

# 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### Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision.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](mailto:energystarhome@energystar.gov).



# Rater Design Review Checklist for the Tropics ENERGY STAR Certified Homes, Version 3 (Rev. 08)

Home Address: _____ City: _____ State: _____ Permit Date: _____		
<b>1. Partnership Status</b>	<b>Must Correct</b>	<b>Rater <sup>1</sup> Verified</b>
1.1 Rater has verified that builder is an ENERGY STAR partner using <a href="http://energystar.gov/partnerlocator">energystar.gov/partnerlocator</a>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Rater has verified that HVAC contractor holds credential required to complete the HVAC Commissioning Checklist, unless all equipment to be installed in home to be certified is an exempted type, in which case check "N/A" <sup>2</sup> <input type="checkbox"/> N/A HVAC Contractor Company Name: _____	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. Review of HVAC Design Report</b>		
2.1 HVAC Design Report collected for records, with no items left blank <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2 HVAC Design Report reviewed by Rater for the following parameters (HVAC Design Report Item # indicated in parenthesis):		
2.2.1 Cooling season and heating season outdoor design temperatures used in loads (3.3) are within the limits defined at <a href="http://energystar.gov/hvacdesigntemps">energystar.gov/hvacdesigntemps</a> for the State and County where the home will be built, or the designer has provided an allowance from EPA to use alternative values <sup>4</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.2 Number of occupants used in loads (3.4) is within $\pm 2$ of the home to be certified <sup>5</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.3 Conditioned floor area used in loads (3.5) is between zero and 300 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
2.2.4 Window area used in loads (3.6) is between zero and 60 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
2.2.5 Predominant window SHGC used in loads (3.7) is within 0.1 of predominant value in the home to be certified <sup>6</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.6 Sensible, latent, & total heat gain are documented (3.10 - 3.12) for the orientation of the home to be certified <sup>7</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.7 Total heat gain (3.12) has been reduced through any combination of energy efficient design practices such that the resulting cooling load is: <ul style="list-style-type: none"> <li>• HI: <math>\leq 12</math> kBtuh per 1,000 sq. ft. of conditioned floor area</li> <li>• GU, PR, NMI, and USVI: <math>\leq 16</math> kBtuh per 1,000 sq. ft. of conditioned floor area</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.8 The variation in total heat gain across orientations (3.13) is $\leq 6$ kBtuh <sup>7</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2.9 If system specified, cooling sizing % (4.13) is within cooling sizing limit (4.15) selected by the HVAC designer	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. Solar Water Heating System</b>		
3.1 If system is specified, specified system is Solar Rating & Certification Corporation (SRCC) OG-300 certified <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. Review of Thermal Comfort System Design</b>		
4.1 Operable apertures (e.g. windows, skylights, window air inlets) specified that meet the following requirements:		
4.1.1 For all primary living areas <sup>9</sup> , operable aperture areas totaling a minimum of 12% of the floor area of the room specified in that room <sup>10</sup> . Components contributing to the operable aperture area specified to be able to be opened without the use of ladders or special tools.	<input type="checkbox"/>	<input type="checkbox"/>
4.1.2 The total operable aperture area specified in each room shall be provided by a minimum of two components. <sup>11</sup> No single component shall contribute $\geq 70\%$ of the total operable aperture in each room.	<input type="checkbox"/>	<input type="checkbox"/>
4.1.3 The specified components contributing to the operable aperture area in each room shall be located on two or more exterior walls except when placed on a single exterior wall with wing walls <sup>12</sup> . If placed on adjacent walls, components shall be placed at a minimum of one third of the wall width from the adjoining corner.	<input type="checkbox"/>	<input type="checkbox"/>
4.1.4 Insect screens specified for all components that contribute to the operable aperture area.	<input type="checkbox"/>	<input type="checkbox"/>
4.1.5 All components that contribute to the operable aperture area specified to include an integral device that is capable of holding the component in an open position. <sup>13</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.1.6 All interior doors in primary living areas <sup>9</sup> specified to include a mechanically-attached door stop or similar device capable of holding the door in an open position.	<input type="checkbox"/>	<input type="checkbox"/>
4.2 Solar gain through windows shall be reduced using one of the following options:		
4.2.1 South-facing windows shall have an overhang with a projection factor <sup>14</sup> $\geq 1.0$ and all other windows shall have an overhang with a projection factor $\geq 0.60$ , <b>OR</b> ;	<input type="checkbox"/>	<input type="checkbox"/>
4.2.2 Windows: $\leq 0.60$ U-Value; $\leq 0.27$ SHGC, <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>
4.2.3 Skylights: $\leq 0.70$ U-Value; $\leq 0.30$ SHGC, <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>
4.2.4 If total window-to-floor area ratio $> 15\%$ , then SHGCs adjusted as outlined in Footnote 15.	<input type="checkbox"/>	<input type="checkbox"/>
4.3 One ceiling fan junction box specified in every primary living area <sup>9</sup> greater than 75 ft <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name: _____ Date of Review: _____		
Rater Signature: _____ Rater Company Name: _____		



