ENERGY STAR Certified Homes, Version 3.1 (Rev. 08) Modified Prescriptive Path Allowance

Prior to Rev. 06, homes were permitted to be certified using either a Prescriptive Path or a Performance Path. With the release of Rev. 06, only the Performance Path remains, which has been renamed the ENERGY STAR Certification Process. However, to help minimize the disruption to partners who might have had Prescriptive Path projects in process at the time Rev. 06 was released, homes with a permit date before 09/01/2015 [1] are permitted to use the following modified Prescriptive Path allowance.

Modified Prescriptive Path Allowance

The modified Prescriptive Path allowance provides a single set of measures that can be used to construct an ENERGY STAR Certified Home. No tradeoffs are allowed. However, under this allowance, modeling is required to ensure that all homes receive a HERS rating. The only purpose of this allowance is to provide an alternative ENERGY STAR HERS Index Target. This alternative target will only be beneficial for homes in which the Prescriptive Path efficiency measures do not produce a HERS index that meets the default ENERGY STAR HERS Index Target.

Follow these steps to use the modified Prescriptive Path allowance:

1. First, assess the eligibility to use the modified Prescriptive Path allowance by comparing the conditioned floor area (CFA) of the home to be certified to the CFA of the Benchmark Home as specified in Exhibit 2. [2] For the purposes of this step, calculate the number of bedrooms and the CFA of the home to be certified using RESNET standards with the following exception: floor area in basements with at least half of the gross surface area of the basement's exterior walls below grade shall not be counted. [3] The modified Prescriptive Path allowance is only permitted to be used if the CFA of the home to be certified is equal to or smaller than the CFA of the Benchmark Home.
2. If the home to be built is eligible to use the modified Prescriptive Path allowance, use a RESNET-accredited Home Energy Rating software program to determine the default ENERGY STAR HERS Index Target, which is the highest numerical HERS Index value that each rated home may achieve to earn the ENERGY STAR under the Certification Process. [4]
3. Using the same software program, configure the home to be certified with all of the efficiency features of the ENERGY STAR Reference Design, Exhibit 1, and generate the resulting HERS index.
4. If the resulting HERS index does not meet the default ENERGY STAR HERS Index Target, then the home is eligible to use the resulting HERS index instead, called the alternative ENERGY STAR HERS Index Target. Contact EPA at energystarhomes@energystar.gov prior to certification to request use of the allowance, along with the modeling file from the software program, the default ENERGY STAR HERS Index Target, and the alternative ENERGY STAR HERS Index Target. EPA will review the model for accuracy and, upon review, will allow the project to be certified using the alternative ENERGY STAR HERS Index Target. Partners will then proceed with Step 3 of the ENERGY STAR Certification Process defined in the ENERGY STAR Certified Homes National Program Requirements, Version 3.1 (Rev. 08).

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Exhibit 1: ENERGY STAR Reference Design

Hot Climates (2009 IECC Zones 1,2,3) [5]	**Mixed and Cold Climates** (2009 IECC Zones 4,5,6,7,8) [5]
Cooling Equipment (Where Provided) [6]	
• Cooling equipment shall meet the following applicable efficiency levels:	
• ≥ 15 SEER / 12 EER, **OR;** • Heat pump (See Heating Equipment)	• ≥ 13 SEER AC, **OR**; • Heat pump (See Heating Equipment)
Heating Equipment [6]	
• Heating equipment shall meet the following applicable efficiency levels:	

