Flashing a Chimney

Installing the flashing along with the bricks makes for a more secure and much better-looking job

BY JOHN CARROLL

Laying up perfect steps. A variety of clamps allows the author to set the flashing at the same time he builds the chimney. The welding clamps secure counterflashing yet leave room for upper courses of brick.

In the early 1970s, my father and a friend went into the roofing business. The friend supplied the capital, and my father, who had six sons, supplied the labor. Being the most particular of the six boys, I was given the task of flashing chimneys. My work was good enough to justify my father's confidence, but invariably, the finished product was a hodgepodge of incongruent shapes and oozing tar—nothing to be proud of.

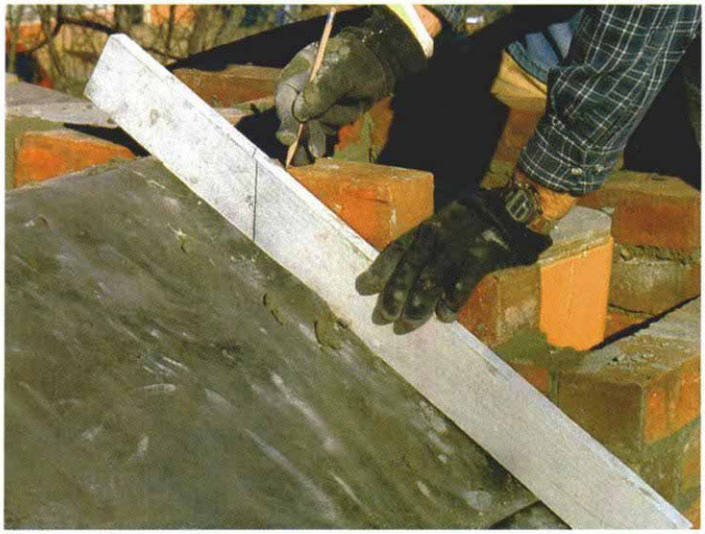
In the intervening quarter-century, I've built as many chimneys as I've flashed. As I've grown from a schoolboy roofer to a seasoned builder and mason, experience has taught me that the best way, visually and structurally, to flash a chimney is to do so at the same time the bricks are being laid. Being skilled in both trades is convenient, but it's not a requirement. If plumbers and carpenters can rough in a bath together, a mason and a roofer working in a spirit of cooperation can easily do this job.

Chimneys need double protection

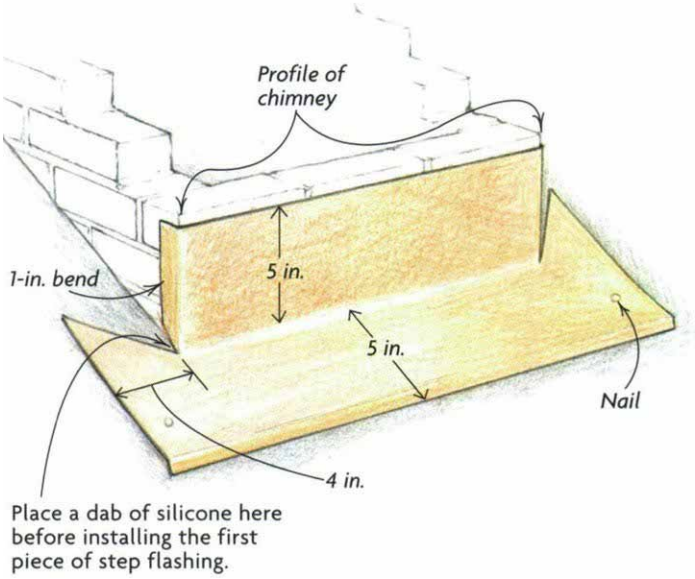
Chimney flashing looks complicated because it involves two distinct components: base flashing and counterflashing. The base flashing covers the joint between the chimney and the roof, ensuring that all the water that flows down the roof is channeled back onto the surface of the shingles. The counterflashing laps over the top of the base flashing to ensure that any water that runs down the chimney is channeled to the outside of the base flashing.

Chimneys break through the surface of roofs in every conceivable place: at the eaves, on the ridge, along the rake and almost everywhere in between. As different as these configurations might be, the strategies for directing water to move harmlessly around a chimney are basically the same. Whenever I'm installing roofing or flashing, I always visualize the flow of water. An upper piece of

GETTING OFF TO A GOOD START



Uniform steps of brick make for perfect flashing. The author uses a 3-in. wide board as a gauge to lay out a consistent set of steps. The next course of brick begins where the board meets the top of the brick.



