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Installing EPDM Rubber Roofs

This single-ply rubber membrane offers a leakproof solution to flat and low-slope roofs

by Joe Bublick

I can't count the number of times a homeowner has called me to fix a leaking flat or low-slope roof. If you're a remodeler faced with this situation and you go to the lumberyard to buy materials, they'll probably sell you 17-inch selvage roll roofing and a few cans of cold patch cement and send you on your way. But if you install a half-lap roof in a climate that gets much weather, chances are in a few years the homeowner will be calling you again.

The world of commercial buildings is full of flat roofs, and obviously commercial roofers know how to make a flat roof last for longer than a few years, in any climate. But many of the roofs used on commercial buildings — torch-applied modified bitumen or ballasted systems, where the roof membrane is held in place with stone — are just not practical on residential jobs. Most roofs aren't built for the extra weight of ballast, and it's insanity to fire up a torch on the roof of a wood-frame building.

As a roofing contractor with a reputation to protect, I wasn't about to resort to roll roofing for residential flat roof repairs. So out of necessity, I began using EPDM for these jobs: It's light, durable, and easy to install. And if installed correctly, the product is virtually failure-proof.

What Is EPDM?

EPDM is a black, single-ply rubber roofing membrane. The letters stand for **ethylene propylene diene monomer**, which describes its chemical makeup. EPDM stands apart from — and above — other single-ply rubber membranes. You may see ads for "rubberized one-ply" roofing or other such names. These are typically types of modified bitumen, which, though less expensive, are not as good as EPDM. With EPDM, you don't have to worry about different formulations or compatibility issues: It's all the same stuff, with the same chemical makeup, regardless of where you get it.

EPDM was developed as a pond liner. Then, during the early 1970s, someone had the bright idea that if it worked under water, why not use it as a roof? When I started using it on homes, it was still a commercial-only product. In recent years, though, because of its amazing qualities, EPDM is finding its

way into more and more residential projects.

Availability. I primarily use EPDM made by Roofing Products International (RPI, 5120 Beck Dr., Elkhart, IN 46516; 800/628-2957). It's available in two thicknesses, .045 inch and .060 inch, and comes in a variety of widths from 7 1/2 to 50 feet and lengths from 25 to 200 feet. I usually buy 100-foot-long rolls of 20-foot-wide material. For residential work, I always use the .060-inch EPDM, because it lies flatter with less wrinkling and offers better durability.

As a certified installer, I can offer a 10-year residential warranty. But in over 20 years of installing EPDM roofs, I've never had a product failure. If an EPDM roof fails, I'm willing to bet that eleven times out of ten it has to do with installation error.

Durability. EPDM has excellent UV resistance, so it requires no further covering for protection from sunlight. It deteriorates at a rate of about 1 mil per year, so the 60-mil product ought to perform well for at least five decades.

EPDM will stretch without tearing, and holds up well to the rigors of installation. It also performs well in extreme temperatures: The product I use will stay flexible down to -49°F and resist heat up to 300°F without cracking or deforming.

EPDM should not be exposed to grease, solvents, oils, and petroleum products; fortunately, these are not usually a factor on residential roofs. (If you use EPDM on a rooftop deck, you should warn the homeowner about grease spills from a grill.) EPDM also has a good fire rating, and is available in a fire-retardant-treated version.

Where to Use EPDM

EPDM hasn't replaced asphalt shingles on all my jobs, but I use it for flat or low-slope roofs, and primarily on roofs that can't be seen from the ground. I tell customers that EPDM makes the ugliest roof they'll ever see — but that they won't see it. Typically, a flat roof on a one-story addition can be seen from a second-floor window, but that's it.

On rooftop decks, EPDM can be covered with a wood deck on pressure-treated sleepers, with outdoor carpet or Astroturf, and even with concrete pavers. EPDM can also be painted with Hypalon paint, but the paint will have to be recoated every three or four years.

Installation

Most of my residential EPDM jobs are replacements for roofs that don't drain. Often the framing has sagged under the weight of ponding water, so the deck has to be given a slight slope before reroofing with EPDM. In cases where the old half-lap or built-up roof has leaked, I check the framing to make sure there's no rot, and replace or reinforce members as necessary.

The first phase of a replacement job is to completely strip the old roof and replace the sheathing where necessary. Next, we lay down a covering of polyisocyanurate insulation board (see Figure 1).



Figure 1. EPDM is installed over a special felt-covered insulation board. Screws and large metal fastener plates secure the insulation board to the roof deck.

This board, called "iso board" by roofers, is different from ordinary rigid foam board in that it has a special glass-fiber-reinforced felt skin that is compatible with the EPDM adhesive. You'll have to buy this board through a roofing supply house. On a residential job, I typically use 1-inch board which has an R-value of 6.