• Gas furnace, efficiency as follows:
  • *CZ 1 & 2:* ≥ 80 AFUE furnace, **OR;**
  • *CZ 3:* ≥ 90 AFUE furnace, ENERGY STAR certified, **OR;**
• ≥ 80 AFUE oil furnace, **OR;**
• ≥ 80 AFUE boiler, **OR;**
• ≥ 8.2 HSPF / 15 SEER / 12 EER air-source heat pump, with electric backup or dual-fuel backup heating, **OR;**
• Ground-source heat pump, any product type, ENERGY STAR certified [8]
	• ≥ 95 AFUE ENERGY STAR gas furnace, **OR;**
	• ≥ 85 AFUE ENERGY STAR oil furnace, **OR;**
	• ≥ 90 AFUE ENERGY STAR gas boiler, **OR;**
	• ≥ 86 AFUE ENERGY STAR oil boiler, **OR;**
	• Air-source heat pump [7], with efficiency as follows:
	  • *CZ 4:* ≥ 8.5 HSPF / 15 SEER / 12 EER with electric backup, **OR;**
	  • *CZ 5:* ≥ 9.25 HSPF / 15 SEER / 12 EER with electric backup, **OR;**
	  • *CZ 6:* ≥ 9.5 HSPF / 15 SEER / 12 EER with electric backup, **OR;**
	• Air-source heat pump, ≥ 8.2 HSPF / 15 SEER / 12 EER with dual-fuel backup, **OR;**
	• Ground-source heat pump, any product type, ENERGY STAR certified [8]

Envelope, Windows, & Doors

- Insulation levels shall meet or exceed 2012 IECC levels and achieve Grade I installation per RESNET standards. [9,10,11]
- Infiltration rates shall be less than or equal to the following values:

4 ACH50 in CZs 1,2	3 ACH50 in CZs 3,4,5,6,7

- Windows, doors, and skylights shall be ENERGY STAR certified, as illustrated below: [12,13]

Window U-Value:	≤ 0.40 in CZs 1,2	≤ 0.30 in CZ 3	≤ 0.30 in CZ 4	≤ 0.27 in CZs 5,6,7,8
Window SHGC:	≤ 0.25 in CZs 1,2	≤ 0.25 in CZ 3	≤ 0.40 in CZ 4	Any in CZs 5,6,7,8

Skylight U-Value:	≤ 0.60 in CZs 1,2	≤ 0.53 in CZ 3	≤ 0.53 in CZ 4	≤ 0.50 in CZs 5,6,7,8
Skylight SHGC:	≤ 0.28 in CZs 1,2	≤ 0.28 in CZ 3	≤ 0.35 in CZ 4	Any in CZs 5,6,7,8

Door U-Value:	Opaque: ≤ 0.17	≤½ lite: ≤ 0.25	>½ lite: ≤ 0.30
Door SHGC:	Opaque: Any	≤½ lite: ≤ 0.25	>½ lite: ≤ 0.25 in CZs 1,2,3; ≤ 0.40 in CZs 4,5,6,7,8

Water Heater

- DHW equipment shall meet the following efficiency requirements: [14]

Gas:	30 Gal = 0.63 EF	40 Gal = 0.61 EF	50 Gal = 0.59 EF	60 Gal = 0.57 EF	70 Gal = 0.55 EF	80 Gal = 0.53 EF
Electric:	30 Gal = 0.94 EF	40 Gal = 0.93 EF	50 Gal = 0.92 EF	60 Gal = 0.91 EF	70 Gal = 0.90 EF	80 Gal = 0.89 EF
Oil:	30 Gal = 0.55 EF	40 Gal = 0.53 EF	50 Gal = 0.51 EF	60 Gal = 0.49 EF	70 Gal = 0.47 EF	80 Gal = 0.45 EF

Thermostat & Ductwork

- Programmable thermostat shall be installed unless thermostat controls a zone with electric radiant heat, for which manual thermostat is allowed.[15]
- Total duct leakage shall be ≤ 4 CFM25 per 100 sq. ft. of conditioned floor area at rough-in.
- All ducts and air handlers shall be located within conditioned space.

Lighting & Appliances

- Where refrigerators, dishwashers, ceiling fans, or exhaust fans [16] are installed, products shall be ENERGY STAR certified.
- ENERGY STAR certified light bulbs or fixtures shall be installed in ≥ 90% of RESNET-defined Qualifying Light Fixture Locations.