Base flashing turns the corners of the chimney. The author scribes the edges of the chimney on the backside of the flashing (top photo). After cutting and bending both ends (bottom photo) to match the contours of the chimney (drawing left), he anchors the base flashing by driving one copper roofing nail through each outside edge.

flashing always laps over a lower one. To ensure that every drop of water is deposited on the surface of the roof, the lower piece of flashing always laps over a shingle.

Flashing bends are made in advance

I certainly didn't invent the idea of installing the flashing as the chimney is being built. Bricklayers in New England, where lead flashing is popular, often bed counterflashing in the mortar joints, then bend the flexible metal upward until the roofers come along to fit the base flashing underneath. There is nothing wrong with this method, but I prefer to install all the flashing at the same time. This technique gives me complete control over the flashing process and allows me to use better-looking material.

Besides lead, there are many kinds of sheet metal that roofers use to flash chimneys. I prefer copper. Standard 16-oz. copper bends crisply and has enough body to stay straight and smooth. Unlike aluminum, it doesn't corrode when embedded in wet portland cement; and unlike steel, it never rusts. To my eyes, copper looks great alongside brick or stone, and like those materials, its appearance improves with age. Handsome, durable, exuding quality, copper is truly the Irishman of flashing materials.

Flashing a chimney involves a lot of cuts and bends that must be made on site, but I prefer to have the rough shapes formed ahead of time in a sheet-metal shop. Getting these pieces fabricated in a shop means the bends are crisp and the material is straight and smooth. Besides just looking good, straight metal makes for a tight fit, and the tighter the fit, the less chance that water will seep into the house.

Bricks are laid to accommodate the flashing

Although the base flashing carries the most water, it's the counterflashing that's most

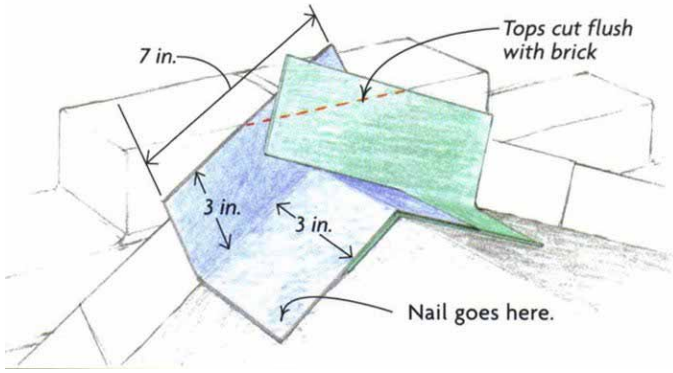
Drawings: Chuck Lockhart

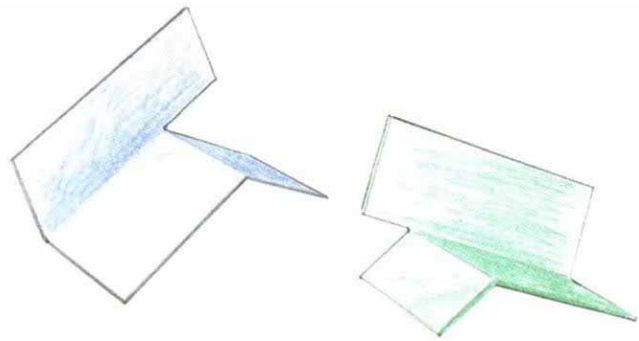
STEP FLASHING KEEPS WATER ON TOP OF THE ROOF

The first layer of step flashing seals the corner. To protect the vulnerable corner, the author traces the profile of the chimney on the backside of the first step (photo left). Using tin snips and seamers, he puts a crisp 1-in. bend on the vertical leg (photo above).

Step flashing is woven into the roof. The first step is held tight against the chimney and secured with one nail (photo left). To ensure that rainwater always runs out on the roof, the first step is covered by the next shingle (photo above), which in turn is overlapped by the next layer of step flashing.

Ganging up on the peak





The two pieces of step flashing that meet at the peak are intertwined, folded over the peak and secured with a nail driven through both outside corners.

visible. I want my counterflashing to look as even as a good set of stairs and to hug the chimney securely. Before I bring the chimney up through the roof, I work out a layout for the counterflashing, then I set the bricks to conform to the layout. I make sure there is a vertical joint in the brickwork at every step in the counterflashing, which allows me to bed the vertical legs of the flashing in the mortar joints along with the horizontal legs.

