

Bottom Paint Basics

Boaters and chemists will try almost anything to keep their vessels' undersides as smooth as a baby's.

By David Liscio

In a dubious attempt to ward off marine growth, some New Jersey clam-boat skippers blend cayenne pepper with cheap bottom paint, convinced that the tongue-numbing spice is potent enough to fight off barnacles, mussels and algae. Other boat-owners toss chopped jalapeno and habanero peppers into their bottom paint, guaranteeing watery eyes—if not a clean hull. Still others slather diaper-rash cream below the waterline or mount sonic vibrators inside their hulls.

Home remedies like these make boat painting experts chuckle, since most agree that effective antifouling paints contain chemicals that kill or make uncomfortable anything that tries to take up residence below the waterline. Paint the bottom with the wrong stuff, and your hull can sport a scraggly brown beard or a hard-shelled encrustation. But finding what works best on the bottom of your boat—and in your favorite waters—can be tricky, as we found out by talking to representatives of some of the largest manufacturers of bottom paints, as well as some lesser-known companies on the cutting edge of antifouling technology.

Generally, antifouling paints contain at least one biocide—an ingredient capable of poisoning marine life that would cling to the hull—but getting these toxins to work usually requires either friction or a chemical reaction.

Tin used to be the top-rated biocide in paints, but that metal has been banned because it leaves sediment that can be dangerous to sea life. That ban has made copper, once the second choice in biocides, the most common active ingredient in bottom paints. But copper is expensive, and boaters will generally find a direct correlation between a paint's copper content and its price. To make matters worse, recent studies indicate that copper may also poison coastal ecosystems, and some European countries have already outlawed its use in marine paint.

Some brands of paint also contain chemicals that inhibit the growth of slimy algae. Interlux Yacht Finishes, a division of Akzo Nobel, the company with the largest share of both the world's paint and marine finishes markets, refers to this process as Biolux Technology. Pettit Marine Paint, a company that ranks a distant second to Interlux in the U.S. recreational boating market, calls it SR, for slime resistant. These biocides, along with the copper, are released gradually as the paint wears off.

Silicone-based paints can provide more environmentally friendly protection, at least for some hulls—although at a much higher price than copper. These products theoretically make a boat's underside too slippery for fouling organisms to hang on once the vessel gets underway. If your boat does 20 knots and you spend plenty of time on the water,

silicone-based paints could be a definite possibility. “The faster you move,” says John Ludgate, vice president of sales and marketing at Pettit, “the faster the growth gets removed from the bottom of the hull.” With any nonstick paint, if you seldom leave the dock, you’ll have to scrub your hull regularly. According to Ludgate, most nonsticks must be wiped down weekly.

Coatings based on silicone shouldn’t be confused with ablative bottom paints, which operate on a different principle. The surface of these paints wears away slowly like a bar of soap, each time exposing more copper or other biocide. If your boat travels at 20 knots or faster, these soft ablative coatings would erode too quickly and leave the hull unprotected. But for slower vessels, abrasives can offer effective but expensive antifouling protection.

“Basically, the average boater wants to slap some bottom paint on in the spring and not think about it again until the fall hauling,” says Ludgate. “It’s like getting an oil change for their car. They really don’t care what sort of oil you put in the engine, as long as the engine runs smoothly and they don’t have to worry about it.” Steve Demeule, a paint specialist at the BoatU.S. retail store in Danvers, Massachusetts, acknowledges that inexpensive one-season bottom paints are big sellers. “But that usually means more work for the boatowner,” he says. “It’s hard-drying and tends to build up in layers. When it gets too thick, you have to remove it completely, and that can be a big job.”

Ludgate says the average recreational boat gets used only two or three percent of the time between launch and haul. “Most of the boats just sit there, and on the weekend get used for a few hours,” he says. “That presents a tough challenge to keep boats clean. They’re stationary targets.” He also warns against coating aluminum boats or outboard lower units with any paint containing cuprous oxide, the most common ingredient in copper-based antifouling, because the two metals react in salt water, producing electrolysis. Aluminum boat parts that are exposed to sea water require special coatings, either containing copper thiocyanate (a less reactive form of copper) or some other biocide.

Old-fashioned Concoctions

Meanwhile, there are always those special kinds of boaters who ignore the latest formulas in favor of old-fashioned concoctions they believe will keep hulls barnacle-free. For example, despite field tests to the contrary, a few diehards still slather diaper-rash creams like Desitin on the bottoms of their skiffs, because the ointment is loaded with zinc oxide. Other home-brew advocates use Vaseline, or they add cayenne pepper, chili powder or dried red-pepper flakes to their paint. Jim Seidel, assistant marketing manager at Interlux, says the industry has experimented with spices and other organic ingredients, all with negligible results.

