

# On Site With

This slip-resistant membrane provides a finished deck surface while protecting the living space below

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My company's main business is commercial roofing. Because of our expertise in making flat roofs watertight, however, homebuilders often ask us to cover exterior decks over residential living space. For years we used a single-ply roofing membrane called Hypalon, but we weren't always happy with the results. Roofing membrane is not intended for foot traffic, and on jobs where the contractor left the membrane exposed, the homeowners complained that the surface was slippery when wet. Covering the roofing with conventional deck boards solves that problem, but it more than doubles the cost of the job.



(Fig. 1)

Typically, the decking must be designed to be removed in sections, allowing for repair of the membrane and for cleaning of leaves and other debris that might cause premature wear.

Given single-ply's shortcomings, I was always looking for a better way. Then I discovered Duradek, a PVC-based material that is waterproof and comes in rolls like membrane roofing, but is designed to serve as a non-skid wear surface for foot traffic. The material can be glued to virtually any clean, dry substrate, and comes in a variety of textures and colors (see "[Weatherproof Sheet Flooring](#)" on page 8). The fire retardant material resists mildew and UV radiation, and is easy to maintain. In the seven years since I started installing Duradek in the area of Delaware where I live and work, I've never had a complaint about the final product. Past projects include plenty of sites on or near the beach that are exposed to bright sunlight and extreme heat, salt spray, hurricane-force winds, and winter freeze-thaw cycles. On top of the manufacturer's 15- or 20-year material warranty, I offer a five-year workmanship warranty. The few repairs I've been asked to make have been for small punctures, cigarette burns, and similar blemishes caused by normal wear and tear.

The manufacturer requires all installers to be factory trained and certified, and the work requires some specialty tools, like heat guns, that few carpenters carry in their toolboxes. The installation techniques, however, are reasonably easy to master, and are similar to those needed to install vinyl flooring or single-ply roof membranes.

## Surface Prep

Duradek is completely waterproof, so deck joists need not be pressure treated. We typically arrive on site after the GC has framed and sheathed the deck. If our specs have been followed, the deck sheathing will be a single layer of 3/4-inch tongue-and-groove fir or pine plywood. The material needs to be dry before we can lay the Duradek, so scheduling is crucial. On a small job, the sheathing may be laid in the morning, so we can do our work the same afternoon; on a larger job, we may arrive the morning after the framing is finished. A sudden rainstorm would cause us to postpone our work till the deck had a chance to dry thoroughly. We'll often use our hot-air guns to take care of any light moisture that may have accumulated on the deck.



The first step is to fix any imperfections in the deck sheathing. Ideally, the GC will glue and screw the sheathing to the joists, countersinking the screw heads, but we can also work with plywood that has been nailed or stapled in place. First, we knock down the edges of the plywood joints and butt seams with a grinder, floor drum sander or edger using a light-grit paper (see Figure 2). Often, the sanding is enough to remove any dew or light surface moisture as well.

To prevent them from telegraphing through the finish surface, we hit all joints and nail or staple heads with a silica-based floor filler similar to that used for indoor sheet vinyl. We also cut out and fill any delaminations, loose "football" plugs, and other defects in the sheathing.



*Figures 2 and 3. Prep work begins with setting nails and sanding all joints and edges in the tongue-and-groove plywood (above). Trowel-on floor filler is used to smooth any imperfections and to bridge any gaps in the seams and butt joints (right).*

## Surface Prep Continued

Once the filler dries, we hit it lightly with the drum sander, then with palm sanders and fine grit paper (Figure 4). After sweeping down the deck, we finish up with a leaf blower to get rid of small wood chips, asphalt shingle granules, and other debris that could be trapped under the Duradek and telegraph through.



(Fig. 4)



(Fig. 5)

**Figures 4 and 5.** The crew smooths the dried patching compound using a light-grit paper in a palm sander (above left). A once-over with a broom and a leaf blower clears the deck of any wood chips, roofing granules, and other debris that could get trapped under the membrane (above right).

## Edge Treatment



(Fig. 6)

At the perimeter of the deck, we ease the corner of the face board with a router and a 1/4-inch round-over bit. When the router won't fit and bumps up against a post, we ease the edge with a sander.

There are two ways to treat the edge. If the carpenters have not left a clean, tight joint between the plywood and the face board, we cap the corner with a custom-bent metal drip-edge (Figure 6). We try to avoid this detail, however, because the metal can telegraph through the surface of the Duradek. We prefer to have the sheathing meet the face board perfectly, in which case we use a flat metal strip with a kickout bend along the bottom edge. This is applied vertically to the face board with the top edge aligned just below the rounded-over corner. The metal still telegraphs through, but it's out of the line of sight

**Figures 6 and 7.** At the perimeter, the membrane is glued over a custom-bent metal drip-edge (left). To create a finished edge, the membrane is tucked under the kickout and capped with a vinyl trim strip (right)



(Fig. 7)

## Edge Treatment Continued

Whichever flashing method we use, the Duradek membrane is glued over the metal and tucked under the kickout. A continuous vinyl trim piece holds it in place and makes for a clean-finished edge.