On moderately pitched roofs (up to about 8-in-12), I generally step up the counterflashing one course of brick at a time. On steeper pitches (up to 16-in-12), I step it two courses at a time, and on very steep pitches (over 16-in-12), I'll make it three courses at a time. On this 1830 cottage, the roof pitch was an oddball (but not uncommon) 6⅝-in-12, so I knew that the counterflashing would step up with each course of brick. But I still had to make sure that those bricks stepped up consistently with the roof.

As I brought the chimney up through the roof, I laid two full courses of brick above the roofllne and stopped. Then I used a 3-in. wide board as a gauge to lay out a consistent set of steps in the counterflashing (photo left, p. 101). I set the board on the roof and marked where the top of the board intersected with the top of the bricks. At that point, I began the next course of bricks. I repeated this process three times and ended up with four uniform steps marching up the roofline. Because this chimney emerged through the ridge, I had to adjust the bricks on both sides of the chimney.

Apron flashing is a copper shingle that's folded in the middle

Before I began the base flashing, I ran the shingles up the roof until the tops of the cutouts were within 5 in. of the bottom of the chimney. The front piece of base flashing (also known as the apron) would essentially serve as the next shingle (photo top right, p. 101). To make up the apron, I'd had the shop bend a 10-in. wide strip of copper down the middle so that the top leg could extend 5 in. up the chimney while the bottom leg extended 5 in. down the roof. The shop also had cut the apron 8 in. longer than the 24-in. wide chimney. This cut allowed a 4-in. overlap on each end to wrap the corners of the chimney (photo bottom right, p. 101). Using tin snips and a pair of hand seamers (Malco Tools; 320-274-8246), I shaped the apron as shown in the drawing on p. 101. I bent the ends a little more than a true right angle to ensure that the tabs would grip tightly against the side of the chimney.

To install the apron, I slipped the folded tabs around the chimney and pushed the metal snugly into the corner where the chimney met the roof deck. Then I drove copper roofing nails through the lower half of the apron into the roof deck. On narrow chimneys such as this one, I place the nails only within the 4 in. that extends beyond the sides of the chimney; these nails will be protected by the overlapping shingles. On wide chimneys, I place nails every 24 in. and coat the exposed nails with clear silicone sealant.

Step flashing is woven into shingles

Fitting the apron is the most complicated part of the base-flashing process. The rest of this process involves alternating layers of step flashing with shingles (done exactly the same way that you would flash against a sidewall). The right-angle step-flashing cards I have made up for every chimney are 7 in. long and 6 in. wide with the bend creating two 3-in. legs.

To ensure that the vulnerable corners were sealed completely, the first piece of step flashing had to wrap around the corner (photos facing page). After making a crisp, 1-in. bend with my hand seamers, I squeezed a dab of silicone into the corners (drawing p. 101); then I held the flashing tight against the chimney and drove a nail through the outside corner. Following the roofing layout, I overlapped the first piece of step flashing with a shingle. Over the top 7 in. of the shingle, I placed the next piece of step flashing. This I followed with another shingle, then another piece of flashing, and so it went all the way up the side of the chimney. (To keep the roof clean of mortar droppings when I laid up the rest of the chimney, I used scrap shingles to pad the base flashing up to the right height. I would leave these temporary shingles in place until I finished the chimney and cleaned up the mess. Then I would remove the temporary shingles and weave the permanent roof into the flashing.)

I left the topmost piece of the flashing loose until I'd run the step flashing up the other side of the roof. To guarantee a watertight seal at the peak, I trimmed both of the top pieces as shown in the drawing on the facing page. Then I interlocked the two pieces, bent the assembly over the peak and drove a nail through both outside corners.

