



Quality Vinyl Floors

In 14 years as a floor installer, I've seen my share of resilient floor failures. Some of these, like edge curling or seam splits, have been adhesive failures, but the majority are humps and bubbles in the flooring caused by delaminated underlayments and moisture at the site. To help you avoid such problems, this article will describe the materials and installation techniques that have proved most successful for my company.

Sheet Goods

Sheet flooring generally performs better than tiles, especially in wet locations and heavy-traffic areas where the many seams between tiles will eventually seep water or become filled with dirt. Prices for sheet goods start at about \$8 per square yard and go up to \$40 or more.

There are two basic types of resilient sheet flooring: a *perimeter-bond* system,

which is secured with adhesive only at the edges, and a *fully adhered* system, which is set in a full bed of mastic. Materials designed for use in perimeter-bond systems are more flexible, so they resist rips and tears during installation.

**To avoid callbacks,
install a stable
underlayment
and don't skimp
on adhesive**

by Ken Smith

Perimeter-bond materials also bridge uneven surfaces and withstand expansion and contraction of the substrates better than fully adhered systems. A fully

adhered system, however, can take more abuse after it has been installed.

All sheet vinyl is made of a foam-cushioned interlayer, which has the pattern stamped into it, sandwiched between a backing layer and a top "wear" layer. Most fully adhered systems have a felt backing, while perimeter-bond systems have a flexible vinyl backing. The interlayer is typically made of a high-density vinyl foam that makes the floor surface soft and more slip-resistant. The wear layer is often a clear vinyl film, unless the flooring has a vinyl and urethane "no-wax" surface.

Despite the name, no surface will keep its shine forever, and the surface must be periodically polished with an acrylic dressing available from a flooring supply house or installer. Never use one manufacturer's treatment on a different brand of floor, since the material may be



Figure 1. For underlayment, the author prefers to use $\frac{3}{8}$ - or $\frac{1}{2}$ -inch PTS plywood or Type 1 lauan, fastened with $1\frac{1}{8}$ -inch galvanized staples (left). A cementitious compound recommended by the flooring manufacturer is mixed with latex and used to fill all joints (above).

incompatible. Also, avoid off-the-shelf cleaners, which can leave a soap buildup that eventually must be stripped. If you can't obtain the manufacturer's brand of cleaner, I recommend using a solution of nondetergent ammonia in warm water.

Choosing Vinyl Flooring

The type of flooring you use will depend on the customer's choice of color and pattern, and on the budget. The contractor can help by steering customers past design issues and focusing on performance.

Wear resistance. Grit is the number one enemy of resilient vinyl floors. A floor wears out as dirt is ground into

pores in the vinyl surface. Inform the client that the more frequently the floor is swept or vacuumed, then lightly mopped, the longer it will last.

Protect the floor during construction. Plywood, lauan, or hardboard laid on top of the flooring offers the best protection. But even if you just use rosin paper, make sure the floor is absolutely clean first. Tape the edges with wide masking tape to keep grit out. Don't use duct tape — it has too much adhesive and can easily pull the wear layer off.

Color choice. This is a matter of personal taste, but you can offer clients some guidelines. Solid colors show scuffs, scratches, and dirt more than patterned

surfaces; dark colors show dust more than light colors. Complicated patterns can create problems with pattern-matching and pattern repeat, but an experienced installer using the right methods should have no trouble laying the floor.

Prolonged sunlight may cause whites to yellow and bright colors to fade. Advise clients to clean the floor frequently to remove cooking grease and oils, which can also cause yellowing. But caution clients to avoid washing with high-mineral-content water, which can discolor the surface.

Stain resistance. Vinyl flooring is generally very stain resistant, as long as spills are wiped up immediately. Mustard, tomato paste, grape juice, shoe polish, hair dye, and ink can leave permanent stains if left on the surface for several hours. Alcohol, hydrogen peroxide, and nail polish remover can eat into the surface if allowed to sit for any length of time. Asphalt and driveway sealers are common sources of stains on entry floors, and the rubber compounds used in many doormats and rubber-backed carpet mats can also leave a permanent mark on vinyl.

