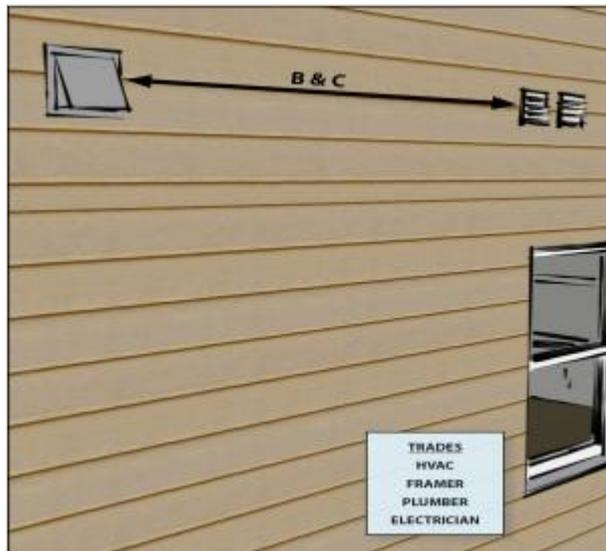


Ventilation Air Inlet Locations

Last Updated: 03/14/2016

Scope



Ventilation air inlets located ?10 ft. of stretched-string distance from known contamination sources such as stack, vent, exhaust hood, or vehicle exhaust

Install fresh air ventilation inlets away from contamination sources.

- Install air inlets at least 10 feet away from all contamination source terminations. Install air inlets in the wall at least 3 feet away from dryer exhausts and contamination sources that exit through the roof (as required by [ENERGY STAR Certified Homes](#)).
- Install air inlets at least 2 feet above grade or above the roof deck in [Climate Zones 1—3](#) and at least 4 feet above grade or above the roof deck in [Climate Zones 4—8](#) (as required by [ENERGY STAR Certified Homes](#)). Note: it is easier to install an air inlet at the gable end of the house than to try to lift it off the roof 2 to 4 feet.
- Ensure that ventilation air comes directly from outdoors and not from adjacent dwelling units, garages, crawlspaces, or attics.
- Install the air inlet duct in a location with the shortest, most direct path possible to the air handler unit, HRV, or ERV.
- Stretch the duct tight and support it adequately to minimize sagging and kinks.
- Air seal around the intake duct termination and seal the duct to the HRV/ERV or return side of the air handler with mechanical fasteners and metal tape or mastic.
- Install a ? 0.5-in.-mesh screen on all air inlets to keep out rodents, insects, and debris, except use a louvered damper rather than a mesh screen on clothes dryer vents.

See the [Compliance Tab](#) for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

When a home has a balanced ventilation system that uses a heat recovery ventilator (HRV), energy recovery ventilator (ERV), or central-fan-integrated supply ventilation, fresh air is brought into the home through a ventilation air inlet. To ensure good air quality, the inlet should be placed in a location away from possible sources of contamination, and where it has unobstructed access to clean air.

Possible contamination sources include bathroom exhaust fans, plumbing vent pipes, kitchen exhaust fans, dryer exhaust vents, furnace exhaust vents, water heater exhaust vents, fireplace flues, and whole-house fans. The locations for these outlets and inlets should be specified on plans. In addition, the HVAC contractor should coordinate with other subcontractors, including the framers, plumbers, and electricians, at the beginning of construction to determine the proper placement of both air inlets and contamination source terminations.

The air inlet should be located high enough above the ground, or roof surface, to prevent accumulated snow from piling up over it, rainwater from splashing into it, and plants from growing into it. It should be located outside, not in an attic, crawlspace, garage, or attached dwelling. The inlet should be covered with a mesh screen to prevent animal and insect entry. Ideally, it should be placed in a location where the home owner can check and clean it regularly.

Where to Install Ventilation Air Inlets

1. Verify locations of all contamination source terminations.
2. Install fresh air inlets so that they are
 - at least 10 feet away from all contamination source terminations
 - at least 3 feet away from dryer exhausts and contamination sources exiting through the roof
 - at least 2 feet above grade or above the roof deck in [Climate Zones 1—3](#)
 - at least 4 feet above grade or above the roof deck in [Climate Zones 4—8](#).

