

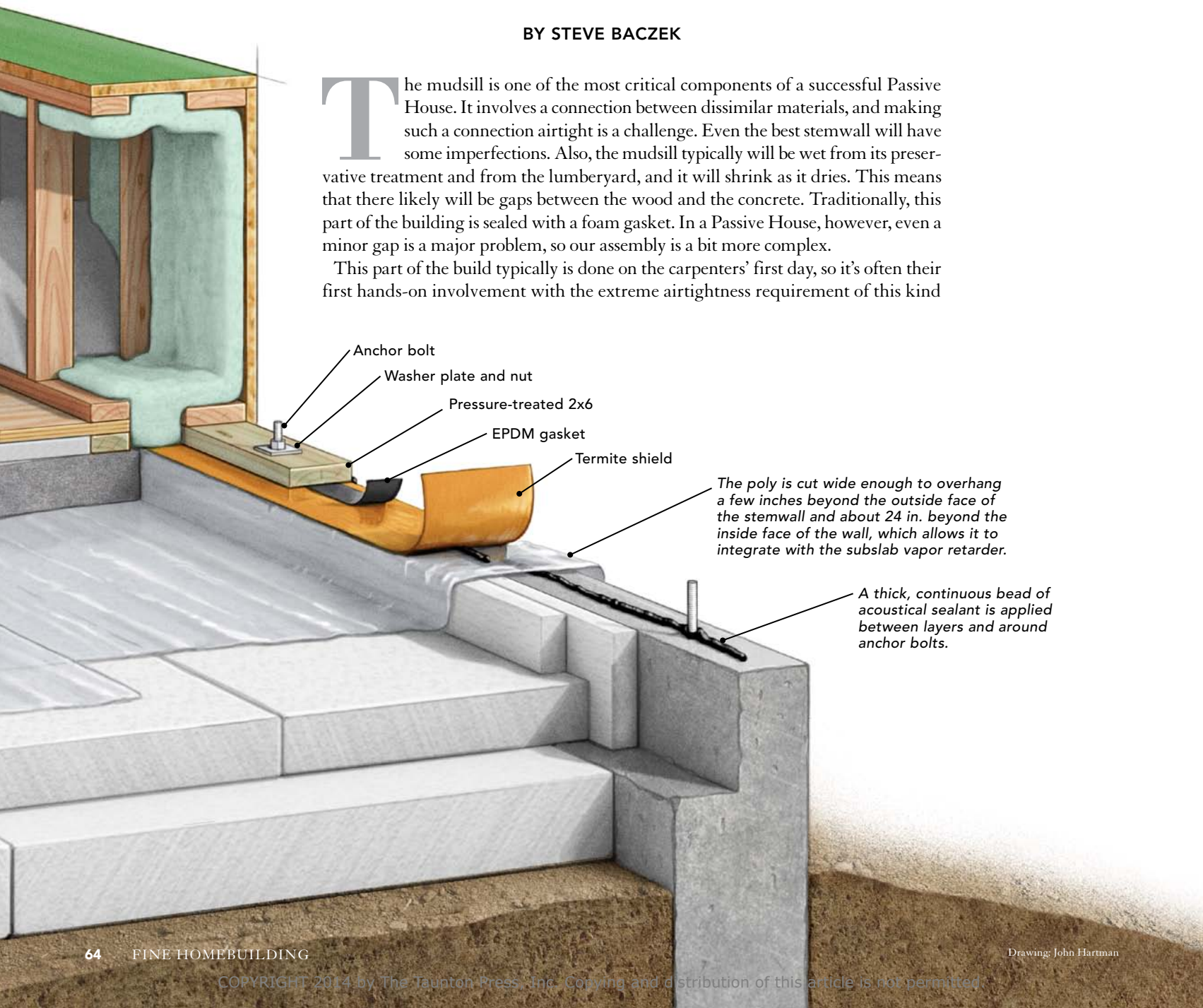
Air-sealed Mudsill Assembly

You only have one chance to get this critical detail perfect

BY STEVE BACZEK

The mudsill is one of the most critical components of a successful Passive House. It involves a connection between dissimilar materials, and making such a connection airtight is a challenge. Even the best stemwall will have some imperfections. Also, the mudsill typically will be wet from its preservative treatment and from the lumberyard, and it will shrink as it dries. This means that there likely will be gaps between the wood and the concrete. Traditionally, this part of the building is sealed with a foam gasket. In a Passive House, however, even a minor gap is a major problem, so our assembly is a bit more complex.

This part of the build typically is done on the carpenters' first day, so it's often their first hands-on involvement with the extreme airtightness requirement of this kind



Anchor bolt

Washer plate and nut

Pressure-treated 2x6

EPDM gasket

Termite shield

The poly is cut wide enough to overhang a few inches beyond the outside face of the stemwall and about 24 in. beyond the inside face of the wall, which allows it to integrate with the subslab vapor retarder.

