Has Latex Won the Paint Wars?

More durable and versatile than ever, water-based exterior house paints are pushing oil to the brink of extinction

BY ZACHARY GAULKIN

Sheldon Brown was one of the holdouts. If a homeowner or a weekend painter wanted to use water-based paint, fine, but no latex would taint *his* brushes. Or so he thought.

"I was one of those firm believers in oil," says Brown, a professional painter in Woodstock, Vermont. He managed to keep latex at arm's length for 20 years before breaking down and using it himself. Now he can't say enough about the top-of-the-line exterior latexes. "They really have come a long way. They spray better, they roll better, they clean up better, and they hold their color better. I haven't painted a whole exterior in oil for four or five years now."

More than 80% of exterior house paint sold in the United States is latex, according to the National Paint and Coatings Association. But many professional painting contractors, a sometimes stubborn and finicky lot, long held that oil-based paint performed better—or at least looked better—than latex.

Now even diehards like Brown have come around. Latex paints have overcome their biggest problems—poor adhesion, hiding ability, flow and leveling—since they came out in the 1950s. Now manufacturers are chasing new milestones in latex: low-temperature formulas, coatings that can stretch and bridge gaps in masonry, and resins that stick to poorly prepped or chalky surfaces. "Latex has finally made it," Brown says.

Why water is sinking oil

If latex is winning, oil is losing, and not just in market share. New environmental regulations going into effect this year are forcing manufacturers to reformulate their products with fewer VOCs, the volatile organic compounds found in mineral spirits and other petroleum-based solvents, which are key ingredients in oil-based paint. Although solvent-borne coatings will not be banned, at least immediately, they will be more expensive and harder to find.

"There is a segment (of professional painting contractors) who want solvent-borne paints, so we are developing these products with lower VOCs to meet the regulations," says Lane Blackburn, vice president of marketing for Sherwin-Williams, the country's largest paint manufacturer. "The primary effort, however, is going into latex."

Consumers have been switching to latex for decades, chiefly because water-based paints are easier to use—brushes and spills can be cleaned with soap and water—and because they don't have head-spinning and air-fouling solvents. Convenience and lack of fumes, however, were never enough to tear

Solid-color stain: paint by a different name

Solid-color stains are relative newcomers crowding onto paint-store shelves. These stains are quasi-paint products that people commonly confuse with true stains.

What's the difference between paint and solid-color stain? Not very much, it turns out. Both contain pigment and binder, both are opaque, and most form a film that, if applied incorrectly, can peel and blister. (Some oil-based solid-color stains are not film-forming). Solid-color stains, in fact, look and act like thinned paint, according to Mark Knaebe, a chemist at the U.S.D.A. Forest Products Laboratory in Madison, Wisconsin.

But where paint forms a smooth surface, hiding the texture of siding or trim, solid-color stain allows the texture (though not the grain) to show through. "There's a misconception that solid-color stains are penetrating stains," said Adam Churchill, assistant manager for technical services at Samuel Cabot Inc., a stain and paint manufacturer in Newburyport, Massachusetts (978-465-1900). Penetrating or semitransparent stains generally do not form a protective film, although they may contain preservatives and water repellents.

Solid-color stains usually have flat or satin finishes and are often used to preserve the texture of rough-sawn clapboards or to avoid thick films on areas that are likely to be repainted often. Because they form a thinner film, they are generally not as durable as paint. According to the Forest Products Lab, the life span of solid-color stains ranges from three to seven years, while paints under similar conditions last seven to ten years.

Although most manufacturers say solid-color stains can be used on bare wood, Knaebe says a compatible primer will increase the life of the top coat. Most researchers, manufacturers and painters agree that the most durable solid-color stains are 100% acrylic latexes.

—Z. G.

Is it stain or paint? Like paint, solid-color stain (bottom sample) is film-forming. Paint (top sample) hides more of the wood's texture. Effects differ on rough and smooth sides of these cedar clapboards.

Choosing exterior house paint

OIL OR LATEX? For new wood siding, most paint contractors and researchers recommend two coats of a 100% acrylic latex over a 100% acrylic primer. Latex formulas shrink and expand with wood movement and hold their color better than oil paints. Properly prepared and applied, this paint job should last eight to ten years. Some painters and manufacturers recommend an oil-based primer with latex top coats. When repainting glossy or chalky surfaces, many painters think oil-based paints adhere better.

ACRYLIC OR VINYL? Latex refers to the binder—the material that forms the film when the paint dries—usually acrylic, vinyl or a blend of the two. For most applications, the 100% acrylic latexes—whether paint or solid-color stain—are considered the best because of their durability, flexibility and color retention. But a gallon of premium all-acrylic exterior paint can cost twice as much as standard-grade vinyl blends. For hardboard, stucco, masonry, EIFS or fiber-cement siding, check with the manufacturer for specific brands or formulas.

professionals away from proven products. To find out what has changed the minds of serious painters, you almost need to understand paint on a molecular level because oil and latex work in different ways (sidebar above).

