

WRAPPING THE HOUSE:

Do's & Don'ts

To some extent, houses have always leaked. But in recent years, using new materials like panel sheathing, housewrap, and flanged windows, we've tightened up construction to the point that houses no

by Patricia McDaniel

longer dry well. During the same period, there's been a decline in traditional methods of carpenter training. One result is that houses are going up without proper attention paid to building paper and flashings. Once these new tight houses leak and the insulated framing cavities get soaked, they're more likely to stay wet and rot than the airy, "breathable" houses of the past.

In more than 20 years of building, repairing, remodeling, and inspecting homes, I've found that even the most critical flashing details are often installed wrong or overlooked altogether. These errors are common to expensive custom homes and inexpensive modular houses alike. Often, it's evident that the carpenters made a conscientious effort, yet still the details are wrong.

Again and again, flashing and papering mistakes come back to one overriding principle: Get the layers right so that water flows out on top, not behind, the housewrap and flashing. A second important principle: Don't rely on the siding to stop the water. I tell customers that the purpose of siding is to look good, and that, yes, it sheds most of the water off the house. But it also lets water past it, so the backup system of housewrap and flashings must deflect that water and allow it to weep or drain back out from behind the siding before it soaks the sheathing and framing.

Materials of Choice

We use Tyvek and Typar interchangeably (my carpenters tend to prefer Typar because it's quieter and easier on the eyes.) Properly installed, we get good performance from either material.

The housewrap debate. There is some research that indicates that housewraps don't perform well when they're subject to persistent wetting. However, in my inspection work, I've never come upon a situation where there was rot behind housewrap that I couldn't trace to a water intrusion higher up — for example, a roof leak, a rip in the housewrap, a backwards lap, or a missing flashing.

I don't claim to have seen everything, but it's my strong opinion that if you get the details right, the brand of housewrap you use is not important. If you just can't bring yourself to trust housewrap, use tarpaper — it's been around for a long time and still performs well.

Install it right, and
housewrap works well
to keep water out;
lap it wrong, and you're
better off without it

Eaves membrane. Any areas subject to a lot of moisture — splashback zones, areas below intersecting roofs that dump accumulated rainwater, or tall beachfront houses, for example — can benefit from extra layers of tarpaper or self-sticking eaves membrane (commonly referred to on the job site as "bituthene") in addition to the housewrap. Just make sure that wherever you use it, the top edge of the membrane or tarpaper is behind the housewrap above.

For the 36-inch-wide rolls of bituthene, we use one of several available brands, including Grace and Certainteed. For the narrow flashing rolls, we prefer to use Grace's Vycor. Although this stuff is very sticky, it adheres best to clean surfaces, and sticks poorly to dirty housewrap.

Get a brake. If you're serious about keeping water out of the houses you build, you should invest in a metal brake and learn to use it. With a brake and a roll of coil stock on hand, we can bend the necessary flashings as we go, and not have to rely on a roofer or metalworking sub who may or may not be at the site when we need it.

Don't rely on chemistry. Don't substitute the stickiness of bituthene for proper layering. The same goes for house-wrap tapes and caulks. In time, chemical bonds can break down, but properly lapped layers will not move.

Sequence Is the Culprit

The photos that follow illustrate common leak spots that occur from installing housewrap improperly. Some of these mistakes result from nothing more than carelessness. But a root cause of many problems is the construction sequence that's common on job sites today: The frame gets sheathed and wrapped, then everything else — doors, windows, decks, and flashings — gets put on top. Immediately you have a layering problem — unless you do something about it.

Incomplete Wrapping

All too often I see sloppy and incomplete house-wrap installations; the housewrap is installed any which way, with no attention to proper layering.

Gable ends. For some reason, builders often think they can get away without wrapping the gable ends (photos **A** & **B**). This may be because they're thinking of the wrap only as an air infiltration barrier but not as a weather barrier, and figure there's no reason to worry about air leaking into the attic.

This is a mistake, because the gable is one of the most exposed parts of the house. Driving rain gets behind the siding, runs down the sheathing, and winds up behind the housewrap.

The problem often appears as drips along the top extension jamb of windows or sliders below. It may be hard to diagnose, because the leak may show up well below the point where the water runs behind the housewrap.