The chimney flashing that comes up through the peak is symmetrical, so once I finished running the step flashing up this side of the chimney, I repeated the process for all the other sides. If the chimney had come up through the plane of the roof, I would have turned the corner and continued

Building a cricket

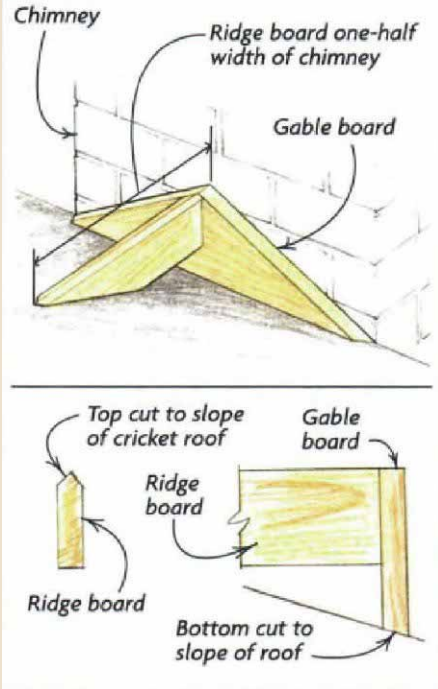
The roofer in me abhors anything that interrupts the flow of water down a roof. So when the back of a chimney faces uphill, I build a cricket to divert water around the edges of the chimney. All I need for this job are two measurements and four pieces of wood. The first measurement is the pitch of the roof, and the second is the width of the chimney. With these measurements in hand, I fabricate the cricket on the ground, then install it as a unit.

After cutting the framing to the dimensions shown in the drawing below, I line up the top of the ridge board with the apex of the gable board and nail the two in the shape of a T. Then I measure and cut two triangular pieces of plywood. Nailing the plywood on my diminutive roof frame completes the cricket.

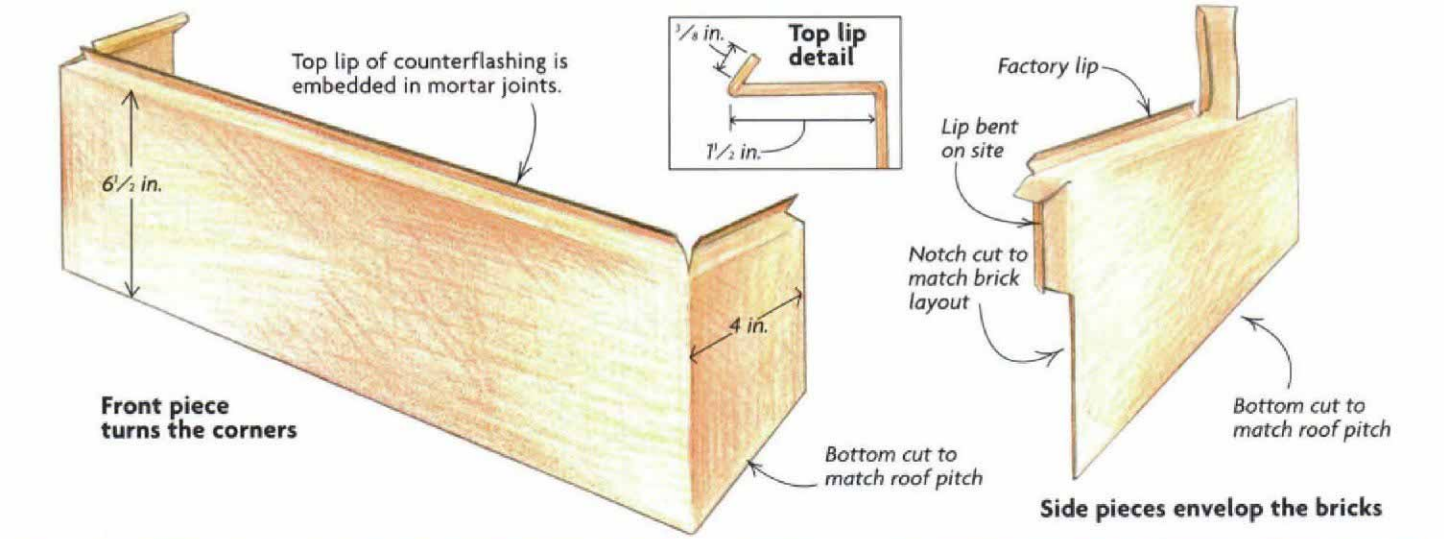
After nailing the cricket in place behind the chimney, I run shingles over it, weaving the valley into the main roof and, at the same time, installing step flashing against the chimney. Then I'm ready to install the counterflashing.

—J.C.

Two boards frame a cricket



COUNTERFLASHING KEEPS WATER ON TOP OF THE STEP FLASHING



Placing the counterflashing. After bending the sides to match the profile of the chimney, the author slips the counterflashing over the bricks and temporarily secures it with a clamp. Note how the bottom of the side piece is cut to follow the pitch of the roof.

