

# Builder Notes

## Brick Veneer Construction: Basics of Resisting Water Penetration in Residential Construction

From homeowners to builders, all recognize the desirability of clay brick. Brick can add value to any home or community as long as some simple steps are taken to design and build it correctly. Every builder seeks to mitigate callbacks, and it goes without saying that water penetration callbacks tend to be costly and difficult to repair. Whether it's a puddle in the basement or mold on water-soaked sheathing, water is something to avoid in all construction.

Water penetration has been known to lead to premature failure of materials; moreover, water is a nuisance to homeowners and a headache to builders. The thickness of a single wythe of brick veneer will allow water penetration, so it is designed and constructed as a drainage wall system. Although the bricks themselves may not allow water through them, the brick veneer will—as will other elements in the wall system, such as windows and other items penetrating the wall. Any water that penetrates behind the brickwork must have a way of exiting quickly. So how do you create a drainage system inside of a brick wall construction? The answer is through the proper design and installation of through-wall masonry flashing.

### Through-Wall Flashing

Within a masonry veneer wall, there

should be a means to redirect any moisture that has penetrated the outer wythe of the wall as well as ways to then redirect any water back out to the exterior. Foundations and lintels alone cannot be counted on to redirect the water in a consistent manner; therefore, flashing should be installed to protect the interior.

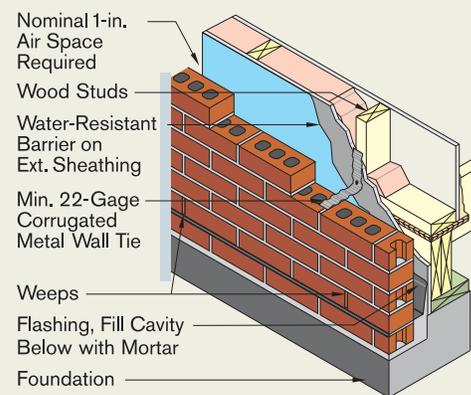
Through-wall flashing is an impermeable membrane placed in the wall that extends from the sheathing, across the air space, and all the way to the exterior of the brickwork (see Figure 1). One should place flashing at all points where the air space is closed off. Model building codes require flashing at the foundation, above window and door heads, at window sills, and where the roof of a one-story wing meets a two-story brick veneer wall.

Because the expense and difficulty of replacing flashing is considerable, only the best materials should be used. Sheet metals, bituminous membranes, plastics, and combinations of such materials are suitable for flashing. Aluminum and building felt should not be used.

Flashing should extend from the outside face of the veneer, through the thickness of the brick veneer, across the air space to the backing, and then up at least 8 inches. The flashing should either extend up

behind the water-resistant barrier or should be attached to its surface with a termination bar. Flashing held back from the outside of the brick veneer—even just 1/2 inch—could allow water to re-enter the wall. Builders need not be concerned with the flashing breaking bond since wall

**FIGURE 1**



**Brick Veneer/Wood Stud Wall**

ties hold the veneer on the house. Flashing that is punctured will not perform as intended and should be torn out and replaced. Where flashing under a brick course requires more than one piece, flashing pieces should be overlapped at least 6 inches and sealed with compatible mastic.

Weeps work in combination with flashing by allowing water to drain and should be placed directly above the flashing to help the water quickly exit the wall. Weeps are usually open head joints or weep vents and are placed every third brick or 24 inches o.c.

### Air Space

To allow water to reach the flashing and weeps, there must be a small air space that permits water to drain downward. A nominal 1-inch air space is required to drain the water as well as keep the brick and mortar from coming into direct contact with the sheathing. If air spaces are less than 1 inch, mortar bridging will occur too frequently. Air spaces can be as large as 4½ inches, if wire wall ties are used. Corrugated wall ties are not as stiff as wire ties and, therefore, are limited to a nominal 1-inch cavity. As brick is laid, some mortar will protrude into the air space; however, the air space should not be clogged to the extent that it inhibits drainage.

### Water-Resistant Barriers

In addition to the air space, water-resistant barriers prevent water that has penetrated the brick veneer from damaging other elements of the wall system. The most common water-resistant barrier is #15 felt, but

one can use Tyvek or any moisture-resistant sheathing material. Punctured water-resistant barriers should be sealed to resist moisture penetration.

### Special Areas of Concern

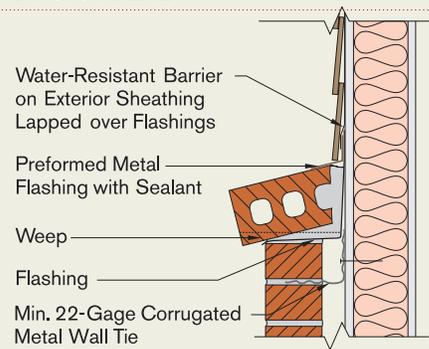
**Foundation**—The area around the top of a foundation can be susceptible to water penetration. This could be due to water penetration from above, but it could also be due to water penetration through the foundation itself. Paying particular attention to the waterproofing through a basement wall can avoid many problems. Foundation waterproofing should

continue above grade to make sure mulch or other landscaping materials are not above that level. Flashing and weeps should also be placed above grade to keep drainage above ground. To prevent water from running into a crawl space or basement, proper installation of through-wall flashing is critical (see Figure 1). The flashing should run from the front face of the veneer to the backup and extend at least 8 inches up the wall. The water-resistant barrier should overlap the flashing by at least 6 inches.

### Transitions From Other Sidings—

Homes built with a combination of lap siding and brick veneer should handle the interface details carefully.

**FIGURE 2**



**Lap Siding/Brick Transition**

For the vertical joint between these sections, a J-channel and sealant should be enough to close off the gap. Other trim pieces may also be used, as long as they redirect water. A more difficult transition occurs in the horizontal direction when the lap siding is placed above brick veneer. Durable flashing must cover the gap created by the air space behind the brick (see Figure 2).

The information contained in these *Builder Notes* is based on the available data and the combined experience of engineering staff at the Brick Industry Association. The information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry.

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