 0.90			
	Insulation: ³			
	Climate Zone:	CZ 4C & 5	CZ 6	
	Wall Assembly U-Factor:	0.056	0.056	
Thermally Isolated Sunrooms:	None			
Doors:	Area: Same as Rated Home			
	Orientation: Same as Rated Home			
	U-Values and SHGCs: ⁵			
	Door Type:	Opaque	≤ 1/2-Lite	> 1/2-Lite
	U-Value:	0.17	0.25	0.30
SHGC:	N/A	0.25	0.30	
Glazing:	Total Area: (except in homes with conditioned basements and attached homes ⁶) <ul style="list-style-type: none"> Same as Rated Home, where Rated Home glazing area is less than 15% of conditioned floor area; <u>OR</u> 15% of the conditioned floor area, where the Rated Home glazing area is 15% or more of the conditioned floor area 			
	Orientation: Equally distributed to North, East, South, and West			
	Interior Shade Coefficient: Same as HERS Reference Home, as defined by RESNET's standard ⁷			
	External Shading: None			
	U-Values and SHGCs: ⁵			
	Climate Zone:	CZ 4C & 5	CZ 6	
	U-Value:	0.27	0.27	
SHGC:	0.30	0.30		
Skylights:	None			
Ceilings:	Construction Type: Wood frame			
	Gross Area: Same as Rated Home			
	Insulation: ³			
	Climate Zone:	CZ 4C & 5	CZ 6	
	Ceiling Assembly U-Factor:	0.026	0.026	
Attics:	Construction Type: Vented with aperture = 1sq. ft. per 300 sq. ft. ceiling area			
	Radiant Barrier: None			
Roofs:	Construction Type: Composition shingle on wood sheathing			
	Gross Area: Same as Rated Home			
	Solar Absorptance = 0.92			
	Emittance = 0.90			



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Exhibit 1: Expanded ENERGY STAR Reference Design Definition for the States of Oregon and Washington (Continued)

Heating Systems:	Heating loads may be calculated and equipment capacity selected according to the latest edition of ACCA Manual J, ASHRAE 2009 Handbook of Fundamentals, or a substantively equivalent procedure; otherwise, same as Rated Home.		
	Fuel Type: Same as Rated Home ⁸		
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump where Rated Home is modeled with ground-source heat pump, electric strip or baseboard heat; applicable efficiency selected from below ⁹		
	Climate Zone:	CZ 4C & 5	CZ 6
	Gas Furn. AFUE:	95	95
	Oil Furn. AFUE:	85	85
	Gas Boiler AFUE:	90	90
	Oil Boiler AFUE:	86	86
Air-Source Heat Pump HSPF:	9.5	9.5	
Air-Source Heat Pump Backup:	Electric	Electric	
Ground-Source Heat Pump COP:	n/a	n/a	
Cooling Systems:	Cooling loads may be calculated and equipment capacity selected according to the latest edition of ACCA Manual J, ASHRAE 2009 Handbook of Fundamentals, or a substantively equivalent procedure; otherwise, same as Rated Home.		
	Fuel Type: Same as Rated Home ⁸		
	System Type: Same as Rated Home, except Reference Design shall be configured with air-source heat pump where Rated Home is modeled with ground-source heat pump; applicable efficiency selected from below. ¹⁰		
	Climate Zone:	CZ 4C & 5	CZ 6
	AC SEER:	13	13
	Air-Source Heat Pump SEER:	15	15
Ground-Source Heat Pump EER:	n/a	n/a	
Service Water Heating Systems:	Use (Gallons per Day): Same as HERS Reference Home, as defined by RESNET's standard, except configured with low-flow showers and faucets and all DHW piping insulated with R-3 insulation. ⁷		
	Tank Temperature: Same as HERS Reference Home, as defined by RESNET's standard. ⁷		
	Distribution System Type: Standard, without recirculation		
	Fuel Type & System Type: If Rated Home uses a system with a gas or propane fuel type, model as instantaneous gas water heater. If Rated Home uses a system with an oil, electric, or other fuel type, model as 60 gallon electric heat pump water heater. Select applicable efficiency from below. ¹¹		
	Climate Zone:	CZ 4C & 5	CZ 6
Gas DHW EF:	0.91	0.91	
Electric DHW EF:	2.5	2.0	
Thermal Distribution Systems:	Duct Leakage to Outside: The greater of 4 CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM25.		
	Duct Insulation: R-8 on all ducts located in unconditioned space		
	Duct Surface Area: Same as Rated Home		
	Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g. multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in attic space.		
	Foundation Type:	Slab	Crawlspace
One Story Above Grade:	100% Attic	100% Crawlspace	100% Basement
Two Story Above Grade:	75% Attic / 25% Conditioned	50% Attic / 50% Crawlspace	50% Attic / 50% Basement
Thermostat:	Type: Programmable		
	Temperature Setpoints: Defined by RESNET's standard, including offsets for programmable thermostat ⁷		
Infiltration & Mechanical Ventilation:	Infiltration Rates:		
	Climate Zone:	CZ 4C & 5	CZ 6
	ACH50:	3	3
	Mechanical ventilation system without heat recovery		
	Rate: CFM = 0.01 * CFA + 7.5 * (Nbr + 1), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms		
	Runtime: 24 Hours per Day		
	Fan Watts: Watts = CFM Rate / 2.8 CFM per Watt, where CFM Rate is determined above		
Climate Zone:	CZ 4C & 5	CZ 6	
Ventilation Type:	Exhaust	Exhaust	
Lighting, Appliances, & Internal Gains:	Lighting: Fraction of qualifying fixtures to all fixtures in qualifying light fixture locations 90% for interior; 0% for exterior and garage		
	Refrigerator: 423 kWh per year		
	Dishwasher: 0.66 EF		
	Ceiling Fan: 122 CFM per Watt; Quantity = Number of bedrooms + 1 when ceiling fans present in the Rated Home; otherwise Quantity = 0		
Internal Gains: Defined by RESNET's standard, including adjustments to account for the high-efficiency lighting & appliances listed above. ⁷			
Internal Mass:	Same as HERS Reference Home, as defined by RESNET's standard. ⁷		
	Additional mass specifically designed as a Thermal Storage Element for the Rated Home shall be excluded.		