Band joist. Another problem area is the band joist. Walls may be sheathed and wrapped while they're lying on the deck. Then, when the wall is lifted, the band or mud sill remains unprotected (**C** & **D**). Splashback from below as well as water running down the housewrap from above can cause severe wetting. If you install wrap this way, make sure you go back and cover the band joist with a strip of housewrap, tucking it under the wrap above. Note that in photo **D** this would be difficult to do, because hold-down straps were installed over the wrap above and band joist below.

Outside corners. Often housewrap doesn't quite make it around the corners (**E**). Like gables, corners get a lot of weather exposure, and any water that enters at this intersection of trim and siding then





has direct access to the structure. A leak at this point may never show up inside the house, but can nonetheless lead to rot over time. Make sure your housewrap extends all the way around corners. We typically add a layer of tarpaper over the housewrap behind all corner trim boards.



Wrapping Around Windows & Doors

Once in a while you see a window that's properly integrated with the housewrap, as in photo F. Here, the flanged window was installed over a strip of flashing paper at the bottom of the window, while flashing strips along the sides cover the flanges. At the top, the head flashing paper laps over the flange and was inserted into a slit in the housewrap above, then secured with tape. I don't have a lot of confidence that the tape will stick to the tarpaper for the long term, but since the lapping is correct, the installation should be weatherproof.

Around the corner on the same house, however, a door cased with brickmold was slapped into place right over the housewrap, with no effort to flash the head (G). This is a



Windows & Doors

common problem both with cased doors and flanged units (**H**). Often the casing or flange is bedded in a bead of caulk. While this may help for a while to prevent water from entering at the window head, it does nothing to prevent the brickmold or wood head casing from soaking up water and eventually rotting. Once water gets behind the siding, it will run down the housewrap and pond on top of the head casing. This problem often shows up inside as water dripping from the head jamb extension.

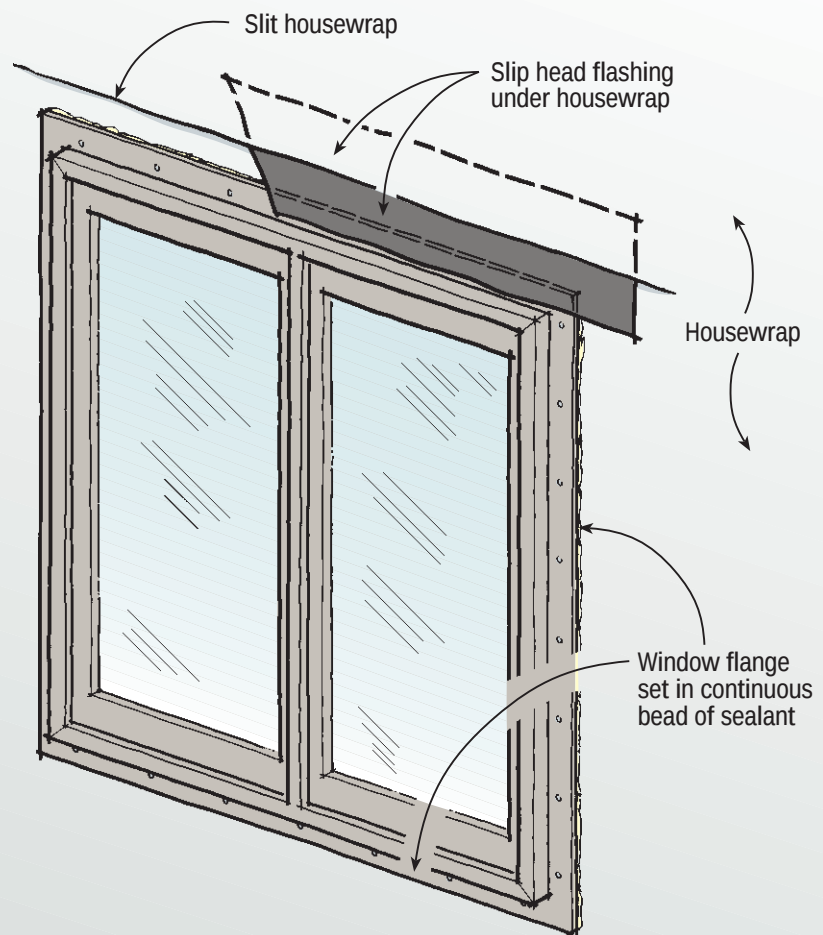
Note in photos **G** and **H** the torn paper at the corners of the door head. This results when the installer is careless in making the conventional X-cut in the housewrap. The more common recommendation now is to make an I-cut, fold the sides in, and slip the top flange of the window behind the housewrap at the head. Or you can install the flanges on top of the housewrap, slice the housewrap above the window, and slip a piece of tarpaper or flashing behind the housewrap at the top (see illustration, right). With wood brickmold, you should use a metal cap flashing, and slip the upper leg behind a slit in the wrap. In my opinion, these simple details will take care of 99 percent of the leaks around doors and windows.

