

Selecting a Hull Paint for Your Boat

(<http://seagrant.ucdavis.edu/selpaint.htm>)

Introduction

Environmental and Cost Factors

Hull paint toxicants are released over time, especially during underwater hull cleaning.⁷ They may be absorbed by mussels, worms, etc. and passed up the food chain to fish, birds and humans, posing health risks.

Heavy metals accumulate in marina sediments. Contaminated sediments are more expensive to dispose after dredging, because they must be treated as hazardous wastes. This raises costs for marinas and their tenants.

Disposal costs for leftover paints and solvents are high, because they are hazardous wastes. They may also release air pollutants during application.

Making a Choice

Boaters can help underwater hull cleaners, marinas and boatyards control costs, promote a healthy boating environment and encourage abundant marine life by considering environmental factors when selecting an antifouling strategy. More information is available in our publication, "**Boating Pollution Economics & Impacts.**"

These tips may reduce environmental impacts:

- Go boating often to slow fouling growth.
- Hire an underwater hull cleaner who uses best management practices. (See our publication, "**Selecting Underwater & Topside Maintenance Services for Your Boat.**")
- Clean hull often to prevent hard growth and reduce scrubbing and toxicant release.
- Select a paint that does not require caustic solvents and releases little or no pollutants.
- Use a hard, less toxic or non-toxic paint and wipe hull often to remove soft growth.

Some boaters use the methods below. There may be drawbacks. Ask marine suppliers, regulatory agencies, other boaters and your marina about cost, availability, effectiveness and regulations.¹⁰

- Store your boat on land
- Store your boat on a floating hoist or surround it in the water with a boat liner or bath. Note: hoists and liners may foul.
- The table (Linked at end) will help you find a paint that meets your requirements. Consult your boatyard, paint dealer and other boaters before deciding.

Factors Affecting Antifouling Paints

Extreme high or low water temperature & salinity, acidic or alkaline waters, fouling growth, waxes, over-spray, dust, silt and chemicals in runoff can clog pores or change paint chemistry and impair antifouling properties.¹³

Regular underwater hull cleaning removes slime build-up & contaminants and increases antifouling ability of hull paint.^{4, 13} Infrequent use allows hard growth to form, requiring forceful hull scrubbing.

Low water allows the hull to hit bottom, scraping the antifouling paint or clogging pores.

Poor surface preparation prevents paint from adhering properly. Proper thickness of epoxy barrier coats beneath antifouling paint prevents blistering.¹³

Immersing the boat too soon or too long after painting, applying too little paint or coats that are too thin reduces paint's life span.^{2, 13}

Faulty or inadequate wiring on boats or in shore power connections may cause stray currents that contribute to corrosion of underwater metals^{7, 13} or (rarely) neutralize antifouling paint.¹¹

Choose your boatyard with care; get supervision if doing the work yourself.⁴

NOTE: The following two tables are meant to be one table; we have broken it into the left and right sides of the table for presentation here.

Hull Paint Selection Factors (Left Side)

Paint Type & Price Range	Antifouling Method	Environmental Considerations	Fuel Consumption ⁵
Soft Sloughing \$75-125/gal ^{11,14}	Free leaching & soft. Paint erodes until completely disintegrated. 20-50% copper ¹⁶	Potential to release much toxicant due to uncontrolled sloughing ⁵	Uneven sloughing increases drag & fuel consumption
Epoxy Ester, Conventional \$155-180/gal ^{11,14}	Hard, smooth finish. Releases toxicant by leaching. Up to 76% copper ^{11,14}	Initial high release of toxicant, replaced by even copper leaching ⁵	Rough surface left by toxicant release increases drag & fuel consumption
Vinyl, Conventional \$160-170/gal ^{2,14}	Hard, smooth finish. Releases toxicant by leaching. 40-67% copper ¹²	Better controlled release rate of copper vs. epoxy ester paint ^{2,5}	Rough surface left by toxicant release increases drag & fuel consumption
Vinyl, Thin Film Teflon \$136/gal ¹⁵	Hard, smooth finish. Releases copper by leaching. 42% copper ¹⁵	Controlled leach rate of copper. Very hard finish ¹⁵	Slick surface decreases drag & fuel consumption
Copolymer, Ablative \$200-235/gal ^{2,14}	Continuously sheds outer layer to release toxicant ⁹ 46-58% copper ¹⁶	Boat use & underwater cleaning release toxicant ⁵	pSurface smooths with boat use; decreases drag & fuel consumption
Water-based, Ablative \$160-192/gal ^{2,14}	Continuously sheds outer layer to release toxicant Up to 64% copper ^{9,12,14}	Boat use & underwater cleaning release toxicant ^{5,*}	Surface smooths with boat use; decreases drag & fuel consumption
Polyurethane, Biocide free \$78-180/gal ^{14,11}	Topside paint. Bard, smooth finish deters fouling. May blister after 72 hours in water ^{2,9,14,**}	Primarily a topside paint. No toxicant to prevent fouling ^{11,14}	Smooth surface, not blistered decreases drag & fuel consumption
Silicone, Biocide free \$600-630/gal ¹⁴	Deters fouling by creating slick surface when wet ^{2,14}	No toxicant to prevent fouling ¹⁴	Slick surface decreases drag & fuel consumption

* Water-based ablative paints release fewer volatile pollutants (VOCs) than do solvent-based paints.