The foam board is attached to the roof deck with screws and large metal plates, which are also available through roofing suppliers. You need one fastener per every 2 square feet. The fastener plates sit slightly proud of the surface, so when the EPDM is installed, the plates are easy to see through the rubber. Each manufacturer has its own dimple pattern on the fastener plate. That way, for warranty work, the manufacturer's inspector can identify and count the plates to be sure that enough were used.

Laying Rubber

In most cases, with a 20-foot-wide roll, we can cover a residential roof area without creating seams. First, we spread the rough-sized sheet out on the deck, smoothing out the wrinkles and getting it into final position.

When we're sure the sheet is where we want it, we roll it back

onto itself halfway (see photo).



Then, using rollers, we evenly spread the EPDM adhesive (350 square feet per five-gallon can) on both the rubber and the insulation deck. The adhesive is like contact cement: It takes about 15 minutes to tack up. Once the adhesive is dry, two or three workers spread out along the membrane and carefully roll it back into place (Figure 2).



Figure 2. After the adhesive has tacked up, workers roll the EPDM into place (top). Wrinkles are smoothed out with a stiff bristle broom (bottom).

Brushing the surface with a stiff deck broom ensures good adhesion. The process is repeated for the other half of the sheet.

Seams. Although they're not usually needed on residential jobs, seams are not difficult with EPDM, but you must make them carefully. I used to use splicing adhesive until seam tape

became available; now I use only seam tape: It makes a stronger seam, and the seam is completely waterproof — an important feature on a flat roof where snow sits or where water might pond.

With splicing adhesive, you allow for a 6-inch overlap. The bottom sheet (the downhill sheet in a sloped roof) is first fully adhered to the deck. When gluing down the top sheet, be careful not to get any adhesive on the overlap area. To make the seam, carefully clean the overlapping surfaces with white gas or a cleaning solvent recommended by the EPDM manufacturer. Then brush on a special splicing adhesive to both mating surfaces and allow it to tack up. When the adhesive is dry to the touch, carefully roll the top piece into place, making sure not to wrinkle or stretch the material. (If the rubber is stretched, this puts a built-in stress on the seam.) Finally, roll the seam with a hand roller to get 100% adhesion, then apply a bead of a special lap caulk to the edge of the seam to keep water from getting between the layers.

Seam tape is a very sticky two-sided tape that comes in a 6-inch roll with a release paper on one side. When using seam tape, the manufacturer recommends both cleaning and priming the mating surfaces. Then unroll the seam tape, sticking it to the bottom sheet as you go. Leave the release paper in place and hand-roll the seam tape to get good adhesion to the bottom sheet. Finally, fold the lapping piece over on top of the seam tape and pull the release paper off as you press the top piece into place. Make sure you carefully trim the top sheet before sticking it down: Its edge should be parallel to and 1/8 inch back from the edge of the seam tape. The edge can then be finished with lap caulk or just left as is, since the exposed edge of the seam tape acts as a water stop.

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Penetrations and Edge Details

Weatherproofing roof penetrations is straightforward with EPDM as long as you work carefully and follow the rules. The secret is to use uncured EPDM, which comes in narrow rolls designed for patching and flashing applications. Cured EPDM has a memory; when you stretch it, it springs back to its original size. Uncured EPDM has no memory; when you stretch it and glue it around a vent pipe, for instance, it forms itself to the shape of the pipe (Figure 3).

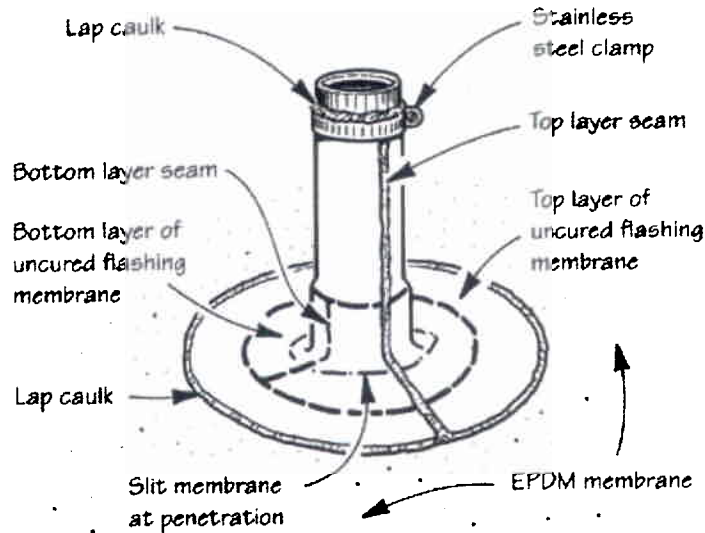


Figure 3.
 Uncured EPDM flashing membrane molds easily to roof penetrations like metal chimneys (top) and plumbing vent pipes. All flashing patches should be sealed with a fully glued double layer of EPDM (bottom).