Mulled windows. Mulled windows are another challenge. Many builders use the manufacturer's accessory mullion cover, but fail to provide a continuous head flashing across the top. The result is that water runs down between the units and often finds its way into the framing at the sill.

Photo **I** shows how someone went to a lot of trouble to seal a window wall tight to the weather, using Grace Ice & Water Shield between and around the windows. Unfortunately, the closeup shot (**J**) reveals some heartbreaking details. Despite the obvious effort, the lapping is wrong: The top flanges of the windows lie on top of the membrane, allowing water to pass down behind the flange and into the fram-



Window Head Flashing



ing. The messy caulk is an attempt to correct the situation, but for a beachfront house like this, it's a leak waiting to happen.

Photo **K**, shot elsewhere on the same house, shows a sticky flashing application already beginning to peel at the top. Ice & Water Shield is probably overkill in this case anyway; it would have been better to use tarpaper and tuck it into a slit at the top of the window.

The sloppy work shown here is indicative of the confusion that surrounds window installation in the industry today. Builders buy high-tech waterproof membranes, spend a lot of time fussing with the installation, and still end up with the basic details wrong.

Round windows. Half-round and full-circle windows are tricky to flash, because there's no practical way to lay the wrap on top of the flange, and metal flashings don't conform to the radius. Photo **L** (next page) shows an attempt to deal with the problem by taping the flange to the wrap. Unfortunately, the roof flashing at the bottom was installed on top of the bottom flange — again reverse layering. Some attempt was made to get it right by slicing the wrap at each side of the window and bringing it out on top of the metal flashing.

I would prefer to see Ice & Water Shield used around radius windows rather than tape.



Roof Flashings

The layering problem with the roof flashing shown in photos **L** and **M** is all too common. It's rare for a roofer to take the time to lift the housewrap or building paper and tuck the upper leg of the flashing underneath. Water runs down the housewrap, behind the flashing, and shows up as a roof leak.

These simple shed roofs are easy to get right. Either hold the paper up until flashing is installed, or slit and tuck in a strip of tarpaper after the flashing goes in.

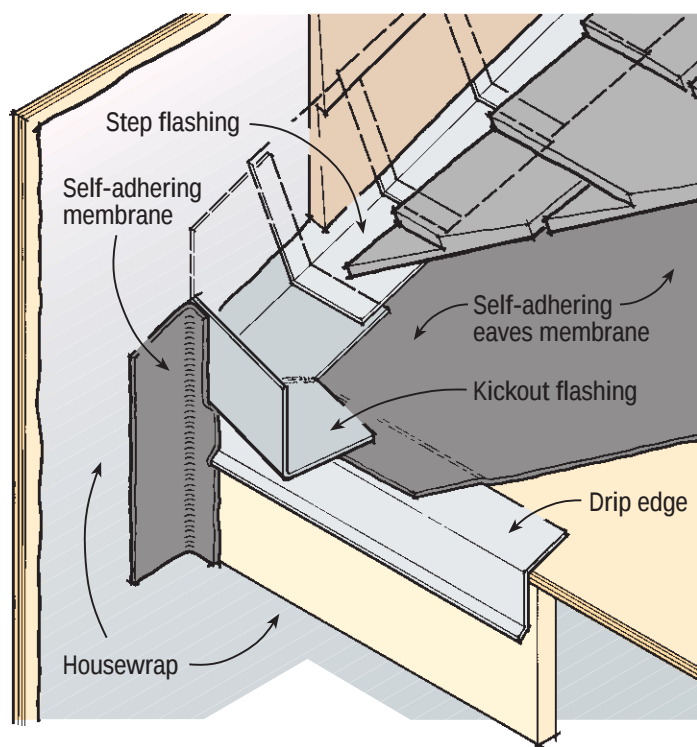
Trickier are the step-flashed areas where roofs meet walls. Photo **N** shows a fancy metal roof with lousy flashing details. Not only is the roof counterflashing on top of the housewrap, but it also delivers water right onto the deck rim joist below (as does the deck membrane above). Once the wood trim board gets installed over that deck rim joist, it's only a matter of time before rot sets in.