Exhibit 2: Benchmark Home [2]

Bedrooms in Home to be Built	0	1	2	3	4	5	6	7	8
Conditioned Floor Area Benchmark Home	1,000	1,000	1,600	2,200	2,800	3,400	4,000	4,600	5,200

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Notes:

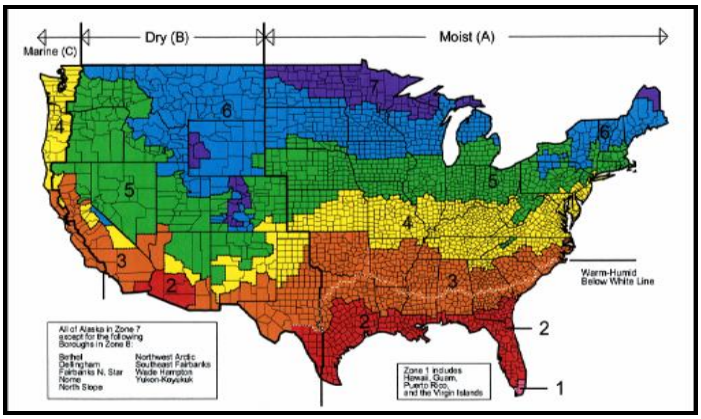
1. The Rater may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.
2. The average-size home with a specific number of bedrooms is termed the "Benchmark Home". The conditioned floor area of a Benchmark Home ($CFA_{Benchmark\ Home}$) is determined by selecting the appropriate value from Exhibit 2. For homes with more than 8 bedrooms, the $CFA_{Benchmark\ Home}$ shall be determined by multiplying 600 sq. ft. by the total number of bedrooms & adding 400 sq. ft.

   Example: $CFA_{Benchmark\ Home}$ for a 10 bedroom home = (600 sq. ft. x 10) + 400 sq. ft. = 6,400 sq. ft.

   A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

   An egress window, as defined in 2012 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

   - have a sill height of not more than 44 in. above the floor; AND
   - have a minimum net clear opening of 5.7 sq. ft.; AND
   - have a minimum net clear opening height of 24 in.; AND
   - have a minimum net clear opening width of 20 in.; AND
   - be operational from the inside of the room without the use of keys, tools or special knowledge.
3. To determine whether at least half of the basement wall area is below grade, use the gross surface area of the walls that are in contact with either the ground or ambient outdoor air, measured from the basement floor to the bottom of the basement ceiling framing (e.g., the bottom of the joists for the floor above). Note that the exception regarding the floor area in basements is only for the purpose of determining a home's Benchmark Home Size, Size Adjustment Factor, and eligibility to use the modified Prescriptive Path allowance. The full conditioned floor area, per RESNET's standards, should be used when rating the home (e.g., determining compliance with duct leakage requirements).
4. This target shall be specifically determined for each rated home by following the steps outlined in the ENERGY STAR HERS Index Target Procedure, Version 3.1, available on EPA's Website. This procedure defines how to configure the ENERGY STAR Reference Design Home and calculate its associated HERS Index value and then how to apply the Size Adjustment Factor to determine the ENERGY STAR HERS Index Target.
5. The following map illustrates the Climate Zone boundaries as defined by the 2012 IECC Figure R301.1.



6. Where ENERGY STAR certified heating or cooling systems are required, all installed equipment of that system type must be ENERGY STAR certified.
7. Air source heat pumps with electric resistance backup heating cannot be used in homes certified in Climate Zones 7 & 8 using the modified Prescriptive Path allowance.
8. The following efficiency levels shall be used based on ground-source heat pump product type:
   - *Closed Loop Water-to-Air*: ≥ 3.6 COP / 17.1 EER
   - Open Loop Water-to-Air: ≥ 4.1 COP / 21.1 EER
   - Direct Geo-Exchange (DGX): ≥ 3.6 COP / 16 EER
   - *Closed Loop Water-to-Water: ≥ 3.1 COP / 16.1 EER*
   - *Open Loop Water-to-Water: ≥ 3.4 COP / 20.1 EER*
9. Insulation levels in a home shall meet or exceed the component insulation requirements in the 2012 IECC - Table R402.1.1. The following exceptions apply:
   a. Steel-frame ceilings, walls, and floors shall meet the insulation requirements of the 2012 IECC – Table R402.2.6. This exception shall not apply if the alternative calculations in d) are used;

b. For ceilings with attic spaces, R-30 shall satisfy the requirement for R-38 and R-38 shall satisfy the requirement for R-49 wherever the full height of uncompressed insulation at the lower R-value extends over the wall top plate at the eaves. This exemption shall not apply if the alternative calculations in d) are used;

c. For ceilings without attic spaces, R-30 shall satisfy the requirement for any required value above R-30 if the design of the roof / ceiling assembly does not provide sufficient space for the required insulation value. This exemption shall be limited to 500 square ft. or 20% of the total insulated ceiling area, whichever is less. This exemption shall not apply if the alternative calculations in d) are used;

d. An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

An assembly with a U-factor equal or less than specified in 2012 IECC Table R402.1.3 complies.

