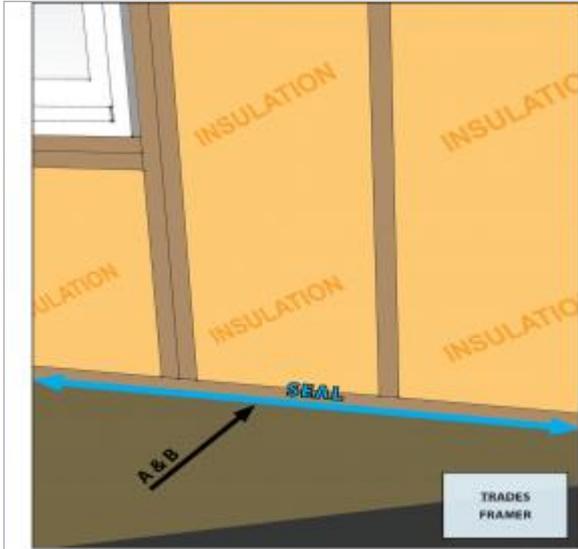


Air Sealing Sill Plates

Last Updated: 03/14/2016

Scope



Air seal above-grade sill plates adjacent to conditioned space to minimize air leakage.

Air seal above-grade sill plates adjacent to conditioned space to minimize air leakage.

- Air seal between the sill plate and the sub-floor with caulk, foam, or an equivalent material.
- Install a foam gasket beneath sill plates that are sitting on concrete or masonry and adjacent to conditioned space to both air seal and serve as a capillary break between the concrete and the sill plate.

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

For a home to perform efficiently, the walls, ceiling, and foundation that comprise the building shell must be connected to provide a continuous air barrier. Any seams where two different building components come together in the building shell represent a potential source of air leakage that must be sealed with an appropriate sealing material as described below. The sill plate where the wall meets the concrete foundation is especially susceptible to air leakage for two reasons: because the concrete surface is sometimes rough, preventing a smooth seam between the foundation and the sill plate and because of the stack effect, which naturally pulls air in through the lower part of the building, where the sill plate is located.

The sill plate (sometimes called the mud sill) is the board laid horizontally directly on top of the foundation wall. It consists of usually one layer of 2x6 or 2x8 pressure-treated lumber. In platform construction, the band joist and floor joists rest on the sill plate. They support the subfloor and the base plate (also known as a bottom plate or sole plate) which sits on the subfloor and to which the wall studs are attached. The sill plate is attached to the foundation wall with anchor bolts that are embedded in the concrete of the foundation wall.

The best way to air seal the sill plate is to place a sill sealer (also called a sill gasket) on the concrete before laying down the sill plate. Sill sealer is a pliable foam product that is available in varying widths up to 10 inches wide. It comes in rolls and is rolled out over the concrete along the foundation perimeter. The flexible sill sealer product conforms to any irregularities in the surface of the concrete. A waterproof closed-cell foam product should be selected that will both air seal and provide a capillary break preventing any moisture that migrates up through the concrete from reaching the wood of the sill plate. The rot-resistant product also prevents insect and rodent intrusion. Some builders seal the sill plate to the foundation wall with two large beads of caulk but a sill seal product that covers the whole sill plate area is preferable because of its waterproofing capability and inherent uniformity.

The seam between the sill plate and the rim joist above is sealed with caulk. The entire sill plate-rim joist area can be further air sealed and insulated with spray foam, but sill plate joints and seams with rim joists should first be caulked. The hole where the anchor bolt protrudes through the sill plate can also be caulked.

Sill sealer installation could be done by the framer. This task should be included in the contract for the appropriate trade depending on the workflow at the specific job site.