In photo **O**, the counterflashing on the upper roof was carefully tucked under the lifted housewrap, while — alas — the flashing on the lower pent roof is right on top of the wrap. Photo **P** shows a classic case of step flashing confusion. The wrap was lifted out of the way to allow the step flashing to slip behind — so far so good. But once the wrap is laid back down, any water that runs down along that step flashing will



track right down behind the wrap onto the wall sheathing below. A situation like this should ideally be handled with a properly detailed kickout flashing (see illustration, right), installed before the eaves trim and roof shingles. If you don't use a kickout, make sure that the housewrap is on top of the upper leg of the step flashing, but that the bottom piece of step flashing directs the water out on top of the housewrap below (and preferably, out on top of the siding). This requires careful slitting and weaving of the wrap and the metal, with Ice & Water Shield patches where necessary. In areas of severe wetting, an additional layer of tarpaper on the lower wall is a good idea.

Kickout Flashing

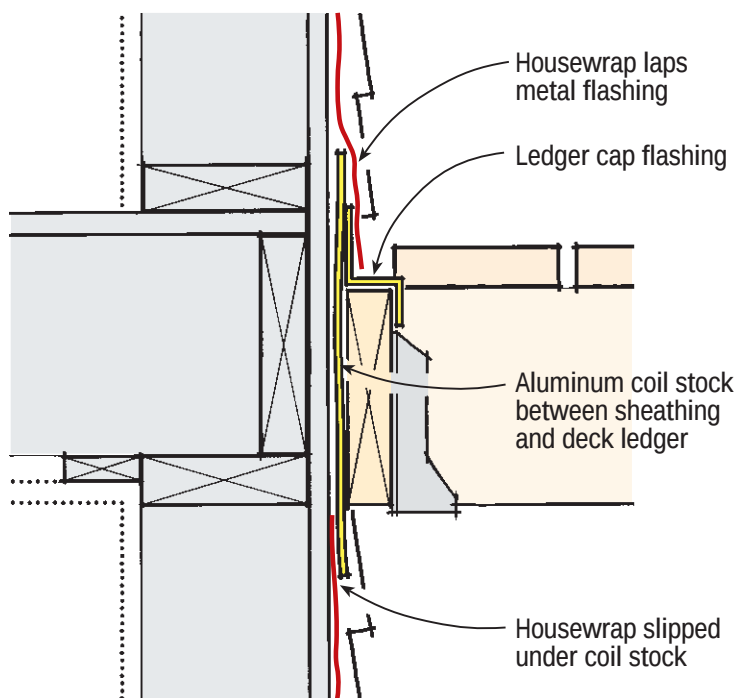


Deck Details

If you're not careful, deck ledgers can provide a direct path for water to enter the structure. Often — around here at least — the framing crew installs the deck ledger before the house is wrapped. In many cases, the band joist never gets sheathed at this point. The housewrap gets installed, but terminates just above the ledger. Unless the top of the ledger is properly flashed — which is not always the case — any water running down the wall gets channeled into the framing, leading to long-term saturation and rot.

Our framers always bring the sheathing down over the band joist, then install aluminum coil stock to separate the deck ledger from the house. We flash the top of the ledger, making sure this flashing is behind the housewrap (illustration, right).

Deck Ledger Flashing



Deck Details

Photo **Q** shows a sloppy wrapping job that leaves the band joist exposed. Because the deck is already in place, there's no practical way to flash the area. In photo **R**, the ledger flashing extends nicely up the wall, but is laid on top of the housewrap.

Attached rails. It's always a good idea to separate railing elements from the house walls when possible, to avoid pathways for water to enter the framing. Photo **S** shows what looks to be a nice detail: The railing is separated from the house wall, and the wrap passes behind. The only problem is that the eventual finish on this house was EIFS, meaning the wood railing post was buried under 1½ inches of foam board.

Whenever we have to attach a post to a house wall, we separate the post from the sheathing with aluminum flashing. We bring the top of flashing 6 inches above the deck rail, and make sure it tucks behind the housewrap. Our preferred method is to install the siding first, and leave a gap of a few inches (code allows up to 4 inches) between the post and the house.

Stupid details. Some details defy common sense, and are best left to your competition (photo **T**). Rule of thumb: If you can't figure out how to flash it, don't build it. 

Patricia McDaniel runs Boardwalk Builders in Rehoboth Beach, Del.