# Rater Design Review Checklist for the Tropics ENERGY STAR Certified Homes, Version 3 (Rev. 08)

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# Rater Field Checklist for the Tropics

## ENERGY STAR Certified Homes, Version 3 (Rev. 08)

Home Address: _____		City: _____	State: _____	Permit Date: _____		
<b>HVAC System</b> <sup>1</sup> (HVAC Design Report Item # indicated in parenthesis)				<b>Must Correct</b>	<b>Rater Verified</b> <sup>2</sup>	<b>N/A</b> <sup>3</sup>
<b>1. Heating &amp; Cooling Equipment</b>						
1.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): <sup>4</sup> <input type="checkbox"/> HVAC Design Report (4.3, 4.4, & 4.17) <input type="checkbox"/> Written approval received from designer				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 External static pressure measured by Rater at contractor-provided test locations and documented below: <sup>5</sup> Return-Side External Static Pressure: _____ IWC    Supply-Side External Static Pressure: _____ IWC				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 <u>Permitted, but not required</u> : HVAC Commissioning Checklist collected, with no items left blank				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. Duct Quality Installation - Applies to Heating, Cooling, Ventilation, Exhaust, &amp; Pressure Balancing Ducts, Unless Noted in Footnote</b>						
2.1 Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork <sup>6</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2 Bedrooms pressure-balanced using any combination of transfer grills, jump ducts, dedicated return ducts, and / or undercut doors to achieve a Rater-measured pressure differential $\leq 3$ Pa with respect to the main body of the house when all bedroom doors are closed and all air handlers are operating. See Footnote 7 for alternative. <sup>7</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
2.3 All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to $\geq R-6$ <sup>8</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4 Rater-measured total duct leakage meets one of the following two options. See Footnote 10 for alternative: <sup>9, 10, 11</sup>						
2.4.1 <u>Rough-in</u> : The greater of $\leq 4$ CFM25 per 100 sq. ft. of CFA or $\leq 40$ CFM, with air handler & all ducts, building cavities used as ducts, & duct boots installed. In addition, <u>all</u> duct boots sealed to finished surface, Rater-verified at final. <sup>12</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4.2 <u>Final</u> : The greater of $\leq 8$ CFM25 per 100 sq. ft. of CFA or $\leq 80$ CFM, with the air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed <sup>13</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5 Rater-measured duct leakage to outdoors the greater of $\leq 4$ CFM25 per 100 sq. ft. of CFA or $\leq 40$ CFM25 <sup>9, 11, 14</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. Whole-House Mechanical Ventilation System</b>						
3.1 Rater-measured ventilation rate is within either $\pm 15$ CFM or $\pm 15\%$ of design value (2.3) <sup>15</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
3.2 A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that's on the ventilation equipment)				<input type="checkbox"/>	<input type="checkbox"/>	-
3.3 No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper)				<input type="checkbox"/>	<input type="checkbox"/>	-
3.4 System fan rated $\leq 3$ sones if intermittent and $\leq 1$ sone if continuous, or exempted <sup>16</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
3.5 If system utilizes the HVAC fan, then the specified fan type is ECM / ICM (4.7), or the controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6 Bathroom fans are ENERGY STAR certified if used as part of the whole-house system <sup>17</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 Air inlet location (Complete if ventilation air inlet location was specified (2.12, 2.13); otherwise check "N/A"): <sup>18, 19</sup>				-	-	<input type="checkbox"/>
3.7.1 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit				<input type="checkbox"/>	<input type="checkbox"/>	-
3.7.2 Inlet is $\geq 2$ ft. above grade or roof deck; $\geq 10$ ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and $\geq 3$ ft. distance from sources exiting the roof				<input type="checkbox"/>	<input type="checkbox"/>	-
3.7.3 Inlet is provided with rodent / insect screen with $\leq 0.5$ inch mesh				<input type="checkbox"/>	<input type="checkbox"/>	-
<b>4. Local Mechanical Exhaust - In each kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards: <sup>15, 20</sup></b>						
<b>Location</b>		<b>Continuous Rate</b>		<b>Intermittent Rate</b> <sup>21</sup>		
4.1 Kitchen	Airflow	$\geq 5$ ACH, based on kitchen volume <sup>22, 23</sup>		$\geq 100$ CFM and, if not integrated with range, also $\geq 5$ ACH based on kitchen volume <sup>22, 23, 24</sup>		
	Sound	Recommended: $\leq 1$ sone		Recommended: $\leq 3$ sones		
4.2 Bathroom	Airflow	$\geq 20$ CFM		$\geq 50$ CFM		
	Sound	Required: $\leq 1$ sone		Recommended: $\leq 3$ sones		
<b>5. Filtration</b>						
5.1 At least one MERV 6 or higher filter installed in each ducted mechanical system in a location that facilitates access and regular service by the owner <sup>25</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2 Filter access panel includes gasket or comparable sealing mechanism and fits snugly against the exposed edge of filter when closed to prevent bypass <sup>26</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3 All return air and mechanically supplied outdoor air passes through filter prior to conditioning				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>6. Combustion Appliances</b>						
6.1 Furnaces, boilers, and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 29 for alternatives. <sup>27, 28, 29</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2 Fireplaces located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 30 for alternatives. <sup>27, 28, 30</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3 If unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary, the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Section A3 (Carbon Monoxide Test), and verified the equipment meets the limits defined within <sup>27, 31</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Rater Field Checklist for the Tropics ENERGY STAR Certified Homes, Version 3 (Rev. 08)