How to Air Seal the Sill Plate

1. Lay the sill plate boards along the perimeter of the foundation. The edge of the sill plate is setback from the outside face of the foundation a distance equal to the thickness of the exterior sheathing. Mark the locations of the anchor bolts and drill holes for the bolts. Lay the boards on the sill to ensure they fit then set them aside ([Koel 2008](#)).
2. Install termite shield if desired. The termite shield is a strip of 26-gauge aluminum, copper, or galvanized sheet metal laid along the outer edge of foundation wall. The outer edge hangs out from the exterior wall and is bent down at an angle to form a drip edge and a diverter, which makes termite presence more visible. The shield is sealed to the concrete with epoxy and joints in the flashing are glued with epoxy or are soldered ([BSC 2009b](#)).
3. Roll out sill sealer along the perimeter of the foundation wall. Press down, and cut if needed to allow anchor bolts to come through the sealer. Apply caulk around anchor bolts.
4. Lay sill board back in place over termite shield, sill sealer, and anchor bolts and bolt down with washers and nuts.
5. Install rim joists. Caulk at rim joist-sill plate seams ([BSC 2009c](#)).

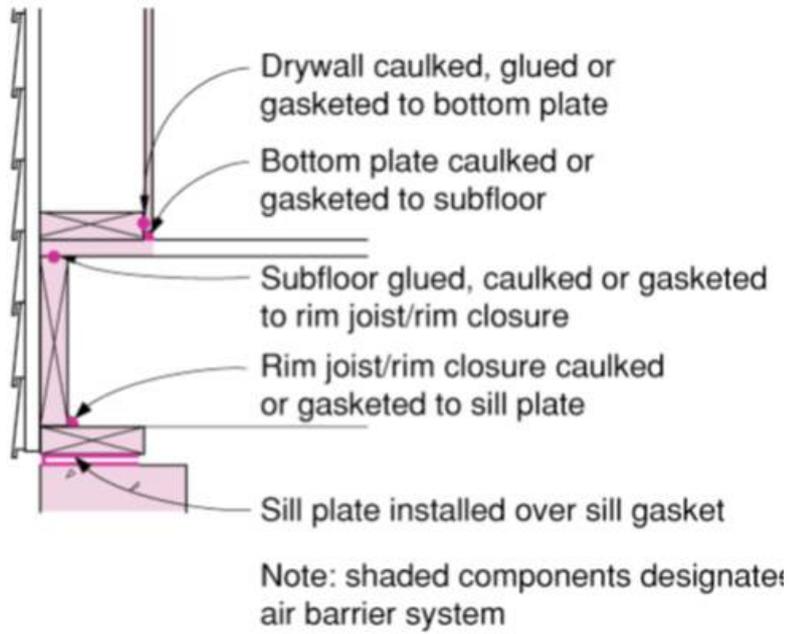


Figure 1 - The sill plate-foundation wall juncture is sealed with a pliable closed-cell foam sill sealer ⓘ

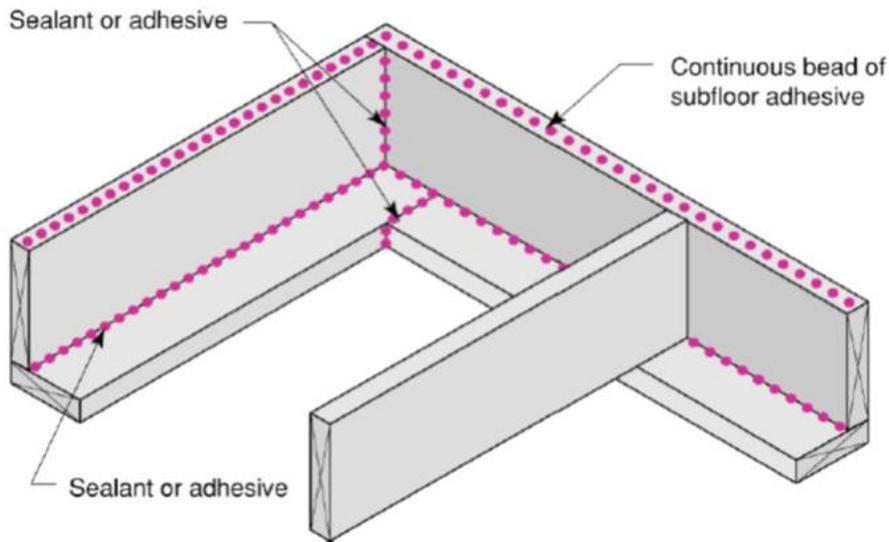


Figure 2 - The top of the sill plate is sealed to the rim joist with a bead of caulk. All joints in the sill plate are sealed with caulk ⓘ

