

# ENERGY STAR HVAC Design Report: 5. Duct 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 5. Duct 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 selecting heating and cooling equipment, see the [Air Conditioning Contractors of America's ANSI/ACCA 5 QI - 2015 HVAC Quality Installation Specification](#) [2] and [ACCA Manual D - Residential Duct Design](#) [3].

These criteria for certification to ENERGY STAR Certified Homes (Version 3.0, Revision 08) are required for homes permitted starting 07/01/2016.



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

### HVAC Designer Responsibilities:

- 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](http://www.energystar.gov/newhomeshvacdesign) and see Footnote 2 for more information. <sup>2</sup>
- 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.

<b>5. Duct Design</b> (Complete if heating or cooling equipment will be installed with ducts; otherwise check "N/A")			<input type="checkbox"/> N/A
5.1 Duct system designed for the equipment selected in Section 4, per ACCA Manual D			<input type="checkbox"/>
5.2 Design HVAC fan airflow: <sup>23</sup>	Cooling mode _____ CFM	Heating mode _____ CFM	-
5.3 Design HVAC fan speed setting (e.g., low, medium, high): <sup>24</sup>	Cooling mode _____	Heating mode _____	-
5.4 Design total external static pressure (corresponding to the mode with the higher airflow in Item 5.2): <sup>25</sup>	_____ IWC		-
5.5 Room-by-room design airflows documented below (which must sum to the mode with the higher airflow in Item 5.2) <sup>26, 27</sup>			-

Room Name	Design Airflow (CFM)	Room Name	Design Airflow (CFM)
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		Total for all rooms	

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

### Footnotes

1. This report is designed to meet [ASHRAE 62.2-2010 / 2013](#) [4] and [ANSI / ACCA's 5 QI-2015](#) [2] 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](http://energystar.gov/hvacdesigntemps). [5]
- Item 3.4: The number of occupants used in loads is within  $\pm 2$  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  $\leq 6$  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](http://energystar.gov/newhomeshvacdesign) [6] for a tool to assist with group designs and for more information.

**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.

**23.** Design HVAC fan airflow is the design airflow for the blower in CFM, as determined using the manufacturer's expanded performance data.

**24.** Design HVAC fan speed setting is the fan speed setting on the control board (e.g., low, medium, high) that corresponds with the Design HVAC fan airflow.

**25.** Design total external static pressure is the pressure corresponding to the Design HVAC fan airflow, inclusive of external components (e.g., evaporator coil, whole-house humidifier, or  $\geq$  MERV 6 filter).

**26.** Designers may provide supplemental documentation with room-by-room and total design airflows in lieu of completing Item 5.5.

**27.** Orientation-specific room-by-room design airflows are recommended, but not required, to distribute airflow proportional to load, thereby improving comfort and efficiency.

**Contributors to this Guide:** ENERGY STAR Certified Homes, Pacific Northwest National Laboratory

## 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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