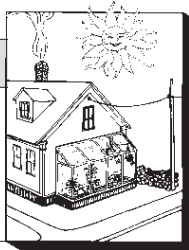


Alternatives to Poly Vapor Retarders

by J.D. Ned Nisson



Let's face it, many contractors simply don't like polyethylene vapor retarders. Drywallers don't because it prevents gluing wallboard to studs. Electricians and plumbers dislike poly because it gets in the way. And many builders are wary because it may cause moisture problems in ceilings. Though required by code in many jurisdictions, poly vapor retarders often get slashed or never get installed in the first place.

The good news is that you really don't need to use poly as long as you use drywall, carefully taped and gasketed (or other suitable materials), to form an air barrier. In fact, there are at least three practical alternatives to polyethylene vapor retarders. These are not compromise alternatives. Each one can provide an effective guard against moisture problems at a reasonable cost without creating problems for any of the trades. Given the practicality of these alternatives, I think the days of the polyethylene vapor retarder may be numbered.

Vapor Retarders Vs. Air Barriers

Although veteran energy-conscious builders are probably sick of the topic, it is important to point out a couple of important differences between "vapor retarders" and "air barriers" to avoid confusion.

A vapor retarder does *not* have to be airtight and does not have to be 100% continuous. To effectively control vapor diffusion, it need only have a low permeability and cover most (95% or more) of the wall or ceiling surface. An air barrier, on the other hand, should be as continuous and airtight as possible to control air and moisture leakage into

wall and ceiling cavities.

Sometimes the same material is used to act as both vapor retarder and air barrier, but in this article I am referring to materials that are meant to serve only as vapor retarders. When doing so, I assume that a separate air barrier, such as airtight drywall, will also be incorporated to control air leakage.

Kraft-faced batts. During the early days of "superinsulation," kraft-faced batts were criticized as poor vapor retarders because of the many seams at the studs. But that criticism is unfounded since the total area of the gaps at all those seams adds up to only a tiny percentage of the overall wall area. (Remember, we're not relying on the facing to serve as an air barrier.) The fact is that the asphalt-impregnated kraft facing on fiberglass batts has a low permeability (about 1 perm) and can definitely serve as an effective vapor retarder.

But here is an unusual recommendation: The best way to install kraft-faced batts is to friction-fit them into stud cavities without folding out the flanges and stapling. Why? Because stapling creates problems and is not really necessary. Face stapling gets in the way of drywall application and prevents gluing. Inset stapling compresses the insulation and creates vertical air gaps in the stud cavity. But unstapled batts provide a full-coverage vapor retarder, a good insulation fit, no air spaces, and no interference with drywall installation (see illustration).

Stapling used to be necessary to hold up the thin (2 inch) batts used years ago, but not with today's full thickness batts. Faced batts are usually

1/4 inch narrower than unfaced batts, but both are still about 1/2 inch wider than standard stud cavities and will hold well without stapling. (This may not work well with R-11 batts because of their low density, but will work fine with all the other batt products, especially the new high density R-15 and R-21 products which are extremely stiff and can't possibly sag.)

Owens Corning ran a series of tests several years ago to compare the effect of stapling technique on moisture transmission in walls built with faced batts. The results showed that it didn't matter how the batts were stapled or whether they were stapled at all.

Foil-faced drywall. If cost isn't a problem, foil-faced drywall tops my list of alternative vapor retarders. The thin aluminum facing has an extremely low permeance (usually less than 0.1 perms) and normal installation provides almost complete coverage without using special materials or techniques.

Although it varies regionally, the extra cost for foil facing compared to regular paper facing is typically 3¢ to 6¢ per square foot. To control the cost, many builders keep a double inventory — foil-faced product for exterior walls, paper-faced for interior partitions.

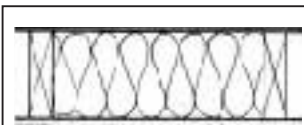
Incidentally, I've had several builders tell me that foil-faced drywall can't be glued to studs. That simply isn't true. Using the correct adhesive, foil-faced wallboard can definitely be glued. Two recommended adhesives are DAP 2000 which is solvent-based, and DAP Big Stick which is a latex adhesive.

Oil-based paint. Probably the only serious drawback to a paint vapor retarder is that it is difficult to inspect. Any oil-base paint, when applied according to the manufacturer's recommendations, creates a vapor retarder with a permeance below 1.0 perm. In fact, a recent research study in Alberta showed that even when installed at 50% of the manufacturer's recommended coating thickness, a single coat of oil-base paint still served as an adequate vapor retarder. (The same Canadian study also showed that special "vapor barrier" paints are no more effective than ordinary oil-base paints.) The additional material and labor costs are minimal.

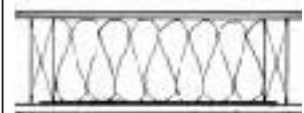
The problem with paint vapor retarders is quality control. The paint must be oil, not latex, and it must cover most of the walls and ceilings. How will it be inspected and approved? While this may not be a problem in highly controlled environments such as manufactured housing factories, it could be very troublesome with site-built construction.

On the Horizon: Vapor-Retarding Sheetrock

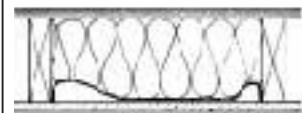
United States Gypsum Company (USG) makes vapor retarding gypsum panels called *Blendtex* for the manufactured housing industry. As currently made, Blendtex wallboard and ceil-



A. Stapling flanges left folded, batt is friction-fit



B. Face stapling prevents gluing and creates uneven surface for drywall



C. Air gaps created by inset stapling

Kraft-facing on batts can provide a good vapor retarder, but not a good "air barrier." For best results, leave the paper flanges folded and friction-fit the batts in place (A). Standard stapling (B) prevents gluing, and inset stapling (C) leaves air gaps around the insulation.

ing board have a plastic film under the kraft facing on the back side of the panel. The permeance is about 0.5 perms.

As manufacturers and builders look for alternatives to polyethylene or paint, USG is planning to extend the concept, lower the cost, and possibly introduce a vapor retarder Sheetrock-brand wallboard in the near future.

The Best Vapor Retarder for Builders

The best alternative to a polyethylene vapor retarder depends on the type of insulation and air barrier being used. With fiberglass batts, I'd go with unstapled kraft-faced batts. With spray insulation, I'd opt for foil-faced drywall rather than paint because it requires essentially no quality control. If no other air barrier is installed, I'd go back to a polyethylene vapor retarder, sealed at the seams to double as an air barrier.

A Note of Caution for Warm, Humid Climates

Interior vapor retarders may induce mold growth and other problems in warm, humid climates. Foil-faced and vinyl-faced wallboard are particularly bad candidates in this regard. Those products should never be used in Gulf Coast states and other warm, humid regions. Although I know of no documented evidence, I suspect that the same warning should apply to oil-base paints in those climates. ■

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Perm rating of common building materials

Description	Permeance (perms)	Rating
Unpainted gypsum wallboard	50	No good
Gypsum wallboard with one coat oil paint	.56	OK
Gypsum wallboard with one coat vapor-retarder paint plus latex or oil overcoat	.19 to .80	OK
Gypsum wallboard with one coat latex sealer plus one coat latex paint	.56 to 4.47	No good
1-inch extruded polystyrene	1.2	Fair
1/2-inch exterior plywood	0.7	OK
6-mil polyethylene film	.06	Excellent
Kraft-faced batts	0.6 to 1.0	OK
Aluminum foil	.001 to 0.1	Excellent

Sources: Alberta Research Council and ASHRAE Handbook of Fundamentals.