** Most polyurethane paints are used for cosmetic purposes on hulls; some are more water-resistant. Ask your boatyard.

*** **Durability Notes:** Controlled copper leach rate makes hull paints last longer.

+ **Standard Hull Cleaning Notes:** Clean hull regularly to keep paint clean for releasing toxicant (except sloughing and ablative paints) and to avoid accumulation of hard fouling growth. Ask your underwater hull cleaner to use a soft carpet or diaper for cleaning and rub gently. Regular cleaning also avoids the need for abrasive pads and forceful scrubbing that release more toxicant. For more information, see our publication, **“Underwater Hull Cleaner Best Management Practices”**

Hull Paint Selection Factors (Right Side)

Durability ***	Special Hull Cleaning Factors +	Special Hull Preparation ++	Special Paint Application +++	Examples +++++
1 year or less ⁵	Soft paint may release much toxicant with underwater cleaning ⁵	Can apply to rough surfaces ^{5,11}	Launch 8-48 hours after painting ^{5,11}	Petit Yacht Copper, Interlux BottomKote (outside Calif.)
-- 2 years ²	Harder surface release less toxicant with underwater cleaning.		Dry 8 or more hours before launchings. ^{8,13}	Pettit Trinidad, Interlux UltraKote, Unepoxy Plus
-- 2 years ²	Harder surfaces release less toxicant with underwater cleaning		Launch 4 to 16 hrs after painting ^{8, 13}	Proline 1088, Interlux Super Vinyl-lux, Pettit Vinylcide
1-1.5 years ¹⁵	Harder surfaces release less toxicant during underwater cleaning	Do not apply over ablative paints ¹⁵	Thin film may need frequent recoat ¹⁵	Extensor VC Offshore
2 years ^{5, 9} Does not oxidize in air ¹²	Moderate potential for toxicant release with underwater cleaning		Do not overcoat with nonablative paints ^{9, 12}	Proline Y1044, Interlux Micron CSC, Petit ACP-50
-- 2 years ^{5,9}	Moderate potential for toxicant release with underwater cleaning	Very clean hull, wet sand or 4000 psi hydrowash ²	Use fresh water for thinning ¹²	Proline 888, Pettit AquaClean. Woolsey Neptune II
Durable topside paint. ³ May blister after 72 hrs in water. ¹⁴	Wipe down often ² , if boat is in water long periods ^{9,14}	Remove old coats ¹⁴		Interlux Interthane Plus! Petit Durathane (2 Part), Proline Deepgloss
2 to 3 years or more ¹⁴	No toxicant release with underwater cleaning.	Remove old coats ¹⁴	Slippery! Special handling for safety. ^{13, 14, 15}	Interlux Veridian 2000, Proline Paints

++ Standard Hull Preparation Notes: Read all directions, thinner, catalyst or solvent requirements for each product. If old paint is in poor condition or consists of more than 4-5 old coats, boatyards can remove old paint and properly dispose of paint chips.¹² Make sure the hull is free of contamination, such as grease, wax, or sanding residue, so paint adheres properly. De-wax new fiberglass hulls. ^{3,10}

+++ Standard Paint Application Notes: Use solvent-resistant, quality application equipment.¹¹ Note that paint solvents are **caustic**, except for water-based paints. Apply at least two coats; a third coat gives protection to leading edges of keel, rudder and through-hull fitting. ^{2,12} Consult boatyard for wet mil thickness of paint coats.

+++ Regulations vary; ask your boatyard what paints are permitted locally.

Inquire about new paints that have reduced or no toxicant.

References

1. Barclays California Code of Regulations (1993), Register 93, Number 2, 1-8-93, Sections 6488, 6489 and 6674.
2. Hudiburgh, Barth (1995) Yacht Sales and Technical Representative, Proline Paint Company, personal communications.
3. Interlux (1994) Boaters' Painting Guide to Bottom Paints, Topside Enamels, Varnishes, Stains & Fillers and Interprotect.
4. Lewis, Bill (1995) Recreational Boaters of California. Personal communications.
5. Longmore, Jeff (1981) "Antifouling bottom paints and fishing vessel fuel efficiency." SNAME/NOAA Fishing Industry Energy Conservation Conference, Seattle, WA, California Energy Extension Service. University of California, Sea Grant Extension.
6. Lucas, Libby (1995) Environmental Health Coalition. Personal communications
7. Mallon, Michael H. & Edward Kolbe (1979) "Cathodic protection for boats in saltwater" Oregon State University Sea Grant, Extension Marine Advisory Program, A Land Grant & Sea Grant Cooperative, SG 46.
8. Nielsen, Tom (1995) Nielsen-Beaumont Marine Personal communications.
9. Paige, David (1995) Sales Representative Pettit Paint. Personal communications.
10. Peters, Greig (1995) Regional Water Quality Control Board. Personal communications.
11. Pettit Paint (1989) Product Information Handbook.
12. Proline Paint Company (1994) Bottom Coating Guide
13. Roberts, Bill (1995) Shelter Island Boatyard. Personal communications.
14. Szafranski, Frank (1995) Sales Representative, Courtaulds Coatings. Personal communications.
15. Tyrell, John, (1994) Oceanside Marine Center. Personal communications.
16. West Marine (1995) "West Marine Master Catalog"

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