

ENERGY STAR HVAC Design Report: 2. Whole-House Mechanical Ventilation Design

When certifying a home to ENERGY STAR [Certified Homes, Version 3.0/3.1 \(Rev. 08\)](#) [1], the HVAC Designer completes the HVAC [Design Report Checklist](#) [1] and provides it to the Rater to document the types of mechanical ventilation, heating, and cooling equipment specified for the home, and the heating and cooling calculation inputs and loads.

This page shows the checklist requirement for Section 2. Whole-House Mechanical Ventilation Design and applicable footnotes.

For information on installing HVAC equipment, see installation guides linked to the HVAC section of the [Rater Field Checklist](#) [1].

For information on determining ventilation rates, see [ASHRAE Standard 62.2-2010/2013, Ventilation for Acceptable Indoor Air Quality in Low-Rise Residential Buildings](#) [2].



HVAC Design Report ¹ ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

HVAC Designer Responsibilities:		Designer Verified
<ul style="list-style-type: none"> Complete one HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Visit www.energystar.gov/newhomeshvacdesign and see Footnote 2 for more information. ² Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder or Home Energy Rater. Provide the completed HVAC Design Report to the builder or credentialed HVAC contractor and to the Home Energy Rater. 		
2. Whole-House Mechanical Ventilation Design ^{4, 5}		
Airflow:		
2.1 Ventilation airflow design rate & run-time meet the requirements of ASHRAE 62.2-2010 or 2013 ⁶		<input type="checkbox"/>
2.2 Ventilation airflow rate required by 62.2 for a continuous system _____ CFM		-
2.3 Design for this system: Vent. airflow rate: _____ CFM Run-time per cycle: _____ minutes Cycle time: _____ minutes		-
System Type & Controls:		
2.4 Specified system type: <input type="checkbox"/> Supply <input type="checkbox"/> Exhaust <input type="checkbox"/> Balanced		-
2.5 Specified control location: _____ (e.g., Master bath, utility room)		-
2.6 Specified controls allow the system to operate automatically, without occupant intervention		<input type="checkbox"/>
2.7 Specified controls include a readily-accessible ventilation override and a label has also been specified 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"/>
2.8 No outdoor air intakes designed to connect to the return side of the HVAC system, unless specified controls operate intermittently and automatically based on a timer and restrict intake when not in use (e.g., motorized damper) ⁷		<input type="checkbox"/>
Sound: 2.9 The fan of the specified system is rated ≤ 3 sones if intermittent and ≤ 1 sone if continuous, or exempted ⁸		<input type="checkbox"/>
Efficiency:		
2.10 If system utilizes the HVAC fan, then the specified fan type in Item 4.7 is ECM / ICM, or the specified controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling		<input type="checkbox"/>
2.11 If bathroom fans are specified as part of the system, then they are ENERGY STAR certified ⁹		<input type="checkbox"/>
Air Inlet Location: (Complete this section if system has a specified air inlet location; otherwise check "N/A") ¹⁰		<input type="checkbox"/> N/A
2.12 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit		<input type="checkbox"/>
2.13 Inlet is ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and ≥ 3 ft. from known sources exiting the roof		<input type="checkbox"/>

Checklist revised 09/15/2015. Required for homes permitted starting 07/01/2016. ¹⁸

Footnotes

1. This report is designed to meet [ASHRAE 62.2-2010 / 2013](#) [2] and [ANSI / ACCA's 5 QI-2015](#) [3] 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, system designs documented through the use of this report are not a guarantee of proper ventilation, indoor air quality, or HVAC performance.

2. The report shall represent a single system design for a house plan. Check the box for "site-specific design" if the design was created for the specific plan configuration (i.e., elevation, option, orientation, and county) of the home to be certified. Check the box for "group design" if the design was created for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Regardless of the box checked, the system design as documented on this HVAC Design Report must fall within the following tolerances for the home to be certified:

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- Item 3.3: The outdoor design temperature used in loads are within the limits defined at energystar.gov/hvacdesigntemps [4].
- Item 3.4: The number of occupants used in loads is within ± 2 of the home to be certified.
- Item 3.5: The conditioned floor area used in loads is between zero and 300 sq. ft. larger than the home to be certified.
- Item 3.6: The window area used in loads is between zero and 60 sq. ft. larger than the home to be certified.
- Item 3.7: The predominant window SHGC is within 0.1 of the predominant value in the home to be certified.
- Items 3.10 - 3.12: The sensible, latent, & total heat gain are documented for the orientation of the home to be certified.
- Item 3.13: The variation in total heat gain across orientations is ≤ 6 kBtuh.
- Item 4.16: The cooling sizing % is within the cooling sizing limit selected.

Provide the HVAC Design Report to the party you are providing these design services to (i.e., a builder or credentialed HVAC contractor) and to the Home Energy Rater. The report is only required to be provided 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 a report has been provided that falls within these tolerances for the home to be certified, no additional work is required. However, if no report falls within these tolerances or if any aspect of the system design changes, then an additional report will need to be generated prior to certification.

Visit energystar.gov/newhomeshvacdesign [5] for a tool to assist with group designs and for more information.

4. The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of a whole-house ventilation system. Designers may provide supplemental documentation as needed to document the system design.

5. In “Warm-Humid” climates as defined by 2009 IECC Figure 301.1 (i.e., CZ 1 and portions of CZ 2 and 3A below the white line), it is recommended, but not required, that equipment be specified with sufficient latent capacity to maintain indoor relative humidity at $\leq 60\%$.

6. Airflow design rates and run-times shall be determined using ASHRAE 62.2-2010 or later. Designers are permitted, but not required, to use published addenda and/or the 2013 version of the standard to assess compliance.

7. In addition, consult manufacturer requirements to ensure return air temperature requirements are met.

8. Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated ≤ 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 ≥ 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.

9. Bathroom fans with a rated flow rate ≤ 500 CFM are exempted from the requirement to be ENERGY STAR certified.

10. 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.

18. This Revision of the HVAC Design Report 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 Home Energy Rater certifying the home 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.

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More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

None Available

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