* Note: it is easier to install an air inlet at the gable end of the house than to try to lift it off the roof 2—4 feet.

3. Install the air inlet duct in a location with the shortest, most direct path possible to the air handler unit, HRV, or ERV. Stretch the duct tight and support it adequately to minimize sagging and kinks. Air seal around the intake duct termination and seal the duct to the HRV/ERV or return side of the air handler with mechanical fasteners and metal tape or mastic.
4. Install a ≤ 0.5 -in.-mesh screen on all air inlets to keep out rodents, insects, and debris, except clothes dryer vents which should have a louvered damper instead. See the guide [Proper Clothes Dryer Venting](#) for more information.

On the diagram of a house below, which has central-fan-integrated supply ventilation, the fresh air intake is located more than 4 feet above grade level and away from other contaminant sources such as other flue or exhaust pipe outlets on the house.

Figure 1 - Fresh air inlet on side of house

The metal frame for the fresh air intake duct grille has been installed in the ceiling of a covered porch of this home under construction.



Figure 2 - Fresh air inlet located in ceiling of covered porch 

The intake and duct have been installed for the fresh air inlet in the eave of the roof of this home under construction. The grille has not yet been installed.



Figure 3 - Fresh air inlet located in eave of roof 

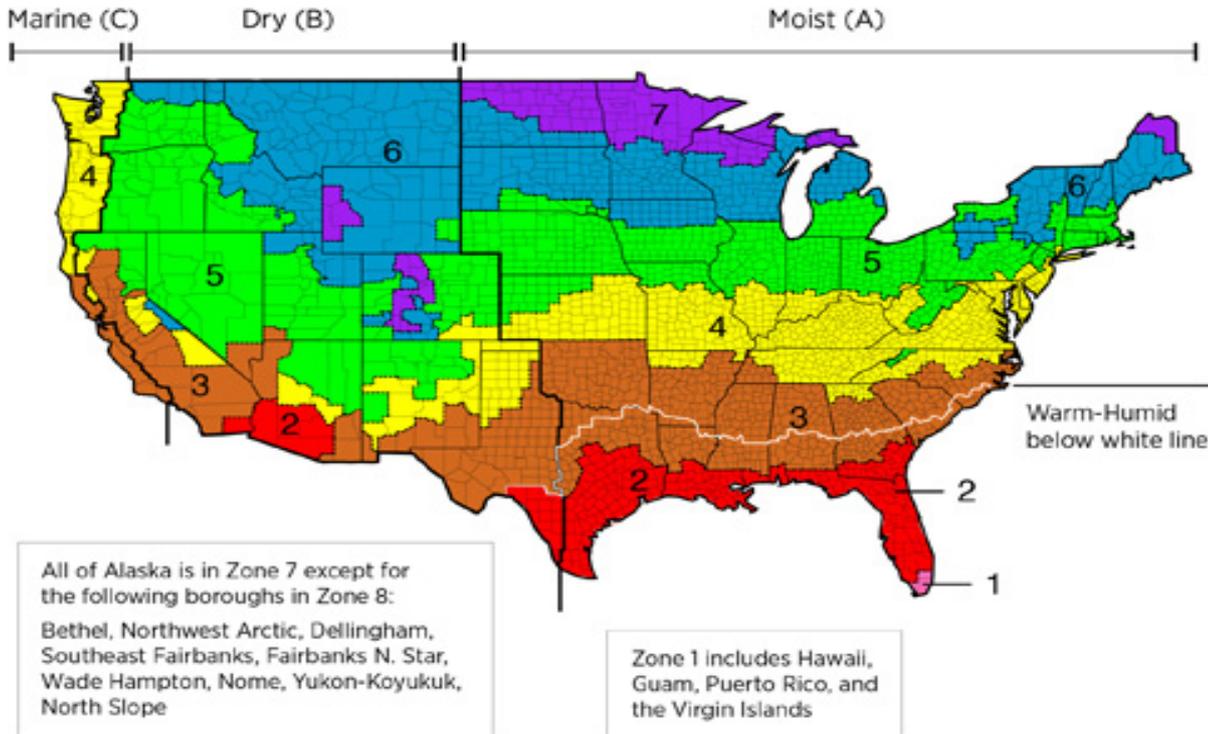
Ensuring Success

Visually inspect the ventilation inlet to ensure that it is at least 10 feet from any known contamination sources, at least two feet above grade and above the roof deck in IECC [Climate Zones 1-3](#) and at least four feet above grade and above the roof deck in IECC [Climate Zones 4 through 8](#). Make sure the inlet is not obstructed by any objects, that the ventilation air comes from outdoors—not from a garage, attic, crawlspace, or adjacent dwelling, and that the ventilation inlet is covered with a protective screen with ≤ 0.5 -inch mesh. Dryer vents should have a louvered damper, not a mesh screen, covering the outside end.

Climate

[ENERGY STAR Version 3, \(Rev. 07\)](#)

HVAC System Quality Installation Rater Checklist, Ventilation Air Inlets & Ventilation Source. Ventilation air inlets \geq 2 ft. above grade or roof deck in Climate Zones 1-3 or \geq 4 ft. above grade or roof deck in Climate Zones 4-8 and not obstructed by snow, plantings, condensing units or other material at time of inspection. The use of reduced ventilation air inlet heights is permitted in North Carolina. The minimum required height in North Carolina for Climate Zone 4 will be reduced from 4 feet to 2 feet and in Climate Zone 5 from 4 feet to 2.5 feet based on historical snowfall data for this state. Note that the potential to reduce inlet heights in other regions based upon historical snowfall data is being evaluated.



Training

Right and Wrong Images

None Available

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Exact code language is copyrighted and 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.

