

PAN FLASHING

a Chimney

For many decades on Cape Cod, masons have routinely used a single, large sheet of lead to create a through-pan flashing for their

by Charles Thomas

chimneys. The main reasons for using lead pan flashing include speed and economy and, in most cases, the lead eliminates the need for a constructed cricket on the upslope side of the chimney. Though I think they're ugly, I've never seen a properly made pan flashing leak, so if that's what customers want, that's what I give them. The general principle behind pan flashing is that any water entering the chimney, whether by absorption or directly down the flue, will be redirected back out through weep holes once it hits the integral barrier inside the flue. Whether building a new chimney, or rebuilding above the roofline, the basic process is to bring the masonry line up a little higher than the roof plane, completely cap it with a single sheet of lead, and then complete the chimney construction.



Chimney Rebuild

On a recent remodeling job, the asphalt roof shingles had just been replaced, and the roofers had conscientiously replaced the old chimney's lead step flashing, turning and caulking it into the face of the brickwork. However, due to the roughly 40-year age of the chimney, freeze-and-thaw cycling had taken its toll on the bricks, mortar, and concrete cap. The chimney still leaked, and a rebuild was called for, from the roofline up.

Building a baseline. I began by covering the roof below the work area with a tarp to protect the shingles, and set up staging just below the chimney, which measured 28 inches across by 24 inches on the sloping side. I tore the old masonry down to just above the roofline, leaving the step flashing and the bricks that it covered in place (see Figure 1, next page). The existing ceramic flue was a large, discontinued size but still in

This regional technique
uses a single sheet of
lead to keep water out
of the chimney opening



Figure 1. Newly replaced stepped flashing won't stop the leaks in a failed chimney but will remain in place under the pan as a secondary barrier, to prevent wind-driven water penetration.

good condition, so I set it aside for reuse. Using a 7¹/₄-inch-diameter diamond-abrasive circular saw blade and the plane of the roof as a guide, I cut through the lead and the brick, making repeated passes to cut as deeply as the blade allowed on the two sloping sides of the chimney. The offset of the saw's shoe kept the cutline about 2 inches above the actual roofline. The blade didn't cut all the way through the brick, but did go deep enough so that I could finish the cut with a chisel. Chiseling fractured a few of the bricks, so I replaced them to create an even, sloped plane.

Leaving the existing lead kept a vital, primary skirt of flashing in place around the chimney's perimeter (Figure 2). The exposed pan flashing actually serves to counterflash the concealed base flashing. Without base flashing installed, wind-driven rain would find its way into the building.

Fail-safe underlayment. On a new chimney, I cut bricks to match the angle of the roof and lay them parallel to the roofline, about 2 inches higher than the surrounding roof deck on all four sides. Ideally, the chimney goes up before the finished roof goes on. I use 12-inch-wide strips of Vycor Plus, a sticky, self-adhesive bituminous membrane (Grace Construction Products, 62 Whittemore Ave., Cambridge, MA 02140; 800/444-6459; www.graceconstruction.com), as a fail-safe underlayment around the chimney. It sticks as well to brick as it does to plywood. I install it just like flashing, working from bottom to top, making the transition from the roof deck up onto the face of the chimney. It's important to install a layer of asphalt felt paper at the bottom of the chimney first to serve as a bond-breaker, so that the Vycor can later be lifted and interwoven in a bottom-to-top sequence by the roofers. I leave the installation of the metal base flashing to the roofing



Figure 2. Using the roof to guide his circular saw, which is fitted with an abrasive diamond masonry blade, the author cuts through the lead and brick on either side of the chimney parallel to the slope (left). The flue tile is marked with a pencil, removed, cut, and replaced. Gaps in the brick are filled and parged with mortar to provide a smooth, even base for the lead pan (right). The basic layout is identical in new construction, minus finished roofing and flashing.

crew, making sure to inform the builder of the importance of this step in the flashing sequence. If there's a leak, I don't want any part of the blame game. I recommend using lead for the apron flashing, stepped flashing, and head flashing under the lead pan to avoid any chance of a galvanic reaction between dissimilar metals.

Gravity at Work

When you pan flash a chimney, you depend on gravity alone to keep the masonry in place. As far as I know, there's no actual adhesion between mortar and lead. I leave a level course of brick at the bottom and top sides of the slope, to serve as a flat ledge for the new masonry to lock onto. Viewed from the slope side, the chimney profile at this stage forms a shallow zigzag. Eliminate this ledge, and you can probably watch the chimney slide off the roof. Otherwise, this is a hurricane-tested method.

With the original flue still in place, I traced the sloped brick profile onto it using a pencil, a little higher than the surrounding brick, and then removed it for cutting, keeping both sections for reuse. I reinstalled the lower flue section using Umaco Mortar Joint Repair (Umaco, 60 Rear Newhall St., Lowell, MA 01852; 800/442-5535), a flexible siliconized acrylic mortar seal that comes in a 10-ounce caulking tube, to seal the joint between the sections. To provide a smooth bed for the lead sheet to rest on, and eliminate any rough edges that could punch through the lead, I parged the top surface of the brick and flue tile with mortar.

Lead sheets. The next step is to cut the lead sheet to size. I buy my sheets at a local stone and masonry supplier. The sheets are available in 5x6-, 6x6-, 4x8-, and 6x8-foot rolls, and weigh 2½ pounds per square foot. They cost about \$1 per pound. You want to leave a 12-inch skirt of lead showing at the bottom and sides of the chimney, and have enough lead at the top to go under at least three courses of roof shingles. The higher the better, because without a cricket, there's always the chance of ice-damming and water seeping in above the top edge of the lead.

