



ENERGY STAR Qualified Homes National Attached Homes Builder Option Package

The requirements for the National Attached Homes Builder Option Package specified below apply to townhomes, apartments, and condominiums that are subject to the residential code of the jurisdiction in which they are built¹.

To qualify as ENERGY STAR using this BOP, a home must meet the requirements specified and be verified and field-tested in accordance with the HERS Standards by a RESNET-accredited Provider. Note that compliance with these guidelines is not intended to imply compliance with all local code requirements that may be applicable to the home to be built.²

Incorporate All Requirements in this Section		
Minimum HVAC Requirements (where provided)	<ul style="list-style-type: none"> 13 SEER A/C³ and 80 AFUE gas furnace; <u>OR</u> 13 SEER A/C³ and 80 AFUE boiler; <u>OR</u> 13 SEER A/C³ and 80 AFUE oil furnace; <u>OR</u> 13 SEER / 7.7 HSPF heat pump^{3,4} 	
Thermostat ⁴	ENERGY STAR qualified thermostat (except for zones with radiant heat)	
Ductwork	Leakage ⁵ : ≤ 4 cfm to outdoors / 100 sq. ft.; <u>AND</u> R-6 min. insulation on ducts in unconditioned spaces ⁶	
Envelope	<ul style="list-style-type: none"> Infiltration^{7,8} (ACH50): 7 in CZ's 1-2 6 in CZ's 3-4 5 in CZ's 5-7 4 in CZ 8; <u>AND</u> Insulation levels that meet or exceed the 2004 IRC⁹; <u>AND</u> Completed Thermal Bypass Inspection Checklist¹⁰ 	
Windows	ENERGY STAR qualified windows or better (additional requirements for CZ2 and CZ4) ^{11, 12, 13}	
Water Heater ^{14, 15}	Gas (EF): 40 Gal = 0.61 60 Gal = 0.57 80 Gal = 0.53 Electric (EF): 40 Gal = 0.93 50 Gal = 0.92 80 Gal = 0.89 Oil or Gas ¹⁶ : Integrated with space heating boiler	
Lighting and Appliances ^{17, 18}	Five or more ENERGY STAR qualified appliances, light fixtures, ceiling fans equipped with lighting fixtures, and/or ventilation fans	
In Addition, Pick One of the Four Options Below		
	Hot Climates ¹⁹ (2004 IRC Climate Zones 1,2,3)	Mixed and Cold Climates ¹⁹ (2004 IRC Climate Zones 4,5,6,7,8)
Option 1: HVAC Equipment (Where Provided)	Right-Sized: <ul style="list-style-type: none"> ENERGY STAR qualified A/C (14 SEER / 11.5 EER); <u>OR</u> ENERGY STAR qualified heat pump (14 SEER / 11.5 EER / 8.2 HSPF) 	<ul style="list-style-type: none"> ENERGY STAR qualified gas furnace (90 AFUE); <u>OR</u> ENERGY STAR qualified heat pump²⁰ (See Note 18 for specifications); <u>OR</u> ENERGY STAR qualified boiler (85 AFUE); <u>OR</u> ENERGY STAR qualified oil furnace (85 AFUE)
Option 2: Lighting ²¹ and/or Windows	<ul style="list-style-type: none"> 75% ENERGY STAR Lighting 	<ul style="list-style-type: none"> 75% ENERGY STAR Lighting; <u>AND</u> Window U-value: 0.30 / SHGC: 0.35
Option 3: Lighting ²¹ , Windows ²² , and/or Fan Motor	<ul style="list-style-type: none"> 50% ENERGY STAR Lighting; <u>AND</u> Homes with 1 detached wall: ≤ 10% WFA Homes with 2 detached walls: ≤ 12% WFA Homes with 3 detached walls: ≤ 14% WFA 	<ul style="list-style-type: none"> 50% ENERGY STAR Lighting; <u>AND</u> Furnace with two-stage burner and fan motor with at least two speeds²³; <u>AND</u> Homes with 1 detached wall: ≤ 10% WFA Homes with 2 detached walls: ≤ 12% WFA Homes with 3 detached walls: ≤ 14% WFA
Option 4: Ductwork	<ul style="list-style-type: none"> All ducts and air handling equipment located in conditioned space 	<ul style="list-style-type: none"> All ducts and air handling equipment located in conditioned space

Note: Due to the unique nature of some state codes and/or climates, EPA has agreed to allow regionally-developed definitions of ENERGY STAR in California, Hawaii, Guam, and the Pacific Northwest to continue to define program requirements. The States of Montana and Idaho may use either the requirements of the national program or the regionally-developed program in the Pacific Northwest.