[ENERGY STAR Certified Homes](#)

ENERGY STAR Certified Homes (Version 3/3.1, Revision 08), Rater Field Checklist

7. Whole-House Mechanical Ventilation System

7.7 Air inlet location (Complete if ventilation air inlet location was specified (2.12, 2.13); otherwise check "N/A").^{45, 46}

7.7.1 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit.

7.7.2 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. distance from sources exiting the roof.

7.7.3 Inlet is provided with rodent / insect screen with ? 0.5 inch mesh.

Footnotes:

(45) Ventilation air inlets that are only visible via rooftop access are exempted from Item 7.7 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.

(46) 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.

ENERGY STAR Revision 08 requirements are required for homes permitted starting 07/01/2016.

[DOE Zero Energy Ready Home](#)

Exhibit 1: Mandatory Requirements. EPA Indoor airPLUS Verification Checklist.

[Air Conditioning Contractors of America](#)

Air Conditioning Contractors of America. 1995. Manual T Air Distribution Basics for Residential and Small Commercial Buildings. Manual T provides details on selecting, sizing, and locating supply air diffusers, grilles and registers, and return grilles.

[American Society of Heating, Air-Conditioning and Refrigeration Engineers \(ASHRAE\)](#)

ASHRAE Standard 62.2-2010 Ventilation for Acceptable Indoor Air Quality in Low-Rise Residential Buildings for purchase by following link above. The standard provides minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality in low-rise residential buildings.

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.

Case Studies

None Available

References and Resources*

1. [ACCA Manual T - Air Distribution Basics for Residential and Small Commercial Buildings](#)
Author(s): Air Conditioning Contractors of America
Organization(s): Air Conditioning Contractors of America
Publication Date: June, 2009
Standard providing guidance on how to select, size, and locate the supply air diffusers, grilles and registers, and the return grilles.
2. [ASHRAE Standard 62.2, Ventilation for Acceptable Indoor Air Quality in Low-Rise Residential Buildings](#)
Author(s): ASHRAE
Organization(s): ASHRAE
Publication Date: January, 2013
Standard defining the roles of and minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality in low-rise residential buildings.
3. [DOE Zero Energy Ready Home National Program Requirements](#)
Author(s): DOE
Organization(s): DOE
Publication Date: August, 2015
Standard requirements for DOE's Zero Energy Ready Home national program certification.
4. [ENERGY STAR Certified Homes, Version 3 \(Rev. 08\) National Program Requirements](#)
Author(s): EPA
Organization(s): EPA
Publication Date: September, 2015
Document outlining the program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 08).

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following Building America Teams contributed to the content in this Guide.

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