7. Thermal Comfort System	Must Correct	Rater Verified <sup>2</sup>	N/A <sup>3</sup>
7.1 Operable apertures provided that meet the specifications of the Rater Design Review Checklist as follows:			
7.1.1 Area, placement, & function is as specified in Items 4.1.1 through 4.1.3.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.1.2 Wing walls present if specified in Item 4.1.3.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.1.3 Insect screens provided per specifications in Item 4.1.4.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.1.4 Integral devices capable of holding components open provided per specifications in Item 4.1.5.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.1.5 Mechanically-attached door stop or similar device provided per specifications in Item 4.1.6.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.2 Solar gain through windows reduced per specifications in Item 4.2 of the Rater Design Review Checklist.	<input type="checkbox"/>	<input type="checkbox"/>	-
7.3 Ceiling fan junction boxes installed per specifications in Item 4.3 of the Rater Design Review Checklist.	<input type="checkbox"/>	<input type="checkbox"/>	-
Rater Name: _____ Rater Pre-Drywall Inspection Date: _____ Rater Initials: _____ Rater Name: _____ Rater Final Inspection Date: _____ Rater Initials: _____			



# Rater Checklist Footnotes for the Tropics

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### Rater Design Review Checklist Footnotes

1. The term "Rater" refers to the person completing the third-party inspections required for certification. This person shall: a) be a certified Home Energy Rater, Rating Field Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET; and, b) have attended and successfully completed an EPA-recognized training class. See [energystar.gov/newhomestraining](http://energystar.gov/newhomestraining).
2. HVAC contractors must be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) if a split air conditioner, unitary air conditioner, air-source heat pump, or water-source (i.e., geothermal) heat pump up to 65 kBtuh with a forced-air distribution system (i.e., ducts) or a furnace up to 225 kBtuh with a forced-air distribution system (i.e., ducts) will be installed in the home to be certified. For all other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems, a credential is not required. An explanation of this credentialing process and links to H-QUITOs, which maintain lists of credentialed contractors, can be found at [energystar.gov/newhomeshvac](http://energystar.gov/newhomeshvac).
3. The Rater shall collect at least one HVAC Design Report per plan. If more than one HVAC system is designed for a plan, then the Rater shall collect one HVAC Design Report per system design. Sections 1 through 3 shall always be completed. In contrast, Sections 4 and 5 shall only be completed if an applicable air conditioner, heat pump, furnace, or duct system are to be included in the home to be certified, and otherwise marked "N/A".