Inside corners where the floor meets the wall don't require a cant strip. The Duradek is pliable enough to take the bend. To prevent the material from pulling away over time, however, we apply a bead of adhesive in the corner.

Alternatively, we install a termination bar on the vertical leg to hold the material in the corner, but the adhesive provides a cleaner-looking detail.



(Fig. 8)

*Figure 8. On the job shown here, Duradek was used as through-wall flashing for brick veneer cladding. The membrane covers the brick below and runs up the house wall and into the door opening. The remaining courses of brick were laid directly on the membrane, which directs any water trapped behind the brick onto the deck.*

On the job photographed for this article, the main building facade was to be brick. We ran the Duradek up and over a course of brick, then onto the wall sheathing (Figure 8). The remaining courses of brick were laid on top of the Duradek, which served as wall flashing, directing any water from behind the brick onto the deck.

## Sheet Goods

We prefer to work with 60-mil Duradek, which comes in rolls 54 inches wide by 75 feet long (thinner versions of the material come in 60- and 72-inch widths). Unless we're covering a walkway, we almost always have a seam, which we try to place in the least conspicuous place. In general, we make sure the lap faces away from the house, so it can't be easily seen by a person coming out the door. We also prefer to have one seam running the length of the deck rather than several shorter crosswise seams. Occasionally, when the dimensions work out just right, we place the seam under the rail or even outside the rail.

We usually begin laying full sheets at the post edge and work back toward the house. That ensures that any odd width will end up close to the house where it will be less noticeable. In new construction, we complete the deck work before the exterior doors are installed so we can run the Duradek a few inches onto the rough sill and up the jambs. In remodeling work, we ask the GC to pull the door so we can run the Duradek into the opening. If the door can't be pulled, we like to have a drop of 2 or 3 inches in front of the door so we can run a termination bar. If the deck is less than 1 1/2 inches below the door, it's sure to leak, so we won't do the job unless the door is pulled.

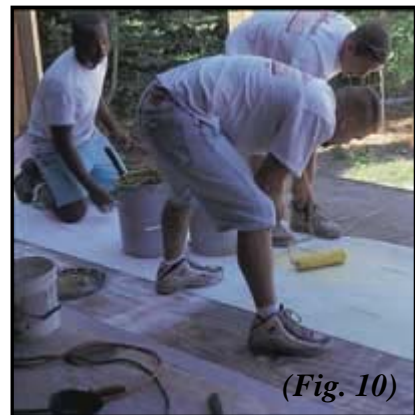
## Sheet Goods Continued



(Fig. 9)

Before we apply any glue, we measure and chalk a line for the first sheet, then dry fit the material to make sure there are no surprises. The manufacturer supplies two types of proprietary adhesives. One is a water-based glue that takes a few minutes to set up, allowing you to realign a sheet if you act quickly. My crew doesn't like it, however, because it has to be applied with a notched trowel, which is hard on the knees. Instead, we use contact cement, which we apply with rollers to both the plywood and the Duradek and let dry. But there's no open time: When we stick the glued surfaces together, they're stuck for good.

We coat the deck between the chalk line and the edge, then fold the sheet in half lengthwise, and coat the inside half of the sheet (Figure 9). When the cement is dry, we put the edge on the chalk line and glue the first half in place. We lay the other half down on the plywood, folding and cutting it around any posts as we go. When everything fits, we coat the remaining half and glue it to the deck, around the posts, and over the metal termination strip on the face board. Subsequent sheets are cemented and laid in the same way.



(Fig. 10)

*Figures 9 and 10. Beginning at the railing, the crew folds full sheets of Duradek in half lengthwise and glues the inner half to a line snapped on the deck (above left). When the contact cement on the remaining half is dry, they roll the rest of the sheet into position, cutting the material to fit around posts and other penetrations (above right).*

## Seams

To ensure the surface is watertight, Duradek seams are not glued; instead, the two layers are welded, or fused, together. Welding the seams is the most critical part of the job - it's not something you learn to do overnight. We use hot air blown from electric heat guns (Leister Triac S, Heely-Brown, 1280 Chattahoochee Ave., Northwest, Atlanta, GA 30318; 800/241-4628; [www.heely-brown.com](http://www.heely-brown.com)) to heat the material to the point where the two edges fuse together. Seam welding requires some finesse: Too much heat and the material will blacken; not enough and the seam may not fuse properly, causing a leak.