Wrapping the corner. For appearance's sake, the author trims the bottom of the first corner piece to match the roofline and carefully wraps the front corner. To make sure that water never finds an entry point, he cuts the back leg 1½ in. long and folds the top lip up the face of the brick.

running step flashing up the cricket roof on the backside of the chimney (see sidebar, "Building a cricket," p. 103).

Clamps hold counterflashing until bricks are laid

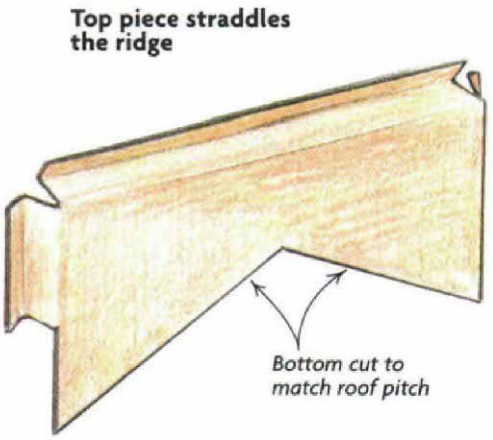
After all the base flashing was in place, I began setting the counterflashing. One of the advantages of installing the counterflashing when I build the chimney is that it allows me to set the flashing deep into the mortar joint. My counterflashing is bent so that the top Hp extends a full 1½ in. into the joint. A ⅜-in. upturned inner lip helps to tie the flashing into the mortar and also serves as a final barrier against water (drawing above left).

As with the base flashing, because this chimney straddled the ridge, I'd made up two front pieces of counterflashing, each of which was 8 in. wider than the chimney. After cutting and fitting each piece to wrap around the chimney, I slipped the flashing over the bricks (photo above left) and secured it with a clamp.

Step counterflashing matches the roofline

With the front piece of counterflashing temporarily clamped in place, I turned to the corners. Each corner piece would cover the first step, with 1 in. wrapping around the front and 1 in. extending beneath the next step up (photo and drawing, above right). After cutting, fitting and clamping both corner pieces, I set up a bar clamp along the front of the chimney to hold all three pieces of counterflashing. This procedure allowed me to remove the smaller clamps and free up the area above the flashing for when I had to become a bricklayer again.

I used the same basic techniques to cut and fit the remaining steps of counterflashing (photo left, facing page). These pieces do have to be notched to fit into the vertical mortar joints where possible and to lap over the flashing below where impossible. As I fit each piece of counterflashing over the brickwork, I held it in place with its own clamp.



Next step up. To secure the flashing without resorting to nails, the author folds the upper levels of counterflashing to lock into the vertical mortar joints [as shown in drawing right, facing page).

Not the easiest way to lay bricks. Threading bricks, mortar and trowel through a series of arches takes a steady hand and a bit of patience. Fortunately, the inevitable spills of mortar are easily wiped up with burlap.

To leave enough room to fit the bricks without removing the clamps, I used 24-in. Vise-Grip (#24SP) C-clamps (American Tool Co.; 847-478-1090). When I reached the two bricks that straddled the peak, I fashioned one piece of flashing with a V-shaped profile on the bottom to cover both sides (drawing above).

Embedding the copper in the wall

After getting the pieces of counterflashing clamped in place, I mixed up a batch of mortar and began laying bricks above the flashing. I admit that threading a trowel through the jaws of the clamps and then laying the bricks under these temporary arches takes getting used to (photo above right). As I pushed each brick into place, mortar that bulged out slid down the flashing. It was messy, but I knew from experience that it would not be difficult to clean up the copper later. I plowed ahead using standard bricklaying techniques, and within a few hours, the flashing was permanently embedded in the structure of the chimney. I was able to remove most of the clamps that day, and I used burlap to clean mortar droppings off the copper.

Keeping water from sneaking in from above

To make sure my brickwork never leaks, I pack all the joints tightly with mortar; I use type-N lime-portland cement mortar, which I'm convinced is more flexible (less prone to hairline cracks) than harder varieties. As I work, I keep an eye on the joints, and when the mortar begins to shrink and pull away from the bricks, I point it with fresh mortar. Then I tool the joint with a jointer that compresses the mortar. To shed water from the top of the chimney, after it has had time to cure, I form and pour a concrete chimney cap in the shape of a hip roof. □

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