Regardless of whether the "site-specific design" or "group design" box has been checked in Item 1.6 of the HVAC Design Report, the system design as documented on the HVAC Design Report must fall within the tolerances in Item 2.2 for the home to be certified. The report is only required to be collected once per system design, even if multiple homes are built using this design (e.g., in a production environment where the same plan is built multiple times, only one report is required as long as no aspect of the system design changes between homes). The Rater is only responsible for verifying that the designer has not left any items blank on the applicable Sections of the HVAC Design Report and for verifying the discrete objective parameters in Item 2.2 of this Checklist, not for verifying the accuracy of every input on the HVAC Design Report.

4. Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR certified homes and the process for a designer to obtain an allowance from EPA. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 F, then the same report could be used in Fairfax County (which has a higher limit of 94 F) but not in Arlington County (which has a lower limit of 92 F).
5. To determine the number of occupants among all HVAC systems in the home, calculate the number of bedrooms, as defined below, and add one. The number of occupants used in loads must be within  $\pm 2$  of the home to be certified, unless Item 1.5 of the HVAC Design Report indicates that the system is a cooling system for temporary occupant loads.

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 2009 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 inches 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.

6. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
7. Orientation represents the direction that the front door of the house is facing. The designer is only required to document the loads for the orientation(s) that the house might be built in. For example, if a house plan will only be built one time in a specific orientation (e.g., a site-specific design), then the designer only needs to document the loads for this one orientation.
8. For more information, visit [www.solar-rating.org/certification\\_listing\\_directory](http://www.solar-rating.org/certification_listing_directory).
9. Primary living areas include dining rooms, living rooms, family rooms, dens, bedrooms and home offices. Primary living areas do not include other spaces, such as kitchens, bathrooms, hallways, stairways, entrances, garages, and utility rooms.
10. Operable area shall be based on the free unobstructed area through the aperture. Obstructions that can be removed from the aperture by the occupant without tools or special knowledge, such as blinds, shades, or operable shutters shall not be included when calculating the unobstructed area. For the purposes of this checklist Item, 90% of the nominal window or door area of jalousie window and door products shall be permitted to be used as the free unobstructed area.
11. For example, components could consist of two windows or one window and one door.
12. Where wing walls are included in the building design for ventilation purposes, they shall be placed between windows to create a high-pressure and a low-pressure zone on each window. Wing walls shall extend from the bottom to the top of the window and extend outward from the building a distance at least equal to one-half the width of the window. Additionally, it is recommended but not required that the wing wall be located on the windward side of the building.
13. For example, an integral device could consist of a mechanically-attached door stop or operable louvers for exterior doors.
14. The window projection factor shall be determined in accordance with Equation 5-1 of the 2009 IECC:

$$PF = A / B$$

Where PF is the projection factor, A is the distance measured horizontally from the furthest continuous extremity of any overhang, eave, or permanently attached shading device to the vertical surface of the glazing and B is the distance measured vertically from the bottom of the glazing to the underside of the overhang, eave, or permanently attached shading device.



# Rater Checklist Footnotes for the Tropics

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

15. 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 improved window SHGC shall be used:

$$\text{Improved SHGC} = [0.15 / \text{WFA}] \times 0.27$$

16. This Revision of the Rater Design Review Checklist is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. 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.