Latex can flex and breathe

Paint contains many ingredients—pigments, solvents and additives that make it spread easily and dry smoothly with a uniform color and sheen—but the muscle that holds it all together is the *binder,* sometimes referred to as the *resin.* Binders in oil-based paint are made of drying vegetable oils (usually linseed or tung oil) or "modified" oils known as alkyds. Painters like oils because they penetrate deeply into wood fiber, they stick like glue to lots of different substrates, they hide knots and other defects, and they dry slowly, which reduces lapping and brush marks.

The problem is that oils oxidize—they never fully cure—so years later, the paint becomes brittle and starts to crack and peel. As the oils oxidize, they erode, leaving pigment and other solids on the surface, what painters call *chalk.* Unfortunately, many oils are also a favorite food for fungus and mildew.

Instead of oil, the binder in latex is usually acrylic or a blend of vinyls and acrylics. In fact, the word *latex* refers to the binder, which is essentially a form of plastic suspended in water. As the water evaporates, the binder fuses into a hard, continuous film.

When latex dries (and it dries a lot faster than oil), it is remarkably durable and resilient. It won't fade as quickly as oil-based

FLAT OR GLOSS? The difference between flat and gloss paint is in the pigment-to-binder ratio: the more pigment, the flatter the film. As a result, flat paint covers and hides better than gloss paint, but it also wears faster. For wood siding, flat or extremely low-gloss paints are used because they hide imperfections and are easier to maintain and repaint. For trim, a satin or semigloss is sometimes used to set off the woodwork, but glossy surfaces must be sanded prior to repainting.

INEXPENSIVE OR PREMIUM? The "get-what-you-pay-for" advice is usually true with paint, but manufacturers have figured this out, so don't pay a premium price for average paint. The best benchmark for quality is the amount of solids. The higher the solids content (by weight and volume), the better the paint. Ask your paint dealer or the manufacturer if the information is not printed on the can.

paint. Mildew has a tougher time living on latex, and because it doesn't oxidize, latex is less prone to erosion and chalking. Latex also resists alkali bleed, which are stains that show up on painted masonry.

Most important, latex binders are flexible. When a wood clapboard swells in summer, the paint moves with it, at least to a point. This means the film is less likely to crack, and as a result, it will last longer on wood and other materials, such as masonry, EIFS and various hardboard and cement sidings. Latex also breathes, which means small amounts of moisture can migrate through the surface. If painting is done in damp conditions or if moisture is trapped in the substrate, this feature can be a blessing because the paint will be less likely to peel or blister.

Some prefer oil for primer and trim paint

Although latex dominates the market, people still use oil-based paints on exteriors, more often just for the primer coat. Primers have a few simple jobs—mainly sticking, sealing and stain-blocking—and here, oils excel, particularly on wood. Oils are more water resistant; they penetrate wood fiber, making them a good preservative; and they adhere to problem surfaces.

Oil-based exterior paints have a reputation for sticking under the most trying circumstances: previously painted surfaces with gloss paint or chalk buildup, for example, or siding with mill glaze, a smooth, shiny texture sometimes found on new wood clap-

The wonder ingredient is water. Although latex paint has many benefits—durability, color retention, lack of fumes—the chief reason for its popularity is the fact that brushes and drips can be cleaned with water.

boards. "If you've got glossy or chalky oil paint, latex will not adhere," says Brian J. Doherty, a professional painter in Richmond, Virginia. "You'll have to sand it back to give it some tooth. But unless you go back to bare wood, you can't guarantee that something isn't going to lose adhesion."

There are other reasons oil paint is still around. For one thing, it dries slowly, giving it superior flow and leveling. In layman's terms, this means brush strokes will disappear more readily. It also covers better than latex, especially in high-gloss paints, which contain more binder and less pigment. This is why oil is still a popular choice for glossy interior trim: Oils tend to look better.

Nevertheless, oil-based primers are not safe from advances in latex technology. The U.S.D.A. Forest Products Laboratory in Madison, Wisconsin, has tested various coatings for wood siding and found that the most durable paint job was one coat of an all-acrylic latex primer topped by two coats of an all-acrylic latex paint. "We couldn't say that ten years ago," said Mark Knaebe, a researcher at the Forest Products Lab. If you use this system, Knaebe also recommends coating bare wood with a paintable water repellent and preservative prior to priming. "The biggest reason for paint failure is moisture," he says.

Lab results and real houses are two different things, and many painters have chosen to stick with proven oil-based or alkyd primers. Doherty uses an alkyd primer made by Benjamin Moore (800-622-0550), which he covers with two coats of an all-acrylic latex. "When we're painting our own houses, that's what we do," he said.

Pushing latex to extremes

Oil-based paints used to have another advantage: They are less sensitive to temperature extremes than latex paints. "In 90°F heat, you can't even get latex off the brush before it dries," says Doherty. In hot weather, oil paint has more open time, the amount of brushing time you have before the film begins to cure.