Prior to joining Interlux, Seidel worked for a small New Jersey distributor that sold bottom paint to commercial clammers in Barnegat Bay. “The clammers bought Red Hand, the cheapest paint we made. It had about 25 percent cuprous oxide (copper). These guys would sprinkle in plenty of cayenne powder that they bought down at the A&P. They swore it worked, but they also used their boats every day, so the bottom growth

didn't build up," he says. "Frankly, I think they were just glad the paint didn't fall off." The effectiveness of cayenne depends on whom you ask, but at Interlux they've concluded that nature's hot stuff just doesn't do the trick. "We found that it didn't do much," says Seidel, whose company conducted joint experiments with McCormick, the spice retailer. Interlux also tested antifouling paints blended with jalapeno or habanero peppers. "The pepper blistered the guy's fingers in the lab when he touched it, but we didn't see a whole lot of difference in the paint."

Nonetheless, some boaters continue to use folk remedies such as fresh garlic, lime juice, Tabasco sauce and even antibiotics like Tetracycline, all with questionable results. More unscrupulous boaters have been known to add lead, DDT and potent garden weed-killers before applying their bottom paint. While these concoctions may keep bottom growth under control, they pose daunting risks to the environment and to human health. Paint color might play a key role in antifouling. Tests conducted in Sweden indicate that light colors do better than dark, perhaps because of heat absorption; dark colors heat up faster. Interestingly enough, black is still the top-selling color for bottom paints, followed by blue. After that, it's a tossup between red and green.

Paints Without Copper

While spicy home-brews may not be the way to give barnacles the kibosh, the ban on copper in some European countries is encouraging research into alternative antifouling technologies. In fact, Leigh Taylor Johnson, a marine advisor for California's Sea Grant Extension Program, says copper paint could soon be history. "Nontoxic coatings are more expensive, require special hull preparation and application, and the hull must be cleaned about twice a month. This makes them sound very unattractive to boaters," she acknowledges. "On the other hand, the life of the paint is not dependent on the strength of the toxicant, so it's possible that a durable, nontoxic hull coating could greatly extend the time between haulouts and make up the cost difference."

Alex Walsh, president of E Paint in Falmouth, Massachusetts, says his company's paints are photo-reactive, which means they need the presence of visible light to activate their biocides. Founded in 1991, E Paint makes products that depend mostly on hydrogen peroxide, a chemical that acts as a biocide when first released. Because it's mostly oxygen and water, hydrogen peroxide leaves no potentially dangerous residue when it breaks down. Although E Paint's products are environmentally friendly, they only last about two years on a hull. "The Coast Guard is our biggest customer," says Walsh, explaining that for the past four years, E Paint has supplied paint for the 41-foot utility patrol boats and 47-foot motor lifeboats, and that the company has 50 percent of the national market in bottom paints for aluminum boats. "We mostly market to the aluminum-hull boaters, especially now that tin is banned."

Nature's Antifouling

Cutting-edge research involves studying various organisms in nature that seem to resist fouling. Starfish, sea urchins, some corals and sponges, and eel grass, for example, seldom get encrusted with marine growth. "Researchers are trying to extract the secondary metabolites from the plants or organisms that are good at keeping creatures

off,” says Walsh. “The idea is to extract and synthesize whatever it is that emanates from the organism and makes it able to naturally ward off fouling.”

SealCoat, a Swedish company, is working on what Walsh calls a “hairy paint” that would fight bottom growth with microfilaments. The paint’s tiny fibers would “act like little hairs waving around that whack at any critters trying to attach themselves.”

Another paint-less weapon in the fight against fouling employs sonic devices attached inside the hull that set up a low-frequency vibration. According to sales literature from Clean Seas Company, a Florida-based retailer of the devices, the vibrations create a layer of moving water that is supposed to prevent organisms from adhering to the hull. Earlier versions of such devices have been known to make fastening screws back off, Ludgate says.

At Poseidon Ocean Sciences, Inc., a New York-based company that targets natural products for industrial use, Dr. Jonathan Matias is developing nontoxic, metal-free antifouling paints. Speaking to a conference of industry experts, Matias said the greatest challenge is finding environmentally friendly compounds that can be manufactured economically, and then getting them to work in paints.

In another approach, Dolphinite and Clean Seas (the same company that sells the sonic system) touted an antifouling paint that relies on the release of enzymes. The product won a number of awards from trade associations, but Dolphinite is currently the object of a class-action lawsuit by boaters who allege that the paint didn’t work and that they were forced to strip and repaint with traditional coatings.

So here’s the bottom line on bottom paint for recreational boaters, at least for the foreseeable future: Copper-based antifouling will dominate sales until effective, comparably priced nontoxic substitutes become available. Since copper is expensive, the higher percentage paints will cost plenty. Deciding on the right amount of copper depends on your wallet, the water temperature, how often you go boating, how much work you’re willing to put into scraping and sanding the hull, and your environmental attitude.

If that news isn’t welcome, there’s always the spice rack.

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Getting it on (Sidebar)

Putting antifouling paints on—or removing them—requires special care.

Bottom paints have two primary components: the binder—the colored liquid that most people call “paint”—and the active antifouling ingredient (biocide). Because most bottom paints are two-part concoctions, you can’t always judge the amount of protection by the appearance of the boat. A conventional paint applied last season may remain bright and colorful, but that doesn’t mean it has enough chemical oomph to keep the barnacles at bay.