### Rater Field Checklist Footnotes

1. This Checklist is designed to meet the requirements of ASHRAE 62.2-2010 / 2013, and ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems, (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.
2. The term 'Rater' refers to the person completing the third-party inspections required for certification. This person shall: a) be a certified Home Energy Rater, Rating Field Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET; and, b) have attended and successfully completed an EPA-recognized training class. See [energystar.gov/newhomestraining](http://energystar.gov/newhomestraining).
3. The column titled "N/A," which denotes items that are "not applicable," should be used when the checklist Item is not present in the home or conflicts with local requirements.
4. If installed equipment does not match the HVAC Design Report, then prior to certification the Rater shall obtain written approval from the designer (e.g., email, updated HVAC Design Report) confirming that the installed equipment meets the requirements of the HVAC Design Report. In cases where the condenser unit is installed after the time of inspection by the Rater, the HVAC manufacturer and model numbers on installed equipment can be documented through the use of photographs provided by the HVAC Contractor after installation is complete.
5. The Rater shall measure and record the external static pressure in the return-side and supply-side of the system using the contractor-provided test locations. However, at this time, the Rater need not assess whether these values are within a specific range to certify the home.
6. Kinks are to be avoided and are caused when ducts are bent across sharp corners such as framing members. Sharp bends are to be avoided and occur when the radius of the turn in the duct is less than one duct diameter. Compression is to be avoided and occurs when flexible ducts in unconditioned space are installed in cavities smaller than the outer duct diameter and ducts in conditioned space are installed in cavities smaller than inner duct diameter. Ducts shall not include coils or loops except to the extent needed for acoustical control.
7. Item 2.2 does not apply to ventilation or exhaust ducts. For an HVAC system with a multi-speed fan, the highest design fan speed shall be used when verifying this requirement. As an alternative to the 3 Pa limit, a Rater-measured pressure differential  $\leq 5$  Pa is permitted to be used for bedrooms with a design airflow  $\geq 150$  CFM. The Rater-measured pressure shall be rounded to the nearest whole number to assess compliance.
8. Item 2.3 does not apply to ducts that are a part of local mechanical exhaust and exhaust-only whole-house ventilation systems. EPA recommends, but does not require, that all metal ductwork not encompassed by Section 2 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation.
9. Items 2.4 and 2.5 only apply to heating, cooling, and balanced ventilation ducts. Duct leakage shall be determined and documented by a Rater using a RESNET-approved testing protocol. Leakage limits shall be assessed on a per-system, rather than per-home, basis. For balanced ventilation ducts that are not connected to space heating or cooling systems, a Rater is permitted to visually verify, in lieu of duct leakage testing, that all seams and connections are sealed with mastic or metal tape and all duct boots are sealed to floor, wall, or ceiling using caulk, foam, or mastic tape.
10. For a duct system with three or more returns, the total Rater-measured duct leakage is permitted to be the greater of  $\leq 6$  CFM25 per 100 sq. ft. of CFA or  $\leq 60$  CFM25 at 'rough-in' or the greater of  $\leq 12$  CFM25 per 100 sq. ft. of CFA or  $\leq 120$  CFM25 at 'final'.
11. For a home certified in the State of ID, MT, OR, or WA that is permitted before 01/01/2016, as an alternate to Rater-verified duct leakage, a PTCS<sup>®</sup> Duct Sealing Certification Form is permitted to be collected by the Home Energy Rater.
12. Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the 'rough-in' test. For homes permitted through 12/31/2013: Homes are permitted to be certified if rough-in leakage is  $\leq 6$  CFM25 per 100 sq. ft. of CFA or  $\leq 60$  CFM25, with air handler & all ducts, building cavities used as ductwork, & duct boots installed.
13. Registers atop carpets are permitted to be removed and the face of the duct boot temporarily sealed during testing. In such cases, the Rater shall visually verify that the boot has been durably sealed to the subfloor (e.g., using duct mastic or caulk) to prevent leakage during normal operation.
14. Testing of duct leakage to the outside can be waived if all ducts & air handling equipment are located within the home's air and thermal barriers AND infiltration does not exceed the following: CZ 1-2: 3 ACH50; CZ 3-4: 2.5 ACH50; CZ 5-7: 2 ACH50; CZ 8: 1.5 ACH50. Alternatively, testing of duct leakage to the outside can be waived if total duct leakage is  $\leq 4$  CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM, whichever is larger.
15. The whole-house ventilation air flow and local exhaust air flows shall be measured by the Rater using RESNET Standard 380 upon publication and, in the interim, a flow hood, flow grid, anemometer, or substantially equivalent method.
16. Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3 of the HVAC Design Report. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated  $\geq 400$  CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be  $\geq 4$  ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.
17. Bathroom fans with a rated flow rate  $\geq 500$  CFM are exempted from the requirement to be ENERGY STAR certified.