But here again, latex paints are catching up through the use of additives that increase their open time so that painters can use them in hot weather (sidebar facing page). Jim Tafoya, a commercial painting contractor in Albuquerque, New Mexico, uses Floetrol (Flood; 800-356-6346), which allows him to paint with a 100% acrylic latex all summer long. "It can be 110°F during the day and go down to 50°F at night," says Tafoya. He once painted a wall that he figured was HOT. "We used a lot of Floetrol. We had to paint that day."

On the cold side, 50°F used to be the limit for most latex paints, while oil-based paint can be brushed on in temperatures as low as 40°F without compromising finish or longevity. (This is why some professionals switch to oil in spring and fall.)

But latex is breaking that barrier with low-temperature formulas that can go on when the surface temperature (not the air) is 35°F. Sherwin-Williams (800-336-1110) introduced the first generation with its all-acrylic LowTemp 35, and "now everyone is jumping into 35°F technology," says Scott Lewis, a technician with ICI-Dulux (800-834-6077); which manufacturers Glidden and Fuller-O'Brien paints.

Manufacturers say low-temperature formulas will increase the painting season in northern climates by six weeks in spring and fall, but few professionals are taking chances. "I'm never going out there and standing in the snow to paint," says Sheldon Brown of Vermont, who says he has used LowTemp 35 for faster drying times but not in extreme conditions. Doherty avoids painting exteriors entirely when the temperature goes down to 40°F. "Craftsmen shouldn't work in adverse conditions," he says. "You're simply courting disaster."

Paint of the future

Low-temperature tolerance is not the only advance in water-based technology. Manufacturers are continually modifying latex binders to improve the durability, flexibility and adhesion of latex paint. They are creating climate-specific blends with special properties (such as mildew resistance) and are coming out with thick acrylic coatings for masonry called *elastomerics,* which can bridge cracks and gaps. "Latex technology is nowhere near at its peak," says Johannes Boonstra of Akzo-Nobel, which manufacturers Sikkens finishes, among others.

So what's next? John Stauffer of Rohm and Haas, a maker of acrylics and other paint ingredients, says researchers are working to make latex cheaper, increase its drying time, give it better stain-blocking ability and improve its adhesion to chalky or glossy surfaces. The ultimate coating—one that will apply itself—is not yet on the horizon. But the pace of latex research, plus the possibility of even more stringent VOC regulations, suggests oil will be pushed farther to the brink. Says Stauffer: "People are just not investing in improving them." □

Zachary Gaulkin is a former associate editor at *Fine Homebuilding.* Photos by Scott Phillips, except where noted.

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Should you add anything to a can of paint?

In the days before latex, painters often added turpentine or mineral spirits to paint. It was a common practice, probably going back to the days of thick, homemade blends that spread like sludge unless solvent was added.

These days, manufacturers generally frown on changing their finely tuned formulas. "We really don't recommend altering our products," says Brett Reily, a spokesman for Samuel Cabot Inc. "If we thought something needed to be thinned, we would have thinned it ourselves."

Still, paint additives abound. The most common is paint thinner, which is usually mineral spirits (for oil-based paint) or simply water (for latex). Thinning paint can affect spreading, coverage and film thickness, which is why most manufacturers do not recommend thinning their paints (except in some cases, such as for spraying). Read the label or check with the manufacturer for thinning instructions.

Rather than simply thinner, paint conditioners such as Floetrol and Penetrol (Flood; 800-356-6346) add both solvent and solids. Penetrol is an alkyd-modified paint oil (mixed with a solvent) that can improve the penetration, and therefore the adhesion, of oil-based paints. By adding oil, it also can give the paint better flow and leveling. Floetrol, a blended acrylic, increases the open time of fast-drying latex paints, reducing the chance for brush marks to dry before leveling out, for example. Professionals sometimes use Floetrol to improve results when spraying latex paint. Flood also manufactures a hybrid called Emulsa-Bond, which adds oil to latex mixtures to improve bonding on chalky or problem surfaces.

These products (and others like them) are not recommended in all situations. "We always recommend that people just try to paint first," says Mike McEnroe, a spokesman for Flood. "It's when you challenge a paint that our products will help."

Other additives found at paint stores are Japan drier, which accelerates the drying time of oil-based paints; deodorants that help to dissipate fumes; and mildewcides, which inhibit mold growth and insect infestation. Most exterior paints, however, contain some sort of mildew repellent, and additional mildewcide may have only marginal effects. The bottom line about additives: Don't use them unless you absolutely must. As Byron Papa, a painter and contractor from North Carolina, puts it: "When you start tampering with the formulas, you never really know what's going to happen."

—Z. G.

Additives for every occasion. Paint manufacturers calibrate their formulas carefully, but additives sometimes may be needed. Additives include thinner and compounds that improve flow and leveling, speed drying, adjust consistency to make spraying easier, inhibit the growth of mildew and improve latex adhesion on chalky surfaces.