Patches require two layers of flashing membrane — a smaller first layer and a wider top layer that completely covers the bottom layer. For plumbing vents, you can use an EPDM rubber boot instead of the first layer of EPDM. Patches and flashing are glued with splicing adhesive.

Where the roof meets an inside corner of a sidewall or parapet, you can either fold the corner or slit the membrane and patch (Figure 4).

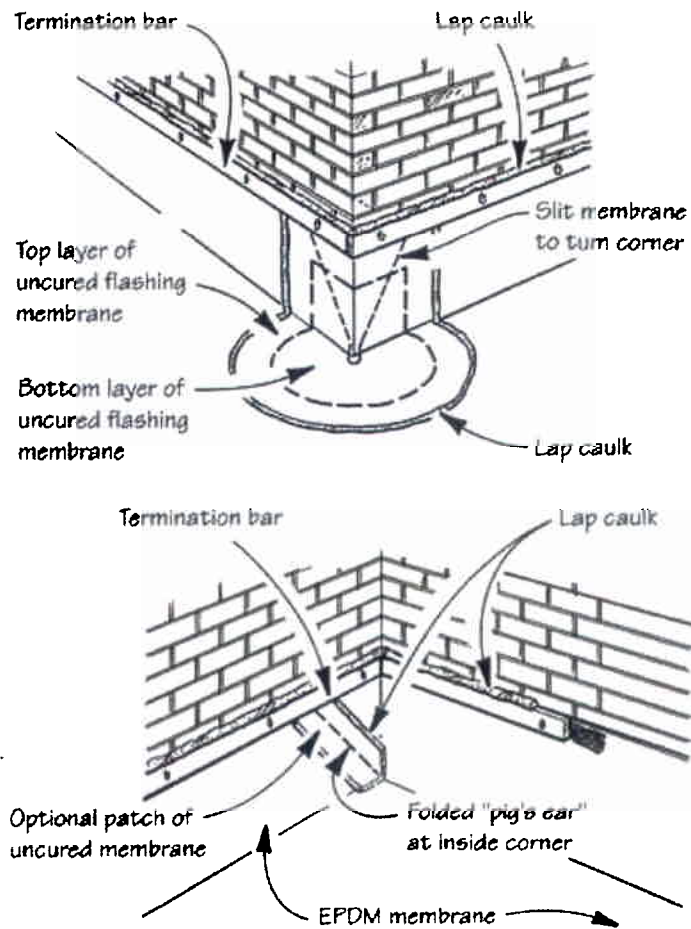


Figure 4. At outside corners, slit the membrane and apply a two-layer patch of uncured flashing membrane (top). Inside corners can either be slit and patched like an outside corner, or folded and secured with a termination bar (bottom).

At outside corners, a patch is always necessary.

Where a roof meets a brick wall, you glue the EPDM to the brick for 8 to 12 inches up the wall, then secure it with an aluminum termination bar (Figure 5).

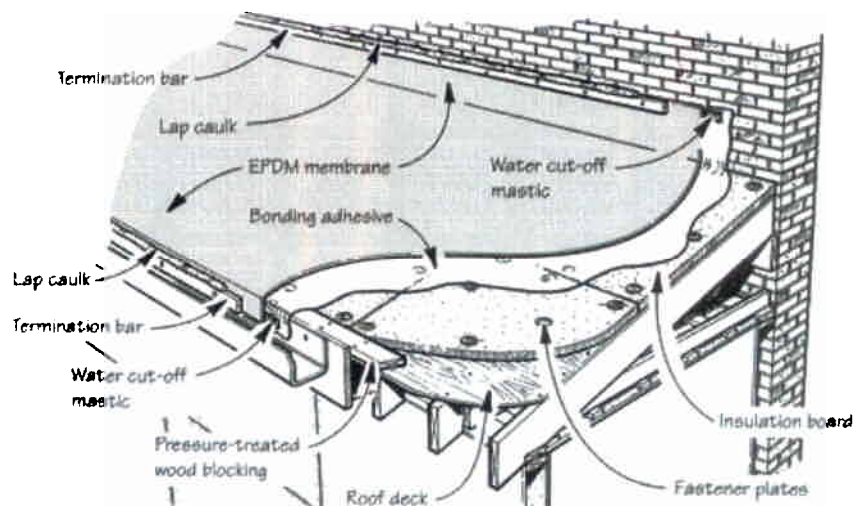


Figure 5. Use aluminum termination bars to secure the edges of an EPDM roof. A special lap caulk protects the top of the termination bar, while a water-block tape or mastic seals the bottom edge of the membrane.

Where an EPDM roof meets a wood-sided wall, you can run the EPDM behind the bottom course of siding. There are a variety of ways to detail roof edges, depending on the look you want. Your EPDM supplier can provide detailed installation specs and drawings.

Joe Bublick is a roofing contractor and builder in Toledo, Ohio. Photos by Carolyn Bates and courtesy of Evergreen Roofing.

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