# Rater Checklist Footnotes for the Tropics

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

18. Ventilation air inlets that are only visible via rooftop access are exempted from Item 3.7 and the Rater shall mark “n/a”. The outlet and inlet of balanced ventilation systems shall meet these spacing requirements unless manufacturer instructions indicate that a smaller distance may be used. However, if this occurs the manufacturer’s instructions shall be collected for documentation purposes.
19. Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the owner.
20. Continuous bathroom local mechanical exhaust fans shall be rated for sound at no less than the airflow rate in Item 4.2. Intermittent bathroom and both intermittent and continuous kitchen local mechanical exhaust fans are recommended, but not required, to be rated for sound at no less than the airflow rate in Items 4.1 and 4.2. Per ASHRAE 62.2-2010, an exhaust system is one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope (e.g., bath exhaust fans, range hoods, clothes dryers). Per ASHRAE 62.2-2010, a bathroom is any room containing a bathtub, shower, spa, or similar source of moisture.
21. An intermittent mechanical exhaust system, where provided, shall be designed to operate as needed by the occupant. Control devices shall not impede occupant control in intermittent systems.
22. Kitchen volume shall be determined by drawing the smallest possible rectangle on the floor plan that encompasses all cabinets, pantries, islands, and peninsulas and multiplying by the average ceiling height for this area. Cabinet volume shall be included in the kitchen volume.
23. For homes permitted through 01/01/2014: Homes are permitted to be certified without enforcement of this Item to provide partners with additional time to integrate this feature into their homes.  
For homes permitted on or after 01/01/2014: Homes shall meet this Item. Alternatively, the prescriptive duct sizing requirements in Table 5.3 of ASHRAE 62.2-2010 are permitted to be used for kitchen exhaust fans based upon the rated airflow of the fan at 0.25 IWC. If the rated airflow is unknown,  $\geq 6$  in. smooth duct shall be used, with a rectangular to round duct transition as needed. Guidance to assist partners with these alternatives is available at [energystar.gov/newhomesresources](http://energystar.gov/newhomesresources). As an alternative to Item 4.1, homes that are PHIUS+ certified are permitted to use a continuous kitchen exhaust rate of 25 CFM per 2009 IRC Table M1507.3.
24. All intermittent kitchen exhaust fans must be capable of exhausting at least 100 CFM. In addition, if the fan is not part of a vented range hood or appliance-range hood combination (i.e., if the fan is not integrated with the range), then it must also be capable of exhausting  $\geq 5$  ACH, based on the kitchen volume.
25. Per ASHRAE 62.2-2010, ducted mechanical systems are those that supply air to an occupiable space through ductwork exceeding 10 ft. in length and through a thermal conditioning component, except for evaporative coolers. Systems that do not meet this definition are exempt from this requirement. Also, mini-split systems typically do not have MERV-rated filters available for use and are, therefore, also exempted under this version of the requirements. HVAC filters located in the attic shall be considered accessible to the owner if drop-down stairs provide access to attic and a permanently installed walkway has been provided between the attic access location and the filter.
26. The filter media box (i.e., the component in the HVAC system that houses the filter) may be either site-fabricated by the installer or pre-fabricated by the manufacturer to meet this requirement. These requirements only apply when the filter is installed in a filter media box located in the HVAC system, not when the filter is installed flush with the return grill.
27. The pressure boundary is the primary enclosure boundary separating indoor and outdoor air. For example, a volume that has more leakage to outside than to conditioned space would be outside the pressure boundary.
28. Per the 2009 International Mechanical Code, a direct-vent appliance is one that is constructed and installed so that all air for combustion is derived from the outdoor atmosphere and all flue gases are discharged to the outside atmosphere; a mechanical draft system is a venting system designed to remove flue or vent gases by mechanical means consisting of an induced draft portion under non-positive static pressure or a forced draft portion under positive static pressure; and a natural draft system is a venting system designed to remove flue or vent gases under nonpositive static vent pressure entirely by natural draft.
29. Naturally drafted equipment is allowed within the home’s pressure boundary in Climate Zones 1-3 if the Rater has followed Section 805 of RESNET’s Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Sections A3 (Carbon Monoxide Test) and A4 (Depressurization Test for the Combustion Appliance Zone), and verified that the equipment meets the limits defined within.
30. Naturally drafted fireplaces are allowed within the home’s pressure boundary if the Rater has verified that the total net rated exhaust flow of the two largest exhaust fans (excluding summer cooling fans) is  $\leq 15$  CFM per 100 sq. ft. of occupiable space when at full capacity. If the net exhaust flow exceeds the allowable limit, it shall be reduced or compensating outdoor airflow provided. Per ASHRAE 62.2-2010, the term “net rated exhaust flow” is defined as flow through an exhaust fan minus the compensating outdoor airflow through any supply fan that is interlocked to the exhaust fan. Per ASHRAE 62.2-2010, the term “occupiable space” is defined as any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas. See Footnote 16 for the definition of “habitable spaces”.
31. The minimum volume of combustion air required for safe operation by the manufacturer and / or code shall be met or exceeded. Also, in accordance with the National Fuel Gas Code, ANSI Z223.1 / NFPA54, unvented room heaters shall not be installed in bathrooms or bedrooms.
32. This Revision of the Rater Field Checklist is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. 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.