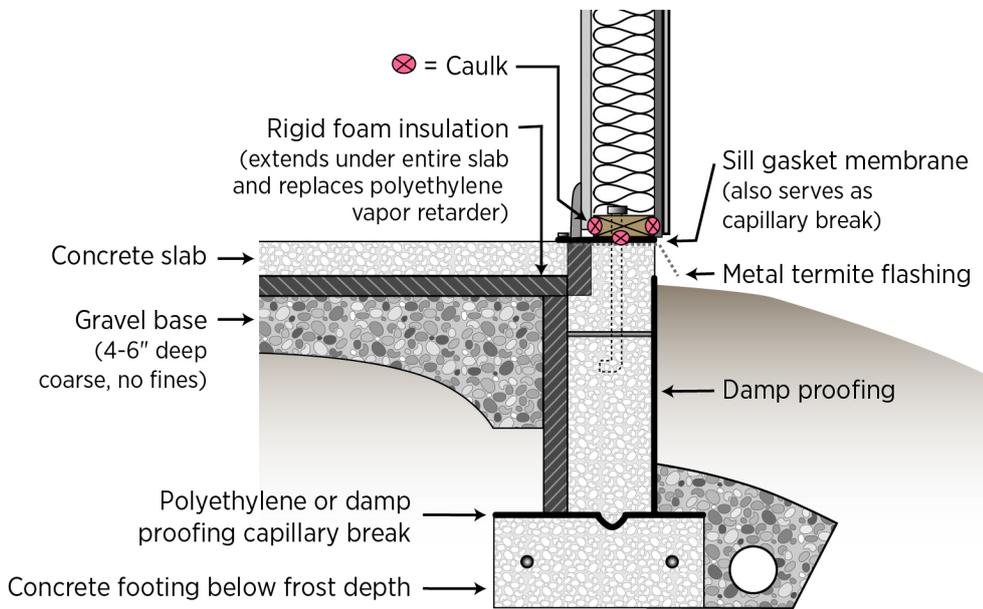


Figure 3 - A sill sealer and termite shield are installed between the sill plate and the foundation on a raised slab foundation i



Figure 4 - Spray foam provides a critical seal that further air seals and insulates the subfloor-rim joist-sill plate juncture i