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Notes:

1. Any parameter not specified in this exhibit shall be identical to the value entered for the Rated Home.
2. "Same as Rated Home" indicates that the parameter shall be identical to the value entered for the Rated Home.
3. Slab insulation R-values represent nominal insulation levels; and assembly U-factors for foundations, floors, walls, and ceilings represent the overall assembly, inclusive of sheathing materials, cavity insulation, installation quality, framing, and interior finishes.
4. If software allows the user to specify the thermal boundary location independent of the conditioned space boundary in the basement of the rated home, then the thermal boundary of the ENERGY STAR Reference Design shall be aligned with this boundary. For example, if the thermal boundary is located at the walls, then the wall insulation shall be configured as if it was a conditioned basement. If the thermal boundary is located at the floor above the basement, then the floor insulation shall be configured as if it was a floor over an unconditioned space.
5. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion.
6. When determining the ENERGY STAR HERS Index Target for homes with conditioned basements and for attached homes, the following formula shall be used to determine total window area of the ENERGY STAR Reference Design:

$$AF = 0.15 \times AFL \times FA \times F$$

Where:

- AF = Total fenestration area
- AFL = Total floor area of directly conditioned space
- FA = (Above-grade thermal boundary gross wall area) / (Above-grade boundary wall area + 0.5 x Below-grade boundary wall area)
- F = $1 - 0.44 \times (\text{Common wall area}) / (\text{Above-grade thermal boundary wall area} + \text{Common wall area})$

And where:

- Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions;
 - Above-grade thermal boundary wall is any portion of a thermal boundary wall not in contact with soil;
 - Below-grade boundary wall is any portion of a thermal boundary wall in soil contact; and
 - Common wall is the total wall area of walls adjacent to another conditioned living unit, not including foundation walls.
7. RESNET requires that all RESNET-accredited Home Energy Rating software programs automatically configure this parameter per ANSI / RESNET / ICC 301-2014 when calculating a HERS index value.
 8. Fuel type(s) shall be same as Rated Home, including any dual-fuel equipment where applicable. For a Rated Home with multiple heating or cooling systems using different fuel types, the applicable system capacities and fuel types shall be weighted in accordance with the loads distribution (as calculated by accepted engineering practice for that equipment and fuel type) of the multiple systems.
 9. For a Rated Home without a heating system, the ENERGY STAR Reference Design Home shall be configured with a 78% AFUE gas furnace system, unless the Rated home has no access to natural gas or fossil fuel delivery. In such cases, the ENERGY STAR Reference Design Home shall be configured with a 7.7 HSPF air-source heat pump.
 10. For a Rated Home without a cooling system, the ENERGY STAR Reference Design Home shall be configured with a 13 SEER electric air conditioner.
 11. For a Rated Home with multiple water heating systems using different fuel types, the system capacities and fuel types shall be weighted in accordance with the loads distribution (as calculated by accepted engineering practice for that equipment and fuel type) of the multiple systems.