## Seams Continued



(Fig. 11)

The first trick is to keep from slopping glue onto the edges of either sheet. To avoid this kind of contamination, we switch from paint rollers to small brushes to spread the glue at the edges. We carefully paint glue onto the plywood right up to the edge of the sheet that's already been laid, while holding the glue back about 3/4 inch from the edge of the overlapping sheet. Sometimes the seam will vary a little bit when, for example, the factory edge is not 100% true and straight. But this slight variation is not noticeable.

*Figures 11 and 12. At the seams, the edges of the membrane are fused together using hot air from a heat gun and pressure from a hand roller (above). The same technique is used to weld flashing pieces around posts and at inside and outside corners (below).*

With the overlapping sheet firmly glued in place, we insert the blade of the heat gun between the two membranes and move it at a steady rate while rolling the edges with a small hand roller (Figure 12). We make one pass the entire length of the seam, then come back and melt down the sharp corner on the top sheet, using the roller to roll down the edge. Once a seam has cooled, which takes just a few seconds, the two sheets are essentially a single homogeneous layer.

## Flashing Details

At rail posts, we cut the floor material flush to the post, then fabricate a collar with one leg that bends out over the deck and a second that runs 2 or 3 inches up the post. If the post will be left exposed, we make sure the edge is neatly trimmed, and caulk the top edge. More often, however, the post is trimmed with 1-by lumber or a vinyl sleeve.



(Fig. 12)

In either case, we make the joint between the deck and the collar watertight by welding the collar to the deck. Where we have to slit the corner to bend around the post, we weld on small corner patches. We use a similar welded patch at outside corners along the perimeter of the deck or where the deck meets the house wall. At inside corners, we use a "pig's-ear" fold for a neat, finished look.

## Cleanup and Maintenance

The contact cement is easy to clean off the surface of the Duradek. Like rubber cement, once it dries, you can peel it up by rubbing it with your fingers or a dry rag. Even a thick spill will roll up easily after we soften it with a light shot of hot air from the heat gun.

Uncured water-based glue cleans up easily with soap and water, but it's much more difficult to deal with once it hardens. The manufacturer provides several special cleaning liquids to help with spills, but it's best to wipe up the glue before it sets.

The Duradek surface is ready for traffic as soon as it's glued in place, so we don't have to worry about stepping on sheets that are still curing. Even better, the homeowner can use the deck the day we do the job. The surface is also easy to keep clean. The manufacturer makes proprietary cleaners, but a mild dish detergent in warm water will work just as well. If necessary, the deck can be soaped, then swept with a stiff-bristled broom and rinsed with clean water from a garden hose.

As for wear and tear from furniture, we tell homeowners that they can follow the same rules they use for the vinyl on their kitchen floor. Duradek is susceptible to cuts and punctures just like other sheet goods; burning cigars, cigarettes, and charcoal embers will cause it to char. The good news is that we can easily repair most minor damage. For a small puncture or burn mark, we remove the damaged material with a 3-inch punch, then glue and weld a replacement piece in place. The patch is as visible as a seam - more so if the rest of the deck material has faded a little - but the patch is 100% waterproof. We can also repair large sections by removing the entire damaged area and patching in new material.

## Cost

A three-man crew can install a 300- to 400-square-foot deck in one day. The cost varies depending on the thickness of the material used and the size of the job. We recommend the heavier 60-mil material, which we can install on average for about \$7 per square foot on a 400-square-foot deck; the unit cost would go down for a larger area. We also charge an additional flat fee of \$25 each for 4x4 posts, and \$30 each for 6x6 posts.

*(Duradek Editorial Note – The Installation Cost for Duradek can vary dependent upon location. This is one Duradek dealer's cost, at the time of publication.)*

## Weatherproof Sheet Flooring

Duradek is a PVC-based material that can be installed over virtually any solid surface. Available in more than two dozen colors and patterns, the surface is textured for slip-resistance when wet, and the vinyl is treated with mildew inhibitors and ultra-violet stabilizers.

To prevent premature fatigue, which has been known to occur in some vinyl roofing products, Duradek is backed with fiberglass reinforcement and treated with citrus-based plasticizers. Manufactured in rolls beginning at 30 mils in thickness, the heavier 60-mil Ultra series is ASTM tested and approved as a roofing material that can be used over conditioned living space.



Certified installers order material through local distributors, who typically require no more than a week's lead time for delivery. When multiple rolls are ordered, the material is color matched by lot number at the factory to avoid any variation in color from one lot run to the next.

Although Duradek should be installed at temperatures above freezing, the material remains flexible to -40F.

The manufacturer also makes a lightweight, powder-coated aluminum railing system called Durarail. The interchangeable components are available in stock or custom colors, with a choice of rail profiles. Guard rail designs include "view-through" tempered glass, traditional picket, or a combination of the two.

For more information, contact Duradek Inc., 1722 Iron St., N. Kansas City, MO 64116; 800/338-3568; [www.duradek.com](http://www.duradek.com).

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