Dents and scuffs. Point loads can permanently deform vinyl flooring. In fact, manufacturers will not warrant a floor against dents from high heels. In kitchens, take particular care reinstalling the refrigerator to avoid ripping or scuffing the surface. We use an air sled to move appliances, but lauan strips will also work. Once the refrigerator is in place, tip it back to remove the strips.



Figure 2. To ensure a perfect fit, pattern paper is laid over the entire floor area (left). Then the outlines of the room perimeter, as well as doorways, cabinets, and other obstructions, are scribed onto the paper using a steel square (center). In the shop, the markings are transferred to the sheet flooring (right) and cut with a knife against a straightedge.



Figure 3. The author prefers to install his own underlayment. After taping together rough-cut sheets of plywood laid on the shop floor (left), he traces the outline of the finished flooring on top and cuts the plywood to size.

The Subfloor Matters

We won't give a quote without going out to inspect the subfloor. The type of material, the thickness, and the underlying structure are all important.

In New England, it's not uncommon to find wood floors built over a crawl-space with a dirt floor, especially in rural areas. I won't take the job, however, unless there is a minimum 18 to 24 inches of air space with plenty of cross ventilation. Otherwise, moisture from the ground is sure to cause problems.

As a basic rule of thumb, the subfloor and underlayment together should be at least 1 inch thick. If possible, we prefer to install the underlayment and do all the floor prep ourselves — that way, we can guarantee the whole package.

Underlayment: Narrow Choices

In the days of asbestos backings, resilient flooring was a lot more forgiving. Asbestos added strength to the flooring, allowing it to bridge larger surface irregularities. For this reason, you could use a wide variety of panel products as underlayment. Not so any longer. Today's lighter-weight resilient flooring must be laid over a smooth, stable surface. We take a very conservative approach and use only PTS (plugged-touch-sanded) plywood or high-grade lauan (see Figure 1).

A-C plywood, which has voids in the core and is made with an interior-grade glue, is not acceptable for underlayment. PTS plywood has a much more consistent core and is made with exterior-grade glue.

Lauan also works well and is easy to get. Make sure you use Type 1, however, which has an exterior glue, and opt for the highest face grade available (often designated B-B).

Lauan is made under a wall-panel specification of the International Hardwood Products Association. No flooring manufacturer's specifications support its use as an underlayment. However, we get our lauan from a

wholesaler that provides much of our flooring. So if there's a problem with the lauan, we know we're covered. But if you can't be sure that the panel manufacturer will warrant the lauan, stick with PTS plywood.

Many panel manufacturers still claim particleboard, hardboard, and OSB are suitable underlayments, but I've seen too many failures caused by these unstable underlayments. Besides, vinyl manufacturers are very specific about what they consider an acceptable underlayment. Using anything else will void the warranty.

Installing underlayment. When laying the underlayment, don't stack the joints over the joints in the subfloor. Stagger the joints at least 2 inches in both directions. Leave a 1/32-inch gap between panels to allow for expansion and contraction.

Fill all gaps with a cementitious patching compound mixed with latex, which keeps the joint flexible. Most resilient floor manufacturers specify a particular compound. For example, we use Ardex with Mannington, Congoleum, and Tarkett flooring, but for Armstrong flooring, we use Armstrong's own S-174.

If you use ring-shank or spiral nails to secure the panels, you're not supposed to fill the holes after setting the heads. If you do, the nail heads can work their way up, causing the patching compound to create a bump in the vinyl. However, if you don't fill the holes, you end up with an unsupported divot that can create a hole in the flooring.

For this reason, we prefer to use 1 1/8-inch-long galvanized staples. For 3/8-inch-thick lauan or plywood underlayment, staple every 5 inches in the



Figure 4. When cutting seams in thin flooring material, the meeting edges are overlapped and cut at the same time. Thicker sheets are cut separately and butted.



