



# Tropics Rater Design Review Checklist

## ENERGY STAR Certified Homes, Version 3 (Rev. 09)

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 National 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 National HVAC Design Report</b>		
2.1 National HVAC Design Report collected for records, with no items left blank <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/>
2.2 National HVAC Design Report reviewed by Rater for the following parameters (National HVAC Design Report Item # 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, or US Territory, 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 100 sq. ft. smaller 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 15 sq. ft. smaller and 60 sq. ft. larger than the home to be certified, or, for homes to be certified with > 500 sq. ft. of window area, between 3% smaller and 12% larger	<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. <sup>15</sup>	<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: _____		



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### 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 National HVAC Design Report per plan. If more than one HVAC system is designed for a plan, then the Rater shall collect one National 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 National HVAC Design Report, the system design as documented on the National 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 National 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 National 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 National HVAC Design Report indicates that the system is a cooling system for temporary occupant loads.

A bedroom is defined by ANSI / RESNET / ICC Standard 301-2014 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.



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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:

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