

# SPRAY-APPLIED Foundation Waterproofing

For a few hundred dollars more than conventional dampproofing, these membranes will ensure a dry, livable basement



by Rich Binsacca

**T**here's just about no worse call-back than a leaky basement — unless it's a leaky basement with finished living space in it. That's why Indianapolis builder John Lawrence regularly includes spray-applied foundation waterproofing in his projects. The basements in the 15 or so homes he builds each year are more than just below-grade storage cellars:

They're true extensions of the living space, complete with carpet, textured walls, windows, and fireplaces. And the key to offering this high-margin upgrade is the waterproofing system.

"Waterproofing is central to doing anything with a below-grade space," says Joe Carr of Custom Concrete Company in Westfield, Ind., the foundation contractor who builds water-

proofed basements for Lawrence and others in that market. "You can't build below-grade living space if there's the possibility of a leak."

Carr is one of several concrete and foundation contractors who've made the logical leap into basement waterproofing services, investing more than \$20,000 in trucks and equipment, and committing crews to training and cer-

tification by a growing number of spray-applied systems manufacturers.

In a morning's time, and for about \$1 a foot (sometimes half that, depending on the system and the contractor), a certified applicator can spray two coats of membrane and secure protective panels to the foundation walls to deliver at least one of the ingredients for a dry basement. The rest of the recipe depends on proper surface prep, perimeter drainage, and backfill.

### Solvent vs. Water-Based Systems

Spray-applied foundation membranes come in two main types — a solvent-based rubber and a water-based, polymer-enhanced asphalt (see Chart, at end of article). The rubber-based formulations often come in bright yellow or green (which seems to have more to do with marketing distinctions than anything else), while the asphalt-based formulations look like conventional black dampproofing (see Figure 1). Differences in curing times, elongation, and working temperatures play a role in their applications, as discussed below.

### Surface Prep

Whether rubber- or asphalt-based, these waterproofing membranes are designed for use on newly built foundations. Newly poured concrete or recently stacked block walls are cleaner, smoother, and generally in better condition than existing foundations to offer good adhesion for the membrane.

Before the waterproofing membrane can be applied, workers must cut and patch the tie wires on both sides of the foundation walls, smooth out any honeycombs and voids, scrape away fins, spalls, and slurry, and sweep debris and mud from the footings.

As both foundation contractor and waterproofer, Virgil Ayers of Gray Cloud Waterproofing in Charlotte, Mich., assumes those responsibilities to ensure proper prep for the asphalt membrane he applies. "We offer the whole package to make sure the warranty remains valid," he says. For

patchwork, Ayers's crews use a mastic made by Terry Industries to be compatible with its House Guard and Tru-Dry waterproofing membranes. Most suppliers offer similar packages (see list of manufacturers, at end of article).

Some installers may argue that it is unnecessary to patch voids and honeycombs, claiming that because the membrane can adhere directly to the concrete, you can just fill these areas. But this is a practice most manufacturers discourage. "You have to fill them up either way," says Mark Stanley of Mar-Flex, which manufactures both

types of waterproofing membranes. "A trowel-grade compatible formula is much easier and faster to apply," he says, "than trying to spray on a thick coating to fill voids."

Proper surface prep also applies to utility penetrations. A spray-applied membrane itself will not cover up any holes cut in the foundation wall for incoming services. But if the holes are punched before waterproofing, the rough openings must be sprayed. Conduit and pipes installed later will need to be flashed with a compatible mastic or hydrostatic concrete. If penetrations



**Figure 1.** Spray-applied foundation membranes come in two main types — a distinctive green (or yellow) solvent-based rubber (top) and a water-based, polymer-enhanced asphalt (left).

are drilled later, some manufacturers, like Mar-Flex, require the applicator to come back and respray those areas to ensure proper coverage.

### Application

With polymer-asphalt membranes, an applicator can move in with his high-pressure spray equipment and start working as soon as the forms are removed. For solvent-based membranes, the typical wait is 24 hours minimum. "The asphalt system impregnates the concrete, so it can be applied on a 'green' wall if necessary," says Stanley, who nevertheless prefers his asphalt applicators to wait a full day. "The rubber membrane doesn't penetrate, so it requires a drier surface."

Once the surface is prepped and dry, a typical two-coat application can take less than an hour. "The prep time usually takes twice as long as the actual application," says Stanley, noting 30- to 45-minute spray jobs as routine for a 1,000-square-foot area.

Waterproofing manufacturers recommend a two-coat application. The final result leaves a consistent, 60-mil

thickness. But they differ on how a certified contractor should achieve such coverage. Typically, the second layer is sprayed in a pattern that runs perpendicular to the first to ensure complete coverage. However, on a hot or especially cold day (either of which will cause the membrane to dry quickly), Ayers's crew might spray one wall at a time, then add a second coat right away (making sure to overlap the joints of the first pass by at least 4 inches) before moving on to another wall section. On a moderate day (between 40°F and 80°F, when the membrane is slower to cure), the crew often sprays the entire perimeter before applying a second coat. Ayers may also add a drying agent to speed up the process and keep the membrane from sliding down the wall surface. "It's never the exact same pattern," says Ayers.