Figure 5. Edges that can't be covered with molding are epoxied in place using a special edging tool and a hand roller (left). The entire floor is pressed into the adhesive with a 150-pound roller (right).

field and every 2½ inches along the edges. For ½-inch-thick material, fasten every 6 inches in the field and every 3 inches along the edges. Keep the staple crowns parallel to the face grain of the underlayment panels.

Scribing the Vinyl

We like to install the vinyl before the cabinets go in. This makes it easier to trim the edges, and the woodwork will help prevent edge curl and cover any shrinkage. This sequence is not crucial, however, so long as the flooring is pattern scribed.

Pattern scribing. Many installers will boast that they freehand cut the flooring to make it fit. In my experience, however, this is an inferior method. No one can cut freehand as precisely as someone who pattern scribes the flooring.

To cut a pattern for the floor, we use pattern paper, a heavyweight paper that comes in 3-foot-wide rolls 300 feet long. Pattern paper is flexible, so it lies perfectly flat right off the roll. The paper is expensive (\$56 per roll) and is available only from flooring suppliers, but it's made specifically for scribing vinyl.

After taping the sheets of pattern paper to each other and to the underlayment, we use a carpenter's square and a straightedge to scribe the profile of the room's perimeter onto the paper (Figure 20). Back in the shop, we unroll the pattern paper on top of the vinyl and

reverse the scribing process. By aligning the square or straightedge with the lines on the paper, we can transfer the room's outline exactly onto the vinyl.

Working in the shop, we can cut with precision, keeping the knife perpendicular to the surface of the flooring. This leaves a crisp, square edge that fits tight to cabinet ends, kick stops, and baseboards. By contrast, it's nearly impossible to cut a perfectly straight line, or not to cut at a slight angle, when freehand cutting. This leaves gaps and slightly beveled edges that invite water, detergents, and dirt to get to the underlying adhesive. Over time, these contaminants will cause the vinyl to curl and lift.

Once the flooring material is cut to size, we use it as a pattern for the underlayment (Figure 3). Again, we work in the shop, first cutting the plywood to rough size and taping the sheets together, then tracing the floor pattern on top. We cut the plywood at the shop and carry the pieces to the site, where they fall into place easily for a perfect fit.

Cutting seams. To create tight seams, we use one of three methods. On thin, low-end vinyl stock, we double-cut the seams by laying one edge over the other and cutting both at the same time (Figure 4). For heavier material, we simply use a straightedge and butt the two cuts. Inlays require a special underscribing tool, which has a small guide tab that slides under the main sheet of flooring.

As you pull the tool along the edge, a small pin scribes the cut line for the inlay on the surface of the vinyl. The inlay can then be cut using a knife and a straight-edge.

The Right Adhesive

If there's one absolute in this trade, it's that you must use an adhesive recommended by the flooring manufacturer. Adhesives from another manufacturer may have solvents and other additives that can react with the specified flooring material.

Perimeter-bond floors only get adhesive at the edges. The glued edges won't move, but the rest of the floor will tighten up slightly after installation.

For full-spread jobs, we try to schedule installation after the trim has been installed so we can butt the flooring to the mop board. Afterwards, the edge should be covered with shoe molding or quarter-round. Along edges without this molding, such as against a door jamb, we use an epoxy-based adhesive (Figure 5).

Don't skimp on epoxy and adhesive, especially at seams and edges. Most seam failures are caused by poor cuts and not enough adhesive. Also, to ensure good adhesion, the floor must be rolled with a 150-pound roller. Be sure to roll the floor before the adhesive starts to harden — check the label on the adhesive container for the open time, which can vary between 5 and 50 minutes. For best results, we roll the floor immediately after it is laid and properly aligned.

Transitions

In new construction, I like to handle transitions between resilient flooring and other materials, like carpet or hardwood, before the job starts. I talk with the contractor to ensure that all floors will finish at the same height. We start with the highest floor, usually ceramic tile, and work down to the vinyl.

In renovations, we encourage the contractor to install a hardwood saddle when flooring materials change. If that's not possible, we use any of the standard transition moldings. We try to avoid metal transition pieces, because they look like you're trying to hide something. But we can usually find a molding for every situation. ■

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