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National Attached Homes BOP Notes

1. Most residential building codes apply to structures up to three stories tall. Units in four- and five-story multi-family buildings may qualify for ENERGY STAR under this BOP if they are permitted as residential structures by the local building department. Multi-family units that are located on top of commercial spaces (e.g., retail, restaurant, etc.) may be qualified as ENERGY STAR under this BOP even if the structure is permitted as commercial, as long as: 1) the entire structure is five stories or less; and 2) the space conditioning and water heating systems are not shared between the residential and commercial spaces.
2. Where requirements of the local codes, manufacturers' installation instructions, engineering documents, or regional ENERGY STAR programs overlap with the requirements of these guidelines, EPA offers the following guidance:
 - a. In cases where the overlapping requirements exceed the ENERGY STAR guidelines, these overlapping requirements shall be met;
 - b. In cases where overlapping requirements conflict with a requirement of these ENERGY STAR guidelines (e.g., slab insulation is prohibited to allow visual access for termite inspections), then the conflicting requirement within these guidelines shall not be met. Furthermore, qualification shall still be allowed if the rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement of these ENERGY STAR guidelines (e.g., switching from exterior to interior slab edge insulation).
3. Cooling equipment shall be sized according to the latest editions of ACCA Manuals J and S, ASHRAE 2001 Handbook of Fundamentals, or an equivalent procedure. Maximum oversizing limit for air conditioners and heat pumps is 15% (with the exception of heat pumps in Climate Zones 5 - 8, where the maximum oversizing limit is 25%). The following operating conditions shall be used in the sizing calculations and verified where reviewed by the rater:

Outdoor temperatures shall be the 99.0% and 1.0% design temperatures as published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available; Indoor temperatures shall be 75 F for cooling and 70 F for heating; Infiltration rate shall be selected as "tight", or the equivalent term.

In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils shall be matched in accordance with ARI standards.
4. Homes with heat pumps in Climate Zones 6, 7, and 8 cannot be qualified using this BOP, but can earn the label using the ENERGY STAR Attached Housing Performance Path requirements. In homes with heat pumps that have programmable thermostats, the thermostat must have "Adaptive Recovery" technology to prevent the excessive use of electric back-up heating.
5. Ducts must be sealed and tested to be ≤ 4 cfm to outdoors / 100 sq. ft. of conditioned floor area, as determined and documented by a RESNET-certified rater using a RESNET-approved or equivalent ASTM-approved testing protocol. Duct leakage testing can be waived if all ducts and air handling equipment are located in conditioned space (i.e., within the home's air and thermal barriers) AND the envelope leakage has been tested to be ≤ 3 ACH50 OR ≤ 0.25 CFM 50 per sq. ft. of the building envelope.
6. EPA recommends, but does not require, locating ducts within the home's conditioned space (i.e., inside the air and thermal barriers), and using a minimum of R-4 insulation for ducts inside the conditioned space to prevent condensation.
7. Envelope leakage must be determined by a RESNET-certified rater using a RESNET-approved testing protocol.
8. To ensure consistent exchange of indoor air, whole-house mechanical ventilation is recommended, but not required.
9. Insulation levels of a home must meet or exceed Sections N1102.1 and N1102.2 of the 2004 IRC. These sections allow for compliance to be determined by meeting prescriptive insulation requirements, by using U-factor alternatives, or by using a total UA alternative. These sections also provide guidance and exceptions that may be used. However, note that the U-factor for steel-frame envelope assemblies addressed in Section N1102.2.4 shall be calculated using the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method as is stated in the code. Additionally, Section N1102.2.2, which allows for the reduction of ceiling insulation in space constrained roof/ceiling assemblies, shall be limited to 500 sq. ft. or 20% of ceiling area, whichever is less. In all cases, insulation shall be inspected to Grade I installation as defined in the RESNET Standards by a RESNET-certified rater. Note that the fenestration requirements of the 2004 IRC do not apply to the fenestration requirements of the National Attached Homes Builder Option Package. Therefore, if UA calculations are performed, they must use the IRC requirements (with the exception of fenestration) plus the fenestration requirements contained in the national BOP. For more information, refer to the "Codes and Standards Information" document.
10. The Thermal Bypass Inspection Checklist must be completed for homes to earn the ENERGY STAR label.
11. The window performance levels match ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights—version 4.0, with additional requirements for climate zones 2 and 4. Additional information about version 5.0 of the program requirements for windows, which is more stringent and offers additional savings, can be found at www.energystar.gov/windows.
12. All decorative glass and skylight window area counts toward the total window area to above-grade conditioned floor area (WFA) ratio. For homes with a WFA ratio $>18\%$, the following additional requirements apply:
 - a. In IRC Climate Zones 1, 2, and 3, an improved window SHGC is required, and is determined by:



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Required SHGC = $[0.18 / \text{WFA}] \times [\text{ENERGY STAR SHGC}]$

Where the ENERGY STAR SHGC is the minimum required SHGC of the climate-appropriate window specified in this BOP.

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

Required U-Value = $[0.18 / \text{WFA}] \times [\text{ENERGY STAR U-Value}]$

Where the ENERGY STAR U-Value is the minimum required U-Value of the climate-appropriate window specified in this BOP.

13. Up to 0.75% WFA may be used for decorative glass that does not meet ENERGY STAR requirements. For example, a home with total above-grade conditioned floor area of 2,000 sq. ft. may have up to 15 sq. ft. (0.75% of 2,000) of decorative glass.
14. More efficient water heating equipment represents a significant opportunity for energy savings and a meaningful way to differentiate ENERGY STAR qualified homes from those with standard equipment. An ENERGY STAR qualified water heater not only satisfies the Water Heater efficiency requirements, but also counts toward the requirement for five or more ENERGY STAR qualified lighting products or appliances as detailed in the Lighting and Appliances guideline.
15. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations:
Gas DHW EF $\geq 0.69 - (0.002 \times \text{Tank Gallon Capacity})$; Electric DHW EF $\geq 0.97 - (0.001 \times \text{Tank Gallon Capacity})$.
16. In homes with gas or oil hydronic space heating, water heating systems must have an efficiency ≥ 0.78 EF. This may be met through the use of an instantaneous water heating system or an indirect storage system with a boiler that has a system efficiency ≥ 85 AFUE. Homes with tankless coil hot water heating systems cannot be qualified using this BOP, but can earn the label using the ENERGY STAR Attached Housing Performance Path requirements.
17. Any combination of ENERGY STAR qualified products listed may be installed to meet this requirement. ENERGY STAR qualified ventilation fans include range hood, bathroom, and inline fans. ENERGY STAR qualified lighting fixtures installed in the following locations shall not be counted: storage rooms (e.g., closets, pantries, sheds), or garages. Eligible appliances include ENERGY STAR qualified refrigerators, dish washers, and washing machines.
18. Efficient lighting fixtures represent a significant opportunity for persistent energy savings and a meaningful way to differentiate ENERGY STAR qualified homes from those meeting minimum code requirements. To learn more about the EPA's Advanced Lighting Package (ALP), refer to www.energystar.gov/homes.
19. The appropriate climate zone shall be determined by the 2004 International Residential Code (IRC), Figure N1101.2.
20. In order to fulfill the efficient HVAC requirements of Option 1, homes in Climate Zones 1, 2, and 3 with heat pumps must have an HSPF ≥ 8.2 . Homes in Climate Zones 4 and 5 with heat pumps must have an HSPF ≥ 8.5 , which exceeds the ENERGY STAR minimum of 8.2 HSPF, in order to fulfill the requirements of this option. Homes with heat pumps in Climate Zones 6, 7, and 8 cannot be qualified using this BOP, but can earn the label using the ENERGY STAR Attached Housing Performance Path requirements. In homes with heat pumps that have programmable thermostats, the thermostat must have "Adaptive Recovery" technology to prevent the excessive use of electric back-up heating.
21. Up to 20% of the lamps (i.e., light bulbs) installed may be ENERGY STAR qualified screw-in compact fluorescent light bulbs. The remainder must be ENERGY STAR qualified hard-wired fixtures.
22. Window to Floor Area (WFA) ratio is calculated by dividing the gross window area by the total conditioned floor area of the home.
23. Gas furnaces and oil furnaces must be equipped with a two-stage burner and a fan motor with two or more speeds. Two-speed, multi-speed, and variable-speed fan motors are all acceptable.