With experience, applicators develop a feel for the best ways to apply the membranes to critical areas where stress on the fresh concrete may cause fissures and cracks that can lead to leaks. New concrete can shrink in all

directions and as much as 1/8 inch in 20 feet. To accommodate this movement, Ayers's crews apply a second coat perpendicular to the first at every form joint, and add an extra layer of membrane at every step-down and underneath all windows, especially egress units that are installed at or below grade. For walls that are outside the living area but connected to the foundation, manufacturers recommend applying the membrane at least 12 inches onto those surfaces to block moisture from reaching the walls of the conditioned space.

As for the footing-to-wall joint, Stanley and others rely on gravity — the membrane settling into the joint. "Most problems aren't at the footing," he says, but at untreated or poorly filled tie holes and at window corners where cracks can develop as the concrete cures. Even so, some applicators may build up the membrane at the footing-wall joint so water runs off the intersection.

Beyond slight differences in allowable working conditions, the per-foot cost and application of solvent-based rubber and polymer-asphalt membranes is fairly similar. As flammable compounds, however, solvent-based rubber mixtures require good natural ventilation and a respirator. And be sure to prohibit any open flame in the area during application. "Rubber has its place, but it's not for every application," Stanley says.

Generally, rubber membranes perform better in areas with expansive soils where foundation settling is more common and volatile. Rubber coatings are rated to expand up to 1800% to bridge cracks while still blocking any hydrostatic pressure. Asphalt membranes, by comparison, typically expand 850% percent — enough to accommodate most hairline fissures common in foundation work.

Finally, many systems include a thin panel, usually foam or fiberglass, applied over the membrane (Figure 2). The panels may be marketed as having some insulating quality, but it's usually not enough to garner a measurable R-



**Figure 2.** Spray-applied foundation systems typically include protective foam or fiberglass panels. These must be applied over the membrane to protect the coating from damage during backfilling and to help reduce hydrostatic pressure.

rating. Mostly, the panel protects against damage during backfilling, while some also have some drainage capability that helps reduce hydrostatic pressure. Recently, to make waterproofing systems even more affordable, some suppliers have eliminated the panel in favor of a hard-shell second spray coat that assumes the dual role of water barrier and protective layer, as with Koch Waterproofing's Watchdog system.

### Drainage and Backfill

To shed and drain water away from the foundation walls, Carr and others recommend at least a perimeter drain tile system, with tiles installed on both sides of the footings and an 8-inch-thick underslab bed of washed gravel. Carr also makes sure the gravel fill over the perimeter drain overlaps the protective panels by several inches, thus allowing any water draining away from the wall to leach down through the gravel to the drain tiles and away from the structure.

The backfill is the final step to ensuring the integrity of a spray-applied waterproofing system. Made up mostly of dirt and small stones, typical backfill can puncture the membrane (hence the protective panels on most systems). It's also important to let poured concrete cure a few days before filling in behind it. Weight against a green wall only adds to the pressure and heightens the risk of structural failure, waterproofing membrane or not.

In addition, poorly sloped fill won't allow water to flow away from the building, and adds to any hydrostatic pressure against the below-grade foundation walls. Carr and other concrete contractors take special care to slope any flatwork, such as walkways and patios, away from the foundation as well.

### The Bottom Line


For builders and contractors, the opportunity to offer buyers a basement warranted against leaks can have significant bottom-line benefits. According to an NAHB survey, about half of all new homes are built with a full base-

## Solvent-Based vs. Water-Based Membranes

	Rubber (solvent-based)	Polymer asphalt (water-based)
Min. temperature for application	15° to 20°F	0° to 20°F
Application rate (square ft/gallon)	25-35 (cast in-place concrete or parged block)	25
Cure time	24 hrs.	8-24 hrs.
Elongation	1800%	850% (min.)
Low-temperature flexibility	Flexible to -20°F	-10° to 0°F
Crack-bridging ability	1/8 in. at -15°F	1/8 in. at -15° to 0°F

**Note:** Rubber-based foundation coatings are more flexible than asphalt-based formulations, and can better withstand differential movement of the foundation. However, both formulations perform about the same to bridge gaps in the wall.

ment, and most new home buyers say they'd pay an extra \$10,000 for one. "For a \$400 premium over dampproofing (which merely retards water and does not meet industry standards as a water barrier), you buy a 10-year warranty and peace of mind," says Ayers.

In fact, since Ayers started offering waterproofing services in 1995, he's seen the market explode. Today, nearly half the new homes in his area get the treatment, up from fewer than 5% just four years ago. In part, he says, the growth has come from educating buyers and builders about the differences between waterproofing systems and dampproofing. Ayers also decided to market his new business as a high-volume, low-margin alternative to higher-priced systems. "We made it affordable for the builder," he says. "It's become something that builders consider foolish not to use." 

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### Spray Waterproofing Manufacturers

#### Koch Waterproofing Solutions

*Tuff-N-Dri/Watchdog*  
800 Irving Wick Dr. West  
Heath, OH 43056  
800/876-5624  
www.tuff-n-dri.com

#### Poly-Wall International

8400 Coral Sea St. N.E.  
Blaine, MN 55449  
800/846-3020  
www.poly-wall.com

#### Terry Industries

*House Guard/Tru-Dry*  
8600 Berk Blvd.  
Hamilton, OH 45015  
800/560-5701  
www.houseguard.com

#### Wall-Guard Corporation

6365 S. 20th St., Suite 15  
Oak Creek, WI 53154  
800/992-1053