A thick, continuous bead of acoustical sealant is applied between layers and around anchor bolts.

PREP THE PLATE



Make your mark. To locate the bolts accurately, the mudsill is laid on edge across the top of the stemwall, and each bolt location is scribed onto the face of the 2x6.



Narrow walls require offset strings. The tops of these stemwalls are only wide enough to carry the 2x6 walls, so the carpenters attach 2x spacer blocks to the stemwalls, and then they fasten an offset stringline to the blocks to use as a reference for measuring.



Drill the layers as a sandwich. Although they started out marking and boring through each layer separately, the carpenters quickly learned that it's faster to stack up the poly, termite shield, and 2x6 mudsill; clamp them together; and drill through everything at once.



The gasket is treated separately. The soft and stretchy EPDM gasket (sidebar p. 67) tends to get snagged and wrapped up by a spinning drill bit, so after the other layers are drilled, the gasket is stapled to the underside of the mudsill and sliced with a utility knife at each bolt-hole location.

STACK THE LAYERS

Starts gooeey and stays that way. The primary air-seal in this assembly is Tremco acoustical sealant (about \$15 per tube). Highly elastic and sticky right out of the tube, this sealant won't harden over time like construction adhesives, so it creates a reliable air-seal at vulnerable joints.



Plastic comes first. After applying a thick, continuous bead of acoustical sealant to the top of the concrete, the carpenters lay the poly vapor retarder in place. They use hand pressure to push it firmly into the bead of sealant.



Termite shield. Another bead of acoustical sealant is laid across the top of the poly before the termite shield, a copper-polymer composite membrane called YorkShield 106 TS (yorkmfg.com), is placed over it.



of house. In most cases, the carpenters never will have built even close to a Passive House level of airtightness, so establishing a good mental standard for the job starts here.

The mudsill is a one-shot deal. This project relies on several blower-door tests to evaluate air leakage, but the first test won't happen until the walls and roof are in place and sheathed. By then, any air leakage at the mudsill is far more difficult to address. It needs to be right the first time; there is no second chance here.

Learning to love acoustical sealant

There are various sealants, gaskets, self-adhering membranes, and building tapes for air-sealing mudsills. Although we used a gasket in one layer of the mudsill assembly on this house—a belt-and-suspenders approach—most of the airtightness hinges on the use of Tremco acoustical sealant. Sold in tubes at specialty retailers and online, the black sealant installs easily with a caulk gun. It's exceedingly sticky and highly elastic, and unlike construction adhesive, it never cures. While the gooeey, get-everywhere sealant makes for an interesting job site (you'll want to keep a large bottle of Goof Off or Goo Gone on hand), it is the most effective air-sealing solution I have found.

One of the issues I have in sealing mudsills with a rubber gasket alone is the treatment of butt joints and changes in direction. A healthy bead of sealant eliminates any concern about gaps in these areas.

Every change has implications

The previous article in this series ("Designed for Success," *FHB* #240) touched on the importance of nailing down all of the building details before any principle construction work begins. Even the best-laid plans are going to need last-minute tweaks, however. Here, the client feared that termites might move into the walls, where the double-stud framing would make it especially difficult to notice the infestation. In an effort to ease the client's mind while keeping with the builder's schedule, we decided to add a copper termite shield to the mudsill assembly. This termite shield later was trimmed back on the inside and covered with foam, eliminating the chance of a thermal bridge. □

Steve Baczek is an architect in Reading, Mass. Photos by Justin Fink, except where noted.



SEAL THE JOINTS



Butter the butt joints. Before placing the next 2x6 sill, a thick bead of sealant is applied to the edge of any adjoining sill. This is a commonly overlooked weak spot in an air-sealed assembly.



Belt and suspenders. After all of the layers are in place and the foundation bolts have been fully tightened, another bead of sealant is applied to the exterior joint between mudsill and stemwall and at all butt joints.

Gaskets

Traditionally, the mudsill is laid atop a ¼-in.-thick polyethylene gasket. Although this sill sealer does help to reduce air leakage between the sill and the concrete, it's far from airtight. On this house, the builders installed a soft rubber EPDM gasket (BG63) made by Conservation Technology (conservationtechnology.com). Unlike with poly gaskets, the manufacturer claims that its EPDM gaskets will stay flexible at extremely low temperatures and will respond well to shrinkage and swelling even after decades of compression.



Polyethylene gasket

EPDM gasket

Next in the series
Part 3: Superinsulated slab



Online members can watch a companion video for each article in the series at FineHomebuilding.com/extras.