A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table R402.1.3 also complies. The performance of all components (i.e., ceilings, walls, floors, slabs, and fenestration) can be traded off using the UA approach. Note that Items 3.1 through 3.3 of the Rater Field Checklists shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

10. Consistent with the 2012 IECC, slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12 inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of the interior slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall.

11. Insulation shall be verified by a Rater to achieve Grade I installation as defined in the RESNET Standards, except for ceiling, wall, and floor assemblies with continuous rigid insulation. For such homes, Grade II installation is acceptable for the cavity insulation only if the continuous rigid insulation meets or exceeds the following levels: R-3 in Climate Zones 1 to 4; R-5 in Zones 5 to 8.

12. All windows, doors, and skylights shall meet or exceed ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights – Version 6.0 as outlined at www.energystar.gov/windows. If no NFRC rating is noted on the window or in product literature (e.g., for site-built fenestration), select the U-factor and SHGC value from Tables 4 and 14, respectively, in 2005 ASHRAE Fundamentals, Chapter 31. Select the highest U-factor and SHGC value among the values listed for the known window characteristics (e.g., frame type, number of panes, glass color, and presence of low-e coating). Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion. The following exceptions apply:

a. An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements;

b. An area-weighted average of fenestration products > 50% glazed shall be permitted to satisfy the SHGC requirements;

c. 15 square feet of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above;

d. One side-hinged opaque door assembly up to 24 square feet in area shall be exempt from the U-factor requirements and shall be excluded from area-weighted averages calculated using a) and b), above;

e. Fenestration utilized as part of a passive solar design shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above. Exempt windows shall be facing within 45 degrees of true South and directly coupled to thermal storage mass that has a heat capacity > 20 btu / $ft^3 x^oF$ and provided in a ratio of at least 3 sq. ft. per sq. ft. of South facing fenestration. Generally, thermal mass materials will be at least 2 in. thick.

13. All decorative glass and skylight window areas count toward the total window area to above-grade conditioned floor area (WFA) ratio. For homes that have a WFA ratio > 15%, the following additional requirements apply:

a. In Climate Zones 1, 2, and 3, an improved window SHGC is required and is determined by:

Improved SHGC = [0.15 / WFA] x [ENERGY STAR SHGC]

Where "ENERGY STAR SHGC" is the max. allowable SHGC in Exhibit 1 for the Climate Zone where the home will be built.

b. In Climate Zones 4, 5, 6, 7, and 8, an improved window U-Value is required and is determined by:

Improved U-Value = [0.15 / WFA] x [ENERGY STAR U-Value]

Where "ENERGY STAR U-Value" is the max. allowable U-Value in Exhibit 1 for the Climate Zone where the home will be built.

14. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations: Gas DHW EF ≥ 0.69 - (0.002 x Tank Gallon Capacity); Electric DHW EF ≥ 0.97 - (0.001 x Tank Gallon Capacity); Oil DHW EF ≥ 0.61 - (0.002 x Tank Gallon Capacity). The minimum efficiency for instantaneous water heaters shall be determined using the above equations and assuming a 1 gallon capacity.

Domestic hot water systems that are integrated with the space-heating system are permitted to be used in the following two scenarios: either the space-heating system (e.g., furnace or boiler) shall heat and circulate a fluid through an indirect storage tank, or a single integrated/combined product intended for both space heating and domestic hot water shall be used. A 'tankless coil water heater', where domestic water flows through a coil installed in the space-heating system, is not permitted.

15. For homes with heat pumps that contain an electric resistance heating element used to supplement the capacity of the heat pump, the thermostat shall have 'Adaptive Recovery' technology to prevent excessive use of the heating element.

16. All exhaust fans shall be ENERGY STAR certified, except in half bathrooms. A half bathroom is any bathroom that does not contain a bathtub, shower, spa, or similar source of moisture.