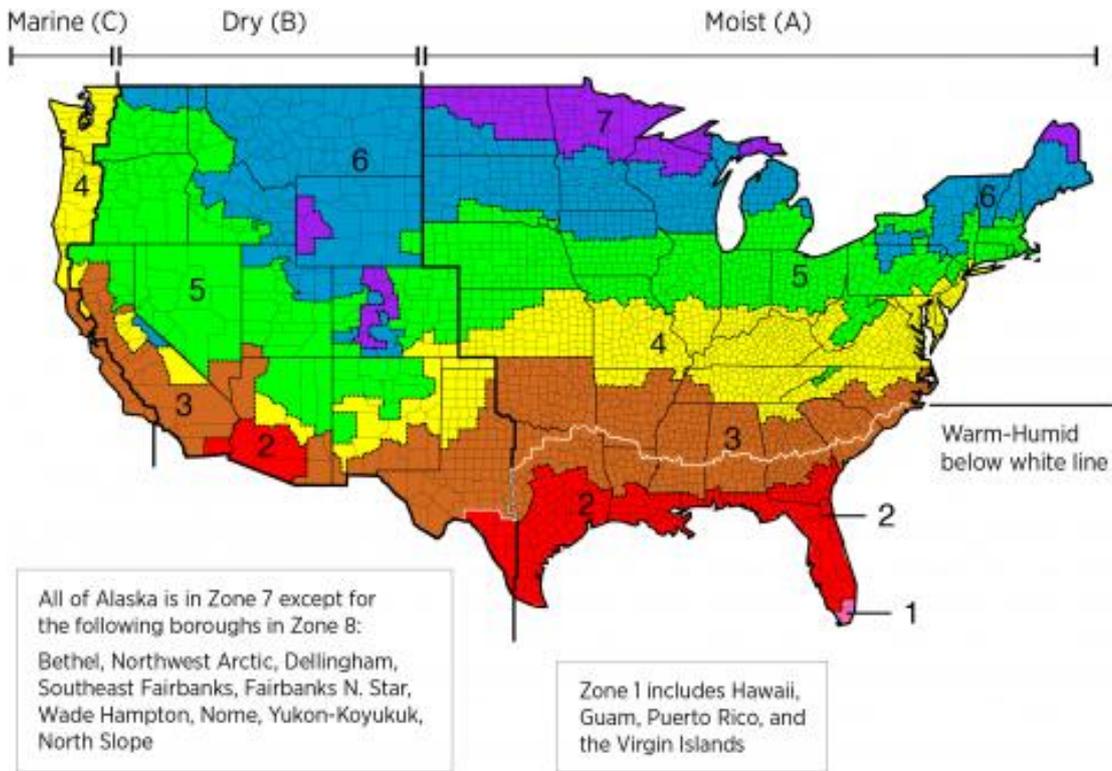
Ensuring Success

Before drywall is installed, visually inspect that a foam gasket has been installed under the sill plate and that the sill plate is caulked to the rim joist.

Climate

ENERGY STAR Version 3, (Rev. 07)

In Climate Zones 1 through 3, a continuous stucco cladding system adjacent to sill and bottom plates is permitted to be used in lieu of sealing plates to foundation or sub-floor with caulk, foam, or equivalent material.



Training

Right and Wrong Images



Display Image: [ES_TESRC_5.2.1_PG140_281b_102811_0.jpg](#)

Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Author(s): EPA

Organization(s): EPA

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Author(s): EPA

Organization(s): EPA

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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Author(s): EPA

Organization(s): EPA

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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Author(s): EPA

Organization(s): EPA

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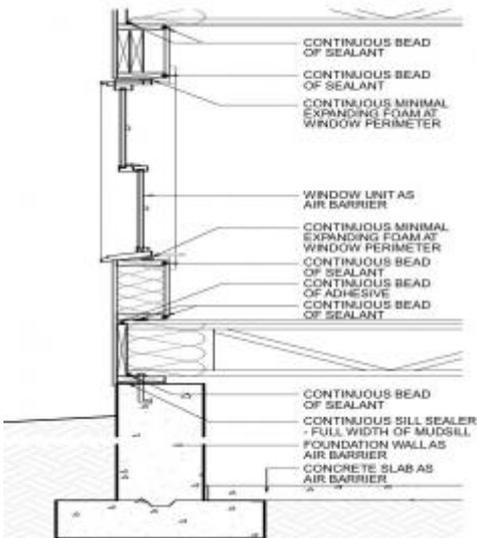
Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.

CAD



CAD FILE: [319&521_CAD_1-1_air_seal_lower_wall_502002_GBA_1-31-12.dwg](#)

PDF: [319&521_CAD_1-1_air_seal_lower_wall_502002_GBA_1-31-12.pdf](#)

Reference: [Building Plans for Advanced Framing](#)

Author(s): Green Building Advisor

Organization(s): Green Building Advisor

Website providing CAD files and drawings of advanced framing details.