Leached-out biocide is the reason you apply a fresh coat of conventional antifouling every spring. Paint chemists have developed so-called ablative (also known as copolymer) paints to help avoid painting the bottom every year. Because the biocide is linked chemically to the binder, as long as any color remains to a coat of ablative paint, so does antifouling protection.

Preparation

Don’t forget that preparation is 99 percent of the job. Start by cleaning off the slime and barnacles left from last season. If you didn’t pressure-wash the boat at haulout time, do it now. Remove loose paint with a scraper. Scuff sand lightly with 80-grit sandpaper to ensure adhesion of the new paint. Read the label before you pop the lid on a new can of antifouling. Virtually all paint failures are the result of improper application.

Cheap masking tape costs too much in cleanup labor. Buy quality tape at least one inch in width to mask off the waterline. Apply tape in the morning before you plan to paint. Never leave ordinary masking tape on the hull longer than overnight. Sunlight can bake ordinary tape onto the hull, making removal difficult. (Special tape is available for situations where it must be left on the boat for an extended period.)

Check the label for how long to wait between coats or how long before you can launch. Some paints must be top-coated within 4 hours of the application of the first coat, while others need at least 16 hours between coats. Copolymer paints can be exposed to the air for an indefinite period after application. Many conventional bottom paints must be launched within 48 hours.

Thin bottom paint only enough for workability. Never thin to extend coverage, because thinned paint results in a thinner layer of protection. Use the proprietary thinner recommended by the paint manufacturer. The wrong solvent can turn the paint binder into something resembling lumpy peanut butter.

Painting the Bottom

Rollers are recommended if you’re applying bottom paint yourself. You’ll need at least two roller frames, one full-size and a second small enough to get into odd spaces. A 9-inch roller works well on powerboats with flat planing surfaces. Sailboats’ rounder hulls may require a 7-inch roller. A 3-inch trim roller will also come in handy. Choose short-knap or foam roller covers, and fit the larger roller with at least a 54-inch extension handle. Buy a white spray-painter’s suit and hood from your neighborhood auto supply store. Wear chemical-resistant gloves and eye protection.

Apply paint at the waterline and around transducers and other fittings with the trim roller. Then switch to the larger roller to finish the job. Some places may require a brush. The flow of water over the bottom will cause paint to wear away fastest at the waterline, around the bow or on the leading edge of sailboat keels and rudders, so applying an extra coat of paint in these areas can extend the life of your paint job.

Copolymer paints are usually applied in three layers. The first, or “signal,” coat is a contrasting color to the desired final coat. Then apply two coats of the desired color. As long as the desired color is unbroken, you don’t need to repaint. Once the signal coat begins to peek through, repainting is indicated.

Bottom paints come under local, state and even federal antipollution laws, so be sure to dispose of your rollers, paint and brushes and tray liners properly.

Old Paint Buildup

Several years of applying new antifouling over the old produces a heavy coating that can create almost as much drag as a barnacle family reunion. The only fix is to get back to bare gelcoat, either with stripping chemicals or abrasion. Check with your marina office before you start, because you’ve got to comply with the local environmental regulations on disposal of the paint residue. Be sure to prepare the ground beneath the boat so that all of the mess can be cleaned up when you are finished. If your boat is protected by a barrier coating, be aware that sanding or scraping can break through this coating and expose the underlying laminate to sea water.

Chemical Strippers

Ordinary paint removers contain harsh chemicals that burn the skin and can hurt the eyes—as well as damage fiberglass resins. Special paint removers are available at marine stores. Look for one that is water washable and reasonably kind to the environment. Read and follow all instructions on paint remover products. Wear chemical-resistant gloves, eye goggles, long sleeves and a buttoned collar.

Apply the stripper to no more area than the instructions recommend. Allow enough time after application before you start to scrape. The drippy mess that comes with using paint removers led to the development of systems where the stripping chemical is covered with a special paper that is later peeled away with the paint. While less messy, this is a more expensive approach.

Abrasion

Dry scraping, sanding and blasting are all forms of abrasive paint removal. Blasting is the easiest, because all you have to do is sign the check. It’s a job for professionals with the right tools. Dry scraping with a 2½-inch scraper can be surprisingly easy and effective on thick, old paint. Sanding may seem easier because it is done with a machine, but holding a sander up over your head is tiring work. All abrasive removal methods produce blizzards of paint particles, so never work without a respirator, eye protection, gloves and long sleeves.

—David G. Brown

Table: Popular Antifouling Paints

Brand name Biocide Price/Gallon

Epoxies

INTERLUX YACHT FINISHES

Fiberglass Bottomkote 25% copper \$45

PETTIT MARINE PAINT

Unepoxy Standard 55% copper \$55

Unepoxy Plus % copper, algaecide \$95

Trinidad 75% copper \$145

Trinidad SR 75% copper, algaecide \$165

Ablatives

INTERLUX YACHT FINISHES

Fiberglass Bottomkote ACT 50% copper \$100

Micron CSC 37% copper \$150

CSC Plus 39% copper, algaecide \$175

PETTIT MARINE PAINT

Ultima SR 60% copper, algaecide \$200

Silicone-based

INTERLUX YACHT FINISHES

Veridian none \$400

Other

E PAINT none \$98-\$245

-D. L.