To make a clean cut, I use my trusty diamond blade again, slicing through the lead while it's still rolled up. For this 28x24-inch chimney, I cut the 5x6-foot roll to 4-foot-4-inches by 6 feet, and unrolled it across the top of the chimney (Figure 3).

After squaring it up over the chimney, I gently beat the lead over the flue with a rubber mallet, making a "telegraphed" impression of the flue opening to guide the cut-through. Using a razor knife, I cut an opening in the lead, about 1 inch smaller than the inside dimension of the flue. This leaves enough lead inside the flue to bend up into a lip, forming the "gutter" (Figure 4). Finger power, a rubber mallet, and patience are all it takes to form lead. The corners will tear if you force it, but it will stretch enough to make the corner-bends intact if you're careful. If you tear the lead and leave it, I can tell you where to look for a leak.

With the inner lip completed, the upper section of the cut flue can be placed. I run a generous bead of the Umaco



Figure 3. After the lead is cut to width while still rolled, it's laid out and centered over the chimney, leaving a 12-inch-wide skirt on three sides, with the excess run up the roof, at least three shingle courses high on a mid-roof chimney.

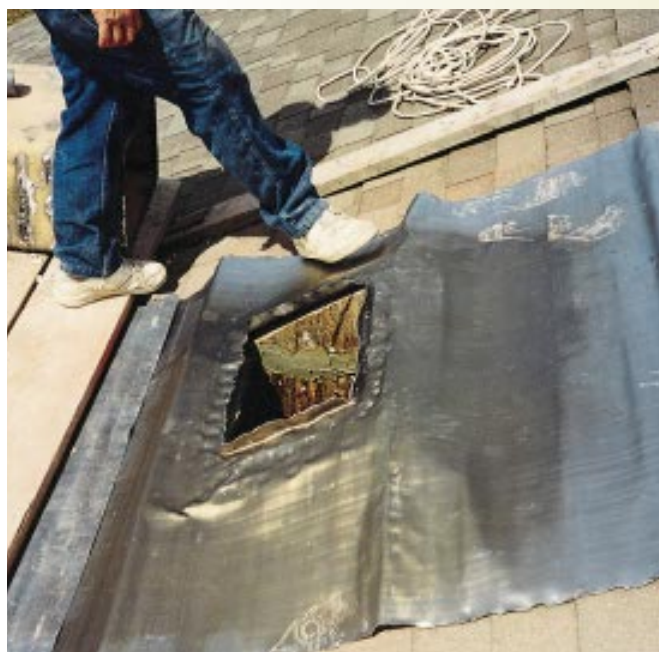


Figure 4. After outlining the flue by gently beating the lead with a rubber mallet, the author cuts the flue opening about 1 inch smaller than the inside dimension, and bends the edge up into a vertical lip. Care is taken not to tear the lead at the corners.



Figure 5. The remaining section of the cut flue tile is set in a heavy bead of joint repair mastic, surrounding the upturned lead berm. The mastic serves as an additional water stop, and helps to hold the flue in place on the lead during construction.



Figure 6. The author cuts and dry-lays all of the makeup brick courses on the pan, then sets them in mortar. Two vertical joints are kept mortar-free to serve as weepholes, allowing any penetrating water to drain from the pan.

mortar on the cut edge, and bed it down into the lead, reuniting the two flue sections.

To determine the number of courses required to level a sloped base, masons use a brick rule, which is a simple story pole with standard brick courses marked on it. By crossing the brick rule, held plumb at the downhill edge of the chimney face, with a level resting at the upper edge, you get a reading for the number of cut courses required to reach a level course of bricks. With this number in hand, I take a reading off the roof with a bevel square, transfer this angle to the new bricks, and cut enough to make up the required number of courses. I lay the cut bricks up dry on the pan to keep track of my progress (Figure 5). All that's left now is to add mortar and lay the brick. I'll leave the mortar out of a couple of the vertical joints in the first course of brick across the lower front of the chimney to allow any water that enters the chimney to exit at this point (Figure 6). From this point on, it's standard masonry fare to the top of the chimney.

Shaping the pan. To make a neat job of the pan, I flare the lead out from the chimney before beating it with the rubber mallet to shape it to the contour of the roof shingles and to form the corners. Corner work calls for a little folding and coaxing; again, patience and a light touch are the paths to success here. The easy workability of soft lead is also a liability; you have to be very careful not to drop a brick or a heavy tool on it while completing the chimney. All it takes is a little tear to ruin the job.

Usually, the lead on the upslope side of the chimney tucks under the shingles, but in the case of this rebuild, the roof shingles were already newly installed. So, with the builder's approval, I opted to keep the lead out on the surface, and shaped it over the top of the venting ridge cap. I admit that this is a less-than-ideal detail, but if wind uplift ever proves to be a problem, the builder can simply go back and reverse the order of installation above the chimney.

When finished roofing follows new chimney construction, the roofers will gently raise the lead pan skirt around the chimney and install the primary apron and step flashing in sequence with the shingles. Head flashing caps the step flashing, and the pan flashing folds back down over the works. Generally, roofing shingles cover the pan flashing only above the chimney, leaving the sides and the apron completely exposed.

A few days after the chimney is completed, I go back and spray on a coat of Silocks VOC (Silpro, 2 New England Way, Ayer, MA 01432; 800/343-1501; www.silpro.com) to seal the brick against water absorption. An application is supposed to be good for about three years. If it's a new chimney job, I'll wait until the roofers have done their thing and gone, then beat the lead skirt into final shape, finishing up with the Silocks treatment.



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