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

Thermal Enclosure System:

4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material):

4.3 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to conditioned space^{25,26}

Footnotes:

(25) Existing sill plates (e.g., in a home undergoing a gut rehabilitation) on the interior side of structural masonry or monolithic walls are exempt from this Item. In addition, other existing sill plates resting atop concrete or masonry and adjacent to conditioned space are permitted, in lieu of using a gasket, to be sealed with caulk, foam, or equivalent material at both the interior seam between the sill plate and the subfloor and the seam between the top of the sill plate and the sheathing.

(26) In Climate Zones 1 through 3, a continuous stucco cladding system adjacent to sill and bottom plates is permitted to be used in lieu of sealing plates to foundation or sub-floor with caulk, foam, or equivalent material.

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

[DOE Zero Energy Ready Home](#)

Exhibit 1: Mandatory Requirements. Certified under ENERGY STAR Qualified Homes Version 3

[2009 IECC](#)

Section 402.4.1 Building thermal envelope. Joints (including rim joist junctions), attic access openings, penetrations, and all other such openings in the building envelope that are sources of air leakage are sealed with caulk, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.*

[2009 IRC](#)

Section N1102.4.1 Building thermal envelope. Joints (including rim joist junctions), attic access openings, penetrations, and all other such openings in the building envelope that are sources of air leakage are sealed with caulk, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.*

[2012 IECC](#)

Table R402.4.1.1 Air Barrier and Insulation Installation, Walls: Junction of foundation and wall sill plates, wall top plate and top of wall, sill plate and rim-band, and rim band and subfloor are sealed. Corners, headers, and rim joists making up the thermal envelope are insulated.*

[2012 IRC](#)

Table N1102.4.1.1 Air Barrier and Insulation Installation, Walls: Junction of foundation and wall sill plates, wall top plate and top of wall, sill plate and rim-band, and rim band and subfloor are sealed. Corners, headers, and rim joists making up the thermal envelope are insulated.*

*Due to copyright restrictions, exact code text is not provided. For specific code text, refer to the applicable code.

[2015 IECC](#)

[2015 IRC](#)

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

1. [New Whole-House Solutions Case Study: Schneider Homes, Inc., Village at Miller Creek, Burien, WA](#)
(893 KB)
Author(s): PNNL
Organization(s): PNNL
Publication Date: February, 2013
Case study about new home construction in the marine climate that achieved 50% savings over the 2004 IECC.
2. [New Whole-House Solutions Case Study: Tom Walsh & Co., New Columbia, Portland, OR](#)
(867 KB)
Author(s): PNNL
Organization(s): PNNL
Publication Date: February, 2013
Case study about a new construction building project of 20 homes that earned HERS scores that represent greater than 50% energy savings in heating and cooling over the 2004 IECC.

References and Resources*

1. [Air Barriers - Airtight Drywall Approach](#)
Author(s): Lstiburek
Organization(s): BSC
Publication Date: May, 2009
Brochure about creating an air barrier by sealing drywall assemblies.
2. [Best Practices Series Volume 16: 40% Whole-House Energy Savings in the Mixed-Humid Climate](#)
Author(s): Baechler, Gilbride, Hefty, Cole, Adams, Butner, Oritz, Love
Organization(s): PNNL, ORNL
Publication Date: September, 2011
Report describing measures that builders in mixed-humid climates can use to build homes that have whole-house energy savings of 40% over the Building America benchmark with no added overall costs for consumers.
3. [Building Profile: Hot-Dry/Mixed-Dry Climate: Albuquerque](#)
Author(s): BSC
Organization(s): BSC
Publication Date: April, 2009
Information sheet with details on building enclosures for hot-dry and mixed-dry climates.
4. [Carpentry, Fifth Edition](#)
Author(s): Koel
Organization(s): American Technical Publishers
5. [Critical Seal \(Spray Foam at Rim Joist\)](#)
Author(s): BSC
Organization(s): BSC
Publication Date: September, 2009
Information sheet about air sealing.
6. [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.
- 7.

[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).

8. [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Publication Date: October, 2011

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.

*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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