

HIGH PERFORMANCE



Air-Sealing a Masonry Party Wall A masonry parge and fluid-applied membrane are the keys to performance

BY ED MAY

I'm a Passive House consultant working in New York City. These days, my partner, John Mitchell, and I spend a lot of our time focusing on Passive House renovations of existing brownstone townhouses. We currently have seven or eight similar townhouse projects underway in various stages of completion, consulting with various general contractors, where a brownstone is being gut-renovated and extended and the project goals include Passive House certification. Our role includes detailed energy and building performance modeling, as well as a lot of on-site design, advising, inspection, crew education, and quality assurance.

Like all extensive renovations, a Passive House brownstone renovation is complicated work with many intricate and interesting

problems to solve. One of those problems is how to deal with the party wall between the dwelling that's being renovated and its adjacent neighbors. We're typically shooting to comply with the EnerPHit Passive House standard, which calls for a total building airtightness of 1.0 ACH50; to hit that mark, that party wall needs to be made as airtight as possible.

In a city like New York with an older building stock, townhouses with true shared party walls are an enormous market, and a real challenge for builders seeking to improve the airtightness on their projects. These shared party walls are typically built of brick masonry, and have pockets for timber joists from both sides. This unsealed wall can lead to a variety of troubles for homeowners,

AIR-SEALING A MASONRY PARTY WALL



Before the masonry parge and air-sealing fluid membrane can be applied, masonry needs to be repaired as necessary. Above, a chimney flue (1) and other irregular surfaces (2) will have to be filled before the wall can be coated. Penetrations from new and existing structural carrying members (3) also need to be filled and smoothed prior to air-sealing.

allowing air and cooking odors, pests such as mice and insects, as well as noise and other unwanted contaminants to pass between neighboring homes.

Most projects start with demolition: The party walls are stripped back to bare masonry. There are exceptions; sometimes we are asked to preserve existing plaster, which can be quite airtight and may have aesthetic value or historical significance. In those cases, we may have to work around the old material, and bridge or connect to it somehow. But in general, we pull everything off the walls until we can see existing old bricks and mortar.

At this point, we need to repair any missing or damaged masonry as directed by an experienced structural engineer. These are pretty old walls that we're working on, and most of them have seen better days. At the very least, you're going to need to repoint certain portions of the wall. Some of the masonry may have water or fire damage. Earlier renovations may have been done in a way that requires repair now.

Then, once the masonry itself is in good shape, we recommend a full parge coat using a lime mortar, to create a flat and level surface for later air-sealing work. This allows the masons to even out any irregular surfaces from the masonry and fill small voids or gaps where necessary.

Once the wall field is prepared and any joist replacement has been completed, a liquid-applied airtightness material is installed over the parge. This material can be any of a number of products, but we typically recommend Sto Gold Coat or Sto EmeraldCoat. These water-based acrylic coatings, typically used for exterior waterproofing under EIFS applications, are vapor permeable but airtight, and can be rolled on or spray applied. This material is installed over the field of the wall and is applied roughly around the timber joists.

We apply a minimum of two coats at 12-mil wet thickness, and sometimes as many as three coats if the substrate is very irregular. Some installers have taken to adding a small amount of different colored pigments to the material before application in order to clearly show where the various coats have been, and have not been, applied, as an aid in inspection.

Sometimes we have clients who push back on the masonry parge step, and want to apply the fluid-applied membrane to the bare brick and mortar without parging first. Occasionally, we've let that happen, but recently, I've become more of a stickler for the parge coat. It's vitally important in order to get that nice, flat masonry surface. Without the parge coat, there are significant voids and gaps, and the Sto fluid is hard to apply on a rough, variable surface like that. It's just like painting: Surface preparation is key. It's boring, nobody



A lime mortar parge (4) is the first layer to be applied to the brick masonry after rough repair is completed. Next, the parge is coated with up to three coats of fluid-applied, vapor-open airtight sealing membrane (5). The final result is a fully membrane-coated wall (6), ready for blower-door testing to verify airtightness levels.

likes to do it, and it's invisible in the end, so nobody likes to spend money on it. But it's important to prepare the surface properly to receive these additional coats.

While it is possible to air-seal around the joist-to-masonry-wall connection with tapes, sealants, or other products, the new generation of spray-applied flexible airtightness materials seem to provide a more cost-effective and thorough seal at this joint. Products such as Partel's Blowerproof or Pro-Clima's Visconn (see photo, page 43) are an ideal solution to this joint, because they can span over small gaps and maintain elasticity and integrity at this connection over the long term. The spray application also helps to speed up the installation of the product on these irregular and oddly shaped connections.

Once the field and the joints have been sealed, the last step is to connect this party wall airtight layer to the front and back walls of the row house. These front and rear walls are typically exposed to the outdoors, and as a result will feature insulation and other layers distinct from those of the party walls. Most common in high-performance retrofits are interior side air/vapor control membranes, and in particular, one of the new generation of "smart" vapor control membranes which has a variable permeability depending on the ambient relative humidity. In that case, we like to seal the air/

vapor control membrane robustly to the party wall by extending the membrane onto the party wall 8 to 12 inches and using a permanently elastic sealant such as Pro-Clima's Contega-HF to bond the plastic sheet to the masonry layer. A termination bar or tape layer is also used to keep the plastic membrane in place and avoid any curling or damage during construction.

At this point, any insulation can be installed on the party wall as desired. Many clients will elect to add some insulation to this wall to reduce unwanted sound from the neighbors. Additionally, to reduce the thermal bridging from the masonry party wall at the front and rear, it is recommended to install insulation 3 feet along the wall at the front and back. Beyond that zone, insulation is not required for energy or thermal comfort.

Finally, we try to test our airtightness application with an interim blower-door test while we can still get to and fix the airtightness layers. Even the most careful air-sealing can still miss gaps in unexpected locations, and the blower-door test is the only good way to verify that everything has been installed correctly and is working as expected, and to point to any areas that need further attention.

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